PEOPLE COMETTEE OF BINH DINH PROVINCE
DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT BINH DINH
IRRIGATION PROJECT MANAGEMENT UNIT

DAM REHABILITATION AND SAFETY PROJECT (DRSIP)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENTS (ESIA)
(Updated in accordance with Letter No. 935/CPO - WB 8 dated 25 May 2017 of the CPO
and Updated in accordance with report of Resettlement Action Plan –RAP dated 8 January 2018)

REPAIR AND IMPROVEMENT FOR SAFETY OF THACH BAN RESERVOIR,
BINH DINH PROVINCE

Binh Dinh, March 2018
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ABBREVIATIONS

AH  Affected Household
B, Bt  Width
BD  Sludge sample
BDARD  Binh Dinh Department of agricultural and rural development
Binh Dinh DoNRE  Binh Dinh Department of natural resources and environmental
BOD  Biochemical Oxygen Demand
BTNMT  Ministry of natural resources and environment
Co.Ltd  Limited company
COD  Chemical oxygen demand
CPC  People committee of Commune
CPO  Central Project Office (MARD)
CSC  Construction Supervision Consultant
CV  Type of vehicle
D600  Type of tube, referring in dimension
DARD  Department of Agriculture and Rural Development (province level)
dBA  Decibel (noise measurement unit)
DCST  Department of Cultural, Sport and Tourist (province level)
DO  Dissolved Oxygen
DO  Dissolved oxygen
DO gasoline  Vehicle gasoline
DoC  Department of Construction (province level)
DOET  Department of education and training (province level)
DoIT  Department of industrial and trade (province level)
DoNRE  Department Of Natural Resources and Environment (province level)
DPC  District People’s Committees
DRSIP  Dam rehabilitation and safety project
EAP  Environmental Action Plan
EC  Electronic conductivity
ECOPs  Environmental codes of practice
EMDP  Ethnic Minority Development Plan
EMP  Environmental Management Plan
ESIA  Environmental and Social Impact Assessment
ESMF  Environmental and Social Management Framework
ESMoP  Environmental and Social Management Framework
Fig.  Figure
FS consultant  Feasibility study consultant
GDP  Gross domestic production
GoV  Government of Vietnam
HH  Household
IEMC  Independent environmental monitoring consultant
IMC  Irrigation Management Company
IPM  Integrated Pest management
ITCZ  Inter Tropical Convergence Zone
IUCN  the International Union for Conservation of Nature
IWE  Institute for Water and environmental
K  Compact factor
KK  Air sample
L  Litter
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>LURCs</td>
<td>Land User right committee</td>
</tr>
<tr>
<td>M200</td>
<td>Concrete graded 200</td>
</tr>
<tr>
<td>MARD</td>
<td>Ministry of Agriculture and Rural Development</td>
</tr>
<tr>
<td>MCM</td>
<td>Million cubic meters</td>
</tr>
<tr>
<td>Mill.</td>
<td>Million</td>
</tr>
<tr>
<td>MONRE</td>
<td>Ministry of Natural Resources and Environment</td>
</tr>
<tr>
<td>MPN</td>
<td>Most probably number</td>
</tr>
<tr>
<td>N</td>
<td>North</td>
</tr>
<tr>
<td>ND-CP</td>
<td>Legal document of Vietnam government</td>
</tr>
<tr>
<td>NG</td>
<td>Welling water sample</td>
</tr>
<tr>
<td>NH</td>
<td>Reservoir water sample</td>
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<tr>
<td>NM</td>
<td>Surface water sample</td>
</tr>
<tr>
<td>NN</td>
<td>Ground water sample</td>
</tr>
<tr>
<td>ODA</td>
<td>Official Development Assistance</td>
</tr>
<tr>
<td>OP/BP</td>
<td>Operating safeguard Policies of the WB</td>
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<tr>
<td>PCR</td>
<td>Physical cultural resources</td>
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<tr>
<td>pH</td>
<td>Acidity</td>
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<tr>
<td>Pic.</td>
<td>Picture</td>
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<tr>
<td>PMU</td>
<td>Project management Unit</td>
</tr>
<tr>
<td>PPMU</td>
<td>Provincial Project Management Unit</td>
</tr>
<tr>
<td>QCVN</td>
<td>National Technical Regulation</td>
</tr>
<tr>
<td>QH13</td>
<td>National assembly</td>
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<tr>
<td>RAP</td>
<td>Resettlement Assessment Plan</td>
</tr>
<tr>
<td>RPF</td>
<td>Resettlement Policy Framework</td>
</tr>
<tr>
<td>SA</td>
<td>Social assessment</td>
</tr>
<tr>
<td>SS</td>
<td>Suspended solid</td>
</tr>
<tr>
<td>TCVN</td>
<td>Vietnam Environmental Standards</td>
</tr>
<tr>
<td>TDS</td>
<td>Total dissolved solids</td>
</tr>
<tr>
<td>TL</td>
<td>Provincial road</td>
</tr>
<tr>
<td>TSS</td>
<td>Total suspended solid</td>
</tr>
<tr>
<td>TV</td>
<td>Television</td>
</tr>
<tr>
<td>USS</td>
<td>United state dollars</td>
</tr>
<tr>
<td>UXO</td>
<td>Unexploded Ordinance</td>
</tr>
<tr>
<td>VFF</td>
<td>Vietnam Fatherland Front Committee</td>
</tr>
<tr>
<td>VND</td>
<td>Vietnam currency (dong)</td>
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<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health organization</td>
</tr>
<tr>
<td>WUA</td>
<td>Water User Association</td>
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EXECUTIVE SUMMARY

1. **Background.** The “Repair and Improvement of Thach Ban Reservoir, Binh Dinh Province” is one of the sub-projects being considered for first year implementation under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). An Environmental and Social Impact Assessment (ESIA) was undertaken on the subproject in order to comply with the requirements of the World Bank’s Safeguard Policy and the Vietnam’s Law of Environment Protection 2015 (LEP-2015).

2. Thach Ban reservoir is located in Thach Ban Dong-Cat Son commune- Phu Cat district, Binh Dinh Province. It is 7.5 km from the national highway in the West and 40 km to Qui Nhon City in the North. The reservoir was built in 1978 with a designed water storage capacity of 772,000m$^3$. The catchment’s area of the reservoir is of 3.0km$^2$. The reservoir is designed and rated as Level II under the Vietnam dam classification. The headwork cluster and auxiliary works of Thach Ban reservoir consist of the following main components:

   - **Dam:** It is homogeneous earth dam with height of 12.1 m and crest elevation at +52.50m. The length and width of the dam crest are 897 m and 4.0m, respectively.
   - **Spillway:** Principal spillway with B=30m with a 50m chute and a rip rap stilling basin
   - **Outlet works:** It was built in 1990; the location is on the middle of the embankment, at elevation +43.50m and made of reinforced concrete structure. It is box sewer with regulator tower gate in downstream slope
   - **Access and management road:** Route to the dam from Son Loc bridge, current width is of 2.5m; length L = 845.4m. It is earth filled, is slippery in rainy season and difficult to travel.

3. **The existing conditions do not ensure safety.** Due to long time use, the construction has seriously deteriorated. The problems include: (i) the gully erosion at the downstream slope; (ii) water seepage through the embankment; (iii) serious damage at the left and right abutment and the main structure; (iv) the upper stream slope of the dam has been deformed and localised erosion on the top of the dam made dam narrowed; (v) sedimentation of the stilling basin; (vi) the outlet is not working and causing water lost, the valve to control water flow has been corroded and difficult to operate; and, (vi) the 845.4 m earthen access and management road (2.5m wide) is difficult to travel and slippery in rainy season. Some sections on the top of the dam are at not at designed elevations but vary between +52.50m to 52.90m. Dam surface has been eroded with many traversed cracks. The thickness of the dam at its top has been narrowed down due to erosion and material degradation. Although several items had been reinforced, many items of the work have been degraded, capability to store water is low, and there is safety risk during operation.

4. **Sub-project description:** The main purposes of upgrading and improvement are: (i) to ensure the safety of the reservoir during operation, protecting 80 households and local infrastructure of Thach Ban Dong village-Cat Son commune; and, (ii) to ensure original design goals of supplying water for 130 ha of rice and crop plants in current irrigated areas of villages Thach Ban Dong, Thach Ban Tay-Cat Son Commune, modernization of operational management. The proposed civil works under the subproject are: (i) fixing of the seepage in embankment and foundation; (ii) construction of a new training wall and rehabilitation of the concrete lining of the spillway; (iii) replacement of the old outlet works with a new concrete structure; (iv) upgrading of the 845-m access and management road. Materials such as cement, steel, etc will be purchased from warehouses in Quy Nhon City, 30-40km distance from the construction site. The maximum of workers to be mobilized at the peak of construction is 80. The number of vehicles and equipment to be mobilized is around 53 units, including bulldozers, excavators, trucks, mixers, concrete pavers, generators and water pumps. The subproject has been designed and will be implemented in accordance with the World Bank Safety of Dam Policy (OP/BP 4.37) and the national standards of Vietnam.
5. Results of Environmental and Social Screening: The sub-project is not located within or near critical natural habitats and there are no known rare or endangered species in the area. There are also no sites, structures or monuments with cultural, religious or historical significance within and in the vicinities of the construction site. In terms of ethnic minorities, about ninety-nine percent of the people in the area belong to the Kinh ethnolinguistic stock which currently constitutes the mainstream population of Vietnam and there are no ethnic minorities among those affected by the sub-project. The dam, having a height of 12.1 meters and a reservoir capacity of more than 700,000 cubic meters, is considered a “small” dam under the World Bank Safety of Dam Policy.

6. Impacts of the sub-project: The project will bring in considerable benefits to local community particularly in terms of stable and reliable supply of irrigation water and improved dam safety. However there are also some negative impacts due to land acquisition and construction activities that need to be mitigated. These include:

- **Loss of lands, trees and crops.** The sub-project will require acquisition of 60,894 m² of land; affecting 34 households (177 people) and one organization (public land Cat Son commune). Of which permanently acquired land is 49,803 m² for expanding management road, construction of head-works and material pit (land of 22 households including 1,364 m² of paddy field; 22,981,1 m² of annual tree lands and 22,689,8 m² of perennial tree lands and public lands of 2,759 m²); temporarily acquired land is 11,091 m² including land for construction road and construction camps 1,812,4 m² belonging to 5 households and land acquired for dumping area of 9,278,6 m² belonging to 7 households. In terms of trees and crops, about 5,514 Eucalyptus and Acacia trees, 7 coconut trees and 263 peach trees, 2 tamarind trees, 12 orange and lemon trees, 2 payaya trees, 229 banana trees, 13 mango, guava, jackfruit, plump, avocado trees and 191 Meliaceae trees and some other crops such as peanut, watermelon, chili. The changed data is explained by the changed location of soil mine.

- **Affecting structures, houses including:** 01 temporary house and 02 byres of 02 households in material pit for dam filling.

- **Irrigation water supply interruption.** Due to the construction of dam and outlet repairs during 16 June to 31 August (when irrigation activities do not take place) no household is affected regarding their productions and compensation is not required.

- A resettlement action plan has been prepared for the subproject. About 1,355.2 million VND (about USD 60,100) to pay for land acquisition and support to affected households during construction. The cost of compensation is reduced due to the construction progress adjustment and no compensation is needed for damages caused by water cut during construction and the change of soil pit location reduced the area to be acquired.

- **Common Construction Impacts.** The following are the negative impacts associated with construction activities:

  a. Increased sedimentation and turbidity - About 120,314m³ of soil will be excavated and 113,767m³ of soil will be used for filling in all the construction activities. These earthmoving activities could increase sedimentation and water turbidity. The use of properly sited borrow pit with capacity of 180,000 m³ is located at 1 km from construction site and disposal of unused excavated soils at Land area of borrow pits and disposal area 100 m from construction site should help minimize risk of massive sedimentation.

  b. Dust - An estimated 19 tons of dust will be generated from the operation and reparation of head works. This can pollute to air quality and impact to the 80 worker’s health on site and to the 10 households living along the construction routes.

  c. Noise nuisance - The residential area is located 1km away therefore only workers on site can be impacted by noise.

  d. Fuel spillage and used oil - The amount of waste oil generated is approximately 8,478 litters. This could cause significant damage if directly released to the environment.
This potential impact will be managed under the construction site management plan prepared for the subproject.

e. Increased health and safety risks to local residents and workers – Local residents will be exposed to construction hazard risks in the construction sites and routes. This will include deep excavations, loading and unloading of construction plants, the operation of machine, increased traffic in the area, increased risks related to disease transmissions between the workers and local community and vice versa, etc.

φ. Possible damage to existing roadways – The 1.0 km roadway to the burrow pit and the 100 m road to disposal site will likely suffer damage due to heavy traffic.

7. The long term impacts, possible land and soil degradation within and around the constructions site, particularly at the borrow pits and disposal sites, due to changes in landscape, compaction, excavation, litters and improper disposal of construction spoils. There is also a possible increase in the use of pesticide in the irrigation service area as irrigation water becomes available on a stable and reliable basis. These potential impacts will be managed by optimising spoil disposal plan and site reinstatement before construction is completed, and IMP program.

8. Mitigation Measures: In order to address these impacts, an Environmental and Social Management Plan (ESMP) has been prepared as part of this document with proposals on institutional arrangements for impacts management, environmental monitoring and supervision, reporting requirements, capacity building as well as budget for implementation. A separate Resettlement Action/Compensation Plan has been prepared to address the impacts of land acquisition impacts. The following are the measures to be undertaken:

- Implementation of the RAP
- Incorporate environmental mitigation measures into engineering design where possible
- Consultation with the farmers on the actual timing of repair activities in the dam with the aim of minimizing impact of any disruptions in irrigation service
- Requiring the contractor as part of the contract, to undertake regular maintenance and repair of existing of the construction routes
- Requiring the contractor as part of the conditions of the contract, to prepare and submit to the PMU its own Environmental and Occupational Health and Safety Plan based on the construction-related measures identified in the ESMP, the national environmental criteria and standards as well as standard construction site safety and management plan practices, such as regular sprinkling at construction site to control dust, provision of warning signs, barriers on dangerous areas, and provision of adequate sanitation and waste handling facilities (i.e. septic tank and/or soak pit for domestic wastewater) at the base camp.
- Requiring the contractor to undertake clearing and restoration of construction sites and temporary easements after completion of the works; and,
- Introduction and promotion of the Integrated Pest Management approach in the irrigation service areas.

9. Consultations: Consultant and Project owner hold two consultations; the first was conducted on January 28, 2015 at office of Binh Dinh Project Management Unit with 15 participants including representative of departments, agencies of province, district, comunes in Project area to communicate about Project, consultation of agreement for implementation of subproject, identifying affected scope and objects. The second consultation was carried out on March 06, 2015 at headquarters of Cat Son commune People’s Committee with 40 participants including local authority and social organization, leaders of villages, representatives of affected households to inform the negative impacts of Project on environment, social and mitigation measures. Results: 100% participants support the implementation of Project and proposed mitigation measures. In addition, the affected households recommend: i) taking water from Hoi Son reservoir to irrigate approximately 40 ha agricultural land during construction phase; ii) selecting construction route which goes through Son Loc bridge to avoid impacts on residential area; iii) compensation for damage to local road and infrastructure due to construction; iv) assessing risks at downstream in case of emergency flood discharge; v) transport and
disposal of all construction waste, domestic waste to avoid in attractive landscape and obstructing traffic. Project owner has recorded and committed to implement.

10. 

Resettlement action plan (RAP): Total area of acquired land is 60,894m², 34 households are affected, of which, area of permanently acquired land is 49,803m², area of temporarily acquired land is 11,091m².

11. Risk of dam broken failure: If dam failure happen, not only the lives and livelihood of 80 households are threatened, damages would be caused to local existing infrastructures, particularly the 60 km of existing rural road, 21 km of irrigation canals, 3 schools, one health care centre, one CPC office building would In the long term it also be more efficient for the exploitation of the reservoir for sustainable development in the region. Affected land area including: 90 ha agricultural land; 7,138.7ha forestry land and 995.27 ha perennial crops land.

12. Budget allocation: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. Total budget estimation is VND 37,498,138,000. Budget for ESMP implementation including:
- Environmental monitoring (VND 702,182,000, or approximately 32,644 USD, main for meeting environmental monitoring requirements of the Government of Vietnam)
- Capacity building (VND 220,000,000, or 10,200 USD)
- IPM Trainning (VND 120,000,000, or 5,600 USD)
CHAPTER I. INTRODUCTION

1.1 General information of the project

DRSIP is intended to improve the safety of the dams and related works, as well as the safety of people and socio-economic infrastructure of the downstream communities as defined in Decree 72 - governing the management of dam safety in Vietnam. The project will consist of the following components:

- Component 1: Dam safety rehabilitation (US$ 385 million)
- Component 2: Dam safety management and planning (US$ 60 million)
- Component 3: Project management support (US$15 million)
- Component 4: Disaster contingency (US$ 0 million - no fixed allocation, but not to exceed 20% of the total project cost)

DRSIP will be implemented in 31 provinces in the North, Central and Highland regions of Vietnam. Up to 400 dams will be selected for consideration under the project based on agreed selection criteria aimed at prioritizing those interventions that address the safety risks within an explicit poverty and inequality framework.

The proposed project will be implemented over a period of six years – from December 01, 2015 to December 01, 2021. The project is required to comply with applicable Vietnamese legislations and the Bank safeguard Policies. The project Environmental Management and Social Framework (ESMF) and the draft Environmental and Social Impact Assessment (ESIA) of the first year subprojects will be ready for disclosure prior to Project appraisal. The ESIA of the subsequent years’ subprojects will be prepared once the ESMF has been agreed by the Government of Vietnam and the World Bank.

The Ministry of Agriculture and Rural Development (MARD) will be responsible for overall implementation and management of the project. The Central Project Office (CPO) within MARD would provide the support to all the three Ministries and responsible for overall coordination and monitoring of the project. The implementation of the rehabilitation works and preparation of dam safety plans, including safeguard and fiduciary, would be decentralized to the provincial level authorities. The provincial Department of Agriculture and Rural Development (DARD) would be lead agency at the provincial level. Provincial project management unit (PPMU) of DARD in each province will response to manage and monitor the sub-project under MARD supervision.

The project will support the physical rehabilitation of the existing irrigation dams most of which were built during the 1980s and 1990s. About 90% of the dams to be rehabilitated are earthen structures and are considered as small dams with height of less than 15m and design volume of less than 3 million cubic meters (MCM). The proposed project is not intended to support significant structural modifications or expansions beyond what is needed to ensure safety. The rehabilitation will be limited to reshaping of the main and auxiliary dams, slope stabilization by either concrete slab or in-situ or stone paving, strengthening or expansion of existing spillways to increase the discharge capacity, refurbishment of existing intake structures, replacement of mechanical and electrical systems of intakes and spillways,
grouting for seepage control and improvement of existing roads (access and management roads).

The rehabilitation of the Thach Ban irrigation reservoir is the one of the first year sub-projects that will be considered to implement under DRSIP. This ESIA is prepared for the subproject.

1.2 Objectives and methods of environmental and social assessment

- The objectives of this ESIA is to carry out the environmental and social assessment of this specific sub-project so as the sub-project’s potential social and environmental impacts can be identified at early stage of subproject preparation, the measures to avoid or mitigate the potential negative social and environmental impacts can be proposed for implementation.

- The key contents of this ESIA include assessments on the potential social and environmental impacts of the proposed rehabilitation works on the Thach Ban Irrigation Reservoir; an environmental and social management plan (ESMP) which includes environmental monitoring and supervision plan, and reporting mechanisms. Through the ESIA, communication channels have been established to allow local communities to be informed about sub-project proposals and involve the decision making process.

e) Method

- Survey and field investigation: the Consultant team conducted 2 field surveys (1st phase) January 28th, 2015 to February 12th, 2015 and (2nd phase) on March 06th, 2015 to March 15th, 2015

- Sociological survey: interview 123 households (affected directly and indirectly, benefit) Cat Con commune, Phu Cat district of Binh Dinh province, 13 local leaders in the level of commune/ ward and city.

- Statistical method: data collection, processing and analysis: (i) the meteorological, hydrological and environmental data for many years in the project area; (ii) The reports and data on the socio-economic and gender in 3 consecutive years of Cat Con commune, Phu Cat district of Binh Dinh province.

- Inherited method: inherit the research results of the relevant projects.

- Expert method: consultancy unit participated and organized the meeting, the exposure to take comments on proposed measures to mitigate the negative impacts of the subproject of environmental experts, sociological experts, dam safety experts and gender experts.

- Analytic and synthetic method: analyze and synthesize the impact of the project on the components of the natural environment and socio-economic at the operational area of the project.

- Rapid assessment method: use the pollution factors of the World Health Organization (WHO) to estimate the amount of waste and pollution forecasting.
- **Comparison method**: the impacts are evaluated by comparison with the norms and standards for the quality of soil, water, noise, air and other relevant environmental standards.

- **Figure model method**: using Figure model to calculate and forecast the average concentration of pollutants in the exhaust gas of material transports to assess the impact of pollutants on the environment.

- **Matrix method**: to compare each activity of the project with each parameter or environmental and social component (air, water, health, economic, etc.) to assess the relationship of cause-consequences of the subproject implementation.

### 1.3 Approaches and methods of social assessment

To ensure all potential impact could be identified during project preparation, the SA was conducted through series of consultations with various project stakeholders. A particular focus was maintained on households who are potentially affected (both positively and adversely). The research techniques employed for this SA include 1) review of secondary data, 2) field observations; 3) focus groups discussions/ community meetings, 4) key informant interview, and 5) households survey (Please see Appendix B1 for how the Sampling Frame). A total of 149 of respondents participated in the ESIA exercise for this subproject, of which 123 people participated in the households survey (quantitative), and 29 people participate in focus groups discussions, community meetings, key informant interview (qualitative).

In section 4, 5 we will present the findings of the SA (positive and positive impact), including the result of the gender analysis. In Section 6, we will briefly perform the results of SA along with the recommendations on the basis of the SA results. Please note that a gender action plan and gender monitoring plan are presented at Appendix B4 of this ESIA), and the public health intervention plan and public consultation and communication plan were presented at Appendix B2 and B3, respectively). Complaint settlement process were presented at Appendix B5 and Information announcement and social and monitoring accountability were presented at Appendix B6

### 1.4 Project Owner and Budget

The Project owner is the Project Management Unit for Agriculture and Rural Development, Binh Dinh Province with contact details as below

Director: Tô Tấn Thi  
Postal address: 200, Tran Hung Dao str., Quy Nhơn city, Binh Đinh  
Tel: +84 (256) 381.4701  Fax: +84 (256) 381.4701

e) **Total cost estimation:**

The total estimated investment budget is **VND 37.498.318.000** (thirty seven billion, four hundred and ninety eight million, three hundred and eighteen thousand Vietnamese Dong).
Table 1.1: Investment cost estimation

<table>
<thead>
<tr>
<th>No.</th>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cost for construction</td>
<td>25,193,496,000</td>
</tr>
<tr>
<td>2</td>
<td>Project management</td>
<td>532,068,000</td>
</tr>
<tr>
<td>3</td>
<td>Cost for preparation of construction investment</td>
<td>4,246,987,000</td>
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<tr>
<td>4</td>
<td>Others</td>
<td>636,444,000</td>
</tr>
<tr>
<td>5</td>
<td>Cost for implementation of Rap</td>
<td>1,355,262,000</td>
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<tr>
<td>6</td>
<td>Budget contingency (including cost for implementation of ESMP)</td>
<td>3,657,061,000</td>
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<tr>
<td>7</td>
<td>Interest payment</td>
<td>1,877,000,000</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>37,498,318,000</strong></td>
</tr>
</tbody>
</table>

Sources: Decision No. 1603 / QD-UBND dated 12/5/2016 of the Binh Dinh PPC and RAP update 2017

1.5 ESIA Consultant Team

- Organisation name: Institute for Water and Environment (IWE)
- Contact person: Dr. Doan Tuan, Doan, Director
- Tel: +84 (04) 3.5634809; Fax: +84 (04) 3.5634809
- List of expert involve to ESIA report

Table 1.2: Consultant organisation

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Qualification</th>
<th>ESIA’s position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vu Quoc Chinh</td>
<td>Msc</td>
<td>Team leader/environmental expert</td>
</tr>
<tr>
<td>2</td>
<td>Nguyen The Quang</td>
<td>Dr</td>
<td>Dam safety expert</td>
</tr>
<tr>
<td>3</td>
<td>Nguyen Xuan Thanh</td>
<td>Dr</td>
<td>Ecological expert</td>
</tr>
<tr>
<td>4</td>
<td>Nguyen van Hung</td>
<td>MSc</td>
<td>Hydrology</td>
</tr>
<tr>
<td>5</td>
<td>Nguyen Thi Ha Chau</td>
<td>MSC</td>
<td>Environmental expert</td>
</tr>
<tr>
<td>6</td>
<td>Cac Thi Hien</td>
<td>MSc</td>
<td>Policy expert</td>
</tr>
<tr>
<td>7</td>
<td>Le Van Cu</td>
<td>Bachelor</td>
<td>Assistant staff</td>
</tr>
<tr>
<td>8</td>
<td>Nguyen Kieu Oanh</td>
<td>MSc</td>
<td>Assistant staff</td>
</tr>
</tbody>
</table>
CHAPTER II. SUBPROJECT DESCRIPTION

2.1 Overview

The Thach Ban Irrigation Reservoir Repair and Upgrade Subproject (hereafter called “the Sub-project” is located in Thach Ban Dong village, Cat Son commune, Phu Cat district of Binh Dinh province. The subproject is located at 7.5 km from the west of the Highway 1A and 40 km from Quy Nhon city on the North; The subproject geographical coordinates are) 13°53’33.98” north longitude and 109°13’50.53” east latitude.

The reservoir is a small dam and was built in 1978, the designed water storage of 772,000 m³. The catchments areas is of 3.0 km², total water surface of the reservoir is 25.6 ha at normal water level, irrigation with P=85%, the designed flooding peak is Q_{1.5%} = 77.17 m³/s, total annual flow W₀ = 2,706.10⁶ m³. The irrigation can supply irrigation water to 90 ha of agricultural land of Thach Ban Dong village. The terrain of irrigation areas is gradually sloping toward the La Tinh and the Nha Que rivers. The dam crest is 12.1 m high.

The objectives of the Thach Ban sub-project are:
o Recover full irrigation functions of the reservoir for 90 hectares of agricultural land in Thach Ban Dong village, Cat Son commune; improve the strengthen reservoir operational management.

o Enhance safety of the dam and reservoir, protect the residents and the existing infrastructures in downstream.

o Improving the landscape in the areas.

2.2 Proposed Scope of Work

2.2.1 The Dam

Currently the earthen dam has been deteriorated. The downstream slope is facing with gully erosion, lacking of drainage at the toe of downstream slope. Water seepage through transverse cracks of the main body of dam can be observed. Depressions sink holes, longitudinal cracks are also observable at the left abutment of the dam embankment). In the outer layer of the upstream slope, rock displacement has happened due to the lack of adequate support. The materials in the inner layers have been washed out due as the result of erosion from structure degradation and wave movements. Severe depressions and sinkholes or beaching up to 50-60cm deep occurred at 2-2.5m of the free board of embankment. The dam is in lack of parapet-wall. Some sections on the top of the dam are at not at designed elevations but vary between +52.50m to 52.90m. Dam surface has been eroded with many traversed cracks. The thickness of the dam at its top has been narrowed down due to erosion and material degradation. The existing status of the dam is illustrated in Figure 2.2 below:

![The downstream slope: erosion gully and water seepage through transverse cracker](image1)

![The upper stream slope Outer layer: the riprap is placed and lateral spreading](image2)

![Dam crest has been narrowed down at some sections](image3)

Figure 2.2: Photos showing the existing condition of Ban Dam

The proposed scopes of work on the dam are:

o Reinforce upstream slope with concrete slabs casted on-site graded M200 with size of (2x2) m, thickness 12cm contain drainage holes, the particle layer thickness of 10cm beneath and the last layer construct by geotextile liner.
Repair, reinforce downstream slope: remove 0.5 to 1m of top soil, termite treatment, refill the slope by soils reinforce the slope by grass planting. Build drainage cells (6x6) m, construct drainage channels at the toe of the slope.

- Dam crest: harden dam crest by concrete with thickness 20cm, crushed stone size 2 x 4 (cm) used for making the concrete. Build concrete parapet wall with 0.8m high, 0.4m m thick at upstream.

- Total volume of soil excavation is 110,073 m$^3$, earth fill: 104,382 m$^3$. In which 6,795 m$^3$ of excavated materials will be reused, the remaining will be transported to disposal site.

- Proposed construction method are:
  - Earth work (soil excavation and filling): remove materials on top layer in both toes of the dam, and transport waste to the disposal site. Transport filling material to the constructing site for filling.
  - Using bulldozers to remove the top soil in the borrow pits, use an excavator to load materials to the transporting vehicles.
  - Use vibrating compactor to cut-off repairing and/or the groin zone of the dam.
  - Reinforcing the riprap of the up stream slope by stone and concrete (machine and manual works)

Figure 2. 3: Plan view and cross section of Dam rehabilitation
2.2.2 Spillway

The width of spillway crest is B=30m. Spillway slope: L =50m. Stilling basin (plunge basin) structure is made of rock fill structure and has been sedimented.

Proposed work on the spillway:

- Keep the section of stonework facing (at the start section) with length 35.45m, rebuild spillway training walls by using concrete M200 L= 35.45m (at the starting point of the chute) by concrete M200.

- Lengthen the chute with length of 5m and its walls by using concrete M200.

- Construct a new water staircase from the top of the existing spillway to the chute with length of 11.1 m and training wall by concrete M200; concrete the section of the chute from 39.8m and its walls to the starting point of stilling basin by using concrete M200.

- Reinforcing the part of the construction (from middle of the spillway to the starting point of stilling basin, includes spillway training walls) with L= 39.8m by concrete M200.

- Total volume of excavation is 1,490m³, filling volume is 1,607m³, in which excavated materials to be reused is 501m³.

- Proposed construction method and activities:
  - Earth work: remove the materials on top layers of the spillway and transport to the disposal areas. Transport filling materials and rocks to the constructing site.
  - Use mixing machine (capacity: 500-700 litters) to fill concrete to indicated zone.
  - Machine and manual works for construction.

The stilling basin (plunge basin) of the spillway sedimented

Figure 2.4: Spillway: existing condition and proposed rehabilitation work
2.2.3 Outlet work

The outlet works was built in the 1990’s. The outlet works and its components have been deteriorated thus causing water lost of the reservoir. The valve has been corroded, difficult to operate and to regulate water flow.

Proposed repair and upgrade outlet works: Replace existing pipes with new D600 steel pipes, build the concrete M200 sleeves, and install a new valve at outlet section. Total volume of excavation to remove the old outlet works is 7,451 m$^3$, filling is 7,671 m$^3$, all from borrow pits. All excavated materials will be disposed off at the disposal site. Construction will be carried out with machine and manual works.

Figure 2.5: Outlet work: Existing condition and proposed rehabilitation work

2.2.4 The Access Road

The existing access road is started at Son Loc bridge and ended at the dam site. It is 845m long, in which 750m is earth filled. The road is 2.5m wide with road 0.5 m shoulder 5m at each side.
The access road (earth fill) saturated during wet season

Figure 2.6: Access Road: Alignment, existing condition and proposed typical cross section design

Table 2.1 summarise the key parameters of the four main work items before and after the project.

### Table 2.1. Technical Parameters of current construction

<table>
<thead>
<tr>
<th>No</th>
<th>Content</th>
<th>Unit</th>
<th>Parameter current status</th>
<th>Parameter after repair</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Construction category</td>
<td></td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td>II</td>
<td>Reservoir</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Capacity $W_o$</td>
<td>$10^3 m^3$</td>
<td>772</td>
<td>772</td>
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<tr>
<td></td>
<td>Total effective capacity $V_h$</td>
<td>$10^3 m^3$</td>
<td>707</td>
<td>707</td>
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<tr>
<td></td>
<td>Death capacity of reservoir $V_c$</td>
<td>$10^3 m^3$</td>
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<td>65</td>
</tr>
<tr>
<td>III</td>
<td>Embankment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dam Crest elevation</td>
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<td>52.50</td>
<td>52.50</td>
</tr>
<tr>
<td></td>
<td>Height of dam</td>
<td>m</td>
<td>12.1</td>
<td>12.6</td>
</tr>
<tr>
<td></td>
<td>Length (included spillway)</td>
<td>m</td>
<td>897</td>
<td>897</td>
</tr>
<tr>
<td></td>
<td>Top-width</td>
<td>m</td>
<td>4.0</td>
<td>5.0</td>
</tr>
<tr>
<td>IV</td>
<td>Spillway</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spillway crest elevation</td>
<td>m</td>
<td>50.60</td>
<td>50.60</td>
</tr>
<tr>
<td></td>
<td>Spillway (length)</td>
<td>m</td>
<td>58.3</td>
<td>58.3</td>
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<tr>
<td></td>
<td>Stilling basin elevation</td>
<td>m</td>
<td>+42.92</td>
<td>+43.12</td>
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<tr>
<td></td>
<td>Stilling basin length</td>
<td>m</td>
<td>10.17</td>
<td>11.55</td>
</tr>
<tr>
<td>V</td>
<td>Outlet works</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elevation of outlet works</td>
<td>m</td>
<td>+43.50</td>
<td>+43.50</td>
</tr>
<tr>
<td></td>
<td>Length</td>
<td>m</td>
<td>60.0</td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Access and management road</td>
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<tr>
<td></td>
<td>Length</td>
<td>m</td>
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<tr>
<td></td>
<td>Road surface (width)</td>
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<td>4</td>
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<td></td>
<td>Concrete (hardnosed)</td>
<td>m</td>
<td>0</td>
<td>3</td>
</tr>
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</table>
After repairing, capacity of reservoir, width and elevation of spillway, outlet works do not change; the height of dam is increased from 12.1 m to 12.6 m because of supplementing parapet wall for avoiding risks (top dam crack transversy, erosion); the elevation of stilling basin increases from +42.93m to +43.12m because of addition a concrete layer in repairing, stilling basin length is extended from 10.17m to 11.55 m to stabilize water flow at downstream.

2.2.5 Ancillary Items

**Workers Camps.** The proposed Workers Camp site and storage areas is located in the crop land (watermelon) owned by one local household. The temporarily land area used for these sites is 2,000m².

![Figure 2.7: Proposed camp site](image1.jpg)

**Material Storage Area.** Two zones, 1000 m² each, were proposed for material storage area. Zone 1 is located in downstream slope areas, close to the access road and is 100 m from construction site. It is 1 km from the nearest residential area. The zone is for dam repair and outlet works. Elevation of the zone is +44m. Zone 2 is located at 100 m from the spillway. It is proposed for storing the material for spillway rehabilitation. Elevation of the zone is +51m. Zone 1: is next to construction site 100m and 1km to resident areas.

![Figure 2.8: Proposed material storage areas](image2.jpg)

**Disposal Site.** The proposed disposal site is 10,000m² located at downstream areas of the dam. This area is public land and being managed by Cat Son commune but contracted to households to rice cultivation. The nearest resident area is 1.2 km from the site, and is 1km from the La Tinh River.
2.2.6 Proposed resources Used

Filling Materials.

One borrow pit has been proposed to use

- *The Main borrow pit*: Locates in the reservoirs, 700m from construction site. The total land area of this borrow pit is 63,600 m². This is a new pit, has capacity of 187,397 m³ and can be excavated to 3.0m deep. Existing land uses is plantation or cultivation land for eucalyptus, cassava, rice. There are no residents or houses in the areas. To open this borrow pit, 13,756 m³ of top soil will need to be removed.

The acquisition of land for soil pit will be temporary, after the soil exploitation to fill in construction works, the surface soil will be leveled and the site will be returned to households for continued use.

The adjustment of soil pit locations is in accordance with Decision No. 1603 / QD-UBND dated 12/5/2016 of the Binh Dinh PPC on the approval of the adjustment of investment projects - supproject: Repairing Thach Ban reservoir, which related to the adjustment of soil pit into the reservoir to save transport cost as suggested by the Water resource Directorate.

Construction Materials: Cement, metal, steel will be purchased from agents in Quy Nhon city, 30 km from the construction site. The materials will be transported on National road 1A, provincial road 634 and access road. Stone will be purchased from Nhon Hoa licensed quarry which is currently being operated by Binh Son co. Ltd. The distance to construction site is 45km in which the section going through Cat son commune is 1.25km including 0.4km of concrete road and 0.85 km of earth road. Sand will be bought from the material construction kiosk, 3km from the construction site, transportation route goes through Cat Son commune.
### Table 2.2. Estimated Resources to be used

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Stone (m³)</td>
<td>Cement (tons)</td>
<td>Sand (m³)</td>
<td>Steel (tons)</td>
<td>Soil (Exca.) (m³)</td>
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<tr>
<td>1</td>
<td>Embankment repairing</td>
<td>9,625</td>
<td>1,272</td>
<td>3,048</td>
<td>2,159</td>
<td>110,072</td>
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<td>2</td>
<td>Spillway repairing</td>
<td>1,105</td>
<td>28</td>
<td>657</td>
<td>69</td>
<td>1,490</td>
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<td>Culvert repairing</td>
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<td>75</td>
<td>145</td>
<td>14</td>
<td>7,451</td>
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<td>4</td>
<td>Access road</td>
<td>660</td>
<td>200</td>
<td>543</td>
<td>0.6</td>
<td>1,300</td>
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<td></td>
<td>Total</td>
<td>12,721</td>
<td>1,575</td>
<td>4,393</td>
<td>2,242.6</td>
<td>120,313</td>
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</table>

- List of machine use

### Table 2.3. List of proposed machines and equipment’s

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<thead>
<tr>
<th>TT</th>
<th>Type</th>
<th>Key function</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
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<td>Excavator 0.8 – 1.25 m³</td>
<td>Excavation</td>
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</tr>
<tr>
<td>2</td>
<td>bulldozer 110CV-140CV</td>
<td>Remove the top soil in the borrow pit and quarry</td>
<td>02</td>
</tr>
<tr>
<td>3</td>
<td>Track tamper</td>
<td>road compacting</td>
<td>02</td>
</tr>
<tr>
<td>4</td>
<td>Dump truck</td>
<td>Material transportation</td>
<td>09</td>
</tr>
<tr>
<td>5</td>
<td>Concrete batching plant 30m³/hour</td>
<td>Concrete mixing</td>
<td>02</td>
</tr>
<tr>
<td>6</td>
<td>Concrete container</td>
<td>Concrete containing</td>
<td>03</td>
</tr>
<tr>
<td>7</td>
<td>Reedley vibrator</td>
<td>Concrete compacting</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>Truck mixer</td>
<td>Transport mixed material</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td>Weller</td>
<td>Metal welling</td>
<td>02</td>
</tr>
<tr>
<td>10</td>
<td>Cutting and bending machine</td>
<td>Cut &amp; bend metal</td>
<td>02</td>
</tr>
<tr>
<td>11</td>
<td>Crane 15Tonnes</td>
<td>Material lifting</td>
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<td>12</td>
<td>Generator</td>
<td>Energy supplying</td>
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<td>13</td>
<td>Water pump</td>
<td>Water supplying</td>
<td>04</td>
</tr>
<tr>
<td>16</td>
<td>Jumping jack compactor</td>
<td>Surface compacting</td>
<td>02</td>
</tr>
</tbody>
</table>

### 2.3 Construction Schedule
### Table 2.4. Construction Schedule

<table>
<thead>
<tr>
<th>Scope of works</th>
<th>First year</th>
<th>Second year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. access road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth fill</td>
<td></td>
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<tr>
<td>Road surface</td>
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<tr>
<td>2. Outlet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>works</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Embankment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Spillway</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Source: Project design report, 2017]
CHAPTER III. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORKS

The subproject does not impact to the ethnic minorities groups, also the addressed areas does not have any natural forests, biodiversity conservation areas, wetlands or the threatened species (includes fauna and flora species). The major impacts of the sub-project to the natural environment relate to the activities of land excavation, reparation of headwork of dam, material and waste transportations, borrow pit exploitation, and some impacts on the local committees due to temporary land acquisition (11 affected households) and permanent land acquisition (12 affected households). The applicable policies, institutional frameworks for environmental and social impacts assessment of the sub-project can be explained below:

3.1 Country's Environmental and Social Safeguards Policies and Legislations

This chapter provides the brief of the relevant environmental and social policies of the GoV and the World Bank. Annex-I includes the detailed description and discussion.

3.1.1 Environment

Law on Environmental Protection (No.55/2014/QH13) dated June 23, 2014 and Decree on Environmental Protection Planning, Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Plans (No. 18/2015/ND-CP) dated February 14, 2015 are key legal framework for environmental management in Vietnam. Law on Environmental Protection (LEP) provides statutory provisions on environmental protection activities; measures and resources used for the purpose of environmental protection; rights, powers, duties and obligations of regulatory bodies, agencies, organizations, households and individuals who are tasked with the environmental protection task. LEP is applicable to regulatory bodies, public agencies, organizations, family households and individuals within the territory of the Socialist Republic of Vietnam, including mainland, islands, territorial waters and airspace. LEP is on regulating strategic environmental assessment, environmental impact assessment and environmental protection commitment. According to Article 10, chapter II of LEP, the responsibility for preparing the planning for environmental protection are as following:

1) The Ministry of Natural Resources and Environment shall prepare the national-level planning for environmental protection.

2) People’s Committees of centrally-governed cities and provinces (hereinafter referred to as provincial People’s Committee) shall take charge of formulating processes or preparing the local planning for environmental protection.

Furthermore, the law also indicated to consultation on, inspection and approval of the planning for environmental protection (Article 11, chapter II) as well as the list of entities subject to strategic environmental assessment in appendix I and II of the Decree No. 18/2015/ND-CP dated February 14, 2015 of the Government:

- The Ministry of Natural Resources and Environment shall consult with Ministries, regulatory agencies and provincial People’s Committees in writing and hold an official consultation with relevant regulatory agencies and organizations during the preparation of the national-level planning for environmental protection.

- Provincial People’s Committees shall consult with departments, regulatory agencies
and People’s Committees of a district, town or city (hereinafter referred to as district-level People's Committee) in writing and hold an official consultation with relevant regulatory agencies and organizations during the preparation of the provincial-level planning for environmental protection.

Inspection and approval of the planning for environmental protection shall be required as follows:

- The Ministry of Natural Resources and Environment shall establish a Council for interdisciplinary inspection and prepare the national-level planning for environmental protection for submission to the Prime Minister with the intent to seeking the approval for that planning.

- Provincial People’s Committee shall inspect and approve the report on the provincial-level planning for environmental protection after obtaining written advice from the Ministry of Natural Resources and Environment.

Ministries, ministerial level agencies and Government bodies shall have the responsibility to establish the council or organize the selection of review service organizations to review environmental impact assessment reports of the projects within their competence of decisions and approvals, except inter-sector and inter-provincial projects.

Provincial level People’s Committees shall have the responsibility to establish the council or organize the selection of review service organizations to review environmental impact assessment reports of the projects that take place within their territories and subject to their competence of decision and approval and that of the People’s Councils of the same level.

Management: Unit for Industrial Parks, Export Processing Zones and Hi-tech Zones: Provincial people’s committee can authorize the Management Unit for Industrial Parks, Export Processing Zones and Hi-tech Zones as regulated in Decree 29/2008/ND-CP dated 14/03/2008 by the Government on industrial parks, export processing zones and economic zones.

The Section 3 of Chapter II of LEP describes the requirements of Environmental Impact Assessment. Owners of projects regulated in Clause 1 Article 18 of this Law shall carry out, on his own, or hire an advisory organization to carry out the environmental impact assessment and take statutory responsibility for the conclusive result after carrying out such assessment. The environment impact assessment must be performed in the preparatory stage of the project. The conclusive result yielded after carrying out the environment impact assessment shall be expressed in the form of the report on environmental impact assessment. Expenses incurred from the formulation and inspection of the report on environmental impact assessment, and included in total investment budget shall be covered by the project owner.

According to Article 21 of LEP, the consultation to be required in the process of environmental impact assessment is aimed at completing the report on environmental impact assessment. It emphasis that consultation helps minimize the negative impacts on the environment and human beings and ensure the sustainable development of the project. Project owners are obliged to consult with regulatory agencies, organizations and communities that are directly affected by the project.

The Article 22 of LEP describes the scope of EIA reporting. It will include: (i) origin of the project, project owners, and the competent authority's approval of the project, method of the
environmental impact assessment; (ii) evaluation of technological choice, work items and any activity relating to the project which can cause bad effects on the environment; (iii) assessment of current status of natural and socio-economic environment carried out at areas where the project is located, adjacent areas and demonstration of the suitability of the selected project site; (iv) assessment and forecast of waste sources, and the impact of the project on the environment and community health; (v) assessment, forecast and determination of measures for managing the risks of the project posed to the environment and community health; (vi) waste disposal measures; (vii) measures for minimizing the impact of the project on the environment and community health; (viii) consultation result; (ix) environmental management and supervision programs; (x) budget estimate for the construction of environmental protection facilities and measures to be taken to minimize the environmental impact; and (xi) alternatives to the application of measures for the environment protection.

The Article 23 of LEP defines the authority to verify the report on EIA. The Ministry of Natural Resources and Environment shall arrange to verify the report on environmental impact assessment in respect of the following projects: (a) Projects subject to the decision on investment intentions made by the National Assembly, Government and the Prime Minister; (b) Interdisciplinary or inter-provincial projects stipulated at Points b and c Clause 1 Article 18 in this Law, exclusive of those classified as the secret projects in the field of national defence and security; and (c) Projects verified by the Government’s authorized entities. The Ministries and quasi-ministerial agencies shall inspect the report on environmental impact assessment in respect of projects that shall be permitted under their decision and approval, but are not specified in regulations mentioned at Points b and c Clause 1 of this Article. The Ministry of National Defence and the Ministry of Public Security shall arrange to verify the report on environmental impact assessment in respect of projects that shall be permitted under their decision and approval, and those classified as the secret projects in the field of national defence and security. Provincial People’s Committees shall arrange to verify the report on environmental impact assessment in respect of investment projects within their territories that are not regulated at Clause 1, 2 and 3 of this Article.

The Article 26 of LEP describes the responsibility assumed by the project owner after being granted the approval of their report on the environmental impact assessment. These include – Clause 1: comply with the requests specified in the approval of their report on environmental impact assessment. Clause 2: where any change in the project size, capacity and technology applied in the project execution is blamed for the negative impact on the environment in comparison with the alternatives given in the approved report on environmental impact assessment, but is not too serious to make another report as stipulated at Point c Clause 1 Article 20 of this Law, the project owner must send their explanation to the agency who grants the approval of the report on environmental impact assessment, and the project shall be commenced only after obtaining the permission from such agency.

The Article 27 of LEP explains the responsibility assumed by the project owner before bringing the project into operation. These include - Clause 1: apply measures for the environmental protection under the decision on the approval of their report on environmental impact assessment; and Clause 2: notify the agency who grants the approval of the report on environmental impact assessment of the developmental process of environmental protection works functioning as an ancillary part of major projects that can cause bad impacts on the environment in accordance with the Governmental regulations. These projects will be commenced only after the agency in charge of the approval of the report on environmental impact assessment has inspected and certified the completion of environmental protection works.
The Article 28 of LEP mentions the responsibility of the agency in charge of approving the report on the environmental impact assessment. These include – Clause 1: Bear the statutory responsibility for their conclusive result and decision on the approval of the report on environmental impact assessment. Clause 2: Within a period of 15 days as from the date on which the project owner’s report on the completion of environmental protection works under the regulations specified in Clause 2 Article 27 of this Law, the agency in charge of approving the report on environmental impact assessment must examine and issue the certificate of completion of environmental protection works. Where an analysis of complicated environmental criteria is required, the time span for the issuance of the certificate of completion of environmental protection works can be extended for less than 30 days.

The Article 13 of the Decree (No. 18/2015/ND-CP) explains the requirement of the pertaining EIA agencies. Clause 1: the project owner or the advisory organization conducting EIA must meet all requirements – (a) there are staff members in charge of EIA meeting requirements prescribed in Clause 2 of this Article; (b) there is specialist staff members related to the project obtaining at least Bachelor’s degrees; and (c) there are laboratories, inspection and calibration devices eligible for performing measurement, sampling, processing and analysis of environmental samples serving the EIA of the project; if there is not any laboratory with decent equipment for inspection and calibration, it is required to have a contract with a unit capable of carrying out inspection and calibration. Clause 2: the staff members in charge of EIA must obtain at least Bachelor’s degrees and Certificate in EIA consultancy and Clause 3: the Ministry of Natural Resources and Environment shall manage the training and issuance of Certificates in consultancy of EIA.

In addition, the following Articles are important and since these are relatively new, details have been provided in the Annex.

Article 14: the authorities for different scales of EIA report approval with deadlines
Article 15: re-compilation of EIA reports
Article 16: responsibility of project owners pertaining to the approved EIA reports
Article 17: inspection and confirmation of environmental protection works serving the operation phase of the projects
Article 21: Reporting.

3.1.2 Dam safety regulations

Decree no.72/ND-CP on date 07/05/2007 of the government of Vietnam regarding on dam safety management. According to the decree, a big dam is the dam with the height calculating from the floor face to the top of the dam equal to or greater than 15 meters or dam of water reservoirs with the scale of capacity equal to or greater than 3,000,000 m$^3$ (three million cubic meters). Small dam is the dam with the height calculating from the floor face to the top of the dam smaller than 15 meters. Dam owners are organizations and individuals owning dams to harness the benefits of water reservoirs or assigned to manage, operate and harness water reservoirs by the competent state agencies. Ministry of Agriculture and Rural Development takes responsibility before the Government for the implementation of state management of dam safety. The Ministry of Industry presides over and coordinates with ministries, branches and relative localities to appraise, approve or submit to the Prime Minister for approval of the process of operating hydropower reservoirs. The provincial-level People's Committees implement its state management on dam safety in the areas.

In chapter 4 of Decree no.18/2015/ND-CP on date 14/02/2015, from the article 12 to article 17 were specified in the formulation, evaluation and approval of environmental impact assessment reports, the implementation of projects and the designed mitigation measures to
protect environment before and after a project officially operation. In the article 12 of this Decree also regards on environmental impact assessment process to the project implementation, the project owner have to organize meetings to public consultants, such as Provincial People's Committees, local authority (Commune People's Committees level- CPC), affected (direct or indirect) people or committees in the local by the project implementation, mandatory; analysis the feedbacks, comments obtained from the affected groups, and consider advantage or disadvantage the impacts of the project to community and to design the mitigation measures to reduce the negative impacts on natural environment, biodiversity, community. According to the annex no.2 of the Decree, the project has to make EIA if the reservoir capacity is of 100,000m³ or more. According to the regulations of Vietnam Government, the all proposed subprojects under DRSIP project have to perform the report of Environment Impact Assessment (ESIA).

### 3.1.3 Land acquisition

The GOV’s Legal Framework: The legal framework with respect to land acquisition, compensation and resettlement is based on the Constitution of the Socialist Republic of Vietnam (2013), and the Land Law 2013 (revised), and other relevant decrees/guidelines. The principal legal documents applied for this RPF include the followings:

- Constitution of Vietnam 2013
- The Land Law 45/2013/QH13 which has been effective since July 1, 2014
- Decree No.43/2014/ND-CP dated on May 15, 2014 guiding in detail some articles of Land Law 2013
- Decree No.44/2014/ND-CP dated on May 15, 2014 provides on method to determine land price; make adjusted land price brackets, land price board; valuate specific land price and land price consultancy activities
- Decree No. 47/2014/ND-CP dated on May 15, 2014 providing compensation, assistance, resettlement when land is recovered by the State
- Decree No. 38/2013/ND-CP dated on April 23, 2013, on management and use of official development assistance (ODA) and concessional loans of WB
- Decree No. 201/2013 / ND-CP dated on November, 27, 2013 of the Government detailing the implementation of some articles of the Law on Water Resources
- Circular No. 36/2014 / TT-BTNMT dated on 30 June 2014, regulating method of valuation of land; construction, land price adjustment; specific land valuation and land valuation advisory
- Circular No. 37/2014/TT-BTNMT dated on 30 June 2014, regulating compensation, assistance and resettlement when the State acquires land
- Decision No. 1956/2009/QD-TTg, dated on November 17, 2009, by the Prime Minister approving the Master Plan on vocational training for rural labors by 2020
- Decision No. 52/2012/QD-TTg, dated on November 16, 2012, on the assistance policies on employment and vocational training to farmers whose agricultural land has been recovered by the State
- Others.

Other laws, decrees and regulations relevant to land management, land acquisition and resettlement include the Construction Law 50/2014/QH13, dated on 18 Jun 2014, on construction activities, rights and obligations of organization and individual investing in civil works construction and construction activities; Decree 102/2014 / ND-CP on sanctioning of administrative violations in the field of land replaced by Decree No. 15/2013 / ND-CP dated
on February, 06, 2013 on quality management of constructions.; Decree No. 12/2009/ND-CP of the Government, dated 12 February 2009 on the management of construction investment projects and replacing the Decree 16/2005/ND-CP, the Decree 38/2013/ND-CP of the Government on the management and use of Official Development Assistance (ODA) fund, and Decree 126/2014/ND-CP of the Government on marriage and family Law implementation, stipulating that all documents registering family assets and land use rights must be in the names of both husband and wife; Decisions of project provinces relating to compensation, assistance and resettlement in provincial territory will be also applied for each relevant project province.

3.1.4 Indigenous/Ethnic minority people

Viet Nam has a large number of policies and programs specifically designed to assist ethnic minorities’ development. The Government of Viet Nam (GOV) has paid much attention to the welfare of ethnic minority groups. There is a ministerial-level government body, the Committee for Ethnic Minority and Mountainous Area Affairs (CEMA), which is in charge of management functions for ethnic minorities and mountainous areas. A country profile of Viet Nam published by the International Work Group for Indigenous Affairs (IWGIA) reports that:

“Indigenous peoples are full citizens of the Vietnamese state and enjoy constitutionally guaranteed rights to their languages and cultural traditions....On the legislative level, the “Council on Ethnic Minorities” has the mandate to advise the National Assembly on ethnic minority issues and to supervise and control the implementation of the government’s ethnic minority policies and development programs in ethnic minority areas.”

The document also reports that since the 1960s, a number of policies and programs have been designed specifically for ethnic minorities, but these are mainly aimed at integrating them into mainstream society rather than enabling them to strengthen their own institutions. Regarding land issues, it reports that “it is important to highlight that the present legislation in Viet Nam allows for obtaining use right certificates for land and forest and that in 2004 the National Assembly passed a new land law which, most relevant for indigenous peoples, now includes the category of "communal land". By introducing the concept of communal land, the new law provides for the possibility of communities to apply for certificates over communal land.

3.2 Implications of National Policies and Regulations on the Proposed Project

Based on the analysis of the national legal framework, the project will have to fulfill the following minimum requirement and process:

- PPMU or the consulting firm conducting EIA must have staff members in charge of EIA must obtain at least Bachelor’s degrees and Certificate in EIA consultancy. They will also have or arrange adequate laboratory facility for performing measurement, sampling, processing and analysis of environmental samples serving the EIA (Ref. Article 13 of Decree).
- Considering the nature of the subproject, the Provincial People’s Committee (PPC) shall assess and approve EIA reports (Ref. Article 14 of Decree). PPC shall arrange to verify the report on environmental impact assessment in respect of investment projects within their territories (Ref. Article 23 of LEP).
- The assessment of EIA report shall be conducted by the EIA report assessment council established by the Heads of the EIA report assessment authority with at least 07 members. Members of EIA report assessment council shall consist of 01 President, 01
Vice President where necessary, 01 Secretary member, 02 Opponent members and other members, which at least 30 percent of the Assessment council members having at least 06 years’ experience in the EIA field (Ref. Article 14 of Decree).

- Deadlines for assessment of EIA report is within 30 working days from the date on which the satisfactory application is received (Ref. Article 14 of Decree).
- PPMU will have to comply requests specified in the approval of their report on EIA. For any change, the project owner must send their explanation to PPC (Ref. Article 26 of LEP).
- PPMU will have to notify PPC and the rehabilitated dam will be commenced only after the agency in charge of the approval of the report on environmental impact assessment has inspected and certified the completion of environmental protection works (Ref. Article 27 of LEP).
- PPMU will have to prepare a completion report for environmental protection work and within 15 days of receiving the report, PPC must examine and issue the certificate of completion of environmental work (Ref. Article 28 of LEP).
- The inspection of environment protection works serving the operation phase of the subproject shall be carried out by an Inspectorate which is established by the Head of PPC (Ref. Article 17 of Decree).
- The PPC shall send a report on assessment and approval for EIA report, registration and inspection of specific environment protection plans, inspection and approval for environment protection works in the province of the previous year to the Ministry of Natural Resources and Environment before every January 15 (Ref. Article 21 of Decree).
- MARD shall send reports on assessment and approval for EIA report, inspection and approval for environment protection works of the previous year related to project under their management to the Ministry of Natural Resources and Environment before every January 15 (Ref. Article 21 of Decree).

3.3 World Bank Safeguard Policies

The objective of these policies is to prevent and mitigate undue harm to people and their environment in the development process. Safeguard policies provide a platform for the participation of stakeholders in project design, and act as an important instrument for building ownership among local populations.

The effectiveness and development impact of projects and programs supported by the Bank has substantially increased as a result of attention to these policies. The World Bank Safeguard policies are available in its website: http://web.worldbank.org/WEBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTSAFEPOL/0,,menuPK:584441~pagePK:64168427~piPK:64168435~theSitePK:584435,00.html.

3.4 Implications of World Bank Safeguard Policies on the Proposed Project

Eight World Bank policies have been triggered for the project. These are: Environmental Assessment (OP/BP 4.01), Natural Habitats (OP/BP 4.04), Pest Management (OP/BP 4.09), Physical Cultural Resources (OP/BP 4.11), Indigenous Peoples (OP/BP 4.10), Involuntary Resettlement (OP/BP 4.12), Safety of Dams (OP/BP 4.37) and Projects on International Waterways (OP/BP 7.50).

According to WB Operational Policy (OP 4.01), the nature of environmental assessment to be carried out for a particular sub-project would largely depend on the category of the sub-project. As mentioned earlier, The World Bank Operational Policy (OP) 4.01 classifies
projects into three major categories (category A, B and C), depending on the type, location, sensitivity and scale of the project, and nature and magnitude of potential impacts. Considering the environmental risk and complexity related to a large number of subprojects to be implemented in a widespread area, the project has been classified as category ‘A’. However, the subprojects to be funded under the projects can be categorized as ‘A’ or ‘B’ depending on the extent, scope and impact of the specific subproject.

The project physical activities would only work on existing dams and are not expected to lead to conversion or degradation of critical or semi-critical natural habitats. However, it is required to scope, screen and assess potential impacts to natural habitants as part of the subproject ESIA. The project will not finance any procurement of fertilizers and pesticides. However, since the dam rehabilitation work will increase the agriculture command areas, there are chances of more uses of fertilizers and pesticides in the project influence areas. The project will promote the application of Integrated Pest Management (IPM) and guidance will be included in ESMF.

Since the exact subproject locations are unknown at this stage, there is possibility that some rehabilitation work and access road may pass through areas with physical cultural resources. The impacts will be examined as part of the environmental screening/assessment of different subprojects. In addition, ‘Chance find’ procedures conforming to local legislation on heritage would be evaluated so that any physical or cultural resources are not impacted.

The project may intervene in areas where indigenous people live (specific subproject locations will be determined during implementation). In addition, the project may require land acquisition and resettlement. As such, an Ethnic Minority Policy Framework (EMPF) and Resettlement Policy Framework (RPF) are required for the project and will be prepared separately.

The project will not finance construction of any new dams or significant change in dam structure. This policy is triggered as the project will finance rehabilitation and improvement of existing dams including large dams (15 meters or more in height). Thus, it requires to arrange for one or more independent dam specialists to (a) inspect and evaluate the safety status of the existing dam, its appurtenances, and its performance history; (b) review and evaluate the owner's procedures for operations and maintenance; and (c) provide written report of findings and recommendations for any remedial work or safety-related measures necessary to upgrade the existing dam to an acceptable standard of safety. Policy and practice relating to dam safety needs to meet international benchmarks, such as those are laid out by ICOLD and the World Bank regulatory frameworks for dam safety. These measures are designed into the project, which includes the establishment of a national dam safety review panel (DSRP). Also the project will establish an independent Panel of dam safety Experts (PoE) who will carry out independent review of dam safety reports and proposed mitigation measures. This PoE will be working closely with the to-be-established DSRP to ensure the technical integrity of investment interventions. Each subproject will have separate Dam Safety Plan (DSP) in addition to the ESMP.

There are six transboundary river basins in the country; however Vietnam is an upstream riparian only in the Sesan-Srepok basin – a tributary of the Mekong, upstream of Cambodia, and the Bang Giang-Ky Cung basin, upstream of China. So, it is expected that some of the dams will be located on international river basins, and therefore the policy is triggered.

The WBG guidelines provide guidance on certain EHS issues, which include standards for environmental parameters (ambient air quality, water and wastewater quality, noise level,
waste management), hazard and accident prevention, occupational and community health and safety (during commissioning and decommissioning works) etc. These guidelines will be directly applicable to the proposed project. As a general rule, the WBG guidelines should complement the existing Vietnam guidelines or standards. In case the Vietnam guidelines or standards differ from the WBG guidelines, project is expected to follow the more stringent ones.

The World Bank access to information policy would be directly followed. The project will make the environmental/social assessment and ESMF documents available to the public by publishing it in their websites. In addition, Hard copies of these documents in English (including Vietnamese language) will be made available in the MARD and all DARDs.
CHAPTER IV. ENVIRONMENT AND SOCIO-ECONOMIC CHARACTERISTICS OF THE PROJECT AREA

4.1 Physical conditions

4.1.1 Natural conditions

The catchment area of Thach Ban reservoir is approximately 3km² apart of the catchment is mountain (400m height), also is the starting point of 4 streamlines, with flow in rainy season and no water flow in dry season. The area is covered by secondary forest with perennial trees growth. Downstream of the reservoirs is the irrigated area, spreading from Northeast to dam, Southwest to La Tinh river and Nha Que stream. The irrigation areas includes 130 ha of arable land of Thach Ban Dong and Thach Ban Tay.

Figure 4. 1 : Catchment areas of Thach ban reservoir

Figure 4. 2. Overall map of catchment, reservoir and irrigation area.

Climate condition: Thach Ban Reservoir basin is located in the central areas of Vietnam. It has a tropical monsoon climate which can be divided into two distinct seasons. The dry
season starts from January to August. During this period, highest rainfall occurs in May, caused flooding “grain full”. The wet season (rainy season) starts from September to December in the same year. The rainfall in the period covers 70%-80% of total annual rainfall. Also, from October to November the areas has receive intensive rainfall and caused a high flood risk. The rainfall in Phu Cat areas has an average of 1.922mm (intensive rainfall recorded in 1987, 1999, 2003, 2009, 2013). However, the rainfall obtained in this place is lower than the other places in Binh Dinh province in comparison.

Temperature: Average temperature in the areas is 26.9°C. Warmest month (29-30°C) is in June, July and August. The lowest temperature 19 ~20°C is in December and January (source: Binh Dinh DoNRE, 2015). In general, the area represents an average high temperature range and the constantly gradient change.

Humidity: an average humidity in the areas is 56.4%, relative humidity varies significantly with an average of 83-84% in the wet season period. In addition, in summer time, the air humid value is approximately 33-34% due to the "Foen" wind influenced. Water precipitation is 1000mm/year covering 60-70% of total annual rainfall (source: Binh Dinh DoNRE, 2015).

<table>
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<tr>
<th>Month</th>
<th>Temperature (°C)</th>
<th>Humid (%)</th>
<th>Rainfall (mm)</th>
<th>Wind speed (m/s)</th>
<th>Evaporation (mm)</th>
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<tbody>
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<td>60.5</td>
<td>37.6</td>
<td>2.3</td>
<td>75.3</td>
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<td>23.8</td>
<td>47</td>
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<td>25.3</td>
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<td>23.5</td>
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<td>73.5</td>
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<td>54</td>
<td>233.6</td>
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<tr>
<td>October</td>
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<td>585.6</td>
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<td>506.9</td>
<td>2.8</td>
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<td>Average</td>
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<td><strong>46</strong></td>
<td><strong>1922</strong></td>
<td><strong>2.1</strong></td>
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</table>

Source: Sub- Investment report, 2015

**Hydrological regimes**: Water resource of Thach Ban reservoir is unregulated fed by natural waterways of 5 creeks including: Hoc Dinh, Hoc Ngoai, Hoc Lang, Hoc Nho and Hoc Lat. Water. The annual average flows of to the reservoir is 0.046 (m³/s) or 1,451,000 m³ per year and mostly in rainy season (October, November, December), there is no flow into reservoir during dry season.

Annual peak flood discharge to Thach Ban reservoir is, mainly occur in September to December, the designed flood peak discharge is $Q = 77.17$ m³/s. The maximum rate of flood discharge to downstream in case of peak of flood is $Q_{out} = 51.35$ m³/s which is below the designed flood peak. Annual water discharge depends on total water coming into the reservoir, with frequency of P=10%, total water flowing into reservoir in case of flood is $M = 685,000$m³. This amount of water is the main reason of increasing water level in the reservoir up to 50.20m, but this is in safe condition, because the designed high flood level of reservoir

---

1 – source: Binh Dinh DoNRE, 2015
is 50.60m, hence no emergency water releasing needed (spillway will operate in case of water volume exceeding 772,000m$^3$).

In case of discharging flood water out of Thach Ban reservoir, the flow goes freely to the spillway via the spillway channel with length of $L=52.35$ m which is connected to the Nha Que stream (so called Dap Da stream) with length of 1 km and then discharges to the La Tinh river, which finally emptied into the sea.

![Figure 4.3: The trending process of flood discharge of Thach Ban reservoir with flood probability $P=1.5\%$](image1)

Cross section of spillway is trapezoidal shape with total length is $L=52.35$ m; bottom elevation is 44.10 m and $B = 30.0$ m in width, the slope of the spillway is 0.036. Normal water head is 0.29 m; maximum is 0.30 m. Sedimentation, shrubs and small trees at area behind the spillway.

The flow of Nha Que streams is occur only during the rainy season. Currently, there is no data show the natural flow when there is no flood water discharge through the spillway. In many years of operations of the Thach Ban reservoir, the Nha Que stream have never been overflown as the result of flood water discharge from the Thach Ban reservoir. On the other hand, along to the Nha Que stream there is no resident areas, so that releasing of floodwater have no impact to local people or infrastructures in downstream areas.

La Tinh river is one of the four main rivers of Binh Dinh province. It is sourced from the Hoi Son lake, which is situated at elevation of 150 m. The river is 54 km long, two third of this length passes mountains and barren hills. The river is 200 m wide. Its catchment area is approximately 719 km$^2$. The volumetric flood flow of the La Tinh River is 950 m$^3$/s (considered the total flow from upstream). The overflow with flood probability $P = 1.5\%$ is 55.76 m$^3$/s o Thach Ban reservoir. Therefore, in case of Thach Ban reservoir release water with volumetric flow of 12.29 m$^3$/s, this only makes water level in La Tinh River rising up to 2 cm, still within the safe limitation of La Tinh River dikes. La Tinh River flows through the Cat Son commune with total length of 3 km and irrigate to 40 hectares of arable land of Cat Son commune, and transporting water to the sea in case of Thach Ban reservoir emergency water releasing.

*Topography*: the local has relatively complex forms of topography. There are 2 forms of landscape.
o Low mountain landscape with mineralised slop: The majority of project area is covered by the steep mountains (East-South and West-North). The terrain surface is strongly separated by the internal river systems. Most of the original vegetation covers have been replaced. Therefore, the erosion and sedimentation process increased in the areas, especially in the rainy season.

o The food plain landscape: The elevation of the areas is from +250m to +35m following the upper stream to downstream and from North to South directions. The landscape is flat and local people cultivating on the areas.

Geological characteristics

A geological characteristics of the area have been discovered, on which the soils formation on magmatic complexes, on sedimentary-metamorphic rock complex and on Quaternary sediments complexes. The geological characteristics of the areas can be divided into:

Earth fill: two types of earth fill: Sandy loam light – medium soil: containing gravel and crushed stone. The soil has multi colour, such as yellow, brown, red, grey and white, thickness 1.5-5.5m. The soil has low humidity, tightly structured Sandy loam, medium heavy to light clay soil: grey-green colour; moisture, plasticity and tightly structured medium (K=0.80÷0.85), less water permeability coefficient. Thickness of soil is 4.5-13.5m.

4.1.2 Surface water Quality

a) Surface water

The La Tinh River and Thach Ban reservoir are the main water sources for irrigation. Several households living along the bank of river La Tinh are using water directly. The water quality examination results via 10 collected samples at high risks of pollution areas due to the project implementation, show in Table 4.2

The analysed results (Table 6.1, Appendix A6) show that the water quality of the samples NM2, NM5, NM6, water from River La Tinh (NM1, NM3, NM4) from Thach Ban reservoir (NH1, NH2, NH3, NH4) is good. TSS, BOD₅, NO₂⁻, NO₃⁻, PO₄³⁻, NH₄⁺, SO₄²⁻ and heavy metal concentrations (As, Pb, Cd, Fe) lower than the acceptance level of QCVN 08:2015/BTNMT, column B1: National technical regulation on surface water quality, water irrigated agriculture and aquatic cultivation. Particularly, the values of turbidity ranges from 12 to 36 NTU, DO varies between 4 and 6 mg/l for all samples, suspended solids in the reservoir is quite low, from 25 to 29 mg/L.

Some parameter of water sample are exceed the standard, for example: COD (sample NM4) higher than 1.2-1.3 time; NH₄⁺ concentrations of samples of NH₄⁺ concentrations of NM2, NH1, NM5, NM6 are exceed from 1.1 to 1.5 times, at the water canal and proposing camping site. The coliform index of NM1, NM2, NM3 samples are higher 1.1- 2 times in comparison with B1/QCVN 08:2015/BTNMT-the standard water quality to irrigation and aquatic cultivation.

Summary: all results show that the exam indicators for assessing water quality are below the standards. Some parameters are slightly higher than standards, such as COD, NO₂⁻,
Coliform, but it can be used for irrigation purposes. In general, people living in areas are relatively satisfied with the quality of water in the region.

b) Groundwater quality

According to the survey results, ground water stores in Deo Ca complex aquifers at the depth of 5-15 m from surface. Ground water is the main water resources to the human activity and livestock in the areas. Ground water quality: generally, water quality in the areas is relatively good and suitable for the growth and development of plants as well as for life activities.

Assessing the quality of underground water in 10 wells of 10 households in the affected villages of Thach Ban Dong and Thach Ban Tay show in Table 4.3

Results of 10 ground water samples analysed of wells in subproject area (table 2.2, Appendix A2) showed that most of the physical-chemical parameters such as COD, NO$_2^-$, NO$_3^-$, Pb, As, Fe concentrations and the pH, coliform index of the samples within limited threshold of National Technical Regulation on groundwater quality (QCVN 09:2015/BTNMT)

In general, people in the project areas are satisfied the surface water and groundwater qualities. This area is less impacted by the industrial and urban developments in the region.

4.1.3 Air quality

Assessing the current state of air environment in the project area by taking sample at 10 positions, these areas may be affected by the sub-project construction activities, transport material from borrow pit and quarry areas (Table 4.4). The project area does not have any factory, industrial facility or mining activities, the traffic density in the local on the inter-village roads is low.

The results obtained from analysis of 06 sample (on vibration, noise, dust, total, SO$_2$, NO$_2$, CO) in Table 2.3, Appendix A2, shows that air quality in the project area is relatively good, the noise level below the permitted threshold of QCVN 26: 2010 / BTNMT, the parameters of CO; NO$_x$; SO$_2$; suspended dust are within permitted levels of National technical regulation of QCVN 05: 2013/BTNMT.

4.1.4 Soil

Evaluation of analysis results of 5 soil samples (table 2.4, appendix 2) shows that pH of sludge is low (pH$_{KCL}$ = 4.76-5.92), mechanical compositions mainly are sand, mud with medium content (1.370-2.1%); total Nitrogen is low to medium (0.069-0.23%); total Phosphorus is low (0.031-0.04%), Digestable Potassium is low (0.188 – 0.208%), that is poor nutrition soil. Mobile aluminium is 0.154-0.2 mg Al/100g of soil.

Soil acidity pH ranges from 5.63 to 6.48, soil structure is sandy loam soil. Low humus content, from 1.03 to 1.73%. Total nitrogen is poor (0.034- 0.064%) , P$_{total}$ value low, ranges from 0.014 to 0.029%, total potassium in average (0.153 to 0.237%). Overall, the land has poor nutrition due to strong mineralization occurs.

Content of heavy metals such as Zn, Pb, Cu, As, Cd in soil and mud are within the maximum limits of heavy metals following to (QCVN 03:2008/BTNMT).
Summary: according to the results of air, water, soil and mud sample analyse, the physical environmental conditions in the project areas show good quality in comparison with nation standards. Some parameters such as Coliform index and \( \text{NH}_4^+ \) in water are slightly exceeded to the national standard level of water examination. Nutrient in soils is poor and facing to soil degradation due to mineralizing progress.

4.2 Biological resources

Fauna: the wild life in Binh Dinh province included 7 Mammalia group/19 family, 38 species, 13 bird group/37families, of which 77 species belong to Kong Ha Nung (Gia Lai), Ba To, Tra Bong (Quang Ngai), Tra My, Phuoc Son (Quang Nam) biological systems. In the high land areas of province, there are several mammalia groups: macaca arctoides, rhesus macaque, macaca mulatta, lesser mouse deer (Tragulus javanicus), asian tiger, vulpes (urocyon cinereoargenteus), bear, sus scrofa, pholidota, cervidae, cervus unicolor, capricornis sumatraensis, cephalophinae, rodentia, gekko gecko, cynocephalus variegatus, eupetarius cinereus, pythonidae, elephant with few number and living in River Kon water shed – in the West-North of Vinh Thanh and in the West- South of An Lao districts

Aves species are diverse includes: pavo muticus species is a high economic value, but has a few individual, they live in watershed of Kon River. Phasianidae, sturnidae are living in all the forest areas of the province. Gallus, perdix, chloropseidae, streiptopelia, zosteropidae, red-breasted parakeet, oriolus oriolus, gracula religiosa, fringilla coelebs, and apodidae are found in the island of Qui Nhon City, 40km is next to Phu Cat district. However, in the project areas there are no threatened or conservative species found.

Vegetation: The forest types in Binh Dinh province is tropical rainforest, moist deciduous and semi-evergreen seasonal forests receive high overall rainfall with a warm summer wet season and a cooler winter dry season. Topical rainforests can be characterized in 3-4 layers, flora species in the province is diverse, and there are 66 Order, 175 Family 1848 Species. The vegetation species in a forest included: Dalbergia cochinchinensis (Dalbergia), Pterocarpus macrocarpus, dipterocarpus, Beech, Erythrophleum fordii, Madhuca pasquieri Canarium album (Lour.) Raeusch, Spinus tristis, etc. But rich forest with big trees nowadays remains a few areas in the province.

Aquatic ecology. A study carried out in several main water bodies (Châu Trúc, Đèo Son, Núi Mốt, Điêm Tiên lakes and reservoirs) in Binh Dinh by the Provincial Department of Science and Technology found 166 floating flora species, in which the blue-gren alga (Chlorophyta) has 41 species, accounts for 24.8%. Silic algae (Bacilliiophyta) has 41, accounts for 24.8%. Surirella, Synecdrad, Melosira, Ceratium, Nijchia, Navicula, Cymbella, Sicnedesnus cloterium, Periclinium, Skiletonema are common species found in fresh water lakes in Binh Dinh. However, the quantity of these species are at low level, thus fish species are not abundant unless they are fed. About aquatic fauna, the species that are commonly found in fresh water are Cyclopoidea, Cladocera, Rotatoria, Mesocycoops leuckarti, Microcyclops varians, Diaphanosoma sarsi, Moina dubia, Asplanchna sieboldi, Brachionus falcatus. However, the Copepoda - cyclopoidea group is not adapted very well in reservoir formed by dam. Among these species, none of them are typically represent for Vietnam, there are three typically found in tropical and semi-tropical regions which are Brachionus falcatus, B. caudatus, Keretella tropica. In the reservoirs, the quantity of floating fauna do not exceed 100,000 units/m³, which is lowest in all types of catchments, nutrient level is at average level.

Water bodies in Binh Dinh province has 56 fish species belong to seven groups. 20 families and 44 species. 44 of them are freshwater fish. Most commonly found are the carp (26 species)
account for 46.9 % of species. The fish species are characterised with small size, widely distributed, grow fast, short life expectancy, and can eat multiple types of floral species. There are 18 fish species with high economic values such as catfish, carp, crucian carp, etc. These have been farmed commonly in the province.

a) The characteristics of biological resources of the sub-project areas

Testerrial biological: Forest areas: 7,094 ha, covering 62.46% of total natural land in the project areas. Of which: productivity forest areas is 2,187 ha (30.83% of total natural forest areas), protective forest areas: 4,907 ha (covering 69.17% of total natural forest areas), the sub-project areas has no special forest, there is only common plant species, in subproject was surveyed and identified with: Ormosia balansae Drake, Tetranthera, Diospyros rubra, Betula Alnoides…the plants can be used for paper industrial or reduce soil erosion progress.

Surrounding to Thach Ban reservoirs is secondary forest, mainly eucalyptus and acacia mangium. The highest tree is around <4m. The vegetation covers of the project areas which are constituted mostly by bush vines, grass. The project area has not biologically valuable, rare or endangered species base on the criteria for classification of plant species being threatened, in the Vietnam's Red Data Book (2007) and IUCN Red List (2011) of endangered species (according to the Government Decree No. 32/2006/ND-CP).
There are only some common freshwater fish in the reservoir with economic values in the reservoir, and there are no known rare or endangered species in the reservoir. There is no aquaculture activities in the reservoir. In dry season, particularly from July to October, the water level in the reservoir is very low and below the operational level of the reservoir.

4.3 Socio-economic conditions

4.3.1 General features

In recent years 2014, the district has made some progress together with the overall economic development of the province and the country. Statistics showed that the economic growth rate of the subproject area represented by Cat Son’s gross domestic product (GDP): VND 101,288 Millions, incomes is VND 1,926,000/capita/year (90 USD/capita/year).

Cultivation is the main production sector and is gradually developing towards increasing quality, productivity and efficiency; close cooperation between factors such as: the application of advances in breeding, strengthening pest control measures, appropriate planting seasons. However, adverse weather, complicated disease, irrigation systems have affected productivity and crop yields. The situation in the livestock disease is fairly complicated, besides volatile prices is reason leading to unstable scale of livestock and poultry.

Small-industrial and commercial services are accounting for 1.9% of economic structure; they are promoted to develop, contribute significantly on local economic growth, but the scale is minor.

4.3.2 Population

The total population of Cat Son commune in the subproject area is 5,303 per 1,450 households, of which, men 2,742 people (51.7% of total population) and women is 2,561 people. Total number of workers in the subproject area is 3,128, accounted for labour under and over age are 2,175 (covers 69.5% of total worker in the areas), people/household: 3.65, worker/household: 2.15

The natural population growth rate in 2014 of the areas was 1.39%. The average population density is 47 persons/km². Poverty rate is reduced to 2.2% by 2014 in comparison with year 2013. Among the 84,379 households in the subproject area, there is over 97% of the households participating in agricultural and forest activities; and the Commercial services 1.1%, and others: 1.9%

According to the survey data (Table 4.6), the average number of people in a households is 4.5 people/household which is higher than average number of people in a household of country with 3.89 (Statistic year book, 2013). The average number of people in household is different from villages, group of income, and gender of householder (3.8 people/household for female and 4.6 people/household for male).
Table 4.2: Size of households according to the member

<table>
<thead>
<tr>
<th>Contents</th>
<th>Average member of a households</th>
<th>Size of household (%)</th>
<th>1-2 people</th>
<th>3-4 people</th>
<th>5-8 people</th>
<th>9 people and more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>4.5</td>
<td>2.6</td>
<td>48.2</td>
<td>48.2</td>
</tr>
</tbody>
</table>
| I/ Village
| Thach Ban Dong            | 4.4                             | 2.1                   | 51.6       | 46.3       | 0           |
| Thach Ban Tay             | 5.3                             | 0                     | 30         | 60         | 10          |
| Hoi son                   | 4.6                             | 14.3                  | 28.6       | 57.1       | 0           |
| II/ Ethnic
| + Kinh people             | 4.5                             | 2.6                   | 48.2       | 48.2       | 1.0          |
| + Minority                | 0                               | 0                     | 0          | 0          | 0            |
| III/ Householder’s gender | + Male                          | 4.6                   | 2.0        | 49.5       | 47.5        | 1.0              |
|                           | + Female                         | 3.8                   | 20         | 20         | 60          | 0                |
| IV/ Group of income
| Group 1 (rich)            | 0                               | 0                     | 66.67      | 33.33      |
| Group 2                   | 11.61                           | 58.93                 | 30.36      | 0.00       |
| Group 3                   | 0                               | 63.64                 | 36.36      | 0          |
| Group 4 (poor)            | 33.33                           | 50                    | 16.67      | 0          |

4.3.3 Occupation

Table 4.7 shows the survey results on the main occupation of 539 people of 123 affected households. 289 people (53.6%) engaged in farming (rice and vegetables), breeding of cattle and poultry (cow, cocks, duck, etc.). 141 people (26.1%) were at school age. There are also 9 government officials, accounting for 1.7%, 17 workers (4.9%). In addition, the data also showed that 17 people (3.2%) are in poor health condition and cannot work, 35 people are not in working age, (6.5%), 18 people are employees (3.3%). Therefore, the main occupation of local people in project area is farmer, so the impacts due to cut – off water for construction will affect most of people in project area.

Table 4.3: The main occupation of the affected households

<table>
<thead>
<tr>
<th>No.</th>
<th>Contents</th>
<th>Number of people</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Loss of working capacity</td>
<td>17</td>
<td>3.2</td>
</tr>
<tr>
<td>2</td>
<td>Agriculture, forest, fishery</td>
<td>289</td>
<td>53.6</td>
</tr>
<tr>
<td>3</td>
<td>Trade, service</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>4</td>
<td>Official staff</td>
<td>9</td>
<td>1.7</td>
</tr>
<tr>
<td>5</td>
<td>Student</td>
<td>141</td>
<td>26.1</td>
</tr>
<tr>
<td>6</td>
<td>Worker</td>
<td>17</td>
<td>3.2</td>
</tr>
<tr>
<td>7</td>
<td>Military</td>
<td>5</td>
<td>0.9</td>
</tr>
<tr>
<td>8</td>
<td>Housework</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>9</td>
<td>Employer</td>
<td>18</td>
<td>3.3</td>
</tr>
<tr>
<td>10</td>
<td>Unemployed</td>
<td>4</td>
<td>0.7</td>
</tr>
<tr>
<td>11</td>
<td>Children</td>
<td>35</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>539</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Survey data in March 2015
4.3.4 Income and living standards of households

Impact on society improvement:

The survey and assessment results show that the income of people in the subproject areas comes from agriculture production and activity, counting for 85% of total affected households (378 houses), the household bases on livestock development covered 75% of total surveyed households in the areas (Sources: survey result, 2015).

The deteriorated headwork of Thach Ban reservoir is the main constraint to socioeconomic development in the areas. Findings from social surveys shows, the average income in the project area is very low and often below poverty threshold. Most of the poor households think that their situation came from the water shortage for agricultural production. Water supply in winter – spring season is sufficient to crops but countable in summer – autumn season.

As a likely consequence of economic growth, about 3% of total survey household is living in poverty condition. Hardly, the poverty households in project area can access the local infrastructures and public utility services as well as educational. The poor households in project area have very limited access to the local existing infrastructures, services as well as education. An about 5.5% of total children under school age is uneducated or illiterate. Project communes are dominated by single women groups, it means that heavier manual works are carried out by this group. The proposed project will create job opportunity for this group, to help them to earn additional incomes.

The survey results of 123 households in table 4.8 show that the average income of the affected households varies from 3 million VND-5 million VND accounting for 59.4% and income is 5 million/ month accounting for 22.7%. The income level is low, living conditions of local people in project area face with many difficulties.

Table 4. 4: Monthly average income of the affected households in each group

<table>
<thead>
<tr>
<th>No.</th>
<th>Contents</th>
<th>Number of households</th>
<th>Percentage ( %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>From VND 1,000,000 to VND 2,000,000 (47-94 USD)</td>
<td>7</td>
<td>5.7</td>
</tr>
<tr>
<td>2</td>
<td>From VND 2,000,000 to VND 3,000,000 (94-141 USD)</td>
<td>15</td>
<td>12.2</td>
</tr>
<tr>
<td>3</td>
<td>From VND 3,000,000 to VND 5,000,000 (141 to 335 USD)</td>
<td>73</td>
<td>59.4</td>
</tr>
<tr>
<td>4</td>
<td>Higher VND 5,000,000 (more than 335 USD)</td>
<td>28</td>
<td>22.7</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>123</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Survey data in March 2015

b) Households generate income by relatively diverse activities, including:

The survey results in table 4.9 show that agricultural production activities have generated the most income (accounting for 73% of total income), salary/wages (20%), trade/services (6%) and the rest of sources with very small percentage (1%). Fluctuation range of the total average
annual income of households is quite large (from 20 million to 200 million VND, or 930 to 9,300 USD).

Table 4.5: People’s income rate

<table>
<thead>
<tr>
<th>No.</th>
<th>Source of income</th>
<th>Number of households</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agricultural production activities (cropping, farming, aquaculture, afforestation)</td>
<td>90</td>
<td>73</td>
</tr>
<tr>
<td>2</td>
<td>Trade, service, business</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Handicraft</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Salary/wages</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Savings, donations, deposits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Policy/revolution credited family support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Other sources</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>123</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

c) Self –assessment of living standard

Family life is commonly self-rated as not high; only 4 households (3.0%) self-rated as well-off, 113 households (84%) rated as medium, 12 households (10%) as needy and 3.0% as poor.

Table 4.6: Self-evaluation of family life

<table>
<thead>
<tr>
<th>Content</th>
<th>Wealthy</th>
<th>Medium</th>
<th>Needy</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of household</td>
<td>4</td>
<td>103</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Percentage (%)</td>
<td>3</td>
<td>84</td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

d) Food and nutrient

123 affected households show that 103 household (84%) are not in food lack, 11% of households in food lack from 1 to 2 months, only 5% of households in food lack for 3-4 months and no households in food lack for over 4 months/year.

Table 4.7: Food issue in the affected household

<table>
<thead>
<tr>
<th>No.</th>
<th>Lack of food</th>
<th>Number of households</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes, from 1 – 2 months</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>Yes, from 3 – 4 months</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Yes, more than 4 months</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>No</td>
<td>103</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>123</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

e) Change of living conditions

The survey results in Table 4.12 show that, 113/123 households (accounting for 92%) state that living condition is better over past 3 years, 8% of households stated that living condition does not change and no households stated that living condition becomes worse. Because of
the main income from agricultural production, there is a different between female householders and male householders.

Table 4.8: Living condition in over past 3 years

<table>
<thead>
<tr>
<th>Living condition</th>
<th>Number of household</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better</td>
<td>113</td>
<td>92</td>
</tr>
<tr>
<td>no change</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>worse</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

4.3.5 Education

There are two primary schools, one secondary school and neither high school nor vocational training school in project area. Education issue in project area has been improved in recent years; education at primary level achieved 100%, secondary level achieved 99.54%. Percentage of skilled workers is 20%, of which, primary level (3 months and more) takes 60%, college level takes 35%; university level takes 2%. Percentage of workers get job after training: 90%. Results of educational level survey of affected households (Table 4.13) show that, in total 539 people, there are 245 people (45.5%) subject to secondary education; 132 people (24.5%) subject to primary education. The number of college/university graduates is 44 (8.2%); and there are 30 people (5.5%) subject to under 6-years children or in the school age but never went to school. This shows that people are less interested in learning, the number of those pursuing higher education for work is few. Primary and secondary educational attainments takes higher percentage compared to other educational groups (24.5% and 45.5%). The situation of children dropping out of school in the province is not high (1%). Dropouts here are mainly because they do not want to learn. The commune has made universal primary education and 100% of children of 5 years old are pre-schooling. However, universal primary education has been made for only children born in 2005 onwards; hence, uneducated/illiterate situation still occur with children born in 2004 backwards. The educational activities and community training centre have positive contribution to education issue at the local. The educational motivation group collected budget of VND 13,805,000, timely support to poor students. However, the education system is not uniform; quality is not high. The infrastructure for education is limited; number of students in local is low. The scale of educational base is limited that leading to significant impact on education quality.

Table 4.9: Educational levels of household members

<table>
<thead>
<tr>
<th>Contents</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiteracy</td>
<td>6</td>
<td>1.1</td>
</tr>
<tr>
<td>Primary education</td>
<td>132</td>
<td>24.5</td>
</tr>
<tr>
<td>Secondary education</td>
<td>245</td>
<td>45.5</td>
</tr>
<tr>
<td>High education</td>
<td>69</td>
<td>12.8</td>
</tr>
<tr>
<td>Intermediate</td>
<td>13</td>
<td>2.4</td>
</tr>
<tr>
<td>College, university</td>
<td>44</td>
<td>8.2</td>
</tr>
<tr>
<td>No schools ever</td>
<td>30</td>
<td>5.5</td>
</tr>
<tr>
<td>Total</td>
<td>539</td>
<td>100</td>
</tr>
</tbody>
</table>
### Table 4.10: Number of school-aged children dropping out of school

<table>
<thead>
<tr>
<th>Children dropping out of school</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>92</td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

### Table 4.11: Causes of dropouts

<table>
<thead>
<tr>
<th>Causes</th>
<th>Boy (%)</th>
<th>Girl (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic difficulties</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Productive labour</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No want to learn</td>
<td>67</td>
<td>100</td>
</tr>
<tr>
<td>Poor learning capacity</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>School far way/ difficult travel</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Needless of high school</td>
<td>33</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

### 4.3.6 Land use

The total land area in the subproject area is 11,358.42ha. In particular, the area of agricultural land of annual crop is 874.27ha (7.69% of total agricultural land), perennial crop land is 995.27ha, (8.76% of total agricultural land), forestland area is 7,138.7ha, accounting for 62.8% of the total land area. Unused land area is 145.42ha accounting for 1.28%, there was no aquatic cultivation land.

According to the land use planning in subproject area, there are two main soil groups in this region. Detail is as following: Grey soil group (X) found in the upper stream of the reservoirs, acidity soil, average humus. The soil group is suitable for sugar cane, mango, pineapple cultivation, etc. Gley soil group (G) found in downstream of Thach Ban reservoirs, total areas of the group soil is 226.3ha, it suitable for paddy rice cultivation, Five soil samples and 5 sludge sample have been collected to exam and predict the negative impacts of the project implementation to soil quality or by the impacts of flow change and/or sediment load. The collecting positions of samples are show in table (table 4.5).

The total area of cultivated land in Cat Son commune is 1,256/1,869ha. Most households (99%) have local production land, 2,000m² and 112,000m² is the smallest area and biggest area, respectively (according to the quantitative survey).

#### b) Land use right certificate and undersigned person

A land use right certificate certifies the rights of land use to the granted, while confirming the ability to access land resources as well as other resources related to which this certificate is regarded as a condition (e.g. as financial resources). Consulting on the issue: “Who is named on a land use right certificate”. Consultant was advised that families today have agreed on the fact that this is not imperatively husband or wife. In addition, even if one is named, the purchase, sale, mortgage must be signed by both spouses. Thereby equality can be confirmed in access to resources in the province.

As reported, CPOs makes annual submissions to the DPC on LURCs issuance to local people (including residential land and production land). Thus, the percentage of those not having a
LURC certificate is not high: 4.5% for residential land; 1.8% for production land.

### 4.3.7 Health and access to health services

#### a) Health service infrastructure

Cat Son commune has a medical centre, the place has only one medical station with 2 beds and 8 function rooms service. The station was built in the areas of 1,129.5 m², of which the herbal plantation areas: 80 m². Total employer of the medical station are 6 staffs, including 1 medicine doctoral, nurse: 3, midwife: 1, population statistic: 1. Ten (10) public health care and family planning programs have been implemented to reduce the spread of diseases. Medication examination for high school students and olders are carried out regularly.

During construction, 80 workers will be mobilized. With such an infrastructure of health service, first aid and simple disease can be cured.

#### b) Sickness situation

**Table 4. 12: Sickness situation over the past 12 months**

<table>
<thead>
<tr>
<th>Sickness</th>
<th>Number of household</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>118</td>
<td>96</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>123</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

Within 1 year, 96% of respondents said that they have had sickness, common health problems often include (table 4.17):

**Table 4. 13: Morbidness**

<table>
<thead>
<tr>
<th>Health problems</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold</td>
<td>91</td>
<td>9</td>
</tr>
<tr>
<td>Respiratory disease</td>
<td>4</td>
<td>96</td>
</tr>
<tr>
<td>Fever</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>Cholera/dysentery</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>1</td>
<td>99</td>
</tr>
<tr>
<td>Poisoned</td>
<td>7</td>
<td>93</td>
</tr>
<tr>
<td>Accidents/injuries</td>
<td>3</td>
<td>97</td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

c) Health insurance

55% of respondents have health insurance coverage, 45% have no health insurance. There are still a large number of people without insurance participation, this is a big disadvantage for the people in the project area. Thus, policies should be concerned because the percentage of households in sickness is high in the project area.

d) Places of health examination

Private medical facilities and self-medication at chemists’ are chosen places of local people for minor sickness and no health insurance; going to higher routed hospitals has less
percentage because of difficult conditions of the project area for being located far from Provincial and District Centres for health care.

### Table 4.14: Place of health examination

<table>
<thead>
<tr>
<th>Places</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Commune Heath Stations</td>
<td>30</td>
</tr>
<tr>
<td>Inter-commune clinics</td>
<td>0</td>
</tr>
<tr>
<td>District hospitals</td>
<td>9</td>
</tr>
<tr>
<td>Provincial hospital</td>
<td>2</td>
</tr>
<tr>
<td>Central hospitals</td>
<td>1</td>
</tr>
<tr>
<td>Primate health care facilities in the commune</td>
<td>70</td>
</tr>
<tr>
<td>Self-medication at chemist’s</td>
<td>10</td>
</tr>
<tr>
<td>Treatment with traditional medicines</td>
<td>0</td>
</tr>
<tr>
<td>Home treatment with traditional leaves</td>
<td>0</td>
</tr>
<tr>
<td>No treatment/self-recovery</td>
<td>0</td>
</tr>
</tbody>
</table>

*Source: Survey data in March, 2015*

Factors that decline health of people include: 100% of interviewees said that diseases are from unsafe fruits and vegetables and other factors account for low percentages.

**4.3.8 Sanitation and house condition**

Housing is considered as one of the important criteria for assessment of the living standard of the people. Housing is also one of the criteria towards “new rural development” of localities. According to the “Report on implementation results of national target program of new rural development in 2014 and Orientations and tasks in 2015” by Cat Son CPC, the commune has 87.7% of houses reaching the Ministry of Construction’s standards and there is no temporary, dilapidated housing. According to the project survey results: 100% of the households are living in semi-permanent houses.

**4.3.9 Rural infrastructures**

**Rural transportation.** Transportation throughout the project areas is in relatively good condition. Currently, total length of the provincial road 634 (from North to South direction) is 6km with 100% of concreted road. The total length of existing inter-village roads are 21 km, include 7.5 km is concreted, and the entire of inter-road is mainly soil base. The field-interior roads are 13.0 km in length, are often difficult to access communes as the road networks are mainly unpaved, restricting transportation and trade, especially during the harvesting season.

**Electricity.** 100% of households within the project area are connected to the national grid via Phu Cat power station. Some connecting points of the power grid from distribution transformer station to household should renovate. Some connecting points of the power grid from distribution transformer station to household should be renovated. In case of construction, power supply of workers and machine operation will be connected with power grid of Cat Son commune.

**4.3.10 The social, religious organizations**
The social, religious organizations of Cat Son commune include women union, farmer union, youth union, educational encouragement, Buddhism association. The proportion of female is 10 – 20%

4.3.11 Physical cultural Resources

Cat Son areas have 3 physical cultural structures including the Mieu Son Nguyen, Mieu Son Van and Cay Roi. The total land areas of these site are 4,150m2. All of these structures are located in Thach Ban Tay village and far away from the construction site.

4.3.12 Other services

At the central of commune, waste is collected to a centralised disposal site of commune. The waste from other areas is not treated. There is no centralized wastewater drainage system wastewater from domestic and production is discharged directly into lake and river.

There is no clean water supply in Cat Son commune. Ground water is the main source of water for domestic use in region; water for production is taken from Thach Ban reservoir and Hoi Son reservoir via La Tinh river and irrigation system. In case of construction, water for domestic use of workers is well – water constructed by construction unit.

Cat Son commune agricultural cooperative responses to supply water to irrigate and dredge canals in the local. Irrigation costs subsidized under the regime of the state, the cost of water to irrigation is VND 500,000/ha/crop, currently.

4.3.13 Minorities and vulnerable households

Approximately, 0.8% percent of population of Cat Son commune is comprised of ethnic minority groups. The population within the project area is comprised of one main ethnic groups of Ba Na (11 household/38 person). The households are not being affected by the project implementation. In total of 23 affected households due to land acquisition, there are 2 vulnerable households including 01 single mother households and 01 poor household who are acquired land for service road, but total area of acquired land is less than 10% of total current area.

4.3.14 Gender features in the project area

Gender issues in the province have been improved since the Law on Gender Equality, for instance, no serious domestic violence occurred in recent years, women have been more involved in the family issues as well as social activities, gender discrimination has no longer existed in education and health... It should be noted that in the project area, people are all Kinh, no ethnic minority people so there is no different customs, habits of gender.

Table 4.15: Labour arrangement in the family

<table>
<thead>
<tr>
<th>Involvement in production activities</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Both</td>
</tr>
<tr>
<td>Crop production (rice, vegetables)</td>
<td>99</td>
</tr>
<tr>
<td>Breeding</td>
<td>98</td>
</tr>
<tr>
<td>Afforestation/ forest cares and protection</td>
<td>84.7</td>
</tr>
<tr>
<td>Forest products utilization</td>
<td>57.1</td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015
Table 4. 16: Labour arrangement in the family

<table>
<thead>
<tr>
<th>Involvement in family activities</th>
<th>Percentage</th>
<th>Both</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childcare</td>
<td></td>
<td>97</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>House cleaning</td>
<td></td>
<td>89</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Cooking/housework</td>
<td></td>
<td>76</td>
<td>0</td>
<td>24</td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

Table 4. 17: Labour arrangement in the family

<table>
<thead>
<tr>
<th>Involvement in community work</th>
<th>Percentage</th>
<th>Both</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community meeting</td>
<td></td>
<td>92</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Training on production</td>
<td></td>
<td>83</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Social and political activities</td>
<td></td>
<td>76</td>
<td>24</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

Table 4. 18: Labour arrangement in the family

<table>
<thead>
<tr>
<th>Decision making</th>
<th>Percentage</th>
<th>Both</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision making on big family expenditures (shopping valuable assets, weddings, etc.)</td>
<td>98</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Decision making on children’s study, profession</td>
<td>98</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Decision making on investment, production activities</td>
<td>89</td>
<td>11</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Survey data in March, 2015

To indicate the results of gender analysis in the province, the consultant collected data, synthetized and analyzed gender issues in local decision making process and other qualitative and quantitative research results for the analysis of gender issues in the province.

a) Gender issue in politics

Gender in politics is evaluated based on the summary of civil officials, full-time and non-full-time of communes in the same project. Because the data collected is not really sufficient, analysis only based on statistics collected by Cat Son commune. Overall, the percentage of women participating in the staffing system/full-time/non full-time is low. In two full-time female officials, one is in charge of culture and society, one is the president of Commune Women’s Union. Secretary and Vice-Secretary of the Party Committee, CPC President and CPC Vice president in charge of economy are men. In five female civil officials, 2 work in office administration, 1 accountant, 1 in charge of Justice/Births-deaths-marriages and 1 in charge of culture. In three local land survey officials, none is female.

Thus, the percentage of female participation in communal government system is low, and women are not positioned to make decisions, both economically and politically. Besides, participants positioned to make decisions are Kinh people (Party Secretary, CPC President, 2 CPC Vice presidents).

b) Participation in family and community activities
Labour arrangement is seen as by gender in the project area. Although all activities are participated by both women and men, there is different arrangement in each field; in agricultural activities, men involve the most in earth work, transportation, and women involve the most in care and breeding work. Labour arrangement in the province is not quite different from studies, analysis of existing labour arrangement in Vietnam: Women participate in production, reproduction and care activities while men are mainly engaged in manufacturing activities.

Community activities such as community meetings, training on production activities and political organization activities, participation percentage of both spouses were approximately 50%, participation rate of men is higher than women (8% in community meetings; 17% in training on production; and 24% in political organization activities). Thus, key role in community activities participation is occupied by men. And this reflects the restrictions on women’s access to information, knowledge, including information, knowledge of production, family economic development.

There is a link between active groups in labour arrangement by gender as follows: When women have to spend too much time on caring and reproduction activities, they will have no time for production and community activities; moreover, limited knowledge and information due to lack of time to participate in community activities makes it difficult to engage in production activities. Meanwhile, only production activities generate income and area assumed as more important activities. Clearly, the involvement of women is limited than men on project activities related issues, such as consultations, information disclosure, detailed measuring survey, compensation..Inequity will make women more vulnerable when there is no opportunity to participate.

Although the percentage of women and men altogether engaged in family decision making is over 80.0% (98% for family large spendings, 98% for children’s study/career, 89% for production investment), more men than women make decisions on family work, for instance, production investment is nearly definitely decided by men.

c) Female heads and gender issue in families

In female headed families, husband and wife area equally involved in care and production work, female participation in community meetings and social and political organizations is higher than male participation. In the consultation process, questioned on invitation for community discussions on issues of land, project or production activities, the Consultant was advised that household heads are often invited; is this the reason for more opportunities to access information will be given to whom as household heads. For families headed by women: women who area heads also play a more decisive role than men in their families. Regarding family large spending in female-headed families, 70% decided by the couple and 30% decided by the wife, men are not engaged in deciding the matter. Regarding chosen career, percentage of women and men in decision making is 30.0% and 10.0%, respectively; Women deciding on production investment accounted for 35.0% compared with men of 10.0%.

4.3.15 Communication on the project

Communication is one of the critical issues affecting the project success. An assessment on the project communication will contribute to the development of communication strategies, provided information and capacity building for people in the project area. Most representatives of households (household heads) are knowledgeable about the project
implementation. Such good source of information is mainly disclosed in village meetings (68%), hearing from CPC officials (27%), no available sources of radio, newspapers, TV.

4.3.16 Management features of construction

The operation of the reservoir is control by the agricultural cooperative of the Cat Son commune. The operation unit could also regulate the water flow by open and close the regulate valve of outlet works, maintainance and small repair of appurtenant strutures of dam, check the safety condition of headworks before releasing water to downstream.

The operatiop and management fees is come from the irrigation fees and donation of the beneficial person, For the big repair and construction, the budget support from goverment and from local governance. However, because of limitation of budget, maintenance, repairing do not meet the requirement that leading to serious deterioration of headworks of Thach Ban reservoir, which may increase loss of safety for downstream, decrease effective use of water.

4.3.17 Existing conditions of the reservoirs and dam

Thach Ban reservoirs was built in 1978 for irrigation. The reservoir is designed to store 772,000m³. However, the main construction and the appurtenant structures of the dam have been deteriorated as detailed below:

*Embankment,* The downstream slope with erosion gully, lacking drainage layer, later seepage through tranverse crack due to erosion progress. Many depressions, sink holes or longitudinal cracks at the left abutment of the embankment have been occurred.

*The upper stream slope* Outer layer: the slope upon which the riprap is placed and lateral spreading or dislodging of one large rock may cause displacement of the surrounding rock due to a lack of adequate support. The inner layers (filter layers): are removed due to wave action erosion and degradation. Severe depressions and sinkholes or beaching with size of 50-60cm in depth have been occurred at 2-2.5m of the free board of embankment, lacking parapet-wall. Several parts of the top of dam are irregular elevation, change from +52.50m to 52.90m. Surface of the dam is eroded and have many traversed cracks. Top width (top thickness) of the dam is narrowed due to erosion progress and material degradation.

*The spillway* has crest width of B=30m and slope L =50m. Stilling basin (Plunge basin) structure is rockfill structure and is sediment.

The Outlet works was built 1990’s, the water intake and outlet work have been deteriorated which lead to seepage formation and water lost. The valve of the outlet work intake has been broken and un-controllable.

Existing land use at the proposed disposal site is paddy field. The land has been being managed by the Cat Son community authority and leased to local households for rice cultivation. The two proposed borrow pits are currently either eucalyptus plantation or annual crop land for cassava or watermelon. There is no existing resident or local house in these sites.

*Access road:* total length is 845m, with 750m of earth road, width of road is expected to extend to 2.5m to 4m, including 3m of reinforced section and 0.5m buffer zones each side. This road goes through paddy field with 10 households living along two sides of road.
Figure 4. 9 Paddy filed is along service road

Figure 4. 10: Crop land is along service road

Transportation road from construction site to borrow pit: the distance from borrow pit to dam is 1km, this soil managed by People’s Committee of Cat Son commune does not affect land acquisition. Two sides of road is crop land, there is no households living in there and no public construction.

Figure 4. 11: Crop land is along road from construction site to borrow pit

Waste transportation road: distance from disposal areas to construction site is 100m, this land is managed by Cat Son CPC, and local people use to cultivation via a contract with local authority. Along the road is unused land and there is no local house existing.

Figure 4. 12: The road to the disposal areas
CHAPTER V. ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT

5.1 Environmental and social eligibility screening of the sub-project

5.1.1. Environmental and Social impacts screening

The scope of work under this subproject include: (i) dam repair, seepage treatment, excavation, harden dam surface, upstream and downstream slopes reinforcement for erosion control; termite treatment; (ii) build or repair new drainage system at the toe downstream slopes; (iii) spillway rehabilitation, stilling basin extension, spillway crest repair; (iv) outlet works replacement; (v) upgrading access roads.

According to the result obtained from environmental and social screening of the sub-project (see Table 4.1, annex 5) and the result from potential impacts screening for environmental and social (table 4.2, annex 5), in the sub projects areas, there are no ecotourism activities, navigation, aquaculture, fishing or nature reserves, the rare animal, sail, turtle, fish and special plant species, there is also no special ecological system or biodiversity reservation areas nor importance physical cultural resources either, no household impacted by residential land acquisition or relocation, no minority households are affected by the project implementation:

Most potential impacts of the proposed sub-project are mainly in land acquisition (production land), material transportation assessed at medium to low level and reversible. Following the screening results, required documents to complete Thach Ban sub-project must be done with:

- ESIA report and its annexes:
  - Environmental ans social screening (A4)
  - Environmental specification in bid document and construction contract (A8)
  - Chance fine procedure (A9)
  - Termite treatment (A10)
  - Integrated pest management-IPM (A11)
  - Gender Action Plan (B4)
  - Public Health Intervention Plan (B2)
  - Public consultation, Participation and communication strategy (B3)
  - Grievance Redress mechanisms (B5)
  - Information disclosure, accountability and monitoring (B6)

- Resettlement action plan (RAP) report - saperated document

- Dam safety report- saperated document

5.1.2. Ethnic minority screening

As part of the social assessment, where ethnic minority (EM) peoples are present in the subproject area –as confirmed by the EM screening (as per Bank’s OP 4.10), consultation were carried out in a free, prior, and informed manner, to confirm if there is broad community support from affected EM peoples for the subproject implementation. EM screening was conducted as per Bank’s OP 4.10, and was done the scope and coverage of the social assessment vis-à-vis the environmental assessment (OP 4.01).

The results of ethnic minority screening showed that there are not any ethnic minority people living in the subproject area (including affected communities and beneficiaries). Therefore, it
need not to prepare a ethnic minority development plan for this subproject.

A gender analysis was also done as part of the SA to understand underlying gender dimensions (from project impact perspective), and to enable gender mainstreaming to promote gender equality, enhance further the development effectiveness of the subproject, as well as the whole project. A gender action plan was prepared in the Appendix B4 of this Report).

5.2 Potential Positive Social and Environment Impacts

Thach Ban sub-project implementation provides some potential positive impacts to environment and social aspects, they are:

*Enhance Safety for the dam.* The rehabilitation of the dam under the sub-project will reduce the safety risk related to dam failure and improve their reliability of existing irrigation service.

*Improved irrigation service:* The repair of the headwork will contribute to regulate the flow of water in rainy and dry season, provide improved water supply for agricultural production and domestic use in dry season. The area of cultivation land to be irrigated in each crop will be increased as indicated in the Table 5.1 below:

<table>
<thead>
<tr>
<th>Contents</th>
<th>Winter-spring rice</th>
<th>Summer-autumn rice</th>
<th>Spring summer rice</th>
<th>Winter–spring crop</th>
<th>Summer–autumn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without sub-project</td>
<td>45</td>
<td>45</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>With sub-project</td>
<td>85</td>
<td>85</td>
<td>40</td>
<td>45</td>
<td>30</td>
</tr>
<tr>
<td>Difference</td>
<td>+40</td>
<td>+40</td>
<td>+25</td>
<td>+30</td>
<td>+15</td>
</tr>
</tbody>
</table>

*Source: subproject investment report, 2015*

Total profit that the subproject brings about with regard to agricultural production is estimated at VND 5,251,000,000 per year

**Table 5.2. Summary of effectiveness crops before and after project**

<table>
<thead>
<tr>
<th>Contents</th>
<th>Without sub-project</th>
<th>With sub-project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area (ha)</td>
<td>Total income (VND x106)</td>
</tr>
<tr>
<td>Winter-spring paddy rice</td>
<td>45</td>
<td>611</td>
</tr>
<tr>
<td>Summer-autumn paddy rice</td>
<td>45</td>
<td>531</td>
</tr>
<tr>
<td>Spring-summer paddy rice</td>
<td>15</td>
<td>67</td>
</tr>
<tr>
<td>Maize</td>
<td>9</td>
<td>101</td>
</tr>
<tr>
<td>Cassava</td>
<td>6</td>
<td>237</td>
</tr>
<tr>
<td>Total</td>
<td><strong>1,547</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Source: subproject investment report, 2014*

**Impact on society improvement:**

The survey and assessment results show that the income of people in the subproject areas comes from agriculture production and activity, counting for 85% of total affected households (378 houses), the household bases on livestock development covered 75% of total surveyed households in the areas.
The damaged headwork of Thach Ban reservoir is the main reason affects to economic – social development of the areas. Surveys illustrate that average income within project area communes is very low and often below poverty standards. Most of poverty households think that their situation came from the water deficit to agricultural production. Water supply in winter – spring season is sufficient to crops but countable in summer – autumn season. As a likely consequence of economic growth, the survey and assessment results show that the income of people in the subproject areas is not so high, about 3% of total survey household is living in poverty condition. Hardly, the poverty households in project area can access the local infrastructures and public utility services as well as educational, about 5.5% of total children under school age is uneducated or illiterate. Project area communes are dominated by single women groups, it means that heavier manual labour is carried out by the group in a village. Therefore, with project implementation, creating the opportunity to the group and increase their incomes.

5.3 The potential negative social and environmental impacts

5.3.1 The historical negative impacts and mitigation actions

The historical accidents: Thach Ban reservoir was built in 1978. Since then, there is no serious accident happened. However, since 1991, the appurtenant structures of dam have been deteriorated and not functioning:

- The original outlet works was not designed properly, it was not safe and risky for the operators, large amount of water was leak and it was not possible to control water for irrigation
- The original width of the spillway was 20 m and was insufficient for floodwater release during flood. The downstream of the spillway has been eroded deeply due to the floodwater discharged through the spillway.
- Leakage through the outlet work reduced the reservoir’s storage capacity. The reservoir only has enough water to irrigate the first half of the summer – autumn crop. Water for the autumn - winter crops is dependent on rain water thus unreliable, affect the crop productivity and livelihood of 355 households in the serviced areas.

In 1991, the work has been rehabilitated with:

Removed the old 20 m wide spill way and relocate the new spillway to the right abutment of the embankment. The width of the new spillway is Bt = 30m, clay training spillway with thickness of 45cm was built for leakage treatment.

- Increased the length of dam from 510m to 850m toward the end of right abutment of embankment. The new extended section with length of 700 m is treated by clay with thickness of 40-50 cm to prevent seepage.
- Outlet works was re-constructed with sluice-type controlled by stop valve V5 with working bridge on top
- In 2006, the spillway crest was rebuilt with length of 70m, width of 25m by concrete, training spillway walls are stone.

The remain issues needs to be addressed in the subproject

- The body of outlet works concrete has cavity, there are seepages along the outlet causing water lost to the reservoir
- There are many sinkholes within the embankment caused and safety risks. There is no rain water collection system on dam slople. As the result, downstream slope has been eroded significantly. Dam surface has not been hardened with concrete in accordance with the new safety design standard.
- The access road servicing road which will also be functioning as rescue road is still earth fill and saturated in rainy season. This is an obstructions for rescuring activities in emergency.

5.3.2 Land Acquisition and Gender Impacts

Land acquisition. It is estimated that 49,803 m$^2$ of land will be permanently acquired for access road expansion and rehabilitation, construction of head-works and material pit. This will include 22,981.1 m$^2$ of garden land and annual tree land, 1,364 m$^2$ of rice fields, 22,689.8 m$^2$ of perennial tree land of 22 households and 2,759 m$^2$ of public land managed by Cat Son CPC.

11,091 m$^2$ of temporarily acquired for construction site including camping site, dumps site and construction road; including 1,812.4 m$^2$ for construction road and camping site as gardens of 5 households and 9,278.6 m$^2$ for dumps site as gardens of 7 households.

In comparison with RAP 2015, the permanently acquired land increases 45,779 m$^2$ more compared to the impacts estimated in RAP 2015. The increased area is mainly due to the acquisition of land for borrow pit which was not included in RAP 2015 as permanently acquired. The area of borrow pit is 42,474 m$^2$, belong to 8 households, none of them is acquired more than 20% of the total production land. The household having the largest area of land acquired is Mr. Phan Canh Sanh, with a total of 19,795 m$^2$ out of 120,580 m$^2$ as his total productive land, i.e. 16%. After the completion of the project, the area will be returned to the CPC for management and these households will be prioritized to continue their farming activities.

In 34 affected households due to land acquisition for opening access road and auxiliary structures, there are 1 vulnerable households (Mrs. Phan Thi Kim Dung is the beneficiary to the social welfare as regulated by the Government) with total land acquisition is 128 m$^2$ out of 3,428.7 m$^2$, below 10%. During public consultant, the affected households would like to get cash for their properties-lost (land, house), it does not effect much to the household because the land acquisition by the state < 20% of total land, they still have another alternative for cultivation. The affected households of sub-project want to use the compensation budget to feed their children, and save money in a bank to get monthly interest.

Impact on gender: women dominated 34 households who are acquired land in Cat Son commune and they have to find another income sources to keep their household economic in balance. Therefore, the project owner have to create an opportunities to them to find a job during the project implementation.

Impacts on Income and living standard of local resident: The establishment of construction camp with 80 workers could put additional pressure on the existing infrastructure and community services such as community services and staff for medical care, emergency, safety, etc.), markets sanitation service, food and water supply. Due to the Employer has adjusted construction time of dam and outlet repairs during 16 June to 31 August (when irrigation activities do not take place) no household is affected by water cut-off for construction.
5.3.3 Construction Impacts

Generally, there are a number of socio-environmental impacts which occur during the rehabilitation and upgrading of a dam project. Landscape will be altered by construction works, exploitation of construction materials and waste disposal. Trees and vegetation cover will be removed from the land to be acquired. Dust, noise and vibration will be generated from dam and access road rehabilitation and transportation. Solid waste and wastewater will be generated from construction sites and workers camps. Irrigation service will be disrupted during the replacement of the water intake. Loss of vegetation cover, changes in drainage pattern, erosion potential and possible sedimentation would be issues of concerns at borrow pits. The introduction of workers and construction plants to the project area would cause social disturbance to local community. Construction activities, transportation, unloading or disposal of construction materials and wastes would cause safety risks to both local communities and the workers.

Impacts assessment will be made based on the resources to be mobilised and the volume of work under subproject listed below.

**Table 5.3: Estimation of construction volume**

<table>
<thead>
<tr>
<th>Work item</th>
<th>Number of Worker</th>
<th>Equip. (set)</th>
<th>Excavated materials (1000m³)</th>
<th>Filling (m³)</th>
<th>Other materials</th>
<th>Transport distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dam rehabilitation</td>
<td>30</td>
<td>17</td>
<td>110,000</td>
<td>97,000</td>
<td>13,000m³ and 3,400 tones</td>
<td>Soil: 1 km Construction materials: 30 km</td>
</tr>
<tr>
<td>Outlet works</td>
<td>10</td>
<td>9</td>
<td>7,500</td>
<td>7,700</td>
<td>1,800m³ and 96.8 tones</td>
<td>Soil: 200m Cement, steel: 30 km</td>
</tr>
<tr>
<td>Spillway</td>
<td>20</td>
<td>17</td>
<td>1,500</td>
<td>1,600</td>
<td>1,500m³ and 89 tones</td>
<td>Soil: 500 m. Cement, steel: 30 km</td>
</tr>
<tr>
<td>Access road</td>
<td>20</td>
<td>11</td>
<td>1,300</td>
<td>2,000</td>
<td>1,200m³ and 206 tones</td>
<td>Soil: 500m; Cement, steel: 30 km</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>80</strong></td>
<td><strong>53</strong></td>
<td><strong>120,300</strong></td>
<td><strong>108,300</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The key potential impacts of the subproject are discussed below:

**Landscape modification.** Major landscape will be occurred in borrow pits and disposal areas. The permanent landscape change may not only impact on landscape but also on wildlife and their habitats, drainage pattern increases erosion potentials, landslide risks and affect accessibility to the surrounding areas of disturbed areas. These potential impacts are not avoidable but manageable through engineering design measures and construction site management.

**Biological impacts.** The main biological impacts of the subproject is limited. These mainly related to tree cutting during site clearance at borrow pits, workes camp site, construction of access road, storage area with total land area of approximately 60,894m². This impact mainly occurs at pre-construction or at early stage of construction. The trees to be removed under subproject include 5,514 eucalyptus and cacia trees, 7 coconut trees, 263 peach trees, 2 tamarind trees, 12 orange and lemon trees, 2 payaya trees, 229 banana trees, 13 mango, guava, jackfruit, plump, avocado trees and 191 Meliaceae trees planted on the land to be acquired. Although these
trees have economical rather than biological values, removal of trees and vegetation cover, ground disturbance as well as other construction activities may disturb wildlife in the area. However, this biological impact is insignificant as no species or areas of biological important are affected. Seasonal vegetation cover will be lost, this impact is unavoidable but reversible in temporarily acquired land.

Before construction is started, water in the reservoir is gradually discharged to the downstream through irrigation channel, thus there will be no sudden change in hydrological regime in neither upstream or downstream of the reservoir, thus there would be no harful effect to aquatic species in the reservoir. When water is discharged to the downstream through the outlet works and irrigation canal, some aquatic species may follow the water to downstream to irrigation canals, crop lands and may some finally find ways to enter natural waterways that are connected to irrigated crop lands. At the upstream of the reservoir, in dry season, certain amount of water is maintained for aquatic lives as water in the reservoir cannot be discharged to downstream when water level is at dead water level.

During the rehabilitation of the dam and its ancilary works, of the waste and wastewater generated from construction sites enter water bodies, water quality would be affected and thus would affect aquatic life in the reservoir. However, the potential impacts will be limited as the construction would take place mostly on dam crest and in the area surriding the dam face, outlet work and the sluices. This potential impact will be further limited with the construction of coffer dams to be built to keep the water away from the structure but also prevent pollutants from coming into water in the main dam. Contractor will also be required to implement mitigation measures to minimise the potential impacts on the water quality of ther reservoir.

*Increased level of dust, gas emission, noise and vibration.*

- **Dust**

  Increased level of dust may be resulted from site clearance, excavation, leveling, truck hauling, loading and unloading loose material, waste disposal, road rehabilitation, and transport vehicles. Concrete batch mixing and road traffic on unpaved roads combined with idling of vehicles can generate air born dust (suspended particulate matter) and gaseous emissions such as NO$_x$, SO$_x$ and carbon monoxide. Dust can be released from unwashed machine and transportation vehicles, especially in a sunny days or drying season the dust clouds can upraise to 200m height in the air.

  **Dam.** The volume of construction materials includes 3,048 m$^3$ of sand, 9,625 m$^3$ of stone, 1,272 tons of cement, 2,159 tons of steel. These materials are transported from Quy Nhon city with distance of 30km to construction site via national high way 1A, provincial road (TL) 634 to the Son Loc Bridge. The transportation route will also pass the Cat Son School.

  **The outlet work.** The volume of construction material includes: 144.8 m$^3$ sand, 1,331 m$^3$ stone, 75 tons cement, 14 tons steel.

  **Spillway.** The volume of solid waste need to carry out is 1,490 m$^3$. The volume of materials transporting to construction site: 657 m$^3$ of sand, 1105 m$^3$ of stone, 27.8 tons of cement, 69 tons of steel. The material transportation routes will increase dust contents into environment of Thach Ban Dong village.

  **Access road rehabilitation.** with transportation volume of 1,300 m$^3$ of waste soil from construction site to disposal site (distance 500m), and transportation construction materials:
200 tons of cement, 0.6 tons of steels, 543 m³ of sands, 660 m³ of stone.

The estimated volume of dust generating from each of the above component are 17.8 tones from the main dam rehabilitation, 167 kg from the access road road, 84 kg from the outlet rehabilitation and 250 kg from spillway rehabilitation as shown in Table 5.4 below:

### Table 5.4. The estimated dust volume

<table>
<thead>
<tr>
<th>No.</th>
<th>Content</th>
<th>Emission (g/m³)</th>
<th>Transportation volume (m³)</th>
<th>Estimated volume of dust (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td><strong>Main Dam Rehabilitation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Earthworks, ground leveling</td>
<td>1-100</td>
<td>171,800</td>
<td>17,180</td>
</tr>
<tr>
<td>2</td>
<td>Material off load (cement, soil, sand, stone…) by using machines.</td>
<td>0.1-1</td>
<td>173,072</td>
<td>173</td>
</tr>
<tr>
<td>3</td>
<td>Cement mixing, concrete casting</td>
<td>0.1-1</td>
<td>1,272</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Construction material falling down from transport vehicle</td>
<td>0.1-1</td>
<td>16,104</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-Total</strong></td>
<td></td>
<td></td>
<td>362,248</td>
</tr>
<tr>
<td>B</td>
<td><strong>Spillway</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dust generating due to material unloading process (cement, soil, sand,</td>
<td>0.1-1</td>
<td>2,455</td>
<td>245</td>
</tr>
<tr>
<td></td>
<td>stone…)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Dust generating due to construction, cement mixing, concrete casting</td>
<td>0.1-1</td>
<td>41.7</td>
<td>0.04</td>
</tr>
<tr>
<td>3</td>
<td>Material construction trucks drop soil, sand, etc on road surface generating dust.</td>
<td>0.1-1</td>
<td>3,519</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-Total</strong></td>
<td></td>
<td></td>
<td>6,015</td>
</tr>
<tr>
<td>C</td>
<td><strong>Outlet work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dust generating due to earthworks, ground leveling</td>
<td>1-100</td>
<td>7,452</td>
<td>74.5</td>
</tr>
<tr>
<td>2</td>
<td>Dust generating due to material unloading process (cement, soil, sand,</td>
<td>0.1-1</td>
<td>7,502</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>stone…)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dust generating due to construction, cement mixing, concrete casting</td>
<td>0.1-1</td>
<td>50</td>
<td>0.05</td>
</tr>
<tr>
<td>4</td>
<td>Material construction trucks drop soil, sand, etc on road surface generating dust.</td>
<td>0.1-1</td>
<td>2,264</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-Total</strong></td>
<td></td>
<td></td>
<td>17,268</td>
</tr>
<tr>
<td>D</td>
<td><strong>Access road</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dust generating due to material unloading process (cement, soil, sand,</td>
<td>0.1-1</td>
<td>1,507</td>
<td>151</td>
</tr>
<tr>
<td></td>
<td>stone…)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Dust generating due to construction, cement mixing, concrete casting</td>
<td>0.1-1</td>
<td>1,783</td>
<td>1.8</td>
</tr>
<tr>
<td>3</td>
<td>Material construction trucks drop soil, sand, etc on road surface generating dust.</td>
<td>0.1-1</td>
<td>14,063</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td><strong>Sub-Total</strong></td>
<td></td>
<td></td>
<td>17,353</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>Approx. 19 (tons)</td>
</tr>
</tbody>
</table>

The total dust generated from these activities from the four main construction activities is estimated at approximately 19 tons. It may cause decreases in air quality and also affect the health of the construction workers and the communities living in the vicinity of the project area, particularly along the access road, borrow pits and the disposal sites.

Total dust generating from those material will be 2.3tons. Dust (include high contents of NO₂,
CO, CO₂) can cause respiratory and skin diseases, general suspended particles in the air may cause nuisance, constraint visibility and harm the worker health on site and local resident living nearby. The impact assessed at moderate level.

- **Gas emission**

*Dam.* 94,580m³ soils will be transported to disposal site by using diesel engine trucks with distance of 1km. Thus, in order to transport all the waste soil to disposal site, it need 22,500 trip of transportation vehicle (loading rate 7 tons per time). The construction materials (sand, cement, steel) will be transported to construction site by using 10 tons truck and so need 23,746 times of transportation.

*Spill way.* In order to transport 1,490m³ of solid waste to disposal site with distance of 500m, approximately 394 times of 7 tons truck are required; to transport construction material, 799 times of 10 tons truck are required entering construction area.

*Outlet work.* In order to transport 7,451m³ of waste soil, approximately 2394 times of 7 tons truck are required, transport construction material, 352 times of 10 tons trucks.

*Access road.* With an approximately 499 trips of transportation by 7 tons trucks in distance of 500m to disposal site, the volume of exhausted gas generating by 606 times of transportation of 10 tons truck for material transportation.

The estimated volume of exhaust gas emitted from the project is shown in Table 5.5 below.

**Table 5.5: Estimation of gas emission from transportation**

<table>
<thead>
<tr>
<th>No.</th>
<th>Contents</th>
<th>Number of trip (trip)</th>
<th>Estimated emission volume (kg/ton of waste oil)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>SO₂</td>
</tr>
<tr>
<td>I</td>
<td>Main Dam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Emission generating from soil transportation</td>
<td>22,500</td>
<td>8.3</td>
</tr>
<tr>
<td>2</td>
<td>Emission generating from material transportation</td>
<td>23,746</td>
<td>871</td>
</tr>
<tr>
<td></td>
<td>Sub-Total</td>
<td>46,246</td>
<td>879.3</td>
</tr>
<tr>
<td>II</td>
<td>Spillway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Exhausted gases generating from soil transportation</td>
<td>394</td>
<td>243</td>
</tr>
<tr>
<td>2</td>
<td>Exhausted gases generating from material transportation</td>
<td>799</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Sub-Total</td>
<td>1,193</td>
<td>272</td>
</tr>
<tr>
<td>II</td>
<td>Outlet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Exhaust generating from soil transportation</td>
<td>2,394</td>
<td>0.87</td>
</tr>
<tr>
<td>2</td>
<td>Exhaust generating from material transportation</td>
<td>352</td>
<td>13,033</td>
</tr>
<tr>
<td></td>
<td>Sub-Total</td>
<td>2,746</td>
<td>13.90</td>
</tr>
<tr>
<td>III</td>
<td>Access road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Exhaust generating from soil transportation</td>
<td>499</td>
<td>0.3</td>
</tr>
<tr>
<td>2</td>
<td>Exhaust generating from material transportation</td>
<td>606</td>
<td>21.78</td>
</tr>
</tbody>
</table>
**Increased noise level and vibration**

In pre-construction phase, three types of construction machines will be used. Average noise of bulldozer varies from 77-95 dBA, soil excavator is 72-96 dBA and truck is 70-96 dBA, while the permitted noise for bulldozer and excavator is 90 dBA, truck is 88 dBA. Thus, the level of noise generated from these construction machines will be below the allowable level.

During construction phase, with a set of 53 machines and equipment working on site, this impacts generating from clearing, grading, excavation, levelling, truck hauling, stockpiling, waste disposal, road development, transport vehicle, and on site construction. It contributes an inconvenience condition to the people living around the sites and to the workers. If high frequency and high level of noise in long time exposure, some negative impacts will occur to the people and worker, reduce the yield of words, causing fatigue, stress, etc. But these impacts are most likely insignificant impact due to the resident areas located far away from construction areas (1km).

The duration of impact is anticipated to be low as appropriate mitigation measures shall be applied during the construction phase.

**Solid waste from site clearance and excavation.** Solid waste will be generated from site clearance, removal of top soil layer, debris from construction and campsites;

*During pre-construction phase,* solid waste will be generated from tree cutting, removing the top soil layer, debris from camp and storage area sites; 30,000m³ of waste soil, broke stone are expected to be generated be generated by refill the excavated areas in the borrow pit. The tree cutting in the clearing areas handled by household, because the compensation plan included the cost of tree cutting to the affected household and clearing ground. 10 workers are expected to work at pre-construction will generated 5 kg of solid waste each day.

*During construction phase,* the volume of soil to be excavated from construction items is 120,134 m³, the volume of soil to be reused for filling is 15,263 m³, the residual volume of 105,051 m³ will be dumped at disposal site by dump truck, 1 km distance from dam (table 5.6):

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Unit</th>
<th>Excavated soil</th>
<th>Reuse soil for filling</th>
<th>Residual volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dam</td>
<td>m³</td>
<td>110,073</td>
<td>6,795</td>
<td>94,810</td>
</tr>
<tr>
<td>2</td>
<td>Outlet works</td>
<td>m³</td>
<td>7,451</td>
<td>-</td>
<td>7,451</td>
</tr>
<tr>
<td>3</td>
<td>Spillway</td>
<td>m³</td>
<td>1,490</td>
<td>758</td>
<td>1,490</td>
</tr>
<tr>
<td>4</td>
<td>Access road</td>
<td>m³</td>
<td>1,300</td>
<td>2,010</td>
<td>1,300</td>
</tr>
<tr>
<td>5</td>
<td>Cofferdam</td>
<td>m³</td>
<td>-</td>
<td>5,700</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td><strong>120,314</strong></td>
<td><strong>15,263</strong></td>
<td><strong>105,051</strong></td>
</tr>
</tbody>
</table>

Table 5.6: The volume of waste soil in construction phase
80 workers and staff will be working at construction site, the estimated volume of domestic waste generating is 40 kg of waste /day (equal 0.5 kg of waste/person/day). Therefore, the volume of construction solid waste generated under the subproject to be disposed of under the subproject will be approximately 105,000 cubic meters (from the dam, spillway and outlet) plus domestic waste from workers camps. With the 10,000 m² of disposal site, the dump will be approximately 5m higher than the existing ground elevation, equivalence 55,000 m³ of wastes generation dumping into landfill areas, the rest will be used to fill the excavated part in borrow pit. Social and environmental implications associated with solid waste disposal site may include:

- Loss of existing vegetation cover and trees planted at the disposal site
- Erosion potentials related to new barren soil surface exposed to wind and surface runoff
- Disruption to existing drainage pattern and potential localised flooding by rain water
- Slope stabilisation issues
- Interupt access to the nearby cultivation land, houses, and existing infrastructure, if any
- Safety risks to workers and local community along the 1 kilometer transportation route and nearby the disposal site

**Construction wastewater.** Construction wastewater is generated mostly from the activities such as concrete mixing, vehicle washing, machine and equipment cleaning, and construction material preparation. The estimation volume of construction wastewater at each site is from 3 m³ to 5 m³/day. Construction wastewater contains high suspended solid, inorganic matter and debris, low pH. The main small impacts of this wastewater are causing sedimentation in local canal systems and downstream areas and can be managed through site management measures. But with low wastewater. According to the research of Centre of environmental engineering of Ha Noi University of construction, the discharge and concentration of pollutant factors in wastewater are shown in Table 5.7:

<table>
<thead>
<tr>
<th>No</th>
<th>Sources</th>
<th>Discharge (m³/day)</th>
<th>COD (mg/l)</th>
<th>Grease (mg/l)</th>
<th>SS (mg/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wastewater from cleaning machine</td>
<td>5.0</td>
<td>50-80</td>
<td>1.0-2.0</td>
<td>150-200</td>
</tr>
<tr>
<td>QCVN 24:2009/ BTNMT (B)</td>
<td>6.3</td>
<td>100</td>
<td>5</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

(Source: Centre of environmental engineering of Ha Noi University of construction)

**Waste and wastewater from workers’ Camps.** Calculation of domestic waste and wastewater generated by workers will be based on 0.5 kg/person/d and 48L of wastewater per day. Construction of access road take place in January and February of the first year and June to August of the following year while the works in the other items will be executed from April to August of the first year, and from January to August of the second year. Taking the most disadvantage case, i.e. one group working on each work item most of the time there will be up to 60 workers working at the site and most while the last three months in the second year there will be up to 80 workers working at the site.
Table 5.8: Volume of domestic solid waste in construction phase

<table>
<thead>
<tr>
<th>Items</th>
<th>Number of workers (persons)</th>
<th>Construction duration (months)</th>
<th>Domestic waste (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dam</td>
<td>30</td>
<td>13</td>
<td>30 persons * 0.5 kg/d * 30 days * 13 months = 5850 kg</td>
</tr>
<tr>
<td>Outlet</td>
<td>10</td>
<td>5</td>
<td>10 persons * 0.5 kg/d * 30 days * 5 months = 750 kg</td>
</tr>
<tr>
<td>Spillway</td>
<td>20</td>
<td>13</td>
<td>20 persons * 0.5 kg/d * 30 days * 13 months = 3900 kg</td>
</tr>
<tr>
<td>Road</td>
<td>20</td>
<td>5</td>
<td>20 persons * 0.5 kg/d * 30 days * 5 months = 1500 kg</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>12,000 kg</strong></td>
</tr>
</tbody>
</table>

Up to 40 kg of solid domestic waste will be generated from the camp each day. Improper management of such waste may pose health risks to workers and cause environmental pollution. Domestic waste storage, collection and disposal should be carried out properly under camp management plan.

Table 5.9: Volume of domestic wastewater in construction phase

<table>
<thead>
<tr>
<th>Items</th>
<th>Number of workers (persons)</th>
<th>Construction duration (months)</th>
<th>Domestic wastewater (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dam</td>
<td>30</td>
<td>13</td>
<td>30 persons * 48L/d * 30 days * 13 months = 561 m³</td>
</tr>
<tr>
<td>Outlet</td>
<td>10</td>
<td>5</td>
<td>10 persons * 48L/d * 30 days * 5 months = 72 m³</td>
</tr>
<tr>
<td>Spillway</td>
<td>20</td>
<td>13</td>
<td>20 persons * 48L/d * 30 days * 13 months = 374 m³</td>
</tr>
<tr>
<td>Road</td>
<td>20</td>
<td>5</td>
<td>20 persons * 48L/d * 30 days * 5 months = 144 m³</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>1,153 m³</strong></td>
</tr>
</tbody>
</table>

Domestic wastewater contains high suspended solid, organic matters, nutrient (nitrogen and phosphorus), and micro organism. Discharge of untreated domestic wastewater may cause pollution to soil and water. However, even with 80 workers at the site, the daily generation rate from construction camp will be 3.5 m³ (80*48L) of wastewater which is quite small and easy to manage through camp management plan.

Table 5.10: The estimation of domestic wastewater generating in phase

<table>
<thead>
<tr>
<th>No</th>
<th>Contents</th>
<th>Unit</th>
<th>Volume²</th>
<th>Estimation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BOD₅</td>
<td>g/person.day⁻¹</td>
<td>45 – 54</td>
<td>3.6 – 4.3 (kg/day)</td>
</tr>
<tr>
<td>2</td>
<td>SS</td>
<td>g/person.day⁻¹</td>
<td>72 – 102</td>
<td>5.7 – 8.1 (kg/day)</td>
</tr>
<tr>
<td>3</td>
<td>TSS</td>
<td>g/person.day⁻¹</td>
<td>70 – 145</td>
<td>5.6 – 11.6 (kg/day)</td>
</tr>
<tr>
<td>4</td>
<td>NO₃⁻</td>
<td>g/person.day⁻¹</td>
<td>6 – 12</td>
<td>0.48 – 0.96 (kg/day)</td>
</tr>
<tr>
<td>5</td>
<td>Coliform</td>
<td>MPN/100 ml NT</td>
<td>106 – 109</td>
<td>8,480 – 8,720 MPN/100 ml NT</td>
</tr>
</tbody>
</table>

The subproject will manage the waste and wastewater from workers camp through contractor’s contractual obligations.

*Overflow of rain water (run-off):* the overflow of rainwater is likely occurring at construction site in the rainy seasons with the average rainfall in the areas is 1,922 mm/year. However the construction phase only takes place in dry season (from April – August in the first year and January – August in the second year), so the wastewater generating from overflow of rain water can be negligible.

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² Sources: Environmental management in developing countries, series 1
**Hazardous Waste Generation.** For dam rehabilitation, 17 machines and equipments will be used in which, 13 items use DO gasoline. Hence, the volume of wasted oil generated is 13 items*18L*13 months = 3,042 litters (equal 18 litters of DO/month/machine and equipment). For the spillway, 17 machines and equipment will be used in which, 14 items use DO gasoline in 13 months. Hence, the volume of wasted oil generated is 14 items*18L* 13 months = 3,276 litters (equal 18 litters of DO/month/machine, equipment). For the access road, 11 machines and equipment are required, of which, 8 machines and equipments use DO gasoline in 5 months operation. Hence, the volume of waste oil generated is 8 items*18L* 5 months = 720 litters (equal 18 litters of DO/month/machine, equipment). For the outlet work, 9 machines and equipments will be used if which 5 machines and equipment use DO gasoline in 5 months. Hence, the volume of waste oil which may discharge into environment is approximately 450 litters of waste gasoline (equal 18 litters of DO/month/machine, equipment). Therefore, the total volume of waste oil generated will be approximately 7,488 liters. The pollution level of gasoline is high volume and, the impact on the environment can limit if it applying a good hazardous waste management plan on the site before returning it to the gasoline supplier.

**Changing water flow pattern or water quality:** the activities of the project in this phase can be modified the local flows pattern due to increase water discharge into La Tinh River and Nha Que stream. Wastewater generating from domestics activities in workers camps, washing equipments, vehicles and concrete mixing shall be a main pollutant sources to soils, surface water and ground water resource. Wastewater containing high pollutant factors such as high TSS, organic matters, and pathogens. Also, run-off water (from construction site) can be an extra pollutant factors. The volume of wastewater generating from camp site and onsite is 1,153 m³. Untreated wastewater or inadequacy treatment method can pollute water and soils resources in the local area. On the other hand, the potential impacts on water quality of underwater activities under the subproject will be very limited with the installation of 570m long coffer dams. Hence, the mitigation measures for the issues related to site and camp management are necessary to manage the impacts of solid waste and wastewater.

**Increased risk of erosion and sedimentation and localised flooding risks.** With large amount of earth work, erosion may occur in construction phase of dam repair, spillway and access road rehabilitation, at borrow pits and disposal areas. Especially, localised flooding may happen at construction site, borrow pits or disposal areas if exsiting drainage pattern is disrupted. Floodwater runoff through excavated slopes may cause increases in erosion risks and that turbid water flow cause increased turbidity and sedimentation in receiving rivers or canals downstream of Cat Son commune. This potential impact and risk is manageable through site management plan.

**Traffic disturbance and increased traffic safety risk:** rapid increase in number vehicles in a small area will increase pressure on traffic condition in area, especially in the transportation routes along the 845.4 m of the access road, the roads to the borrow pits and disposal site. It is estimated that 51,290 trips of vehicles with loading rate from 7 to10 tons will travel via Cat Son’s local road in 15 months, an average of 110 transportation times per day causing increased traffic safety risks to the local residents. Particularly, the section passing the Cat Son primary school (470 pupils) may be affected with traffic disturbance and have higher traffic safety risks to the students and their parents, and teachers in school starting and school over times in school months, from January to May in two school years. However, this impact is manageable.

**Damage to local roads and exiting rural infrastructure.** Approximately 51,000 trips of
contruction vehicles travelling through the access road, between the construction sites and borrow pits, disposal sites would cause damages to the existing road. Particularly, the exiting the 400 m unpaved local road from TL364 to Son Loc bridge, local roads to borrow pits and disposal sites can be easily damaged by heavy trucks. The roads would become muddy in rainy season, dusty in hot weather, become difficult and unsafe for local people to travel. On the other hand, most of existing rural infrastructures such as power poles, drainage channels, or irrigation canal are weak can be damaged easily. The areas of worker camp, borrow pit and landfill are located in unused land areas, and therefore the local infrastructure won’t impact by the activity. The potential impacts on the road is unavoidable but reversible with road surface reinstatement when construction is completed, damages to other existing infrastructure can be avoidable or reversible.

**Health and Safety risks.** During pre-construction phase, tree cutting, site clearance and ground leveling may cause accidents to worker or local people. Health risks for workers and local people can be from a number of sources and reasons. These can be (i) Domestic waste and wastewater generated from the workers camp and other construction sites but not being managed properly; (ii) Stagnant water, wastewater attracts and create breeding ground for mosquitoes, flies, the diseases transmission vectors, infectious diseases could break out from the polluted environment; (iii) The hazardous material such as termite chemicals, oil if not managed properly can directly enter water sources and cause harm to the health of users; (iv) Residents living along transportation route and workers at construction site can be affected by dust, noise and vibration. These impacts can be managed by applying appropriate mitigation measures.

During construction phase, heavy trucks travelling on local roads will increase the traffic accident risks, especially along sensitive parts such as schools or resident areas. Improper operations of machine may also lead to accident to workers and/or local people present at the site. This potential impact is at high level but can be minimised by an appropriate mitigation measures, particularly the application of IFC’s guidelines on Environment, Health and Safety.

On the other hand, there are also safety (fire and accidents) risk related to the generation, usage, storage or handling of electricity, flammable liquids, vapours, and gases, and combustible dusts. This risk is manageable through Site Safety measures.

**Unexploded Ordnance (UXO).** Some unexploded mines and explosive materials may be left from the war and pose safety risks to the workers if these are not cleared before construction is started. Thach Ban reservoir was built in 1978, after Vietnam war, so that most areas in the project are cleaned from land mines and explosive materials. The areas of landfill, access road and borrow pit still require to clean, total expectation of land is 60.894 m². In additional, these areas are in the unused land and far away from resident areas, so that risk of UXO assess at low level, just happened only to squad team. The project will have to contract specialised defence force to carry out mine clearance before construction commencement.

**Sedimentation.** The auxiliary areas and borrow pit are located in downstream of reservoir hence it is a not sources of reservoir sedimentation. But it is a main problem to irrigation canals and Nha Que stream - 1km distance from construction site. However, these activities are implemented in dry season, so these impacts are assessed at low level.

**Borrow Pits.** Opening of new borrow pit will cause negative impact on the landscape, affect existing natural drainage pattern, increase erosion potentials when the existing vegetation cover is replaced with barren soils, cuts and fills, slopes are created. Landslides and sedimentation risks may also be increased in the borrow pit area. Discharges from borrow...
pits, dust and debris created during transportation of materials can significantly impact surface and subsurface waters because of the sediment in water and runoff from material storage and handling areas. For the Thach Ban sub-project, the borrow pits are located in upstream of reservoir, thus addition of sedimentation loads from the borrow pit to the reservoir will may happen. Abandoned borrow pits might spread vector-born diseases, especially when stagnant water accumulates. These impacts can be managed by appropriated mitigation measures.

To mitigate impacts in the construction area, land gradients and drainages shall be maintained for proper discharge of wastes. Measures shall be taken to confine activities to designated locations and to minimize the creation of dust and debris during transportation. Protective measures shall be implemented during transportation (i.e. covering loads, reduced travel speeds etc.). All disturbed areas shall be properly reclaimed after construction and, slopes shall be re-contoured and proper drainage facilities will be maintained.

**Disruption to irrigation.** The Thach Ban reservoir only supply water for irrigation. It was designed to irrigate 130ha of agricultural land. Due to the deterioration of the headwork, currently water in Thach Ban reservoir is adequate to supply 90 ha in winter – spring crop (including 45 ha of rice and 45 ha of crop) and only 75 ha (including 45ha of rice and 30 ha of crop such as bean, watermelon, chilli...) is irrigated in summer – autumn crop. The harvest of summer crop is in early Juy and and from 15th June onwards irrigation is not needed. The construction of Thach Ban reservoir rehabilitation project is planned in 2 years, commencing in April 2018 and finishing in April 2020. Dam construction time is planned to last from 4/2018 to 10/2018 in which the upstream part of the dam and intake will be substantially completed for irrigation supply in the spring crop in 2019; the remaining period is planned for the construction of the downstream part and completion of remaining works. Therefore, the spring crop would not affected by the construction of works. The Employer can adjust the water lowering time during 15 June to 31 August during the 1st year (for 2.5 months) and the production of summer crop will not be affected. *(adapted from RAP 2017 which has been agreed by social expert).*

**Termite Treatment.** Specific chemical will be used by authorised licensed consultant for termite treatment. Handling and usage of such chemical may pose health risks to the worker and the environment. Annex-Termite Treatment Procedures provide basic information on termite treatment process as well as safety requirements.

**Impact on aquaculture, tourism and inland water way transportation at downstream:** These activities are not known to be existing at downstream. Therefore the sub-project would not have any impact to these activities.

**5.3.4 Potential Impacts During operation phase**

Most of the potential impacts during operation phase are expected to be positive during operation phase. Temporary construction impacts such as dust, noise and vibration etc. will be stopped during operation phase. When the construction is completed, the land use, landscape, local income and social economic tend to be stabilised. Improved dam safety and improved irrigation service would promote socioeconomic development and livelihood improvement for downstream communities. Some will change the status quo than in the past.

**Pest Management in relation to increased irrigated crop land.** The area of crop land to be irrigated will be increased after the reservoir’s headworks have been rehabilitated. Meanwhile, the use of agrochemicals in agriculture is popular in Vietnam. Improper usage
and handling of agrochemicals may harm the environment and cause health risks to the farmers. The sub-project will include Integrated Pest Management training for farmers to reduce the risks related to agrochemical use in extended serviced areas of the subproject.

*Ecological impacts:* The subproject would not cause any potential negative impacts to the downstream ecosystems in operation phase. The rehabilitation of the main dam and spillway, replacement of the outlet work would not lead to any changes in hydrology at downstream “before” and “after” the dam is rehabilitated. As described earlier in the baseline section, the streams that feed water to the reservoir are also dry in dry season, there is no natural flow even in these streams have not been regulated by any structure. Since construction of the dam, water from the reservoir is released either through the outlet work, or the spillway. While the outlet work is connected directly to the irrigation system, the water in the spillway channel only exists in flood water. Generally, there is no direct connection between the reservoir to any natural water bodies.

*Risk of dam safety:* Dam Safety Risks have been assessed and mitigation measures were proposed in detail in a separate Dam Safety Report prepared for the subproject.
CHAPTER VI. ALTERNATIVE ANALYSIS

Several alternatives have been considered in feasibility study of the sub-project, includes:

6.1 No project implementation

The main purpose of the subproject is to ensure and safe for the people living in downstream areas of the dam, to provide reliable irrigation service to 130ha of arable land of Thach Ban Dong and Tach Ban Tay villages of Cat Son Tay commune, modernization operational management, improve ecology systems condition and freshwater aquatic cultivation combination.

Thach Ban Irrigation reservoir was built and used since 40 years ago, it brings high economic efficiency to the local resident and improve social conditions. To date, the headwork of the construction was damaged and degraded. Without the project, the risk of dam failure is high and is a threat to the live and livelihood of 80 households living in flood plain of Thach Ban Tay village. Without the project, 130 ha agricultural land owned by 355 households living in Cat Son commune would not be benefited with improved irrigation service, productivity would be less. If dam failure happen, not only the lives and livelihood of 80 households are threatened, damages would be caused to local existing infrastructures, particularly the 60 km of existing rural road, 21 km of irrigation canals, 3 schools, one health care centre, one CPC office building would In the long term also be be more efficient for the exploitation of the reservoir for sustainable development in the region.

6.2 With the project

a) Borrow pits alternatives:

During the preparation of the subproject, the alternivatives on borrow pits were considered.

The first borrow pit location considered were located at the bank and upstream of the reservoir, about 1km away from the dam site. If this site is selected it requires permanent acquisition to 6ha of annual cropland owner by 10 households and the distance to the work is 1km. It is commented by the Water resource Directorate that the soil pit should be moved to the right dam upstream towards the middle of the reservoir which is 500m away from the dam to the centerline of the pit. The new location of soil pit save transport cost and reduce the borrow area. 2nd option of soil pits can increase the erosion in the reservoir. However the construction take place in dry season and these impacts will be reduced.

b) Access and management road detour

Two options for access road alignments were considered during feasibility.

In the first option, the access road has starting point at from the existing inter-village concrete road to dam construction site with length is of 850m. The transportation of materials from Quy Nhon city to the construction site will damage the existing concreted road surface with length is of 2.3 km, causing damage to the pavement. On the other hand, this route runs through the resident areas of Thach Ban Tay village and 01 rural market place. Therefore, environmental consultants proposed another transportation road. The alternative road starts from Son Loc bridge to the dam with road length is of 845.4m. This road impacts only 400m in length of the existing concreted road (former plan impacts to 2.3km), this is also the new rural road that’s mentioned in rural development plan of the local.
Scenario 1: the access and management road connects original from inner-road to the dam position with total length of 850m. Material transport from Qui Nhon City damanges to 2.3 kilometers of local road (concreted). On the other hand, this route runs through the residential area of Thach Ban Tay village and rural markets.

Alternative plan: Environmental consultants have proposed an alternate road, it starts from Son Loc bridge with total length of 845.4m. This alternative was selected, because it only impacts to 400m of the existing road (former plan impacting 2.3km), also this road is planned in the new rural planning of the commune.

Adjusting construction progress

The previous construction period of dams and outlet is from April to the August in the 1st year, and water cut will affect 75 hectares of summer-autumn crop of 355 households. The Employer made a compensation plan of 1,621.8 million VND for affected households due to ceasing of water supply. However, as the construction only start from June 15 to August 31 when the summer crop is over and the water cut will not affect the farming activities. In the second year the construction will take place during January – August when the construction of structures and dams under the full water supply have been completed and the reservoir stores water to its full level and downstream production will be not affected.
CHAPTER VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

7.1 Public consultation

- To get the consent of the relevant agencies, local governments and communities in the sub-project implementation
- To share information about the scope of the project and its impact on the environment and society
- To increase the encourage of the participation in the community for determining the impacts of the sub-project
- To collect information about the requirement and the responsibility of the local resident and local authority on the proposing mitigation measures of the project owner, or to improve the mitigation measure in pre-construction phase or project design

7.1.1 Consultation on environmental impacts and mitigation measures

Summary of consultation process on environmental impacts and mitigation measures is performed in section 7.1, appendix A7. The response of environmental consultation is shown in Table 7.1 below.

Table 7.1: Feedback and response from environmental consultation

<table>
<thead>
<tr>
<th>Date</th>
<th>Venue</th>
<th>Comments</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>28/1/2015</td>
<td>Binh Dinh IPM, 301, Bach Dang, Quy Nhon</td>
<td>100% of participant agreed with the implementation of the sub-project</td>
<td>Compensation for 02 households by land acquisition and 80 affected households by water cut for construction</td>
</tr>
<tr>
<td>6/3/2015</td>
<td>CPC Cat Son headquarter</td>
<td>Consider to irrigate 130ha of agricultural land during construction from Hoi Son reservoir</td>
<td>Hoi Son reservoir can cover only 10-40ha of arable land. Hence, the project owner have to response to the entries of non-irrigated areas during construction phase</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider alternative road via Son Loc bridge to avoid impacts on residents</td>
<td>Compensate to 1500m2 arable land</td>
</tr>
</tbody>
</table>
|          |                              | Repair the damaged road                                                 |  • Remove damaged layers  
|          |                              |                                                                          |   • resurface and hardnosed  |
|          |                              | Assess risk at downstream areas in case of emergency water release      | The design flood peak at $Q_{TK} = 77.17$ m$^3$/s. The maximum flood can discharge when its peak rise at $Q_{xa} = 51.35$ m$^3$/s, it will not increase the volumetric flood in receiving water behind spillway. The Nha Que stream has a large cross section and sloppy, so that flood discharge does not making overflow to the receiver channel and hence unnecessary to build a connecting cannal. |
7.1.2 Consultation of social impact assessment

Summary of consultation on environmental and social impacts is performed in section 7.2, Appendix A7. The response of social consultation is summarized in Table 7.2 below:

Table 7.2: Social consultant feedback

<table>
<thead>
<tr>
<th>Date</th>
<th>Venue</th>
<th>Feedback</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/03/2015</td>
<td>Cat Son CPC</td>
<td>All participants agreed to implement the sub-project</td>
<td>- Compensate in accordance with RAP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Compensation for affected households</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ensuring the security during construction phase</td>
<td>- Register worker to CPC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Worker management and working hour plan</td>
</tr>
<tr>
<td>24/03/2015</td>
<td>Cat Son CPC</td>
<td>Added feedback after date on 6/03/2015 and 24/03/2015</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensuring safety for workers on working site, community health.</td>
<td>Protect clothing and equipment, avoid rush hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In the project area, there are several vulnerable groups such as children,</td>
<td>Public media, job creation, increase income and training, awareness of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>women, aged and disable person. The owner project should take care of</td>
<td>their need and demand, since have to develop a suitable plan to help the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>these group</td>
<td>group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The sub-project will lead to expose disease in the small areas, from</td>
<td>Training to local people on disease, social evil avoiding and treatment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>worker to local person</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conflicts may arise between households in upstream and downstream due</td>
<td>Public communication plan is needed, besides of that, the project owner</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to unequal access to water. Conflicts may arise between the AHH and</td>
<td>have to discuss with the local people about the advantage of the sub-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>non-affected households due to compensation</td>
<td>project and compensation of affected households, about water supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensuring sufficient water supply to domestic users and to irrigation</td>
<td>during construction phase, etc.</td>
</tr>
</tbody>
</table>

Response and commitment of Project owner

- Project Owner acquires contribution ideas and has timely adjustment in design documents and simultaneously commits doing well the measures to mitigate negative impacts by subproject’s activities
- Project Owner responses to the affected households, damaged local infrastructures, environment pollutions in accordance with Vietnam and World Bank policies and regulations
- Project Owner responses to contact with local authority regularly, prepare worker management, health and safe plans
- Project Owner responsible to local traffic condition
• Project owner committed to take water from Hoi Son reservoir to irrigate 130ha of agricultural land of Thach Ban Dong and Thach Ban Tay villages. The project owner have to response to the entire of non-irrigated areas during construction phase
• Project Owner responses to cconsider the alternative transportation road via Son Loc bridge to avoid impacts to resident living areas
• The project design have to consider to build a canal connecting to stream Nha Que and to river La Tinh to minimize the impact risk to downstream areas in case of emergency water release. Following the feasibility study, the designed plan is focus only on repair the headworks and the capacity of the reservoir does not change after completeing construction. On the other hand, the design flood peak at $Q_{TR} = 77.17 \text{ m}^3/\text{s}$, The maximum flood can discharge when its peak rose at $Q_{sa} = 51.35 \text{ m}^3/\text{s}$, it will not increase the volumetric flood in receiving water behide spillway, in addition Nha Que stream has a large cross section, sloppy therefore it does not making overflow to the receiver channel. From the point of view, the suggestion of the community can be solved and safe

*The public consultation document, the recommendations of the CPC's, the commitment of Binh Dinh irrigation project management Unit response to report on the evaluation of environmental and social impacts are in the appendix.

### 7.2 Information Disclosure Plan

Information disclosure: According to the World Bank’s policy on access to information, all draft safeguard instruments, including the ESMP/ESMoP, are disclosed locally in an accessible place and in a form and language understandable to key stakeholders and in Vietnamese and English at the CPO and InfoShop before the appraisal mission. EMP is locally disclosed at the sites and in the Vietnam Development Information Centre of the World Bank in Hanoi

The report of ESIA of the sub-project will be published in Vietnamese version on the website of the Ministry of Agriculture and Rural Development, CPO, People's Committee of Binh Dinh province. ESIA summary will be sent to the Department of Natural Resources and Environment of Binh Dinh, Phu Cat District People's Committee, the CPC Cat Son to the community and interested organizations can access, monitor the plan of ESMP implement.

The report of ESIA of the sub-project in English will be published on Information Centre of the World Bank in Hanoi
CHAPTER VIII. ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

The details of negative/positive impacts of Binh Dinh sub-project were discussed in part V. The Thach Ban sub-project will not increase the water storage capacity of the reservoir. Most of the potential impacts and risks will be in the construction phase. The negative impacts generated from site clearance, excavation and other construction activities, handling and transportation of materials and waste, waste disposal, borrow pit and camp operation, etc. Changes in landscape in disturbed areas, particularly the borrow pits and disposal site, generation of large amount of stockpiles, increased level of dust, noise and vibration from construction activities and transportation, domestic waste and wastewater from camps, social disturbance related to the mobilisation of workers to the sites, safety and health risks for workers and local community, disruption of irrigation service are the key issues of concerns during construction phase. These impacts would mostly be at low to medium level, localized and reversible, and manageable. This management plan is proposed to manage these potential negative social and environmental impacts. The sub-project's RAP report with detail plan will address the impacts related to land acquisition.

8.1 Mitigation measures

8.1.1 Construction phase

The key potential impact and mitigation measures of direct construction-related impacts are summarised below:

Minimise impacts of land acquisition. Project owner has developed Resettlement action plan to calculate compensation, support to 34 households of Thach Ban Dong village with area of acquired land of 60,894 m², of which, area of permanently acquired land is 49,803 m² of agricultural land and public land and temporarily acquired land of 11,091 m² of arable land. Cost for compensation and support to the affected households is approximately VND 1,355.2 million. Compensation and support to the households who are acquired with land must follow Resettlement Policies Framework of project and ensure that compensation is followed replacement cost.

Minimise safety risks related to UXO. UXO clearance, particularly at the borrow pit and disposal site, camp site, material storage area, etc. will be arranged before handing over the site to the contractor. In case a UXO is discovered during construction phase, all works must be stopped and the site will be protected to restrict access of unauthorised personnel. Relevant authority will be informed. Circular no. 146/2007/TT-BQP dated 4/5/2006 issued by the Ministry of Defence regarding UXO will be complied with. Signing contract with specialized forces of mine clearance at area of disposal site, borrow pit, material storage area and camp site.

Manage potential conflicts between workers and local people. In order to limit conflict between residents of Thach Ban Dong and 80 workers at construction, the contractor shall register the list of workers with local community; Local workers will be hired to carry out manual works where possible.

Minimise impact on income of households and impact on gender. Although land acquisition is compensated according to the Resettlement policies frameworks, project owner should implement some measures to increase income and reduce impacts on gender such as:
create favourable condition to 22 households who are acquired with land of Thach Ban Dong participate in unskilled job at construction site; allowing land owner harvesting plants and crops before clearing site in order to make money or use as a fuel; facilitating local people (women, the poor) desire to supply food to workers to increase their income

**Safety Management.** Comply with the safety provisions under Labour law and construction management regulations. Assigning specialized staffs on environment, safety and health; installing fence, signs, restricted area at construction site. Arranging adequate and safety accommodation for workers with clean water and sanitation facilities. Providing first aid equipment at camp site. Training workers about safety and providing adequately protective clothes for workers. Maintain a supply protection fence, warning signs, traffic lights for traffic signs road marking, and guard rails to maintain pedestrian safety during construction; Vehicular speed on each section of road will be under control. Conduct safety training for construction workers prior to beginning work.

**Limit impact on landscape.** Returning top layer at disposal site, borrow pit and other disturbed area; limiting waste volume by collecting and use of cutting tree with useful purposes

**Dust control.** To mitigate impacts in the construction area, dust control measures shall be implemented on all unpaved roads and construction surfaces, particularly during dry and windy conditions and sections crossing residential houses and buildings. Production of dust and particulate materials at all times should be minimised all the times to avoid impacts on surrounding communities, and especially to vulnerable people (children, elderly people). Dust watering shall occur only during designated hours. The dust generated from stockpiles shall be controlled by compaction and the stockpiles shall not be allowed to expose for extended periods.

**The main access road to dam site.** All trucks carrying construction materials shall be covered and no vehicles shall be left idling. Regular maintenance of vehicles (daily/weekly) shall be performed at designated areas. The traffic on access and service roads shall be regulated in order to minimise air pollution. In addition, all processes shall follow the code of practice during construction and operation phase that meets the requirements of Vietnamese standard (TCVN 5939-2005).

The duration and magnitude of the impact is anticipated to be low if appropriate mitigation measures are applied during the construction phase.

**Noise minimisation.** All construction-related traffic on project access roads should be operated within speed limits. Noise levels associated with all machinery and equipment should be maintained at or below 90db where possible. In sensitive areas (including residential neighborhoods, office, schools, etc.) Transportation during peak hours should be minimized, the vehicles shall be required to slow down and banned from using horns when passing these sensitive areas.

**Biological impacts management.** Large or significant trees in camp areas and access roads should be preserved wherever possible. The application of chemicals for vegetation clearing is not allowed. Construction shall be programmed in sequence so that the scale of earth moving activities and area of exposed surface can be minimized. Re-vegetation shall start at the earliest possible. Appropriate local species of vegetation shall be used. Restoration, of cleared
areas such as borrow pits no longer in use, disposal areas, construction roads, construction camp areas, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works shall be accomplished using landscaping, adequate drainage and re-vegetation. Topsoil stripped from the work areas shall be used for landscaping works, and Watercourses, which have been temporarily diverted by the construction activities, shall be restored to their former flow paths. At the completion of construction work, all construction camp facilities shall be dismantled and removed from the site and the whole site restored to a similar condition to that prior to the commencement of the works, or to a condition agreed to with local authorities and communities.

The potential impacts on aquatic species in the reservoir will be minimized through the careful planning of construction phase. Construction will be started in dry season, at the end of the winter-spring crop where most of the water has been used for irrigation. Water will be gradually discharged during the crop season thus there will be no drastic changes in hydrology either at upstream or downstream, thus cause no harmful effect to aquatic species. Floating flora and fauna, fish would follow the water flow to downstream irrigation canal to crop land, and may finally to natural waterways which are connected to irrigation canals.

Construction Waste Management. Daily site clean-up, including maintenance of adequate disposal facilities for construction debris should be implemented. Debris generated due to the dismantling of the existing structures shall be suitably reused, to the best extent feasible (e.g. as fill materials for embankments). Under no circumstances any material should be disposed on in any in environmentally sensitive areas. Ensure stabilization for disposal site.

Hazardous waste management. Storage areas for diesel fuel and lubricants are not located within 100 meters of the camp or watercourses. Storage are of fuel or lubricants and shall be fenced and have a compacted/impervious floor to prevent the escape of accidental spillage of fuel and or lubricants from the site. Surface water drainage from fenced areas shall be discharged through purpose designed and constructed oil traps. Empty fuel or oil drums may not be stored on site. Waste lubricants shall be recycled, and not disposed to land or adjacent water bodies.

Erosion and Sedimentation control. Site activities shall be carefully managed in order to avoid site erosion and sedimentation of downstream waterways. Areas disturbed by construction activities shall be maintained in their existing state. The area to be disturbed should be minimal and stabilized as soon as possible. Drainage through the area should be controlled and trap sediment onsite. Install erosion control barriers around perimeter of cuts, disposal pits, and roadways if necessary. Water shall be sprayed as needed on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion and dust.

Construction Camp Management. Recruit the available workforce whenever possible and provide appropriate training as necessary. To address potential ethnic tensions between workers and the local communities. The following general measures should be required for construction camps:

1. Be safe, has adequate and suitable facilities for washing clothes and utensils. The camp should have adequate toilets and washing areas for the workers expected on site. Toilet facilities should also be provided with adequate supplies of clean or potable water, soap, and toilet paper, be conveniently accessible and kept in clean and hygienic conditions.
2. Effective sediment and erosion control during construction and operation of the camps.
3. Safe potable water is provided for food preparation, drinking and bathing.
4. There are septic tank systems for camp without causing pollution of nearby watercourses. Wastewater should not be disposed into any water bodies without treatment, in accordance to applicable Vietnamese standards.
5. Apply acceptable storage and disposal or recycling of all solid wastes generated by the labor camp and/or base camp.
6. Provide medical and first aid facilities at each camp area;

**Avoid damages to local infrastructure.** The subproject will hold responsible for any damage caused to local roads and bridges due to the transportation of excessive loads and shall be responsible for repair.

**Soil Management.** The average existing ground elevation is +40.00m. Before disposal, the 0.3 m of top soil will be removed for resurfacing this site during site reinstatement. After that, the waste will be disposed off to height 5.5 m but will be reduced further to 5.0 m after levelling and compaction [should do compaction layer by layer during the entire construction period, not at the end to reach 0.5 m reduction in height. To that stage, the ground elevation on the top of the disposal site will be equivalent to existing ground level in the surrounding area.

The total volume of dump site will be $5.5 \times 10^4 = 55,000$ m$^3$.

The remaining excavated material will be $135,051 - 55,000 = 50,051$ m$^3$ for disposal at the borrow pit, from which the volume of excavated soil would be: $113,767 \times 1.16 - 15263 = 116,707$ m$^3$.

The land area of the dump is 6ha or 60,000 m$^2$. Disposal of the 55,051 m$^3$ will make the dump 0.8m high while the site would be excavated to 2m deep. Thus the borrow pit will be 1.7 m lower than the pre-construction ground level.

**Minimise impacts at downstream and water cut-off on farmers.** Appropriate Construction schedule method has been proposed during the feasibility study to avoid or minimize the potential impacts of construction onto water users at downstream area. Construction will be started in March, at the end of winter-Spring crop during which water has been gradually discharged to downstream through irrigation canal. Therefore, there will be no sudden hydrological or water quality changes at downstream. Aquatic species would either stay in the reservoir at upstream, or follow the irrigation canals to downstream.

A coffer dam will be constructed in the upstream with dam crest height +44.90m (0.5 m higher than regular water level). The construction of dam embankment will be done when it approaches at elevation of +50.60m and the works have to be closed before the flooding season starting (31 August).

Construction is scheduled to implement in dry season from Jun 15th to August 31st in the 1st year and from January to August in the 2nd year. The Employer and Cat Son CPC agreed that during 15 June to 31st August the water will cut for construction of dam and new outlet.

Cat Son CPC decided that after the harvest of winter-spring crop, the summer-autumn crop will start with the sowing and the summer-autumn crop is expected to finish by the end of June. Thus, the water cut does not affect to local farming. In the 2nd dry season when the
upstream dam reach the elevation of +52.50 m, the water level in the reservoir is kept lower than the full water supply of 50.60 m, and the water supply capacity of the reservoir for the downstream is ensured and downstream farming activities will not be affected.

The mitigation measures proposed to address construction impacts will be implemented by the contractor through Environmental Specifications that will be included in construction bidding and construction contract documents.

**Communication with local communities about water discharge.** The Project Management Unit will coordinate with the contractor, the local authorities to make announcements in advance to the farmers about the water discharge schedule during the winter-spring crops so as the farmers can plan their crops accordingly.

### 8.1.2. Management of potential impacts during operation phase

**Use of agricultural chemical when irrigation area is extended.** Training IPM for local people in extended irrigation area will be organised during construction phase. 120 millions VND has been budgeted for this training activity.

#### Table 8.1: Estimated cost for mitigation measures

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Budget</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compensate for land acquisition and support to households affected with water cut off</td>
<td>Total budget: VND 1,355,262 Mill.</td>
<td>Updated RAP January 2018</td>
</tr>
<tr>
<td>2</td>
<td>Waste transportation</td>
<td>in construction cost</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sheets for covering materials, Watering road, Sign boards 4 x 1 Mill. =</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cover sheet for trucks, road cleaning, Compensate for road damages:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cover sheets for borrow pits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>5 mobile toilets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Hazardous waste management and treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Vehicle maintenance fees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Recycle bin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Reinstall disturbed areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Protection clothing and equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Train workers about safety and provide personal clothing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The land acquisition, compensation and resettlement cost of Thach Ban reservoir rehabilitation project of Binh Dinh province decreased from VND 3,374 million to VND 1,355.262 million (US$ 60,100). The change is explained in the updated RAP that the PPMU adjusted the dam repair schedule to the dry season when the reservoir do not supply irrigation water to avoid impacts on cultivation activities (a cost reduction of VND 2,019 million). Reduced acquired land also significantly reduces impacts on affected people and as a result reduced resettlement cost.

### 8.2 Environmental Monitoring Plan

Environmental Monitoring plan includes two types of environmental monitoring
Routie environmental monitoring to check compliance to the project environmental management requirements, to identify non-compliance or arisen issues and propose mitigation measures.

- Environmental quality sampling for verification of the effectiveness of the mitigation measures, propose corrective measures if environmental quality exceed standards.

### 8.2.1 Environmental Compliance Monitoring

Environmental compliance monitoring should be carried out mostly by observation on regular basis by the construction supervisor and PMU environmental officer.

### 8.2.2 Environmental Quality Monitoring Plan

**Table 8.2. The content of environmental quality monitoring programs during construction**

<table>
<thead>
<tr>
<th>No.</th>
<th>Sample</th>
<th>Location</th>
<th>Frequency</th>
<th>parameter</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Construction phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Air quality</td>
<td>1. The embankment areas (KK01)</td>
<td>During the high activity or at the peak of construction phase</td>
<td>Dust PM10, PM 2.5</td>
<td>QCVN 05:2013/BTNMT QCVN 26:2010/BTNMT QCVN 27:2010/BTNMT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. The spill way areas (KK02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. The access road areas (KK03)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>surface Water</td>
<td>1. in the reservoir (NM01)</td>
<td>2 times/year</td>
<td>pH, DO, BOD₅, NH₄⁺, TSS, coliform,</td>
<td>QCVN 08:2015/BTNMT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. at the out let of outlet works (NM02)</td>
<td></td>
<td>turbidity (NTU)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. at the land fill areas (NM03)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Operation phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>surface Water</td>
<td>1. At the out let of outlet works (NM04)</td>
<td>Generally 2 times in the first year</td>
<td>pH, DO, BOD₅, NH₄⁺, TSS, turbidity (NTU)</td>
<td>QCVN 08:2015/BTNMT follows Column B1 criteria Responsibility: Management and operation Unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. at the canal (NM05)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ecological parameter</td>
<td>Aquatic species (if any) to be identified during assessment</td>
<td>Field monitoring Generally 2 times in the first year</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The cost of social and environmental monitoring is estimated in the Table 8.3 below.
Table 8.3. Estimated cost for Environmental and social monitoring

<table>
<thead>
<tr>
<th>No</th>
<th>Categories</th>
<th>Unit</th>
<th>Vol.</th>
<th>Price</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/</td>
<td>Expert salary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Leader</td>
<td>month</td>
<td>3.0</td>
<td>25</td>
<td>75,000</td>
</tr>
<tr>
<td>2</td>
<td>Environmental expert</td>
<td>month</td>
<td>3.0</td>
<td>18</td>
<td>54,000</td>
</tr>
<tr>
<td>3</td>
<td>Ecological expert</td>
<td>month</td>
<td>3.0</td>
<td>18</td>
<td>54,000</td>
</tr>
<tr>
<td>4</td>
<td>Assistant (3 persons x 3 month)</td>
<td>month</td>
<td>9.0</td>
<td>5</td>
<td>45,000</td>
</tr>
<tr>
<td>II/</td>
<td>Sampling and on-site monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Per diem (6 person x 10 day x 5 times)</td>
<td>day</td>
<td>300</td>
<td>350</td>
<td>105,000</td>
</tr>
<tr>
<td>2</td>
<td>Renting vehicle (10 day x 5 times)</td>
<td>day</td>
<td>50</td>
<td>1,500</td>
<td>75,000</td>
</tr>
<tr>
<td>III</td>
<td>Sample analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Surface Water</td>
<td>sample</td>
<td>15</td>
<td>1,826</td>
<td>27,390</td>
</tr>
<tr>
<td>2</td>
<td>Air samples</td>
<td>sample</td>
<td>15</td>
<td>1,396</td>
<td>20,940</td>
</tr>
<tr>
<td>IV</td>
<td>Logistic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Office material</td>
<td></td>
<td>5</td>
<td>2,000</td>
<td>10,000</td>
</tr>
<tr>
<td>2</td>
<td>Document printing out</td>
<td></td>
<td>5</td>
<td>4,000</td>
<td>20,000</td>
</tr>
<tr>
<td>3</td>
<td>Communication</td>
<td></td>
<td>5</td>
<td>1,000</td>
<td>5,000</td>
</tr>
<tr>
<td>V</td>
<td>Management fees (50%)</td>
<td>%</td>
<td>50</td>
<td>228,000</td>
<td>114,000</td>
</tr>
<tr>
<td></td>
<td>Total (I+II+III+IV+V)</td>
<td>%</td>
<td>6</td>
<td>36,319</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Before tax</td>
<td>%</td>
<td>10</td>
<td>60,533</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total (rounded)</td>
<td>%</td>
<td></td>
<td>702,182</td>
<td></td>
</tr>
</tbody>
</table>

8.3 Capacity Building, Training activities

a) Current status of environmental management capacity of project owner

Department of Agricultural and Rural Development is project owner will be the state implementation management of project. Department of Agricultural and Rural Development assign Irrigation project management unit which is specialized unit under Department to perform partly function of project owner in implementation of project.

Irrigation project management unit is representative of project owner, take overall responsibility in implementation of project, is responsible for developing plan, bidding dossier, negotiation of signing contract, contract award, checking, monitoring, controlling construction quality, selecting monitoring consultant as well as monitoring detail design. Irrigation project management unit collaborate with support team of district and monitoring committee of commune in actual activities at site, collaborate with agencies, maintenance and management units, local authorities of communes and water use organizations to take responsibility in management.

People’s Committee of Cat Son commune and Cat Son agricultural cooperatives have
responsibility to manage and operate the completed construction. Maintenance, dredging internal canal are carried out by Cat Son agricultural cooperatives under monitoring of People’s Committee of Cat Son commune. In addition, community supervision should be implemented regularly for construction activities of project.

According to the survey results of consultant, there is no specialized staff on environment at both Binh Dinh irrigation project management unit representative of project owner and Cat Son agricultural cooperative which is management unit. Staffs of them have not been trained environmental management in construction. This is the first time that Binh Dinh PPMU implement a project funded by foreign budget.

b) Building capacity and training activities

According to the current status of environmental management capacity of PPMU, Cat Son agricultural cooperative, in order to meet the requirement of World Bank’s social and environment safety policies, the training program to improve knowledge of technique and social-environment management for PPMU proposed in table 8.4 below:

<table>
<thead>
<tr>
<th>No.</th>
<th>Contents</th>
<th>budget (VND)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Training on Safeguards of the sub-project</td>
<td>1 course * 30 participants = 20 Mill.</td>
<td>Included in contract value</td>
</tr>
<tr>
<td>2</td>
<td>Building capacity on ESMP and ESMoP</td>
<td>1 course * 50 participants = 40 Mill.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Training on HIV/AIDS protection</td>
<td>2 courses * 100 participants x 40 Mill./course = 80 Mill.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Training on improving of gender equity</td>
<td>2 courses * 100 participants x 40 Mill./course = 80 Mill.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>VND 220,000,000</td>
<td></td>
</tr>
</tbody>
</table>

8.4 Reporting Requirements

<table>
<thead>
<tr>
<th>Responsibility for Preparation</th>
<th>Report</th>
<th>Content</th>
<th>Frequency</th>
<th>Submission to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor</td>
<td>Risk/accidents</td>
<td>Collecting information about the risks/accidents</td>
<td>within 24 hour since the risks/accident happen</td>
<td>PPMU and CSC</td>
</tr>
<tr>
<td></td>
<td>Violations</td>
<td>Report infringes on the environmental and social management regulations</td>
<td>Within a week</td>
<td>PPMU and CSC</td>
</tr>
<tr>
<td>Archaeology discovery (if any)</td>
<td>Reporting to the relevant agencies on the new archaeology discovered</td>
<td>Within 24 hours since exposure of the object</td>
<td>PPMU and CSC and Local Cultural Department</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>--------------------------------------------------------------------</td>
<td>------------------------------------------</td>
<td>------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>compliance with ESMP</td>
<td>Reporting on the effectiveness of ESMP mitigation measures</td>
<td>Every month</td>
<td>PPMU</td>
<td></td>
</tr>
<tr>
<td>CSC</td>
<td>Reporting on the ESMP mitigation measures implementation</td>
<td>Effectiveness of ESMP mitigation measures of CSC the results obtained and method applied to solve the accident and remain issues from the last report</td>
<td>Every month</td>
<td>PPMU</td>
</tr>
<tr>
<td>Independent Environmental Consultant</td>
<td>Independent reporting on the ESMoP</td>
<td>The result of on-site monitoring The monitoring results based on community The results from CSC The results from environment monitoring The result obtained from ESMP implementation and comments</td>
<td>Every 3-6 months</td>
<td>PPMU and WB</td>
</tr>
<tr>
<td>PPMU</td>
<td>Report of environment activities of the sub-project</td>
<td>The results of ESMP implementation</td>
<td>Every 6 months</td>
<td>CPO and WB</td>
</tr>
</tbody>
</table>

**8.5 ESMP Implementation responsibilities**

Key responsibilities of PPMU and the contractors are as follows:

a) Binh Dinh-PPMU

Binh Dinh Provincial Project Management Unit (PPMU) is representative of Binh Dinh DARD and is responsible for ensuring effective implementation of subproject environmental management in close coordination with local authorities and communities.

People’s Committee of Cat Son commune and Cat Son agricultural will take part in community monitoring during construction phase.

b) Construction Supervision Consultant (CSC)
During construction phase, the CSC will also supervise the contractor’s environmental and safety performance to ensure that the potential social and environmental impacts of the subproject are adequately addressed during construction phase. The CSC will report on the contractor’s environmental and safety performance as part of construction progress report.

When there are arising issues or complaints, the CSC will work closely with the PMU to direct the contractor to carry out corrective actions in a timely manner.

b) Construction contractor

The construction contractors are responsible for implementing all mitigation measures at costs included in the contract. Take actions to mitigate all potential negative impacts in line with the objective described in the ESMP.

In addition, the contractor will appoint a staff being responsible for environmental aspects during construction phase. He/She will work with the contractor’s technical team to prepare Site-specific Environmental Management Plan (SEMP) and submit to the Project Owner for review and approval before construction is started.

d) Independent Environmental Monitoring Consultant (IEMC)

IEMC will support PMU to establish and operate an environmental management system, offers suggestions for adjusting and building capacity for relevant agencies during project implementation and monitor the Contractor’s EMP implementation in both construction and operation stages. IEMC will also be responsible to support PMU to prepare monitoring reports on ESMP implementation. The IEMC shall have extensive knowledge and experience in environmental monitoring and auditing to provide independent, objective and professional advice on the environmental performance of the project. The IEMC will carry out environmental sampling for the subproject.

e) Local Community

The community are encouraged to take part in environmental monitoring during construction phase. In case of there are arising environmental problems that affect the community, they will discuss directly with the contractor for corrective action and/or report to the Supervision Consultant and/or PPMU.

CPO: CPO will guide Binh Dinh PPMU staffs to carry out environmental and social management plan of subproject. Supervising the progress of subproject during construction time.

Province and District People’s Committees (PPCs/DPCs), Binh Dinh Provincial DoNRE: oversee implementation of subprojects under recommendations of Binh Dinh DoNRE and PPMU to ensure compliance of Government policy and regulations. Binh Dinh DoNRE is responsible for monitoring the compliance with the Government environmental requirements.

8.6 ESMP Implementation budget
### Table 8.6: Budget of ESMP implementation

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mitigation measures</td>
<td>In construction cost</td>
</tr>
<tr>
<td>2</td>
<td>Independent Monitoring</td>
<td>702,182</td>
</tr>
<tr>
<td>3</td>
<td>IPM training</td>
<td>120,000</td>
</tr>
<tr>
<td>4</td>
<td>Capacity Building</td>
<td>220,000</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>1,042,182</strong></td>
</tr>
</tbody>
</table>
APPENDIX

APPENDIX A – ENVIRONMENT
Appendix A1- Drawing of the main works
Appendix A2-Types of Map
Appendix A3- Policy framework, institution and regulation
Appendix A4- Environmental and social screening
Appendix A5- Diagram of sampling and monitoring environment
Appendix A6- Analysis results of environmental samples
Appendix A7- Public consultation minutes
Appendix A8- Environmental Specifications (for inclusion in bidding and construction contracts)
Appendix A9- Chance Find Procedures
Appendix A10- Termite Treatment Procedures
Appendix A11- Integrated Pest Management (IPM)
Appendix A12- Pictures of current status of subproject area

APPENDIX B – SOCIAL
Appendix B1- Methodological note
Appendix B2- Public Health intervention Plan
Appendix B3 – Public consultation, participation and communication strategy
Appendix B4- Gender action plan
Appendix B5- Grievance redress mechanism
Appendix B6- Information disclosure, account ability and monitoring
Appendix B7- Guidelines on physical cultural properties management
APPENDIX A1 – DRAWING OF THE MAIN WORKS

CHI TIẾT ĐỊNH ĐÃP (TY LỆ: 1/100)
DETAILED DRAWING OF DAM CREST (SCALE: 1/100)

MẤT BÀNG ĐÃP (TY LỆ: 1/100)
PLAN LAYOUT OF DAM (SCALE : 1/100)
Figure 1.1: Drawing of dam’s layout plan

Figure 1.2: Drawing of outlet works

Figure 1.3: Drawing of spillway layout
Figure 2.1: Effected areas by Thach ban water interruption

Figure 2.2: Crop land will be covered by Hoi Son reservoir during Thach Ban water interruption
APPENDIX A3- POLICY FRAMEWORK, INSTITUTION AND REGULATION

3.1 Applicable National policies, legals and administrative frameworks

i) Environment

- Law of environmental protection no. 55/2014/QH13, on Regulating Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment. Environmental report should be carried out simultaneously with the establishment of investment projects (Feasibility study report).
- Decree no.18/2015/ND-CP on dated 02/14/2015 regulations on environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plan.
- Directive no.26/CT-TTg on dated 25/08/2014 regards on to implement the Law of Environmental Protection.
- Circular no. 27/2015/TN- BTNMT on dated 05/29/2015 by the Ministry of Natural Resources and Environment regarding strategic environmental assessment, environmental impact assessment and environmental protection plan.
- Circular no. 16/2009/TN- BTNMT on dated 10/07/2009 by the Ministry of Natural Resources and Environment, regarding regulations, national technical regulations on the environment, air quality and a number of toxic substances in the ambient air.
- Decision no.22/2006/QD-BTNMT on dated 12/25/2006 by the Ministry of Natural Resources and Environment regarding on the applying the set of Vietnam standards environmental.

ii) Land use and land acquisition

- Decree no.43/2014/ND-CP on dated 05/15/2014 regarding on implementing of the Land law 2013.
- Decree no.44/2014 /ND-CP on dated 05/15/2014 regulating method of valuation of land; construction, land price adjustment; specific land valuation and land valuation advisory.
- Decree no.47/2014/ND-CP on dated 05/15/2014 concerning on the provisions on compensation, support and resettlement due to land acquisition.
- Decree no.37/2014/ND-CP on dated 06/30/2014 giving more detail information of compensation, support and resettlement when the land acquisition.
- Circular no.23/2014/TN-BTNMT on dated 05/19/2014 regarding on regulations of land use rights, owners house and properties on land.

iii) Construction

- Construction Law no.50/2014/QH13 on dated 08/18/2014 approved by the National Assembly of the Socialist Republic of Vietnam.
- Decree no.15/2013/ND-CP on dated 02/06/2013 on the construction quality management.
• Decree no.12/2009/ND-CP on dated 02/12/2009 on the construction projects management and investment.

iv) Water resources, forest protection, cultural and heritages, biodiversity

• Law of Water resources, approved by Vietnam Assembly on 06/21/2012.
• Decree no.42/2012/ND-CP on dated 05/11/2012 by Government on the management and use of land for paddy rice cultivation
• Decree no.112/2008/ND-CP on dated 10/20/2008 by Government on the integration of management, protection and exploitation of hydropower reservoirs and irrigations.
• Decree no.120/2008/ND-CP on dated 12/01/2008 by Government on the river basins management
• Decree no.149/2004/ND-CP on dated 07/27/2004 by Government regulates the license of exploration, use of water resources and wastewater discharge into water resources.
• Decree no.23/2006/ND-CP on dated 03/03/2006 of the Government regarding on the Law of Forest Protection and Development implementation.
• Decision no.57/QD-TTg on dated 01/09/2012 approved by Vietnam Prime Minister to forests plan protection and development by 2011-2020.
• Cultural Heritage Law no.28/2001/QH10 approved by the National Assembly of the Socialist Republic of Vietnam on 06/29/2001.
• Biodiversity Law no.28/2008/QH12 approved by the National Assembly of the Socialist Republic of Vietnam on 01/13/2008. Chapter III Conservation and sustainable development of natural ecosystems, and Chapter IV Conservation and development of wildlife.

v) Dam safety regulations

• Circular no.34/2010/TB-BTC by the Ministry of Industry and Trade dated October 7/2010 regarding regulations on dam safety management of hydropower projects
• Decree no. 72 /ND-CP on dated 05/07/2007 of the government of Vietnam on dam safety management. According to the decree, a big dam is the dam with the height calculating from the floor face to the top of the dam equal to or greater than 15 meters or dam of water reservoirs with the scale of capacity equal to or greater than 3,000,000 m³ (three million cubic meters). Small dam is the dam with the height calculating from the floor face to the top of the dam smaller than 15 meters and creating water reservoirs with the scale of capacity smaller than 3,000,000 m³ (three million cubic meters). The works relating to water reservoirs include: water intake, outlet works, flood discharge works, Locks. Dam owners are organizations and individuals owning dams to harness the benefits of water reservoirs or assigned to manage, operate and harness water reservoirs by the competent state agencies. The Ministry of Agriculture and Rural Development takes responsibility before the Government for the implementation of state management of dam safety. The Ministry of Industry presides over and coordinates with ministries, branches and relative localities to appraise, approve or submit to the Prime Minister for approval of the process of operating hydropower reservoirs. The provincial-level People's Committees
implement its state management on dam safety in the areas.

- Document no. 1852/BNN-TCTL on dated 10.06.2014 of the Minister of Agriculture and Rural Development on urgent repairs financial to ensure safe water reservoirs

**vi) Resettlement policies**

- Decision no.52/2012/QD-TTg, on dated November 16/2012, on the support policies on employment and vocational training to farmers whose agricultural land has been recovered by the State.
- Decree no.84/2007/ND-CP of the Government of Vietnam on revision of issuing LURC, land acquisition, implementation of land use right, procedure for compensation, resettlement when land acquired by State and grievance redress
- Circular no.37/2014/TT-BTNMT on dated 30 June 2014, regulating compensation, assistance and resettlement when the State acquires land.
- Circular no.37/2014/TT-BTNMT on dated 30 June 2014, regulating compensation, assistance and resettlement when the State acquires land.
- Other regulations or administrative decisions related to resettlement plan to be issued by HCMC People’s Committee in relation to the Land Law 2014, and its relevant decrees and circulars.

**vii) Gender policies**

- Law 73/2006/QH11 On gender equality the national assembly of the socialist republic of Vietnam 10th session of the xi legislature Published Date 11/29/2006
- Decree no.07/2007/ND-CP of January 12/2007 detailing and guiding the implementation Of A Number Of Articles Of The Law On Legal Aid
- Decree No. 70/2001/ND-CP Of October 3, 2001 Detailing The Implementation Of The Marriage And Family Law
- Decree no. 55/2009/ND-CP on sanctioning of administrative violations of gender equality.
- Decree No. 48/2009/ND-CP providing for measures to assure gender equality.
- Circular No. 191/2009/TT-BTC on dated 10/01/2009 guiding the management and use of funds for gender equality activities and activities for the advancement of women. The circular was issued in time to meet the requirements of the Law on Gender Equality in ensuring financial resources for equality activities.
- Circular No 07/2011/TT-BTP on dated 03/31/2011 issued by Minister of Justice providing guidance on gender equality in legal aid activities.
- Decision No. 2351/QĐ-TTg on dated 12/24/2010 of the Government Prime Minister approving the National Strategy on Gender Equality (NSGE) period 2011-2020

**viii) Indigenous Peoples and Minority group development policies**

- Decision no.1956/2009/QD-TTg, on dated November 17/2009, by the Prime Minister approving the Master Plan on vocational training for rural labours by 2020
- Decree no.82/2010/ND-CP of government, dated 20 July 2010 on teaching and learning of ethnic minority languages in schools.
• Resolution no.30a/2008/NQ-CP of government, dated 27 Dec. 2008 on support program for rapid and sustainable poverty reduction for 61 poorest districts.
• Decision no.74/2008/QD-TTg of the Prime Minister dated 9-June-2008 on support productive land and residential land for poor ethnic minority households in Mekong Delta area.
• Decree no.60/2008/ND-CP dated 9-May-2008 of the government on the functions, tasks, authorities and structure of the Committee for Ethnic Minorities Affair.
• Decree no.70/2001/ND-CP: all documents registering family assets and land use rights must be in the names of both husband and wife.

ix) National policies and planning of reducing poverty

• Decision no.33/2007/QD-TTg of the Prime Minister dated 20-July-2007 on the policy of assistance to improve knowledge of laws as a program of 135, phase 2.
• Circular no.06 dated 20-September-2007 of the Committee for Ethnic Minorities Affair guidance on the assistance for services, improved livelihood of people, and technical assistance for improving the knowledge on the laws according the decision 112/2007/QD-TTg.
• Decision no.05/2007/QD-UBDT dated 06-September-2007 of the Committee for Ethnic Minorities Affair on its acceptance for three regions of ethnic minorities and mountainous areas based on development status.

x) The policies relate to the subproject implementation issuing by local authority

• Decision no.818/QD-Phu Cat People's Committee on dated 03/6/2014 regarding to appraisal of survey plan and project bidding to the construction works: repair, upgrade Thach Ban reservoirs
• Decision no.1290/QD-Phu Cat People's Committee on dated 07.15.2014 regarding to appraisal of the survey results of the consultants in the project of Thach Ban reservoir: repair, upgrade

xi) National standards

a) Water:
• QCVN 01:2009/BYT: National technique regulations on drinking-water quality
• QCVN 02:2009/BYT: National technique regulations on running water quality
• QCVN 09-MT:2015 BTNMT: National technical regulation on underground water quality
• QCVN 14:2008/BTNMT: National technical regulation on domestic wastewater

b) Air quality:
• QCVN 05:2008 BTNMT: National technical regulation on ambient air quality.
• QCVN 06:2009 BTNMT: National technical regulation on hazardous substances in ambient air.
c) Soil environment

- QCVN 03:2015/BTNMT: National technique regulations on permitted limit of hard metal in land
- QCVN 43:2012/BTNMT: National technical regulation on sediment quality

d) Solid waste management:


e) Vibration and Noise:


f) Health and labor safety:

- Decision No. 3733/2002/QD-BYT of Ministry of Health dated October 10th 2002 about applying article 21 on labor health and relating safety criterions for microclimate, noise, vibration, chemicals – permitted level in work place.

3.2 Selected environmental and legal safeguard policies of WB

According to the safeguard policies of World Bank, an ESIA report should include the systematic analysis of economic, policies, regulations, technical and social aspect to ensure that the potential negative impacts are identified and mitigated during the subproject implementation and in compliance with the policy should be considered properly. Therefore, in reality condition of the proposed sub-project, five (05) environmental and legal safeguard policies of WB are triggered.
## Table 4.1: Environmental Screening

<table>
<thead>
<tr>
<th>Screening question</th>
<th>Yes/ no</th>
<th>Remark is</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Does the subproject have the potential to cause significant adverse impacts to natural or critical natural habitats?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Leads to loss or degradation of sensitive Natural Habitats?</td>
<td>No</td>
<td>There is no sensitive natural habitat near the construction sites. there is no impact on native trees</td>
</tr>
<tr>
<td>- Leads to loss or degradation of Critical natural habitat?</td>
<td>No</td>
<td>Conservation areas, protect areas do not exist in the project areas.</td>
</tr>
<tr>
<td><strong>2. Does the subproject have the potential to cause significant adverse impacts to physical cultural resources?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leads to loss or degradation of physical cultural resources</td>
<td>No</td>
<td>All physical cultural resources in the place located in Thach Ban Tay village and far away from the construction site</td>
</tr>
<tr>
<td>- Potentially results in a contravention of national legislation, or national obligations?</td>
<td>No</td>
<td>The project implementation following and accordance with National and international law, regulations.</td>
</tr>
<tr>
<td><strong>3. Does the subproject have the potential to cause significant adverse impacts on the lands and related natural resources used by ethnic minorities?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potentially result in impacts on lands or territories that are traditionally owned, or customarily used or occupied, and where access to natural resources is vital to the sustainability of cultures and livelihoods of minority peoples.</td>
<td>No</td>
<td>Indigenous/Ethnic minorities group is Ba Na 38 person/11 household, equal 0.8% of total resident living at Thach Ban Tay village of in Cat Son commune. This group is not impacted by the subproject implementation</td>
</tr>
<tr>
<td><strong>4. Does the subproject have the potential to cause significant adverse effects to populations subject to physical displacement?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leads to physical displacement of populations dependent upon lands or use of specific use of resources that would be difficult to replace or restore? Otherwise lead to difficult issues in the ability of the subproject to restore livelihoods?</td>
<td>No.</td>
<td>– No displaced households and no households are acquired &gt; 20% of area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 11,091 m² of land are temporarily acquired, of which for road and camp is 1,812.2 m² belonging to 5 households and for dumping site is 9,278.6 m² belonging to 7 households</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 49,803 m² of land are permanently acquired for management road, construction of head-works and material pit, of which land of 22 households is 47,044 m² and public lands is 2,759 m² managed by People’s Committee of Cat Son commune.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 02 households are affected by structure and house including: 01 temporary house and 02 byres.</td>
</tr>
<tr>
<td><strong>5. Does the subproject entail the construction of a large dam?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the subproject require construction of a dam</td>
<td>No</td>
<td>The subproject only crest of embankment is 12.1m, and is nota large dam</td>
</tr>
<tr>
<td>Does the operation of the subproject rely on the performance of a dam?</td>
<td>Yes</td>
<td>The sub-project will enhance the safety of the Thach Ban dam to better protect downstream</td>
</tr>
<tr>
<td><strong>6. Does the subproject entail the procurement or use of pesticides?</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Do the formulations of the products fall in WHO classes IA and IB, or in Class II?</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>7. Does the subproject have the potential to cause irreversible impacts or impacts that are not easily mitigated?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Leads to loss of aquifer recharge areas, affects the quality of water storage and catchments responsible for potable water supply to major population centers.</td>
</tr>
<tr>
<td>A lead to any impacts such that the duration of the impacts is relatively permanent, affects an extensive geographic area or impacts have a high intensity.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>8. Does the subproject have the potential to result in a broad diversity of significant adverse impacts?</strong></th>
</tr>
</thead>
</table>
| Multiple sites in different locations affected each of which could cause significant losses of habitat, resources, land or deterioration of the quality of resources. | Yes | - Land acquisition for material exploitation: permanently acquired is 44,079.7 m² and temporarily acquired is 9,278.6 m². During this activity, removing the top layer of land is required. It can affect to soil environment, site vegetation covers and air quality.  
- Camping site construction:Solid waste and wastewater are generating in this activities and impact to physical environmental.  
- Access road operation with 845,4 m in length, increasing noise, dust and traffic condition in the local will happen in this task. |  
| Potential, significant adverse impacts likely to extend beyond the sites or facilities for the physical works. | Yes | Land acquisition for temporally servicing road with arable land 1,500 m². Potential impact to local road 400m from Son Loc Bridge to servicing road. Construction worker is up to 80 workers. The construction activities could affect the existing infrastructure and community services. Social conflicts with local villagers may happen as the result of worker mobilised to the site |  
| Transboundary impacts (other than minor alterations to an ongoing waterway activity). | No | The project is implemented within Vietnam territory. Affected areas are also within the territory of Vietnam. |  
| Need for new access roads, tunnels, canals, power transmission corridors, pipelines, or borrow and disposal areas in currently undeveloped areas. | No | - The subproject only upgrade an the existing access road, no new road or tunnel will be constructed. |  
| Interruption of migratory patterns of wildlife, animal herds or pastoralists, nomads or semi-nomads | No | Wild life, natural habitats and special species are not affected by project |  

<table>
<thead>
<tr>
<th><strong>9. Is the subproject unprecedented?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unprecedented at the national level?</td>
</tr>
<tr>
<td>Unprecedented at the provincial level?</td>
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</tr>
<tr>
<td><strong>10. Is the project highly contentious and likely to attract the attention of NGOs or civil society nationally or internationally?</strong></td>
</tr>
<tr>
<td>Considered risky or likely to have highly controversial aspects.</td>
</tr>
<tr>
<td>Likely to lead to protests or people wanting to demonstrate or prevent its construction.</td>
</tr>
<tr>
<td>No.</td>
</tr>
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<tr>
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<tr>
<td>there were accidents incurred due to landmines or explosive materials remaining from the war</td>
</tr>
<tr>
<td>14. Construction that could cause disturbance to the transportation, traffic routes, or waterway transport?</td>
</tr>
<tr>
<td>15. Construction that could cause any damage to the existing local roads, bridges or other rural infrastructures.</td>
</tr>
<tr>
<td>16. Soil excavation during subproject's construction so as to cause soil erosion.</td>
</tr>
<tr>
<td>17. Need to open new, temporary or permanent, access roads?</td>
</tr>
<tr>
<td>18. Separation or fragmentation of habitats of flora and fauna?</td>
</tr>
<tr>
<td>19. Long-term impacts on air quality</td>
</tr>
<tr>
<td>20. Accident risks for workers and community during construction phase.</td>
</tr>
<tr>
<td>21. Use of hazardous or toxic materials and generation of hazardous wastes</td>
</tr>
<tr>
<td>22. Risks to safety and human health</td>
</tr>
<tr>
<td>23. Interruption water supply to domestic users and to irrigation during appurtenant structures construction</td>
</tr>
<tr>
<td>24. Increase flooding level and reservoir sedimentation</td>
</tr>
<tr>
<td>25. Permanent or temporary loss of land or resources for any families, resettlement</td>
</tr>
<tr>
<td>26. Use land that is currently occupied</td>
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<td>27.</td>
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<td>31.</td>
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<td>32.</td>
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<td>33.</td>
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</tbody>
</table>
APPENDIX A5: DIAGRAM OF SAMPLING AND MONITORING ENVIRONMENT
## APPENDIX A6 - ANALYSIS RESULTS OF ENVIRONMENTAL SAMPLES

### Table 6.1: Analysis results of surface water in subproject area (February 2015)

**Locations of Surface water Sampling**

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Location</th>
<th>Observation at sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NM1</td>
<td>At the Thach Ban bridge, the position will be affected by water release from reservoir during reparation of spillway</td>
<td>Fresh water, odourless, medium flow.</td>
</tr>
<tr>
<td>2</td>
<td>NM2</td>
<td>In the irrigation channel from the reservoirs to paddy field (crossing to access road).</td>
<td>Shallow water, no flow, contains suspended solid, odourless</td>
</tr>
<tr>
<td>3</td>
<td>NM3</td>
<td>At the confluence position of Latin river and streamline, the position will be affected by water release from reservoir during construction</td>
<td>Fresh water, medium flow, odourless contains suspended solid (tree branches)</td>
</tr>
<tr>
<td>4</td>
<td>NM4</td>
<td>At the Son Loc bridge Thach Ban Tay village the position will be affected by water release from reservoir during reparation of spillway</td>
<td>Fresh water, weak flow, odourless.</td>
</tr>
<tr>
<td>5</td>
<td>NH1</td>
<td>At the left abutment of embankment (proposed camping site and material storage areas)</td>
<td>Fresh water, weak flow, odourless, flooding around the sampling position</td>
</tr>
<tr>
<td>6</td>
<td>NH2</td>
<td>At the outlet work intake, the position will be affected by water release from reservoir during reparation of Outlet works</td>
<td>Fresh water, odourless</td>
</tr>
<tr>
<td>7</td>
<td>NH3</td>
<td>At the stilling basin of the spillway, the position will be affected by water release from reservoir during reparation of spillway</td>
<td>Fresh water, odourless</td>
</tr>
<tr>
<td>8</td>
<td>NH4</td>
<td>In the reservoirs, next to the borrow pit, the position will be affected by water release from reservoir during reparation of earth works</td>
<td>Fresh water, odourless</td>
</tr>
<tr>
<td>9</td>
<td>NM5</td>
<td>At the irrigation channel (downstream slope side), the position will be affected by water release from reservoir during reparation of construction activity</td>
<td>Shallow water, odourless,</td>
</tr>
<tr>
<td>10</td>
<td>NM6</td>
<td>At the embankment’s slum the position will be affected by water release from reservoir during reparation of construction activities</td>
<td>Water turbidity, odourless</td>
</tr>
</tbody>
</table>

The analyzed parameters will compare with QCVN 08:2008/BTNTM, column B1: National technical regulation on surface water quality, water irrigated agriculture and aquatic cultivation and QCVN 39:2011/BTNTM: National technical regulation on Water Quality for irrigated agriculture
## Air sampling position

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Location</th>
<th>Position</th>
<th>Inspectorial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KK1</td>
<td>At the junction of TL634 (the beginning point to Thach Ban village)</td>
<td>N 14° 5'52.07&quot; E 108°58'31.93&quot;</td>
<td>Gentle wind, few road user</td>
</tr>
<tr>
<td>2</td>
<td>KK2</td>
<td>At the beginning point of the proposed access road</td>
<td>N 14° 6'19.55&quot; E 108°59'3.85&quot;</td>
<td>no wind, less transporters and road users, fresh air</td>
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<tr>
<td>3</td>
<td>KK3</td>
<td>At the proposed camping site (left abutment of the embankment)</td>
<td>N 14° 6'38.70&quot; E 108°58'49.79&quot;</td>
<td>Gentle wind, few road user, fresh air</td>
</tr>
<tr>
<td>4</td>
<td>KK4</td>
<td>At the proposed borrow pit</td>
<td>N 14° 6'52.97&quot; E 108°58'51.34&quot;</td>
<td>No wind, fresh air</td>
</tr>
<tr>
<td>5</td>
<td>KK5</td>
<td>At the road across to Son Loc, Thach Ban Tay village (next to the proposed material storage areas 200m)</td>
<td>N 14° 6'16.54&quot; E 108°58'29.50&quot;</td>
<td>Gentle wind, earth road</td>
</tr>
<tr>
<td>6</td>
<td>KK6</td>
<td>At the junction of Son Loc bridge and the road via Thach Ban Tay village</td>
<td>N 14° 6'19.78&quot; E 108°58'34.55&quot;</td>
<td>Gentle wind, few road user, fresh air</td>
</tr>
<tr>
<td>7</td>
<td>KK7</td>
<td>At the local road from CPC’s house to Thach Ban reservoirs</td>
<td>N 14° 6'27.26&quot; E 108°58'7.47&quot;</td>
<td>Sunny, gentle wind, few road user, fresh air, concrete road type</td>
</tr>
<tr>
<td>8</td>
<td>KK8</td>
<td>At the local road–Thach Ban Dong, Cat Son commune</td>
<td>N 14° 6'28.66&quot; E 108°58'40.54&quot;</td>
<td>Sunny, gentle wind, few road user, fresh air, concrete road type</td>
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<tr>
<td>9</td>
<td>KK9</td>
<td>At the proposed material transportation road</td>
<td>N 14° 6'33.70&quot; E 108°58'43.19&quot;</td>
<td>Sunny, gentle wind, few road user, fresh air, concrete road type</td>
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<tr>
<td>10</td>
<td>KK10</td>
<td>At the agricultural areas of Thach Ban Dong village</td>
<td>N 14° 6'35.38&quot; E 108°58'46.36&quot;</td>
<td>Sunny, gentle wind, few road user, fresh air, earth road type</td>
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</table>

*Source: Field survey results, 2/2015*
### The samples positions

<table>
<thead>
<tr>
<th>No.</th>
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<th>Position</th>
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<td><strong>Soil sample</strong></td>
<td></td>
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<td>D1</td>
<td>At the areas near the proposed disposal areas</td>
<td>N 14° 6'42.25&quot; E 108°58'43.98&quot;</td>
<td>Plasticity, yellow grey soil</td>
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<tr>
<td>2</td>
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<td>At the crop land areas, closed to proposed access road</td>
<td>N 14° 6'20.22&quot; E 108°59.765</td>
<td>Porosity, yellow grey soil</td>
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<td>At the areas near the proposed borrow pit</td>
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<tr>
<td>4</td>
<td>D4</td>
<td>At the agricultural land in the downstream of the reservoir (to monitor soil quality due to project implementation)</td>
<td>N 14° 6'51.04&quot; E 108°58'41.28&quot;</td>
<td>Plasticity, dark yellow grey soil</td>
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<td>5</td>
<td>D5</td>
<td>At the right abutment of the dam, (impacting by earth work)</td>
<td>N 14° 7'1.39&quot; E 108°58'48.04&quot;</td>
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<td><strong>II</strong></td>
<td><strong>Sludge</strong></td>
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</tr>
<tr>
<td>1</td>
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<td>At Thach Ban bridge position (river La Tinh’s sludge)</td>
<td>N 14° 5'48.65&quot; E 108°58'51.61&quot;</td>
<td>Sandy structure, odourless</td>
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<tr>
<td>2</td>
<td>BD2</td>
<td>At the stilling basin of spillway</td>
<td>N 14° 7'4.28&quot; E 108°58'43.62&quot;</td>
<td>Smoothness structure, back colour and smell</td>
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<td>At the connecting point of stilling basin to the irrigation channel</td>
<td>N 14° 7'6.78&quot; E 108°58'39.43&quot;</td>
<td>Sandy structure, smell due to degradation of leaves i</td>
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<tr>
<td>4</td>
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<td>At the Son Loc bridge potion (Thach Ban Tay commune)</td>
<td>N 14° 7'7.33&quot; E 108°58'40.30&quot;</td>
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<td>At the basement of a pond in Thach Ban Dong, Cat Son commune</td>
<td>N 14° 6'25.66&quot; E 108°58'46.11&quot;</td>
<td>Smooth structure, black colour and smell</td>
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*Source: Field survey results, 2/2015*

The parameters of soil and sludge analyse on: Physical and chemical: pH\textsubscript{H\textsubscript{2}O}, pH\textsubscript{KCl}, Humus total, N\textsubscript{total}, P\textsubscript{total}, K\textsubscript{total}, N\textsubscript{Potential}, P\textsubscript{Potential}, K\textsubscript{Potential}
- Heavy metals: As, Pb, Cd, Cu, Zn;
### Bảng kết quả phân tích chất lượng nước mặt

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<td>19.62</td>
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<td>29.46</td>
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<td>52.16</td>
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</table>

T/M Nhóm phân tích: Trưởng phòng Thị nghiệm Tổng hợp

Lê Văn Ctr

Nguyễn Đức Phong

Phó Viện trưởng

Viện Nước, Địa giới và Môi trường

Hà Nội, Ngày 15 tháng 03 năm 2015
Table 6.2: Analysis results of ground water in subproject area (February 2015)

*Ground water sampling Location*

<table>
<thead>
<tr>
<th>No.</th>
<th>Code</th>
<th>Location</th>
<th>Sampling Location</th>
<th>Position</th>
<th>Inspectorial</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NG1</td>
<td>From the well pit of Mr. Nguyen Van Trung household, Thach Ban Dong village, Cat Son commune, Phu Cat District</td>
<td>N 14°6'7.67&quot; E 108°59'3.38&quot;</td>
<td>Odourless, clean water</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>NG2</td>
<td>From the well pit of Mrs. Nguyen Thi Ngon house, Thach Ban Tay village Cat Son commune, Phu Cat District</td>
<td>N 14°6'24.08&quot; E 108°58'26.48&quot;</td>
<td>Odourless, clean water</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>NG3</td>
<td>From the well pit of, Thach Ban Dong village, Cat Son commune, Phu Cat District</td>
<td>N 14°6'29.08&quot; E 108°58'37.44&quot;</td>
<td>Odourless, clean water</td>
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<tr>
<td>4</td>
<td>NG4</td>
<td>From the well pit of Mr. Phan Van Luan house, Thach Ban Dong village, Cat Son commune, Phu Cat District</td>
<td>N 14°6'26.12&quot; E 108°58'44.28&quot;</td>
<td>Odourless, clean water</td>
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<tr>
<td>5</td>
<td>NG5</td>
<td>From the well pit of Mr. Nguyen Van Binh house, Thach Ban Dong village, Cat Son commune, Phu Cat District</td>
<td>N 14°6'25.29&quot; E 108°58'45.51&quot;</td>
<td>Odourless, clean water</td>
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<tr>
<td>6</td>
<td>NG6</td>
<td>From the well pit of Mr. Le Van Trung, Thach Ban Dong village, Cat Son commune, Phu Cat District</td>
<td>N 14°6'28.50&quot; E 108°58'44.89&quot;</td>
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<tr>
<td>7</td>
<td>NG7</td>
<td>From the well pit of Mr. Phan Van Phi house, Thach Ban Dong village, Cat Son commune, Phu Cat District</td>
<td>N 14°6'21.47&quot; E 108°58'37.57&quot;</td>
<td>Odourless, clean water</td>
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<tr>
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<td>NG8</td>
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<td>N 14°6'23.34&quot; E 108°58'37.45&quot;</td>
<td>Odourless, clean water</td>
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<tr>
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<td>From the well pit of Mr. Vo Van Dau house, Thach Ban Dong village, Cat Son commune, Phu Cat District</td>
<td>N 14°6'28.38&quot; E 108°58'50.48&quot;</td>
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<tr>
<td>10</td>
<td>NG10</td>
<td>From the well pit of Mrs. Luong Ngoc Anh house, Thach Ban Dong village, Cat Son commune, Phu Cat District</td>
<td>N 14°6'29.83&quot; E 108°58'49.75&quot;</td>
<td>Odourless, clean water</td>
<td></td>
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The parameter analyze in Lab for water examination:

- Physical parameter: temperature, turbidity, pH, DO, EC, SS, TDS, COD, BOD₅, NOₓ, NO₃⁻, NH₄⁺, SO₄²⁻, PO₄³⁻, Cl⁻ and Feᵢᵢ
- Micro organisms: Coliform
- Heavy metal: As, Pb, Cd
<table>
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<th>TT</th>
<th>Chỉ tiêu</th>
<th>NG1</th>
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<th>NG3</th>
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<th>NG5</th>
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<td>0,96</td>
<td>1,92</td>
<td>0,80</td>
<td>0,64</td>
<td>1,28</td>
</tr>
<tr>
<td>9</td>
<td>NO₂</td>
<td>mg/l</td>
<td>0,01</td>
<td>0,32</td>
<td>&lt;0,01</td>
<td>&lt;0,01</td>
<td>&lt;0,01</td>
<td>&lt;0,01</td>
<td>&lt;0,01</td>
<td>&lt;0,01</td>
<td>0,01</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>NO₃</td>
<td>mg/l</td>
<td>0,04</td>
<td>0,74</td>
<td>0,06</td>
<td>0,26</td>
<td>1,38</td>
<td>1,62</td>
<td>1,02</td>
<td>3,66</td>
<td>3,22</td>
<td>2,74</td>
</tr>
<tr>
<td>11</td>
<td>NH₃</td>
<td>mg/l</td>
<td>&lt;0,01</td>
<td>&lt;0,01</td>
<td>0,11</td>
<td>0,039</td>
<td>0,101</td>
<td>0,017</td>
<td>0,634</td>
<td>0,632</td>
<td>0,07</td>
<td>0,06</td>
</tr>
<tr>
<td>12</td>
<td>PO₄</td>
<td>mg/l</td>
<td>&lt;0,01</td>
<td>&lt;0,01</td>
<td>&lt;0,01</td>
<td>0,06</td>
<td>0,03</td>
<td>0,01</td>
<td>0,01</td>
<td>0,02</td>
<td>0,28</td>
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<tr>
<td>13</td>
<td>SO₄²⁻</td>
<td>mg/l</td>
<td>2,64</td>
<td>1,8</td>
<td>4,46</td>
<td>1,48</td>
<td>2,98</td>
<td>6,88</td>
<td>3,42</td>
<td>4,69</td>
<td>6,10</td>
<td>5,02</td>
</tr>
<tr>
<td>14</td>
<td>Cl</td>
<td>mg/l</td>
<td>147,47</td>
<td>15,60</td>
<td>11,34</td>
<td>10,64</td>
<td>8,51</td>
<td>8,08</td>
<td>36,58</td>
<td>22,69</td>
<td>26,23</td>
<td>64,52</td>
</tr>
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</table>

T/M Nhóm phân tích

Trưởng phòng Thí nghiệm Tổng hợp

Tài xế Chức Huy Trưởng

laş Ban reservoir sub-project- Environmental and Social Impact Assessment
Table 6.3: Analysis results of air quality in project area, February 2015

<table>
<thead>
<tr>
<th>TT</th>
<th>Ki hiệu mầu</th>
<th>dR</th>
<th>dBA</th>
<th>Bụi</th>
<th>SO2</th>
<th>NO2</th>
<th>CO</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>KK1</td>
<td>0.011</td>
<td>34.03</td>
<td>46.8</td>
<td>70</td>
<td>36</td>
<td>2115</td>
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<tr>
<td>2</td>
<td>KK2</td>
<td>0.004</td>
<td>14.04</td>
<td>23.6</td>
<td>86</td>
<td>41</td>
<td>2207</td>
</tr>
<tr>
<td>3</td>
<td>KK3</td>
<td>0.005</td>
<td>9.46</td>
<td>32.7</td>
<td>74</td>
<td>74</td>
<td>2126</td>
</tr>
<tr>
<td>4</td>
<td>KK4</td>
<td>0.008</td>
<td>8.85</td>
<td>34.5</td>
<td>65</td>
<td>35</td>
<td>2008</td>
</tr>
<tr>
<td>5</td>
<td>KK5</td>
<td>0.006</td>
<td>10.32</td>
<td>54.7</td>
<td>66</td>
<td>29</td>
<td>2020</td>
</tr>
<tr>
<td>6</td>
<td>KK6</td>
<td>0.013</td>
<td>29.44</td>
<td>60.2</td>
<td>63</td>
<td>30</td>
<td>2010</td>
</tr>
<tr>
<td>7</td>
<td>KK7</td>
<td>0.028</td>
<td>34.06</td>
<td>28.8</td>
<td>66</td>
<td>36</td>
<td>2203</td>
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<tr>
<td>8</td>
<td>KK8</td>
<td>0.045</td>
<td>46.07</td>
<td>32.8</td>
<td>70</td>
<td>27</td>
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<td>9</td>
<td>KK9</td>
<td>0.014</td>
<td>23.26</td>
<td>26.1</td>
<td>59</td>
<td>32</td>
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<td>10</td>
<td>KK10</td>
<td>0.030</td>
<td>28.24</td>
<td>30.4</td>
<td>62</td>
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<tr>
<td>QCVN 05:2009</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>300</td>
<td>350</td>
<td>-</td>
<td>30000</td>
</tr>
<tr>
<td>QCVN 26:2010</td>
<td>-</td>
<td>79</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

T/M nhóm phân tích: Trưởng phòng

Lê Văn Cử

Nguyễn Đức Phong

Hà Nội, Ngày 4 tháng 6 năm 2015
Viện Nước, Tổ chức và Tổng hợp

Viện Nước, Tổ chức và Tổng hợp

Vì Chì Chánh Hoàng
Table 6.4: Analysis results of sludge in subproject area (February 2015)

<table>
<thead>
<tr>
<th>TT</th>
<th>Kí hiệu mầu</th>
<th>Đơn vị</th>
<th>BD1</th>
<th>BD2</th>
<th>BD3</th>
<th>BD4</th>
<th>BD5</th>
<th>QCVN 03:2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>pH-H2O</td>
<td>-</td>
<td>5.36</td>
<td>5.65</td>
<td>5.37</td>
<td>6.57</td>
<td>5.24</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>pH-KCl</td>
<td>-</td>
<td>4.89</td>
<td>5.19</td>
<td>4.81</td>
<td>5.92</td>
<td>4.76</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Mn</td>
<td>%</td>
<td>1.68</td>
<td>2.10</td>
<td>2.71</td>
<td>1.37</td>
<td>2.11</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Na</td>
<td>%</td>
<td>0.081</td>
<td>0.092</td>
<td>0.108</td>
<td>0.069</td>
<td>0.123</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>P</td>
<td>%</td>
<td>0.031</td>
<td>0.034</td>
<td>0.040</td>
<td>0.032</td>
<td>0.036</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>K</td>
<td>%</td>
<td>0.188</td>
<td>0.138</td>
<td>0.225</td>
<td>0.216</td>
<td>0.208</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Fe</td>
<td>mg/kg đất khô</td>
<td>79.84</td>
<td>89.12</td>
<td>73.44</td>
<td>75.6</td>
<td>82.13</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>AI</td>
<td>mg/100g</td>
<td>0.154</td>
<td>0.166</td>
<td>0.164</td>
<td>0.174</td>
<td>0.202</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Thành phần cát giới</td>
<td>%</td>
<td>0.02-2mm</td>
<td>83.35</td>
<td>76.00</td>
<td>79.63</td>
<td>82.09</td>
<td>77.35</td>
</tr>
<tr>
<td>10</td>
<td>Ca</td>
<td>mg/100g</td>
<td>1.60</td>
<td>2.80</td>
<td>1.60</td>
<td>8.40</td>
<td>6.24</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Mg</td>
<td>mg/100g</td>
<td>1.20</td>
<td>0.89</td>
<td>3.20</td>
<td>3.60</td>
<td>2.14</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>As</td>
<td>mg/kg đất khô</td>
<td>1.97</td>
<td>2.03</td>
<td>3.78</td>
<td>3.88</td>
<td>2.09</td>
<td>12</td>
</tr>
<tr>
<td>13</td>
<td>Pb</td>
<td>mg/kg đất khô</td>
<td>7.95</td>
<td>8.04</td>
<td>7.37</td>
<td>8.55</td>
<td>6.37</td>
<td>70</td>
</tr>
<tr>
<td>14</td>
<td>Cd</td>
<td>mg/kg đất khô</td>
<td>0.14</td>
<td>0.12</td>
<td>0.20</td>
<td>0.16</td>
<td>0.18</td>
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<tr>
<td>15</td>
<td>Cu</td>
<td>mg/kg đất khô</td>
<td>8.16</td>
<td>14.48</td>
<td>12.22</td>
<td>13.63</td>
<td>11.27</td>
<td>50</td>
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<tr>
<td>16</td>
<td>Zn</td>
<td>mg/kg đất khô</td>
<td>41.74</td>
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<td>50.63</td>
<td>67.74</td>
<td>49.08</td>
<td>200</td>
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111
### Table 6.5: Analysis results of soil quality in subproject area (February 2015)

<table>
<thead>
<tr>
<th>TT</th>
<th>Chỉ tiêu</th>
<th>Đơn vị</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>QCVN 03:2008</th>
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<tbody>
<tr>
<td>1</td>
<td>pH-H2O</td>
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<td>6.48</td>
<td>5.96</td>
<td>6.35</td>
<td>5.63</td>
<td>5.78</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>pH-KCl</td>
<td></td>
<td>5.91</td>
<td>5.40</td>
<td>5.88</td>
<td>5.02</td>
<td>5.12</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Mũi khoáng</td>
<td>%</td>
<td>1.32</td>
<td>1.73</td>
<td>1.49</td>
<td>1.03</td>
<td>1.49</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>N₅₀</td>
<td>%</td>
<td>0.064</td>
<td>0.034</td>
<td>0.037</td>
<td>0.048</td>
<td>0.051</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>P₅₀</td>
<td>%</td>
<td>0.029</td>
<td>0.014</td>
<td>0.015</td>
<td>0.018</td>
<td>0.019</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>K₅₀</td>
<td>%</td>
<td>0.173</td>
<td>0.153</td>
<td>0.237</td>
<td>0.161</td>
<td>0.165</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>N₉₀</td>
<td>mg/100g</td>
<td>0.21</td>
<td>1.27</td>
<td>1.35</td>
<td>1.07</td>
<td>1.40</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>P₉₀</td>
<td>mg/100g</td>
<td>0.83</td>
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<td>2.29</td>
<td>1.43</td>
<td>1.72</td>
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</tr>
<tr>
<td>9</td>
<td>K₉₀</td>
<td>mg/100g</td>
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<td>5.3</td>
<td>3.8</td>
<td>6.04</td>
<td>3.18</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Thanh phân cơ giới</td>
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<td>0.02-2mm</td>
<td>79.03</td>
<td>89.27</td>
<td>83.43</td>
<td>86.35</td>
<td>68.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.02-0.002mm</td>
<td>12.57</td>
<td>10.03</td>
<td>15.00</td>
<td>12.70</td>
<td>24.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt;0.002mm</td>
<td>8.40</td>
<td>0.70</td>
<td>1.87</td>
<td>0.95</td>
<td>6.65</td>
</tr>
<tr>
<td>11</td>
<td>Ca²⁺</td>
<td>mg/l</td>
<td>4.40</td>
<td>1.92</td>
<td>2.80</td>
<td>1.60</td>
<td>3.04</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Mg²⁺</td>
<td>mg/l</td>
<td>2.00</td>
<td>1.04</td>
<td>1.60</td>
<td>2.40</td>
<td>0.56</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>As</td>
<td>mg/kg đất khô</td>
<td>1.92</td>
<td>1.93</td>
<td>2.708</td>
<td>4.36</td>
<td>1.39</td>
<td>12</td>
</tr>
<tr>
<td>14</td>
<td>Pb</td>
<td>mg/kg đất khô</td>
<td>3.94</td>
<td>5.04</td>
<td>9.37</td>
<td>6.56</td>
<td>8.37</td>
<td>70</td>
</tr>
<tr>
<td>15</td>
<td>Cd</td>
<td>mg/kg đất khô</td>
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<td>0.36</td>
<td>0.26</td>
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</tr>
<tr>
<td>16</td>
<td>Cu</td>
<td>mg/kg đất khô</td>
<td>9.16</td>
<td>16.48</td>
<td>15.22</td>
<td>14.23</td>
<td>12.27</td>
<td>50</td>
</tr>
<tr>
<td>17</td>
<td>Zn</td>
<td>mg/kg đất khô</td>
<td>45.74</td>
<td>43.25</td>
<td>80.63</td>
<td>47.74</td>
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T/M nhóm phân tích

Trưởng phòng

Lê Văn Cụ

Nguyễn Bảo Phương

Phó viên trưởng

Viên Nước, Trưởng tiêu và Môi trường

Hà Nội, Ngày 15 tháng 03 năm 2015
Table 6.6: Environmental compliance monitoring plan

<table>
<thead>
<tr>
<th>Impacts/Risks</th>
<th>Parameters to monitor</th>
<th>Location/method</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Land acquisition:</td>
<td>• Compensation paid to affected households</td>
<td>Interview affected households</td>
<td>Regular, until farmers are fully paid</td>
</tr>
<tr>
<td>2 Safety risks related to Unexploded Objects (UXO)</td>
<td>• UXO clearance contract is signed • Work is completed and verified • Payments are made</td>
<td>Check documents</td>
<td>Once or until the contract is fully paid</td>
</tr>
<tr>
<td>3 Social impacts: conflicts with 80 workers, impacts on household livelihood, gender impacts from land acquisition</td>
<td>• Workers are registered to local authority • Number of local people hired by the subproject • Amount of trees, excavated materials reused • Cases of conflicts between locals and the workers • Income, job, cultivation period, crop yield, water irrigation schedule • Complain and grievance of resident</td>
<td>Interview the workers and the community ownstream areas</td>
<td>Every 6 months</td>
</tr>
<tr>
<td>4 Gender impacts: Women &amp; children of 21/355 HH affected with land acquisition/water interruption</td>
<td>• Number of women get temporary jobs or business opportunity from the subproject</td>
<td>Interview the contractor, the worker and local community</td>
<td></td>
</tr>
<tr>
<td>5 Landscape modification</td>
<td>• Fertile top soil are retained for reinstatement • Waste are levelled and compacted</td>
<td>all disturbed areas, particularly borrow pit &amp; disposal sites</td>
<td>weekly</td>
</tr>
<tr>
<td>6 Biological impacts vegetation, trees, wildlife, aquatic lives</td>
<td>• Vegetation and trees are not over cut • Manual vegetation clearance • Cofferdam built for underwater construction activities</td>
<td>Observation at disturbed areas interview</td>
<td></td>
</tr>
<tr>
<td>7 Increased level of dust and gas emission</td>
<td>• Visibility in the air • Loose construction materials are covered • Trucks carrying losse materials are covered • Levelling and compaction done</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Noise and vibration</td>
<td>• The transportation vehicles, equipment must be maintained periodically.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacts/Risks</td>
<td>Parameters to monitor</td>
<td>Location/method</td>
<td>Frequency</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>----------------------------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>9 Solid waste management</td>
<td>• Top soil are retained for reuse and reinstatement</td>
<td>Observations at Construction sites Camp</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reuse and recycle are practiced</td>
<td>Disposal site</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Waste are Leveled and compacted at disposal site</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Waste are loaded in in designated areas only;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Domestic waste &amp; wastewater generation from camp</td>
<td>• Availability and condition of sanitation facility at the camp: toilet, drainage, bins cleanliness of the camp and surrounding area</td>
<td>Observation Interview workers</td>
<td></td>
</tr>
<tr>
<td>11 Hazardous management</td>
<td>• Waste oil are stored in safe containers and away from workers camp</td>
<td>Observation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Waste oil containers are stored on water-proof base and protected with roof, warning signs and restrict access</td>
<td>Interview workers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Status of contract with hazardous treatment contractor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Changes in flow pattern, water quality in reservoir, La Tinh rive, Nha Que stream and canal system at downstream</td>
<td>• Adequate sanitation and drainage facilities are installed in the camp</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Wastewater from construction site is managed and not discharged directly into water sources</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• All disturbed areas are reinstated before construction completion.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Erosion risks, sedimentation management</td>
<td>• Ground is levelled and compacted</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Slops are shaped to enhance stabilisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Loose construction materials are covered.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Refill the borrow pit after completing construction to serve cultivation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Traffic disturbance and increased traffic safety risks: along the access roada &amp; Cat Son school</td>
<td>• Local are informed about construction schedule</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• No accident along access road due to project vehicles or construction activities</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Adequate signs, speed control and fence</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Allocate staff to direct traffic during rush hours</td>
<td></td>
<td></td>
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<tr>
<td>15 Damages to existing local</td>
<td>• Load of truck used</td>
<td>Observe and</td>
<td></td>
</tr>
<tr>
<td>Impacts/Risks</td>
<td>Parameters to monitor</td>
<td>Location/method</td>
<td>Frequency</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------</td>
<td>-----------</td>
</tr>
<tr>
<td>road and other existing rural infrastructure</td>
<td>● Road condition is acceptable</td>
<td>interview</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● No other public service interrupted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Health and Safety risks for workers</td>
<td>● EHS staff is appointed</td>
<td>Observation and interview</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Adequate fence, sign, and lighting at the site</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>● First aid kit available</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>● Workers using adequate protective clothings while working</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Health and safety risks for local community</td>
<td>● adequate fence, warning signs, and lightings at the site</td>
<td>observation</td>
<td></td>
</tr>
<tr>
<td>18 Disruption of irrigation and other public service: 75 ha/355 HH of Thach Ban Đong and Thach Ban Tay</td>
<td>● Support are paid in full to affected households</td>
<td>interview</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Farmers are informed timely about water cut off plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Use water from Hoi Son reservoir for irrigation</td>
<td></td>
<td></td>
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<tr>
<td>19 Pest management related to termite treatment</td>
<td>● Training on IMP for farmers in the area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 Agrochemical use in extended irrigated area</td>
<td>● Number of training courses and number of farmers trained on IPM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 Sedimentation in reservoir before refill due to construction waste</td>
<td>● All construction wastes in the reservoir are collected and transported to disposal site</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX A7: COMMUNITY CONSULTATION MINUTES

7.1. Summary of environmental impact assessment consultation

Two consultation rounds with Phu Cat local communities and communes were carried out:

The first consultation was carried out on January 28th, 2015, Binh Dinh irrigation project management unit (PPMU) organised the meeting to share information about the environmental and social impacts by the sub-project. 15 participants attended the meeting, including:

- Representatives of DARD, DoNRE, DoC, DCST, DOET, DoIT.
- Representatives of CPC of Phu Cat, Agriculture division, Natural resources and Environment division, CPC of Cat Son, leader of villages
- Representatives of Phu Cat Irrigation Exploitation co.Ltd
- representatives from affected households and communities about project impacts
- Environmental and social consultants and engineering consultant

Content of the first consultation:

- Summary of subproject information: objectives, components, scope of works of the sub-project, the household to be affected and financing plan.
- Vietnamese government and WB safeguard management requirements.
- Possible impacts and mitigation measures.
- Environmental management plan and environmental monitoring program.
- Commitment by subproject owner/PPMU.
- Discussion and opinions and feedback of subproject owner/PPMU.

The second consultation about measures to minimize the environment and social impacts of subproject was carried out on March 6th, 2015 at conference room of Cat Son commune, 40 participants participated in the discussion, including: people's Committees, Fatherland Front Committees Cat Son commune, veterans, Women's Unions, youth Unions, farmers' associations, cooperatives, village leaders, the affected households in the areas.

At that time, the environmental consultants discussed on the potential negative impacts on the environment and society during project implementation, identified the objectives and scope of works, proposed a mitigation measures to limit the negative effects of the listed impacts. The participants raised their ideas relating to the impacts, consultants and investors considering the suggestion and incorporating them into the report of ESIA.

In addition, Binh Dinh irrigation project management has also sent the official letter and related documents on the project components, solutions to protect environment and local community to the People's Committee and Fatherland Front Committee Cat Son commune to make a request of consultation for environment and social impacts assessments process of the project. The recommendations of the participants are sent to CPC of cat Son commune by official documents (see appendix…). Also, the subproject’ investors has been received the comments from the affected communities, and from the local authority on the proposed mitigation measures.
Feedbacks received

- Agreement for implementation of subproject: participants participated (100%) in the meeting agreed to implement the sub-project, because it will be ensured to handle the of Thach Ban reservoir in a good condition. The sub-project implementation also reduces the risks for local residents in the rainy season, stables water irrigation to 305 ha arable land of Cat Son commune.

- The negative impacts of subproject on environment and society: the affected households, People's Committee and Fatherland Front Committee agreed that the negative effects could be harmed to the environment and society such as the land acquisition, dust and noise increasing, the health safe etc, have to limit in order to keep a good environment and social conditions.

- The proposed mitigation measures to reduce negative impact on environment: CPC and the VFF of Cat Son Commune and the affected households agreed with the mitigation measures to reduce negative impact on environment that has been proposed on the sub-project EIA report:
  
  o The transporting materials should avoid rush hours, the vehicle have to cover during material carrying, watering water on road.
  
  o The earthworks activities should aware about the rainy season.
  
  o Land occupation for site clearance should be limited.
  
  o Announcement the transportation time schedule on the media and public.

- Based on the systematic analysis of the scope of works, negative impacts, mitigation measures to the sub-project, Cat Son authority gave some advices for the project owner, are:
- Hoi Son reservoir can cover to 40 hectares arable land during construction time
- Consideration the alternative transportation road via Son Loc bridge to avoid impacts to resident living areas.
- Compensation for damage to road and infrastructure due to construction activities
- Assessment the risk to downstream areas in case of emergency water release.
- Transportation of wastes, construction material have to follow the regulations.
- Project owner have to follow the laws, regulations, local authority and community suggestions to protect environmental and social aspects in the ESIA report

7.2: Summary of social impact assessment consultation

<table>
<thead>
<tr>
<th>Date</th>
<th>Venue</th>
<th>Participant/women</th>
<th>Content</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 9/03/2015</td>
<td>Cat Son CPC</td>
<td>136/65</td>
<td>Objectives, proposed financed components; Positive and negative social impacts</td>
<td>Local authority</td>
</tr>
<tr>
<td>2 24/03/2015</td>
<td>Cat Son CPC</td>
<td>132/56</td>
<td>Introduce draft ESIA; Discuss on the consensus for implementing the project; Discusses affected areas, positive and negative social impacts; Mitigation measures; Monitoring and management plan in operation and construction phase</td>
<td>Local authority</td>
</tr>
</tbody>
</table>
7.3. **Consultation minutes for subproject preparation**

<table>
<thead>
<tr>
<th><strong>Consultation minutes for subproject preparation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Problem and Methodology</strong></td>
</tr>
<tr>
<td>2. <strong>Consultation Process</strong></td>
</tr>
<tr>
<td>3. <strong>Consultation Participants</strong></td>
</tr>
<tr>
<td>4. <strong>Consultation Outcomes</strong></td>
</tr>
</tbody>
</table>

*Notes:*
- Thach Ban reservoir sub-project - Environmental and Social Impact Assessment
- The consultation minutes cover the preparation process for the subproject, detailing the consultation with various stakeholders such as local communities, authorities, and experts. The minutes include the methods used, the participants involved, and the outcomes achieved.

*Further Details:*
- The consultation process involved stakeholders from various sectors, including local communities, government officials, and experts.
- The outcomes include the identification of key issues and the development of strategies to address them.

*Conclusion:*
- The consultation process has been successful in engaging various stakeholders and identifying key issues for the subproject.

*References:*
- Thach Ban reservoir sub-project - Environmental and Social Impact Assessment
- Consultation minutes for subproject preparation

*Further steps:*
- The next steps involve implementing the strategies developed during the consultation.
- Regular follow-up meetings will be held to monitor progress and adjust strategies as necessary.
7.4 Kiểm ngơi của các địa phương trong vùng dự án có đồng tính với các nội dung của dự án không?

7.6 Kiểm ngơi của các ngành liên quan:
Trong quá trình lập các dự án, chế độ, chế định viên chức, chức năng, chức vụ, chức danh, tổ chức, vị trí, chức năng, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức danh, tổ chức, vị trí, chức 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3. Nội dung tham vấn
Hội nghị đã triển khai các nội dung tham vấn như sau:
- Giới thiệu về nội dung, các hạng mục công trình của dự án
- Việc sử dụng thuận đối với việc triển khai dự án
- Việc các đối tượng bị ảnh hưởng và phản ánh ảnh hưởng
- Việc tác động tích cực của dự án đến môi trường, xã hội
- Các kiến nghị của công động về các biện pháp giảm thiểu tác động đến môi trường, xã hội

4. Y kiến thảo luận:

a) Về sự đồng thuận của địa phương đối với dự án:

b) Về phạm vi ảnh hưởng của dự án và các đối tượng bị ảnh hưởng:
- Về phạm vi ảnh hưởng:

- Về các đối tượng bị ảnh hưởng:

- Về những tác động của Dự án đến môi trường tự nhiên và kinh tế - xã hội:
- Tác động tích cực:

- Tác động tiêu cực:

- Khi xét các biện pháp giảm thiểu tác động môi trường của Dự án:

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e) Kiến nghị đối với chủ dự án:

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UBND Xã

Chủ tịch

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2. 7.4 Consultation minutes of mitigation measures
V/v kiểm tra văn về dự án sброса và nâng cao an toàn đáp - TDA tiêu...

Kính gửi:

MTTQ xã... Cử. Họ... nhận được Văn bản số... ngày tháng... năm 2015 của... Cử. Họ... Cử. Họ...

Khi thực hiện kiểm tra việc xác định mục đích dự án “Sброса и nâng cao an toàn đáp - TDA tiêu... Cử. Họ...“, sau khi xem xét tại liên quyết... Cử. Họ... có ý kiến như sau:

1. Về những tác động tiêu cực của Dự án đến môi trường tự nhiên và kinh tế - xã hội (nếu có) kiểm định việc các hoạt động tương ứng được trình bày trong tài liệu giới thiệu; trường hợp không đối mặt với các hoạt động, vấn đề cụ thể không được.

2. Về các biện pháp giảm thiểu tác động môi trường của Dự án (nếu có) kiểm định việc các hoạt động tương ứng được trình bày trong tài liệu giới thiệu; trường hợp không đối mặt với các hoạt động, vấn đề cụ thể không được.

3. Kiến nghị đối với chủ dự án:
(nếu có thể, kiến nghị của cộng đồng đối với chủ dự án liên quan đến việc cam kết thực hiện các biện pháp, giải pháp giảm thiểu các tác động xấu về môi trường của Dự án và các kiến nghị khác có liên quan đến Dự án (nếu có).

Trên đây là ý kiến của MTTQ xã... Cử. Họ... gửi... Cử. Họ... để xem xét và hoàn chỉnh báo cáo đánh giá tác động môi trường của Dự án.

Nơi nhận:
- Như trên;
- Lưu...

CHỦ TỊCH

PH.Ng. Văn Trang
Construction Camp Management Plan

General Requirements

The Contractor shall, wherever possible, locally recruit the available workforce and shall provide appropriate training as necessary. The Contractor shall consider all aspects of workforce management and address potential ethnic tensions between workers and the local communities, increased risk of prostitution and communicable diseases, theft, alcohol abuse, market distortion due to temporary inputs to local economy and other local tensions such as unemployment, ethnicity and divergent cultural values.

The following general measures shall be considered for construction camps:

7. The construction camp site will have to be approved by the local authority.

8. The Contractor shall present the design of the camps including details of all buildings, facilities and services for approval no later than two months prior to commencement of any construction work. Approvals and permits shall be obtained in accordance with applicable laws, applicable standards and environmental requirements for the building and infrastructure work for each camp area.

9. The Contractor shall provide adequate and suitable facilities for washing clothes and utensils for the use of contract labor employed therein.

10. Camp site selection and access roads shall be located so as to avoid clearing of major trees and vegetation as feasible, and to avoid aquatic habitats.

11. Camp areas shall be located to allow effective natural drainage and landscaped so as to avoid erosion.

12. The Contractor shall provide suitable, safe and comfortable accommodation for the workforce.

13. The Contractor shall provide adequate lavatory facilities (toilets and washing areas) for the number of workers expected on site, plus visitors. Toilet facilities should also be provided with adequate supplies of clean or potable water, soap, and toilet paper. Separate and adequate bathing facilities shall be provided for the use of male and female workers. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic conditions at all times.

14. The Contractor shall implement effective sediment and erosion control measures during construction and operation of the construction work camps in accordance with the environmental requirements as stipulated by the EMP and SESIA, especially near rivers.

15. The Contractor shall provide recreational facilities to the workforce. Such facilities will help mitigate against potential conflict and impact on the local population as the incentive to go outside the camp will be reduced.

16. The Contractor shall provide safe potable water for food preparation, drinking and bathing.

17. The Contractor shall install and maintain a temporary septic tank system for any residential...
labor camp, without causing pollution of nearby watercourses. Wastewater should not be
disposed into any water bodies without treatment, in accordance to applicable Vietnamese
standards.

18. The Contractor shall establish a method and system for temporary storage and disposal or
recycling of all solid wastes generated by the labor camp and/or base camp.

19. The Contractor shall not allow the use of fuel wood for cooking or heating in any labor camp
or base camp and provide alternate facilities using other fuels.

20. The Contractor shall ensure that site offices, depots, and workshops are located in
appropriate areas as approved by the appropriate the Dam Safety Project environmental
officer or the Supervisory Engineer.

21. The Contractor shall ensure that storage areas for diesel fuel and lubricants are not located
within 100 meters of watercourses, and are operated so that no pollutants enter watercourses,
either overland or through groundwater seepage, especially during periods of rain. A ditch
shall be constructed around the area with an approved settling pond/oil trap at the outlet.

22. Areas for the storage of fuel or lubricants and for a maintenance workshop shall be fenced
and have a compacted/impervious floor to prevent the escape of accidental spillage of fuel
and or lubricants from the site. Surface water drainage from fenced areas shall be discharged
through purpose designed and constructed oil traps. Empty fuel or oil drums may not be
stored on site. Waste lubricants shall be recycled, and not disposed to land or adjacent water
bodies.

23. The Contractor shall ensure that site offices, depots, and workshops are located in
appropriate areas as agreed by local authorities and approved by the Dam Safety Project or
supervisory engineer. They shall not be located within 200 meters of existing residential
settlements.

24. Concrete batching plants shall not be located within 500 m of any residence, community or
work place.

25. The Contractor shall provide medical and first aid facilities at each camp area; and

26. All medical related waste shall be disposed off in proper containers, or dealt with
accordingly with established procedures for safe disposal.

Security

Security measures shall be put into place to ensure the safe and secure running of the camp and
its residents. As a minimum, these security measures should include:

1. Access to the camp shall be limited to the residing workforce, construction camp employees,
and those visiting personnel on business purposes.

2. Prior approval from the construction camp manager shall be required for visitor access to the
construction camp.

3. Adequate, day-time night-time lighting shall be provided.

4. A perimeter security fence at least 2m in height shall be constructed from appropriate
materials; and

5. Provision and installation in all buildings of firefighting equipment and portable fire
extinguishers.

Maintenance of Camp Facilities

The following measures shall be implemented to ensure that the construction camp and its facilities will be organized and maintained to acceptable and appropriate standards:

1. A designated camp cafeteria shall be established under strict sanitary and hygiene conditions.
2. Designated meal times shall be established.
3. Cooking or preparation of food shall be prohibited in accommodation quarters;
4. Designated rest times shall be established.
5. Designated recreational hours shall be put in place.
6. Smoking shall be prohibited in the workplace.
7. Procedures shall be implemented to maintain the condition of the construction camp and facilities and ensure adequate cleanliness and hygiene.
8. The latrines and urinals shall be adequately lighted and shall be maintained in a clean sanitary condition at all times.
9. Water shall be provided in or near the latrines and urinals by storage in drums; and
10. A complaint register to receive and respond to complaints from the construction camp residents regarding facilities and services provided.

Code of Conduct

A major concern during a construction of a project is the potentially negative impacts of the workforce interactions with the local communities. For that reason, a Code of Conduct shall be established to outline the importance of appropriate behavior, drug and alcohol abuse, and compliance with relevant laws and regulations. Each employee shall be informed of The Code of Conduct and bound by it while in the employment of the Client or its Contractors. The Code of Conduct shall be available to local communities at the project information centers or other place easily accessible to the communities. The Code of Conduct shall address the following measures (but not limited to them):

1. All workers and subcontractors shall abide by the laws and regulations of Vietnam.
2. Illegal substances, weapons and firearms shall be prohibited.
3. Pornographic material and gambling shall be prohibited.
4. Fighting (physical or verbal) shall be prohibited.
5. Workers shall not be allowed to hunt, fish or trade in wild animals.
6. No consumption of bush meat shall be allowed in camp.
7. No pets shall be allowed in camp.
8. Creating nuisances and disturbances in or near communities shall be prohibited.
9. Disrespecting local customs and traditions shall be prohibited.
10. Smoking shall be prohibited in the workplace.
11. Maintenance of appropriate standards of dress and personal hygiene shall be in effect.
12. Maintenance of appropriate hygiene standards in accommodation quarters shall be set in place.
13. Residing camp workforce visiting the local communities shall behave in a manner consistent with the Code of Conduct; and
14. Failure to comply with the Code of Conduct, or the rules, regulations, and procedures implemented at the construction camp will result in disciplinary actions.

Construction Impact Management Plan

In order to reduce the impact of the construction activities on local communities and the environment, the Construction Contractor shall implement the following Sub-Plans in accordance with the following stipulations:

Erosion and Sedimentation

Site activities shall be carefully managed in order to avoid site erosion and sedimentation of downstream waterways. In order to minimize negative erosion impacts in the project area, the following activities shall be carried out by the Contractor:

1. Erosion and sedimentation shall be controlled during the construction. Areas of the site not disturbed by construction activities shall be maintained in their existing state.
2. Disturb as little ground area as possible, stabilize these areas as soon as possible, control drainage through the area, and trap sediment onsite. Install erosion control barriers around perimeter of cuts, disposal pits, and roadways.
3. Slope works and earth moving/excavation shall be conducted in order to minimize exposure of the soil surface both in terms of area and duration. Temporary soil erosion control and slope protection works shall be carried out in sequence to construction.
4. Conserve topsoil with its leaf litter and organic matter, and reapply this material to local disturbed areas to promote the growth of local native vegetation.
5. Apply local, native grass seed and mulch to barren erosive soil areas or closed construction surfaces.
6. Apply erosion control measures before the rainy season begins, preferably immediately following construction. Install erosion control measures as each construction site is completed.
7. In all construction sites, install sediment control structures where needed to slow or redirect runoff and trap sediment until vegetation is re-established. Sediment control structures include windrows of slash, rock berms, sediment catchment basins, straw bales, brush fences, and silt fences.
8. Control water flow through construction sites or disturbed areas with ditches, berms, check structures, live grass barriers, and rock.
9. The ground surface at the construction site offices shall be concreted or asphalted in order to minimize soil erosion.
10. Erosion control measures shall be maintained until vegetation is successfully re-established.
11. Water shall be sprayed as needed on dirt roads, cuts, fill material and stockpiled soil to reduce wind-induced erosion and dust.

**Particulate Emissions and Dust**

The Contractor shall propose methods and actions to control dust resulting from construction related activities, including quarry sites, crushing and concrete batching plants, earthworks including road construction, embankment and channel construction, haulage of materials and construction work camps. In particular the Contractor shall undertake the following:

1. Minimize production of dust and particulate materials at all times, to avoid impacts on surrounding communities, and especially to vulnerable people (children, elderly people).
2. Time removal of vegetation to prevent large areas from becoming exposed to wind.
3. Place screens around construction areas to minimize dust proliferation, paying particular attention to areas close to local communities.
4. Spray water as needed on dirt roads, cut areas and soil stockpiles or fill material. Spraying shall be carried out in dry and windy days, at least twice a day (morning and afternoon). The frequency of spraying near local communities shall be increased as needed.
5. Pave access roads with gravel in the sections which near the communities and other sensitive receptors to reduce generation of air-borne dust.
6. Provide an adequate ventilation system and other measures to control concentration of air pollutants within tunnels.
7. Transportation of materials by vehicles and construction of access roads shall be properly designed. For example, the access road can be constructed and paved by concrete/asphalt, or laid with small graded rocks, prior to major earthworks which may require transportation of substantial amount of materials on-site and off-site.
8. Ensure adequate maintenance of all vehicles. Construction plant/vehicles that generate serious air pollution and those which are poorly maintained shall not be allowed on site.
9. Transport of chemicals or materials such as cement, sand and lime shall be covered entirely with clean impervious material to ensure that these materials shall be contained. Overflow of material shall be avoided; and
10. The exhaust gases from construction machinery and vehicles are accepted. However, the engines shall be inspected and adjusted as required to minimize pollution levels.

**Noise**

To minimize noise the Contractor shall:

1. Maintain all construction-related traffic on project access roads at established speed limits.
2. Maintain all on-site vehicle speeds at or below 30 kph, or otherwise designated.
3. To the extent possible, maintain noise levels associated with all machinery and equipment at or below 90db.
4. In sensitive areas (including residential neighborhoods, hospitals, rest homes, schools, etc.) more strict noise abatement measures may need to be implemented to prevent undesirable noise levels.
5. Apply proper measures to minimize disruptions from vibration or noise coming from construction activities.

6. Design a transportation schedule for entry of construction materials to minimize the adverse impact on residents, as well as the traffic on the existing roads. The transportation vehicles shall be required to slow down and banned from using horns when passing sensitive areas. Transportation during peak hours should be minimized. The Contractor shall provide the transportation route in advance to the Engineering Supervisor.

7. Maintain the construction equipment in its best operating conditions and lowest noise levels possible.

8. Use temporary noise barriers to minimize the noise caused by construction equipment;

9. Provide hearing protection to workers who must work with highly noisy machines such as piling, explosion, mixing, etc., for noise control and workers protection.

10. Areas for the storage of fuel or lubricants fenced and have a compacted/impervious floor or other surface to prevent the escape of accidental spillage of fuel and/or lubricants from the site. Surface water drainage from fenced areas shall be discharged through an oil skimmer or other appropriate device to remove hydrocarbons. Empty fuel or oil drums may not be stored on site. Proper MSDS labeling shall be in place and training provided to workers handling these materials.

11. The construction supervision team shall be equipped with portable noise detection devices to monitor the noise level at the sensitive receptors.

12. Materials leaving the construction site shall be transported during non-peak hours in order to minimize traffic noise due to the increase in traffic volumes.

13. Use of properly designed silencers, mufflers, acoustically dampened panels and acoustic sheds or shields, etc. shall be made. Mufflers and other noise control devices shall be repaired or replaced if defective.

14. Use of electric-powered equipment when applicable instead of diesel-powered or pneumatic-powered equipment.

15. Equipment known to emit a strong noise intensity in one direction, shall when possible, be oriented to direct noise away from nearby sensitive receptors.

16. Machines and equipment that may be in intermittent use shall be shut down between work periods or throttled down to a minimum operation.

Earthworks, Cut and Fill Slopes

The contractor shall ensure that the following procedures are undertaken:

1. All earthworks shall be properly controlled, especially during the rainy season.

2. The Contractor shall maintain stable cut and fill slopes at all times and cause the least possible disturbance to areas outside the prescribed limits of the works.

3. The Contractor shall complete cut and fill operations to final cross-sections at any one location as soon as possible and preferably in one continuous operation to avoid partially completed earthworks, especially during the rainy season.
4. In order to protect any cut or fill slopes from erosion, in accordance with drawings, cut off drains and toe-drains shall be provided at the top and bottom of slopes and be planted with grass or other plant cover. Cut off drains should be provided above high cuts to minimize water runoff and slope erosion.

5. Any excavated cut or unsuitable material shall be disposed of in designated disposal areas as agreed to by the Supervisory Engineer, and

6. Disposal sites should not be located where they can cause future slides, interfere with agricultural land or any other properties, or cause runoff from the landfill towards any watercourse. Drains may need to be dug within and around the landfills, as directed by the Supervisory Engineer.

Stockpiles and Borrow Pits

The Contractor shall prepare and overall Stockpiles and Borrow Pits Management Plan for the total works. Operation of a new borrowing area, on land, in a river, or in an existing area, shall be subject to prior approval of the Environmental Supervisor, and the operation shall cease if so instructed by the Supervisory Engineer.

Borrow pits shall be prohibited where they might interfere with the natural or designed drainage patterns. River locations shall be prohibited if they might undermine or damage riverbanks, or carry too much fine material downstream.

The location of crushing plants shall be subject to the approval of the Supervisory Engineer, and not be adjacent to environmentally sensitive areas, or to existing residential settlements, and shall be operated with approved fitted dust control devices.

Rock or gravel taken from a river shall be far enough removed to limit the depth of material removed to one-tenth of the width of the river at any one location, and not to disrupt the river flow, or damage or undermine the riverbanks.

The Plan shall include:

1. A map showing the extent of the area to be developed.
2. A method statement defining the proposed working methods.
3. The proposed access and haulage routes between the borrow pits and the destination for the extracted materials.
4. A justification for the quantities of materials to be extracted, an estimation of the waste material to be generated and disposal details for such waste materials.
5. Details of the measures taken to minimize the borrow pit areas and their visual impact on the surrounding area, and
6. Details of the measures to be taken for the long-term rehabilitation of the borrow pit areas in order to avoid situations that could constitute a threat to health and safety and cause environmental degradation.

In general terms, the Contractor shall:

1. Identify and demarcate locations for stockpiles and borrow pits, ensuring that they are 15 meters away from critical areas such as steep slopes, erosion-prone soils, and areas that drain directly into sensitive water bodies.
2. Limit extraction of material to approved and demarcated borrow pits.

3. Stockpile topsoil when first opening the borrow pit. After all usable borrow has been removed, the previously stockpiled topsoil should be spread back over the borrow area and graded to a smooth, uniform surface, and adequately sloped for drainage. On steep slopes, benches or terraces may have to be established to help control erosion.

4. Excess overburden should be stabilized and re-vegetated. Where appropriate, organic debris and overburden should be spread over the disturbed site to promote re-vegetation. Natural re-vegetation is preferred to the best extent practicable.

5. Existing drainage channels in areas affected by the operation should be kept free of overburden.

6. Once the job is completed, all construction-generated debris should be removed from the site to an approved disposal location.

7. The Contractor shall ensure that all borrow pits used are left in an appropriate condition with stable side slopes, re-establishment of vegetation, restoration of natural water courses, avoidance of flooding of the excavated areas wherever possible so no stagnant water bodies are created which could breed mosquitoes, and

8. When the borrow pits or the local depressions created by the construction activities cannot be refilled or reasonably drained, the Contractor shall consult with the local community to determine their preference for reuse such as fish farming or other community purposes.

**Disposal of Construction Waste**

The Contractor shall carry out the following activities:

1. Establish and enforce daily site clean-up procedures, including maintenance of adequate disposal facilities for construction debris.

2. Debris generated due to the dismantling of the existing structures shall be suitably reused, to the best extent feasible (e.g. as fill materials for embankments). The disposal of remaining debris shall be carried out only at sites identified and approved by the Supervisory Engineer. The Contractor should ensure that these sites (a) are not located within designated forest areas; (b) do not impact natural drainage courses; and (c) do not impact endangered/rare flora. Under no circumstances shall the Contractor dispose of any material in environmentally sensitive areas.

3. In the event any debris or silt from the sites is deposited on adjacent land, the Contractor shall immediately remove such debris or silt and restore the affected area to its original state to the satisfaction of Supervisory Engineer.

4. All arrangements for transportation during construction including provision, maintenance, dismantling and clearing debris, where necessary, will be considered incidental to the work and should be planned and implemented by the contractor as approved and directed by the Supervisory Engineer.

5. Consult with local communities, if any, living close to spoil disposal sites that may be affected. The consultation shall provide local stakeholders with detailed information of the potential spoil disposal site, and provide an opportunity for them to express their opinions and concerns with the proposed plans. Information and feedback from the
consultation process shall be incorporated into the final design for each spoil disposal site.

6. Include provisions for incorporating the most appropriate stabilization techniques for each disposal site.

7. Assess risk of any potential impact regarding leaching of spoil material on surface water.

8. Include an appropriate analysis to determine that the selected spoil disposal sites do not cause unwanted surface drainage, and

9. Stabilize spoil disposal sites to avoid erosion in accordance with the requirements of the Landscape and Re-vegetation Plan.

Demolition of Existing Infrastructure

The Contractor shall implement adequate measures during demolition of existing infrastructure to protect workers and public from falling debris and flying objects. Among these measures, the Contractor shall:

1. Set aside a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels.

2. Conduct sawing, cutting, grinding, sanding, chipping or chiseling with proper guards and anchoring as applicable.

3. Maintain clear traffic ways to avoid driving of heavy equipment over loose scrap.

4. Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged.

5. Evacuate all work areas during blasting operations, and use blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures.

6. Provide all workers with safety glasses with side shields, face shields, hard hats, and safety shoes.

Other Management Plans

The contractor shall be responsible for preparing the following management plans in accordance with the stipulated terms of reference:

Waste Management Plan

During the construction stage, the Contractor shall prepare a Waste Management Plan before commencement of project works. The Plan shall include:

Water and Wastewater

- A review of the preliminary site drainage design prepared during the detailed design.
- An update of the preliminary design based on the actual construction program and site specific conditions (e.g. the geographical conditions, location of slopes and the nature of construction work).
- Detailed design including drawings, location maps, specifications of drainage collection channels and wastewater treatment facilities.
Proposed discharge locations and treatment standards.

A detailed implementation program of the proposed drainage system.

As part of the design of the site drainage system, surface runoff within the construction site shall be diverted in order to avoid flushing away soil material and the water is treated by device such as sediment trap before discharge.

Domestic sewage from site offices, toilets and kitchen shall either be collected by a licensed waste collector or treated by on-site treatment facilities. Discharge of treated wastewater must comply with the discharge limits according to Vietnamese legislation.

A wastewater treatment device such as a sediment tank can be installed near each of the constructions activities that may generate wastewater. Alternatively, sedimentation ponds can be constructed on-site to settle out excessive suspended solids (SS) before discharging into a discharge outlet.

Retaining walls and sandbags barriers shall be constructed surrounding the bored piling machine in order to trap bentonite and wastewater within the piling location. The collected spent bentonite or the wastewater shall be pumped for treatment before discharge.

Prior to the rainy season, all exposed surfaces and slopes shall be properly covered or landscaping shall be provided to minimize run-off of sediment laden. Slope protection can be carried out in sequence to construction and in advance of the rainy season.

Drainage control devices such as sediment traps shall be installed at each discharge outlet, and they shall be cleaned regularly, and

Chemical toilets can be provided on each work site employing 5 workers or more.

At least one toilet shall be installed per 25 workers. Domestic sewage collected from the site office and chemical toilets shall be cleaned up on regular basis. Only licensed waste collectors shall be employed for this disposal. The sludge shall be treated according to the requirements of the Contractor’s Waste Management Plan.

Solid Wastes

Waste such as those listed below are expected due to construction activities:

- Surplus excavated materials requiring disposal due to earth moving activities and slope cutting.
- Disposal of used lumber for trenching works, scaffolding steel material, site hoarding, packaging materials, containers of fuel, lubricant and paint.
- Waste generated by demolition of existing houses / buildings affected by the project or breaking of existing concrete surfaces.
- Waste from on-site wastewater treatment facility (e.g. treatment of bentonite from tunneling works by sedimentation process), and
- Domestic waste generated by construction workers, construction campsite and other facilities.

The above wastes must be properly controlled through the implementation of the following
measures:

▪ Minimize the production of waste that must be treated or eliminated.

▪ Identify and classify the type of waste generated. If hazardous or chemical wastes are generated, proper procedures must be taken regarding their storage, collection, transportation and disposal. (See Emergency Plan for Hazardous Materials and Chemical Waste Management Plan).

▪ Identify and demarcate disposal areas clearly indicating the specific materials that can be deposited in each, and

▪ Control placement of all construction waste (including earth cuts) to approved disposal sites (>300 m from rivers, streams, lakes, or wetlands). Collect and recycle and dispose where necessary in authorized areas all of garbage, metals, used oils, and excess material generated during construction, incorporating recycling systems and the separation of materials.

The Contractor shall make a commitment to waste recycling and re-use methods in consideration of the following:

▪ A method statement on waste recycling, re-use and minimization of waste generation.

▪ Excavated material shall be re-used on-site or the nearby road segment / other projects as far as possible in order to minimize the quantity of material to be disposed of.

▪ Recyclable materials such as wooden plates for trench works, steel, scaffolding material, site holding, packaging material, etc. shall be collected and separated on-site from other waste sources. Collected recyclable material shall be re-used for other projects or sold to waste collector for recycling, and

▪ Collected waste shall be disposed of properly through a licensed waste collector.

**Pollution Prevention Plan**

**Emergency Plan for Hazardous Materials**

If the construction site is expected to have or suspected of having hazardous materials (chemicals, asbestos, hydrocarbons, or other similar hazardous materials), the Contractor will be required to prepare a Hazardous Waste Management Plan and Emergency Response Plan to be approved by the Environmental Supervisor. Removal and disposal of existing hazardous wastes in project sites should only be performed by specially trained personnel following national or provincial requirements, or internationally recognized procedures.

The Contractor shall:

▪ Make the Hazardous Waste Management Plan available to all persons involved in operations and transport activities.

▪ Hazardous waste (or chemical waste) shall be properly stored, handled and disposed of in accordance with the local legislative requirements. Hazardous waste shall be stored at designed location and warning signs shall be posted.

▪ Inform the Environmental Supervisor, or Construction Supervisor of any accidental spill or incident in accordance with the plan.
Prepare a companion Emergency Response Plan outlining all procedures to be undertaken in the event of a spilled or unplanned release.

Initiate a remedial action following any spill or incident; and

Provide a report explaining the reasons for the spill or incident, remedial action taken, consequences/damage from the spill, and proposed corrective actions. The Emergency Plan for Hazardous Materials shall be subsequently updated and submitted to the PEO for no objection.

Chemical Waste

During construction there will be a potential for pollution to adjacent habitat areas and watercourses caused by chemical wastes such as spent waste oil, spent lubricant, contaminated soil material due to leakage of hydraulic oil, fuel from construction plant or vehicles, etc. The following measures shall be put into place in order to minimize the damage caused by chemical waste:

- All refueling of heavy equipment and machinery shall be undertaken by a service vehicle to prevent any spillage or contamination by chemical wastes such as maintenance oils, lubricants, etc.
- All the fuel and hazardous material storage shall be adequately enclosed to prevent any spillage problems.
- Storm water runoff from open workshops, repair areas, and enclosed storage areas shall be collected and treated in hydrocarbon separation pits/tanks before discharge to drains and waterways.
- All explosives shall be transported, stored and handled in accordance with applicable laws and good design engineering and constructions practices. The contractor shall provide details of proposed storage and security arrangements.

Maintenance of Construction Equipment

The Contractor shall:

- Identify and demarcate equipment maintenance areas (>15m from rivers, streams, lakes or wetlands). Fuel storage shall be located in proper areas and approved by the PEO.
- Ensure that all equipment maintenance activities, including oil changes, are conducted within demarcated maintenance areas; never dispose spent oils on the ground, in water courses, drainage canals or in sewer systems, and
- All spills and collected petroleum products shall be disposed of in accordance with standard environmental procedures/guidelines. Fuel storage and refilling areas shall be located at least 100m from all cross drainage structures and important water bodies or as directed by the PEO.

Vegetation Clearing and Salvage

Clearing of Construction Areas

Areas proposed for clearing shall be included in the Vegetation Clearing and Salvage Plan. Only those proposed areas shall be cleared in accordance with the Plan and approved by the Engineering Supervisor. The Vegetation Clearing and Salvage Plan shall consider the existing
usage of the project land to allow its existing usage to continue as long as is practicable, without interference with the Contractor’s activities. Vegetation shall not be disturbed in those areas not submitted with the Plan.

The Contractor shall also arrange to coordinate with local communities as part of the Livelihoods Development Plan to clear the reservoir area.

The following measures shall be implemented:

- Large or significant trees in camp areas and access roads should be preserved wherever possible.
- The application of chemicals for vegetation clearing shall be minimized. To the best extent possible, non-residual chemicals shall be selected and with negligible adverse effects on human health.
- Herbicides use in the project shall be shown to be effective against the target vegetation species, have minimum effect on the natural environment, and be demonstrated to be safe for inhabitants and domestic animals in the treated areas, as well for personnel applying them.
- The design of roads, including temporary and permanent access roads shall avoid crop areas where reasonable and practical.

Landscape, Visual impacts and Re-vegetation

The construction program of the project shall be executed in phases, particularly in those locations where severe or high landscape and visual impacts are expected.

The following measures shall be implemented:

- Construction shall be programmed in sequence so that the scale of earth moving activities and area of exposed surface can be minimized.
- Re-vegetation shall start at the earliest opportunity. Appropriate local species of vegetation shall be used.
- The requirement of compensatory planting shall be included in the design and project contract. A Master Landscaping Plan and requirements of ecological monitoring or survey during different stages of the project shall be prepared during the design stage that shall be implemented during the construction and maintained during operation.
- Facilities and structures shall be located according to the terrain and geographical features of the project site.
- Restoration, of cleared areas such as borrow pits no longer in use, disposal areas, construction roads, construction camp areas, stockpiles areas, working platforms and any areas temporarily occupied during construction of the project works shall be accomplished using landscaping, adequate drainage and re-vegetation.
- Existing trees and plants within the construction boundaries shall be tagged to indicate whether the trees are to be retained transplanted or removed. Transplantation of existing trees affected by the project works shall be carried out prior to the commencement of construction.
- Excavations shall avoid damage to the root systems. Mitigation measures are also
required to prevent damage to trunks and branches of trees.

- Temporary hoarding barriers shall be of a recessive visual appearance in both color and form.
- Upon completion of the construction, the affected areas shall be immediately restored to their original condition, including the re-creation of natural and rocky shoreline, footpath and re-establishment of disturbed vegetation.
- At the highly visually sensitive zones, construction may be scheduled where possible at the low tourist seasons.
- Construction trucks shall operate at night when possible and kept cleaned and covered when shipping bulk materials.
- Construction sites shall be surrounded with fence if located at the scenery zones to avoid direct visual sights of the construction sites.
- There shall not be construction camps in scenic areas.
- Random disposal of solid waste in scenic areas shall be strictly prohibited.
- All mixing stations and concrete batching plants shall not be located near rivers or in scenic areas. The stockpiles shall be located in hidden areas, and outside of the sight from tourists;
- Use the existing roads as access road if possible to minimize the need for new access roads which lead to damage existing landforms and vegetation.
- Land use for agricultural activity prior to use for construction activities shall be, as much as possible, restored to a state to allow the same agricultural activity to continue.
- Spoil heaps and excavated slopes shall be re-profiled to stable batters, and grassed to prevent erosion.
- Topsoil stripped from the work areas shall be used for landscaping works, and
- Watercourses, which have been temporarily diverted by the construction activities, shall be restored to their former flow paths.

**Site Restoration**

- At the completion of construction work, all construction camp facilities shall be dismantled and removed from the site and the whole site restored to a similar condition to that prior to the commencement of the works, or to a condition agreed to with local authorities and communities.
- Remedial actions that cannot be effectively carried out during construction shall be carried out on completion of the restoration works (and before issuance of the acceptance of completion of works).

Various activities to be carried out for site restoration are:

- The construction campsite shall be grassed and trees cut replaced with saplings of similar tree species.
- All affected areas shall be landscaped and any necessary remedial works shall be
undertaken without delay, including grassing and reforestation.

- Water courses shall be cleared of debris and drains and culverts checked for clear flow paths.
- All sites shall be cleaned of debris and all excess materials properly disposed.
- Borrow pits shall be restored.
- Oil and fuel contaminated soil shall be removed and transported and buried in waste disposal areas.
- Saplings planted shall be handed over to the community or the land owner for further maintenance and watering, and
- Soak pits and septic tanks shall be covered and effectively sealed off.

**Safety during Construction**

The Contractor’s responsibilities include the protection of every person and nearby property from construction accidents. The Contractor shall be responsible for complying with all national and local safety requirements and any other measures necessary to avoid accidents, including the following:

- Present details regarding maximum permissible vehicular speed on each section of road.
- Establish safe sight distance in both construction areas and construction camp sites;
- Place signs around the construction areas to facilitate traffic movement, provide directions to various components of the works, and provide safety advice and warning. All signs shall be in English and Vietnamese language and be constructed according to Vietnamese specifications.
- Estimate maximum concentration of traffic (number of vehicles/hour).
- Use selected routes to the project site, as agreed with the PEO, and appropriately sized vehicles suitable to the class of roads in the area, and restrict loads to prevent damage to local roads and bridges used for transportation purposes.
- Be held responsible for any damage caused to local roads and bridges due to the transportation of excessive loads, and shall be required to repair such damage to the approval of the PEO.
- Not use any vehicles, either on or off road with grossly excessive, exhaust or noise emissions. In any built up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor.
- Maintain adequate traffic control measures throughout the duration of the Contract and such measures shall be subject to prior approval of the PEO.
- Carefully and clearly mark pedestrian-safe access routes.
- If school children are in the vicinity, include traffic safety personnel to direct traffic during school hours.
- Maintain a supply for traffic signs (including paint, easel, sign material, etc.), road marking, and guard rails to maintain pedestrian safety during construction.
▪ Conduct safety training for construction workers prior to beginning work.
▪ Provide personal protective equipment and clothing (goggles, gloves, respirators, dust masks, hard hats, steel-toed boots, etc.) for construction workers and enforce their use.
▪ Provide post Material Safety Data Sheets for each chemical present on the worksite.
▪ Require that all workers read, or are read, all Material Safety Data Sheets. Clearly explain the risks to them and their partners, especially when pregnant or planning to start a family. Encourage workers to share the information with their physicians, when relevant.
▪ Ensure that the removal of asbestos-containing materials or other toxic substances be performed and disposed of by specially trained workers.
▪ During heavy rains or emergencies of any kind, suspend all work; and
▪ Brace electrical and mechanical equipment to withstand seismic events during the construction.

**Environmental Training for Construction Workers**

During construction there will be a potential for workers to damage protected areas and waterways adjacent to camps and work areas. The Contractor shall prepare an Environmental Training Plan for all construction workers: the Plan shall address the following items:

▪ All Contractor’s employees shall be required to comply with environmental protection procedures and they shall be able to provide evidence that they attended the training sessions detailed in the Plan.
▪ The Plan shall educate all construction workers on the following issues but not limited to them: fire arm possession, traffic regulations, illegal logging and collection of non-timber forestry products, non disturbance of resettlement communities, hunting and fishing restrictions, waste management, erosion control, health and safety issues, all prohibited activities, the Code of Conduct requirements and disciplinary procedures, and general information on the environment in which they will be working and living;
▪ Establishment of penalties for those who violate the rules; and
▪ Proposed methods for conducting the training program, which shall include formal training sessions, posters, data in newsletters, signs in construction and camp areas and ‘tool box’ meetings.
APPENDIX A9- CHANCE FIND PROCEDURES

The project works could impact sites of social, sacred, religious, or heritage value. “Chance find” procedures would apply when those sites are identified during the design phase or during the actual construction period.

Cultural property includes monuments, structures, works of art, or sites of significant points of view, and are defined as sites and structures having archaeological, historical, architectural, or religious significance, and natural sites with cultural values. This includes cemeteries, graveyards and graves.

In the event of finding of properties of cultural value during construction, the following procedures for identification, protection from theft, and treatment of discovered artifacts should be followed and included in standard bidding document.

- Immediately stop the construction activities in the area of the chance find.
- Delineate the discovered site or area.
- Secure the site to prevent any damage or loss of removable objects.
- Notify the supervisory Engineer who in turn will notify the responsible local authorities.
- Responsible local authorities and the relevant Ministry would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures.
- Decisions on how to handle the finding shall be taken by the responsible authorities and the relevant Ministry. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance), conservation, restoration and salvage.
- Implementation of the authority decision concerning the management of the finding shall be communicated in writing by the relevant Ministry of Cultural, Sport and tourist.
- Construction work could resume only after permission is given from the responsible local authorities and the relevant Ministry concerning safeguard of the heritage.
- The World Bank needs to be notified by PMU on the issues and actions taken.
- These procedures must be referred to as standard provisions in construction contracts. During project supervision, the Site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered.
- Relevant findings will be recorded in World Bank Supervision Reports and the overall effectiveness of the project’s cultural property mitigation, management, and activities will be assessed.
APPENDIX A10- TERMITE TREATMENT PROCEDURES

Name of chemical to be used: Metavina 10DP. This product can kill termite via directly exposure or infection. Process of survey, exploration and termite treatment and hidden risks for dam

Surveying biology and ecology of termite

Collecting and analyzing samples according to the protective clothes/safety requirement

Exploring termite net by sound

Surveying and exploring by rada termite net

*Figure 1: Process of surveying and exploring termite net in dam*

**Process of termite treatment for dam**

Drill a screw and inject termiticide into termite nests then inject clay to voids created by termites in the foundation of the dam in order to protect the surrounding environment and thorough handling of potential dangers caused by termites. This measure does not harm the environment but it requires construction unit to use the specialized equipments, and experience in construction termite treatment for irrigation works. Steps of construction termite treatment as follows:

Drill a screw into termite net

Inject termiticide

Inject clay to fill the void created by termite

Reinstate site

*Figure 2: Process of termite treatment in dam*
**Requirement of protective clothes/ safety for workers**

For termite treatment, the potential impacts may occur such as incidents due to using construction machines in dam slope. Therefore, it is necessary to implement the requirement of protective clothes/ safety for works as follows:

i) Operating properly equipments and machine under right procedure to ensure safety.

ii) Checking current status of machines, equipment before operating. The people who are not responsible for construction, without training on technical operation are not allowed in operation, repairing construction machines.

iii) Staffs, workers must be equipped fully protective clothes such as shoes, gloves, helmet, name label.

iv) Power line, water for construction have to arrange tidily to not obstruct construction activities. Construction signs must be available at construction site.
APPENDIX A11- INTEGRATED PEST MANAGEMENT (IPM)

1. Objectives

   a. General objectives

   Strengthening flora protection at local level, reducing pesticide use in the field, improving the efficiency of prevention, managing well pesticide and pesticide use process to reduce the risk of contamination pesticides on the environment and affect human health.

   b. Specific objectives

   - Support of the Department of Plant Protection of Binh Dinh provinces in strengthening pest management and pesticide management in accordance with the national action plan on food hygiene and safety, food security, adaptation to climate change and the concerned international conventions that the Government has approved.

   - Strengthening environmental protection, food safety through strengthening the role of predators; reduce pesticide residues to ensure food hygiene and safety, reduce environmental pollution (water, land, air).

   - Improving farmers' knowledge: distinguish the major pests, secondary; identify predators and their role in the field, clearly understand the effect of two colors of pesticides, property use, know how to survey pest and use threshold control; understand and apply pest control measures in IPM to increase income for farmers.

2 Basic principles of IPM framework

The following principles will be applied to the sub-projects of Binh Dinh province likely to increase the use of fertilizers and pesticides on 130ha cultivation land:

   a. "Prohibited list": As defined in the screening criteria in Environmental and social Management Framework (ESMF), the project will not finance the purchase of pesticides in large quantities and hence do not trigger OP4.09. However, if there is a serious infestation of pests in the region, the project will support to buy small quantities of pesticides. The acquisition, pesticides, storage and transportation will be subjected to the provisions of the Government and without objection of the Bank, the purchase of pesticides can be done. The list of banned pesticides will not be used and circulated.

   b. IPM program and project support: support and implementation of IPM program is part of the EMP for the sub-project. Support project will include technical assistance (consulting) to perform the non-chemical options, and priority support for agricultural extension services, including additional operating costs. The bank support fee for integrated prevention program of the sub-project and will be required or approved an independent program or as a part of ESMP. A proposed budget has been allocated for the implementation of IPM programs for the downstream areas of the project area. Detailed planning work will be completed through consultation close to farmers, local authority/PCP organization.

   c. The project will apply IPM programs as a method to minimize the potential negative impact of the increased use of fertilizers and chemicals. However, the improvement of knowledge and experience in the use of fertilizers and chemicals are through research surveys and training courses in the work as well as selecting safe use of non-chemicals, other techniques, is being investigated and/or applied in Vietnam. National IPM Program has also summarized the results of the implementation and the lessons of experience. The project will apply
National IPM program results and detailed technical guidance.

d. IPM Program subproject can be set up to support the implementation of the Government's policy and objectives focusing on reducing the use of chemical fertilizers and pesticides.

e. In normal conditions, if pesticide use is considered to be a necessary option, only pesticides registered with the government and the international recognition in use and project will also provide technical and economic information for chemicals use demand. It should consider the options in the management of not harmful chemicals and can also reduce reliance on the use of pesticides. The measures will be incorporated into the project design to reduce risks related to the handling and use of pesticides to allowed possible level and managed by users.

f. The planning and implementation of mitigation measures and other activities will be carried out closely with the authorities, powers and stakeholders, including suppliers of chemicals, to facilitate cooperation and understanding each other.

3. The approach of IPM

Focus more on the risks of abuse and excessive use chemical of plant protection products. The concerned plant are rice, vegetables, tea etc. these plants tend to be sprayed more of pesticides.

Focus on community education, the initial survey will be incorporated into the task with the aim of clarifying the root cause of the abuse and excessive use of plant protection products and the associated risks. Support the capacity building of the instructor (trainer) IPM. The current program will need to be reviewed and new modules will be supplemented to increase the portion related to reducing the risk of plant protection products. The training program will be enriched with the integration of many activities such as System Rice Intensification (System Rice Intensification - SRI), minimum tillage (minimum tillage), production community and use of bio-products replacing plant protection chemicals the training activities, the application will be made in the wide area application of the model.

To perform this content, it should perform the following steps:

• Step 0: Hiring consultants: A group of consultants (IPM consultants) will be hired to assist PMU in implementing IPM programs including ensuring results and cooperation among the agencies, farmers, and other stakeholders. The task for the consultant will be implemented at an early stage of project implementation.

• Step 1: Set up the basic requirements of the register the program of farmers. This step should be implemented as soon as possible with appropriate questionnaire to establish base in 2013 for the use of fertilizers and of pesticides in the project area. Consultation with key agencies in the conduct of training, registration of participating farmers.

• Step 2: Set program goals and prepare a work plan. Based on the results from the questionnaire and consultation at Step 1, work plan and schedule will be prepared, including budgeting and implementation object. The work plan will be submitted to the PMU and approved by the World Bank for review and comment.

• Step 3: Implementation and annual review. After approval of the work plan, the activities will be implemented. Implementation progress will be included in the project progress reports. An annual evaluation report will be implemented by PMU and Sub-Department of Plant Protection.
• Step 4: Evaluate the impact. An independent consultant will be hired to carry out the impact assessment. This is to assess the performance of the project and to provide lessons. PMU will hire a national consultant to perform impact assessment of IPM the program

4. The contents of the sub-projects

(i) Collection of information and selection of solutions

Before implementing IPM program, consultants must have the original investigation to have the necessary information such as:

- Survey to collect data on: staple crops have economic significance in the project area: seeds, crop, growth characteristics, and farming techniques.
- Survey to collect data on soil conditions, pedology, local climate.
- Investigate the situation of the pest, harmful rule arises, their economic damage causing on the major crops in the project area.
- Investigate the role of natural enemies parasitic of pests on the major crops in the project area.
- Investigate the actual situation of pest control measures, pesticide use and their effect at the local.
- Investigate the socio-economic conditions, income, technical knowledge, and practices.

On the basis of these findings, a proposal to evaluate IPM measures will apply on specific crops in regions and localities implement the project through the following measures:

- Cultivation methods: Soil, field sanitation, crop rotation, intercropping, crop seasons, reasonable sowing and planting density, rational use of fertilizers; appropriate caring measures.
- Using seed: the tradition seed and the proposed seed in use.
- The biological measures: taking advantage of available natural enemies in the field, using probiotics.
- Determination of the level of harm and prevention threshold.
- Chemical measures: safe using with natural enemies, the economic threshold; 4 correct use of medicines.

(ii) Develop of demonstration models IPM

This section done by the Department of Crop Production, based on soil characteristics, climate, farming skills. Department of Crop Production will propose to the TDA of pilot field for agricultural development with the highly effective main crops. IPM activities in the pilot field will serve for sightseeing and guidance of practice.

Some of the main contents when building the IPM in the pilot field, as follows:

- Construction of demonstration models for applying IPM measures proposed above.
- Building model involved by the people with the guidance of technical staff.
- In the model, there need to build nuclear farmers, group leader.
○ In addition to technical assistance there should be support materials, for households participating in demonstration models.

○ Compiling IPM guiding documentation for major crops: rice, vegetables ...

○ Scale of model: depending on crops, specific economic conditions, models were constructed using different scales: 5-10 ha / model.

(iii) Coaching and training of IPM staff

TOT (Training of trainers) and Farmer Field School (FFS):

○ Each sub-project will organize workshops and staff training of IPM. The content of the training includes:
  ○ Distinguish the major and secondary pests.
  ○ Identify the natural enemies of pests and diseases in the field.
  ○ Investigate methods to detect worms and diseases.
  ○ Understand the impact of two pesticides, using appropriate pesticides.
  ○ The techniques pest control under IPM principles.
  ○ Advanced farming techniques.

○ The understanding must be trained in theory and practical application in the field. The contents above can be trained under thematic groups: farming thematic, identification thematic and detection methods of pests and their natural enemies, the thematic of IPM techniques in production.

○ Training object: The technical staff of the Department of Agriculture, Sub-department of plant protection, agricultural extension of districts, communes, and cooperatives. These students will train to the farmers in the project area, the implementing of models.

○ The size of each class is from 20 to 30 students, held in each district. Learning time in each stage. According to the thematic training session, each session may last 3-5 days on both theory and practice.

○ Lecturer: hire experts from University/Research institute/Agricultural Extension Center...

(iv) Coaching and training of farmers

Training of Farmers (TOF) follows Farmer Field School (FFS):

○ Method: Combine theoretical training and base on practical fields of farmers and demonstration model on demonstration IMP in the pilot field.

○ Contents are the same as IMP staff training.

○ Participants: participating farmers, farmers who direct implement the models and farmers outside if interested.

○ Classes are organized in each commune.

○ Lecturer: staffs attended TOT classes
(v) **Evaluate and visit the field based on demonstration models and field applied of IPM following the models of farmers**

Visit the coast conference, farmers performing the demonstration models are reporters. The farmers implement the model directly with the participants; visiting farmers will calculate, compare economic performance and identify lessons, limitations and the work being done and not being done.

(vi) **Scientific seminar, evaluation of result and exchange of experience and information, expand the model**

Invite experts in related fields participating in the assessment, analysis and additional evaluation, perfecting the processes; the mass media, the propaganda extension organization, expansion and transfer the result, the technical advances to farmers, and production areas with similar conditions.

5. **The expected results and activities of the project**

The project is expected to achieve the following results:

- The risk of food safety and the environment are minimized through the implementation of existing regulations in business management and use of plant protection products and other provisions in national policy and the implementation.

- The capacity of Phu Cat PPD, farmer trainers are enhanced meeting training work, IPM training and IPM practice advocacy are maintained.

- Support for farmer groups after learning IPM to continue experiment to determine the application technical advances more effectively in production and popular in the community.

- Support for strengthening commune locality, strengthening pesticide management including the implementation and enforcement of legislation controlling plant protection products. Construction and distribution of a short list of specific plant protection products proposed use for rice and safe vegetables production.

6. **Implementation of IPM programs**

Currently, Vietnam is implementing the national IPM program, so sub-projects requires coordinated planning and integration of the IPM program of the project with the National IPM program to perform more effectively within of each sub-project.

- Binh Dinh Project Management Unit PPMU:
  - Developing and implementing IPM program.
  - To be responsible for the preparation of periodic reports on the implementation and submitting to CPO, WB. Final plan and budget will be completed and discussed with the CPO. All documents will be stored in the project file.

- Binh Dinh Sub-Department of Plant Protection:
  - Provide policy and technical guidelines for the implementation of the IPM program.
  - Join in IPM model building.
  - Join coaching and staff training IPM.

- Phu Cat Plant Protection Station
o Coordinate with IPM staff to implement coaching and trained of farmers implemented IPM through the approach and provide of knowledge, support for of farmers on the safe use of pesticides when necessary.

o Guide the list of banned pesticides

o Examine the distribution facility providing pesticides to ensure the provision of safe pesticides for farmers

- Cat Son People’s committee: Organizing for farmers decided to maintain the routine IPM was formed from a training course by organizing IMP-clubs or groups of farmers with the different levels of organization and structure, along with many activities (including the integration of the contents of cattle, credit, market access, etc.,)

- Households in the project area: Implementing IPM program has trained. The members of the IPM club support together to develop agricultural activities. They also play a central role in the task of organizing community IPM program and general agricultural planning of commune and district as well.

- Environmental Safety Monitoring Consultant: Monitoring the implementation of IPM program of sub-projects; Guides local PMU in the implementation; Recommend measures to improve the efficiency of implementation of IPM program of sub-projects.

7- **Funds for implementation of IPM program**

Funding estimates of the sub-projects implement IPM program includes the following categories:

- Funds for coaching and IPM staff training: Calculated for the classes held in each district = unit price x number of district of each sub-project.

- Funds for coaching and training of farmers: Calculated for the organization of class in each commune = unit price x number of commune in each sub-project.

- Funds held assessment and the shore tours based on demonstration models and field applying IPM following models of farmers. Each district held a conference for shore tours in 1 day.

- Scientific conference, evaluating results, information and experiences exchange, expanding the model. Each District held a scientific conference.
APPENDIX 12 – MANAGEMENT AND IMPLEMENTATION OF BOMB, MINE AND EXPLOSIVE MATERIALS

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

MINISTRY OF DEFENSE

No.: 146/2007/TB-BQP

Hanoi, September 11, 2007

CIRCULAR

GUIDING THE IMPLEMENTATION OF DECISION NO. 96/2006/QD-TTg DATED MAY 04, 2006 OF THE PRIME MINISTER ON MANAGEMENT AND IMPLEMENTATION OF BOMB, MINE AND EXPLOSIVE MATERIALS

In furtherance of Decision No. 96/2006/QD-TTg dated May 04, 2006 of the Prime Minister on management and implementation of bomb, mine and explosive materials. After reaching a consensus with the Ministries and sectors concerned, the Ministry of Defense provides the guidance on implementation as follows:

I. GENERAL REGULATION

1. Scope: This Circular provides guidance on implementation of bomb, mine and explosive materials nationwide, construction investment projects using state capital (development investment capital from the state budget, state development investment credit capital, credit capital guaranteed by the state and other state investment capital) and other capital sources; projects (non-project) with foreign involvement and for the purpose of investigation, survey and research related to the existence of bomb, mine and explosive materials after war.

2. Subjects of application: This Circular applies to the Ministries, sectors, People’s Committee of provinces and centrally affiliated cities, investors, project management committees, units, businesses, national social organizations, international organizations, foreign non-governmental organizations and domestic or foreign individuals having activities related to the bomb, mine and explosive materials in the territory of Vietnam.

3. Responsibility for management and implementation organization

3.1. The duties and responsibility of the Ministry of Finance in management and implementation of bomb, mine and explosive material disposal comply with the provisions in Article 1 and 2. The duties and responsibility of the Ministries, sectors, localities and investors comply with the provisions in Article 4 of Decision No. 96/2006/QD-TTg dated May 04, 2006 of the Prime Minister.

3.2. The Ministry of Defense develops and implements the plan for investigation and survey to make a map of bomb, mine and explosive material pollution on a national scale and in detail to communal level. The Ministries, sectors, People’s Committee of provinces and cities, towns, districts and communes will coordinate with the investigation and survey force to implement and
provide relevant information correctly and objectively to complete the plan. The plan result must
make a map of areas still polluted with bombs, mines and explosive material in detail to
communal level, assess the level of residual bombs, mines and explosive materials in each area
and nationwide in service of the planning of social-economic development of the central and
local governments as a basis for consultation and implementation of bomb, mine and explosive
material disposal for construction works or projects.

3.3. Due to the particularly dangerous nature, the bomb, mine and explosive material disposal is
implemented by the method of assigning tasks to specialized sapper units and qualified military
businesses for implementation under the Decision No. 49/2007/QD-TTg dated April 11, 2007 of
the Prime Minister on the special cases of appointment of contractors specified at Point dd,
Clause 1, Article 101 of the Law on Construction.

3.4. The commander of units performing the bomb, mine and explosive material disposal will
take the main responsibility for the result and safety for the projects and works during the
construction and operation related to the issues of bomb, mine and explosive material disposal
within the scope of assigned tasks.

4. Scope of activities of bomb, mine and explosive material disposal

4.1. As an item in the content of site clearance of an investment project.
4.2. As an independent project only performing a content of bomb, mine and explosive material
disposal for the site clearance for general purpose.

4.3. Area, depth and safety corridor of bomb, mine and explosive material disposal for project
will comply with Decision No. 95/2003/QD-BQP dated August 7, 2003 of the Minister of
Defense on issuing the "Technical process of detection and disposal of bombs, mines and
explosive materials" (referred to as area of bomb, mine and explosive material disposal ).

4.4. The underground bomb, mine and explosive material disposal specified in this Circular is
only applied in case of depth up to 15m. In case of over 15 m deep, the separate process and
norm issued by the Ministry of Defense will be followed.

5. The regulations and policies on treatment, allowance and subsidy to cadres and soldiers
directly involved in tasks of bomb, mine and explosive material disposal will comply with the
state current regulations.

II. PROCESS OF IMPLEMENTATION OF BOMB, MINE AND EXPLOSIVE
MATERIAL DISPOSAL

1. Stages of implementation

The bomb, mine and explosive material disposal is conducted in accordance with the order of
implementation of basic capital construction investment projects defined by the Government
including two stages:
- Preparing the estimate of bomb, mine and explosive material disposal during the stage of preparation for investment.
- Implementing the bomb, mine and explosive material disposal during the stage of project implementation.

2. Formulation of estimate of bomb, mine and explosive material disposal during the stage of preparation for investment.

The investor will, based on the area of bomb, mine and explosive material disposal for the project (specified at Point 4.3, Section 4, Part I) and the norm and unit price of bomb, mine and explosive material disposal for 1 ha of area (specified in Annex 01) of this Circular to perform the following:

- Calculation of investment capital (estimate) of item of bomb, mine and explosive material disposal of the project or for an independent project of only bomb, mine and explosive material disposal
- Aggregation of estimated capital into the total investment of project or total investment for an independent project of bomb, mine and explosive material disposal.
- Submission of project for approval.

3. Implementation of bomb, mine and explosive material disposal during the stage of project implementation: The bomb, mine and explosive material disposal during the stage of project implementation is conducted with the following steps:

3.1. Step 1: Preparing the contents of request for bomb, mine and explosive material disposal.
After the investment project is approved, the investor prepares the contents of written request for bomb, mine and explosive material disposal, including: Project name, Location, Investor, Area of bomb, mine and explosive material disposal, Budget, Progress requirement

3.2. Step 2: Sending the written request for bomb, mine and explosive material disposal to the following address: For projects with the area of bomb, mine and explosive material disposal smaller or equal to 30 ha, the written request will be sent to the High Command of Military Zone conducting the investment project for settlement: For projects with the area of bomb, mine and explosive material disposal smaller or larger than 30 ha, the written request will be sent to the Department of Warfare of the General Staff for settlement.

3.3. Step 3: Assigning tasks to units of bomb, mine and explosive material disposal

- Commander of Military Zone will, based on the request of the investor, pollution degree of bomb, mine and explosive materials at the area of project, decide to assign tasks to a qualified unit or business to conduct the survey and make technical performance plan – estimate and implementation of bomb, mine and explosive material disposal.

- The Head of Department of Warfare / General Staff will, based on investor’s request, pollution degree of bomb, mine and explosive material disposal at the project area, deal with the procedures and prepare decision for report to the Ministry of Defense to assign tasks to a qualified unit or business to conduct the survey and make technical performance plan – estimate;
assign tasks to the performing unit. For construction projects and works with large area of bomb, mine and explosive material disposal and requirement of urgent progress, two or many units will be assigned to perform the tasks to ensure the progress.

3.4. Step 4. Assessing and approving the technical performance plan – estimate

After making the technical performance plan – estimate of bomb, mine and explosive material disposal, the assigned unit or business will send dossier to the Commander of Military Zone to assess and approve the technical performance plan – estimate of projects with area of bomb, mine and explosive material disposal smaller than or equal to 30 ha carried out by units or businesses under its management. The dossier will also be sent to the Commander of sapper to assess and approve the technical performance plan – estimate of projects with area of bomb, mine and explosive material disposal smaller and greater than 30 ha carried out by businesses under the management of Ministry of Defense and make a report to the Ministry of Defense for approval.

4. Signing of contract for implementation of bomb, mine and explosive material disposal: Based on the decision on task assignment of the Ministry of Defense or Military Zones, the investor will sign contract with the units and businesses assigned tasks for implementation, payment and finalization.

5. Performance:

5.1. After the task performance contract is signed, the unit directly performing tasks must make a performance plan for report to the superior management level for approval.
5.2. The performing unit will notify in writing the bomb, mine and explosive material disposal to the local military agency in the area of project for uniform implementation and management of area.
5.3. When receiving notice, the units and agencies concerned will create conditions for the assigned unit to carry out the bomb, mine and explosive material disposal and destroy bombs, mines and explosive materials conveniently, quickly and ensure the safety and construction progress of the project.

6. Acceptance an handover: After the completion of bomb, mine and explosive material disposal for the project (or each stage), the performing unit will make a report to the investor for organization of acceptance, payment and finalization on the basis of approved technical performance plan – estimate for the investor to receive, protect and put the site into use. The dossier of result of bomb, mine and explosive material disposal is kept with project documents.

7. Inspection and report: The superior management level of the assigned unit will inspect the result of performance quality at the site. For key projects, the Ministry of Defense will assign the Command of sapper to coordinate with competent authorities for inspection organization in case of necessity. Every quarter, 06 months or one year, the units carrying out the bomb, mine and explosive material disposal will report the result of implementation to the Command of sapper for aggregated report to the Ministry of Defense and the Prime Minister as prescribed.

III. FUND FOR BOMB, MINE AND EXPLOSIVE MATERIAL DISPOSAL
1. For projects using state budget, the compliance with the provisions in Clause 2, Article 3 of Decision No. 96/2006/QD-TTg dated May 4, 2006 of the Prime Minister is as follows:

1.1. Expenditure of allowance for the performing force with the fee of 60,000 dong/person/day under the Decision No.122/2007/QD-TTg dated July 27, 2007 of the Prime Minister on a number of benefits for servicemen and national defense workers and officials directly carrying out the bomb, mine and explosive material disposal.
1.2. Expenditure of materials, labor and machine shift is based on the estimate norm bomb, mine and explosive material disposal issued together with Decision No. 177/2007/QĐD-BQP dated July 30, 2007 of the Minister of Defense.
1.3. The equipment for performance which the army does not have and must leased from outside must be fully and correctly calculated under current regulations.
1.4. Unit price of machine shift based on the quotation of machine shift and equipment used for bomb, mine and explosive material disposal is issued together with Decision No. 177/2005/QD-BQP dated November 04, 2005 and No.80/2007/QD-BQP dated May 03, 2007 of the Minister of Defense.
1.5. Other expenditures are calculated under current regulations.
1.6. Not calculating the pre-calculated taxable incomes and other taxes (except for leased equipment).

2. For projects using other capital sources: To comply with the provisions in Clause 3, Article 3 of Decision No. 96/2006/QD-TTg dated June 04, 2006 of the Prime Minister; the unit price of bomb, mine and explosive material disposal is fully and correctly calculated under current regulations.

3. Method of fund guarantee: The fund guaranteed for bomb, mine and explosive material disposal is taken from the fund of project as an expenditure in the total investment of each project or total investment of independent project of bomb, mine and explosive material disposal. The investor will make a payment or finalize fund directly for units under contract.

**IV. WORK OF BOMB, MINE AND EXPLOSIVE MATERIAL DISPOSAL FOR PROJECTS (OR NON-PROJECT) WITH FOREIGN INVOLVEMENT**

1. Foreign countries, international organizations, foreign non-governmental organizations, foreign individuals or Vietnamese people living abroad and other organizations and individuals having activities to support the development, humanitarian aid in the field of bomb, mine and explosive material disposal in the territory of Vietnam and meet the requirement of the law and regulations of Vietnam are all given the favorable conditions for implementation.

The aid from foreign countries in the field of bomb, mine and explosive material disposal includes the main forms as follows: Aid through programs and projects; Non-project aid and support (aid not under the program, project; giving aid in the form of goods, materials, equipment, finance….)

The Ministry of Defense will coordinate with the Ministries, sectors and localities concerned to receive the supporting sources and remedy the consequences of bombs, mines and explosive materials in Vietnam.
2. The receipt of official development assistance (ODA) to remedy the consequences of bombs, mines and explosive materials left over from war will comply with Decree No. 131/2006/ND-CP dated November 09, 2006 of the Prime Minister issuing the Regulation on management and use of ODA.

3. The receipt of aid from the non-governmental organizations (NGO) will comply with Decision No. 64/2001/QD-TTgdated April 26, 2001 of the Prime Minister issuing the Regulation on management and use of aid from the non-governmental organizations (NGO).

4. The participation in the bomb, mine and explosive material disposal as the international duties assigned by the Government on the basis of international agreements in which Vietnam is contracting party.

**V. IMPLEMENTATION ORGANIZATION**

1. This Circular takes effect 15 days after its publication in the Gazette.

   The previous regulations on management and implementation of bomb, mine and explosive material disposal in contradiction with the provisions of Decision No. 96/2006/QD-TTg of the Prime Minister and the guidelines in this Circular are invalidated.

2. For projects with the items of bomb, mine and explosive material disposal approved before the effective date of this Circular but not under the performance, their expenditure estimate will be adjusted according to this Circular. For the projects of bomb, mine and explosive material disposal still not finished, the volume completed (based on the construction diary confirmed by the investor’s supervisor) as of May 25, 2006 will be entitled to the expenditure as prescribed before the effective date of the Prime Minister’s Decision No. 96/2006/QD-TTg; the volume of performance as of May 26, 2006 to the point of time this Circular takes effect will comply with the Official Dispatch No. 5972/BQP dated November 13, 2006 of the Ministry of Defense. The volume of performance after the effective date of this Circular is adjusted under the provisions of this Circular.

3. The Ministries, sectors, People’s Committees at all levels and project investors will, based on the provisions in Decision No. 96/2006/QD-TTg of the Prime Minister and the guidelines of this Circular, organize the implementation.

   Any difficulty arising during the implementation of this Circular should be promptly reported to the Ministry of Defense for consideration and settlement./.

**FOR THE MINISTER**

**DEPUTY MINISTER**

**GENERAL**

Nguyen Khac Nghien
ANNEX 1 - UNIT PRICE NORM OF BOMB, MINE AND EXPLOSIVE MATERIAL DISPOSAL TEMPORARILY CALCULATED FOR 1HA FOR ESTIMATE OF TOTAL PROJECT INVESTMENT
(Issued with Circular No 146/2007/TB-BQP dated September 11, 200)

<table>
<thead>
<tr>
<th>No.</th>
<th>Signal density area</th>
<th>Unit price of bomb, mine and explosive material disposal for 1 ha (Million dong/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>On ground</td>
</tr>
<tr>
<td>1</td>
<td>Area 1</td>
<td>19.5</td>
</tr>
<tr>
<td>2</td>
<td>Area 2</td>
<td>26.3</td>
</tr>
<tr>
<td>3</td>
<td>Area 3</td>
<td>33.2</td>
</tr>
<tr>
<td>4</td>
<td>Area 4</td>
<td>40.0</td>
</tr>
</tbody>
</table>

CLASSIFICATION OF SIGNAL DENSITY AREA

<table>
<thead>
<tr>
<th>Classification</th>
<th>Name of locality (from district, town or higher)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area 4</td>
<td>- Vietnamese – China border region (≤ 5 km from the border line to our country inland);</td>
</tr>
<tr>
<td></td>
<td>- Thua Thien – Hue province: Huong Thuy and Phong Dien district</td>
</tr>
</tbody>
</table>
| Area 3         | - Nghe An province: Ky Son, Luong, Nam Dan, Nghi Loc, Hung Nguyen, Vinh City; - Ha Tinh province: all districts and towns except Thach Ha district; - Quang Binh province: all districts except Dong Hoi City; - Thua Thien Hue province: all of the remaining districts and cities.
| Area 2         | - Inner cities: Ha Noi, Hai Phong, Bac Giang, Thai Nguyen, Thanh Hoa; |
|                | - Nghe An province: All remaining districts and towns; |
|                | - Ha Tinh province: Thach Ha district; |
|                | - Quang Binh Province: Dong Hoi City; |
|                | - Da Nang city: all districts except Ngu Hanh Son district; |
|                | - Quang Nam province: all districts and towns except Hoi An Town and Tra My District |
|                | - Quang Ngai province: all districts and towns; |
|                | - Ninh Thuan province: all districts and towns except Ninh Hai district, |
|                | - Kon Tum province: all districts and towns; |
|                | - Dak Lak province: MaDrak, Dak RLap, Krong Bong; Buon Don districts; |
|                | - Gia Lai Province: Peiku city; IagGrai and Chu Prong districts; |
|                | - Dong Nai province: Nhon Trach district; |
|                | - Ho Chi Minh City: Cu Chi, Can Gio districts; |
|                | - Long An province: all districts except Tan An town, Can Giuoc and Thanh Hoa districts |
|                | - Binh Thuan province: Tuy Phong, Tanh Linh, Ham Tan districts; |
|                | - Binh Duong province: Ben Cat district; |
|                | - Tay Ninh province: Ben Cau, Tan Bien, Tan Chau and Tan Chau districts; |
|                | - Can Tho city: Chau Thanh, Thot Not districts |
|                | - Hau Giang province: Vi Thanh town |
|                | - Tien Giang province: Go Cong, Cho Gao, Chau Thanh districts, My Tho City, Go Cong town. |
|                | - Soc Trang province: Soc Trang City, My Tu, Long Phu, Ke Sach districts; |
- Kien Giang province: Chau Thanh district;
- Ca Mau province: Ca Mau city, Tran Van Thoi, Ngoc Hien, Dam Doi, Cai Nuoc districts;
- Tra Vinh province: Tra Vinh town
- Vinh Long province: Mang Thit, Long Ho, Vung Liem districts, Vinh Long town;
- Dong Thap province: Sa Dec town; Bac Lieu province: Bac Lieu town.

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area 1</td>
<td>All remaining areas except localities of areas 2, 3 and 4 in the country</td>
</tr>
</tbody>
</table>

**ANNEX 2**

**SURVEY EXPENDITURE ESTIMATE OF BOMB, MINE AND EXPLOSIVE MATERIALS**
(Applied to projects and works with area of 30 ha or more)
*(Issued together with Circular No. 146/2007/TT-BQP dated September 11, 2007)*

<table>
<thead>
<tr>
<th>No.</th>
<th>Expenditure item</th>
<th>Method of calculation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Direct expenditure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total material expenditures</td>
<td>VL</td>
</tr>
<tr>
<td>1</td>
<td>Material expenditure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Labor allowance expenditure</td>
<td>Total labor expenditures</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>Machine expenditure</td>
<td>Total machine expenditures</td>
<td>M</td>
</tr>
<tr>
<td>4</td>
<td>Other direct expenditures</td>
<td>1.5% x (VL + NC + M)</td>
<td>TT</td>
</tr>
<tr>
<td></td>
<td>Total of direct expenditures</td>
<td>VL + M + NC + TT</td>
<td>T</td>
</tr>
<tr>
<td>II</td>
<td>General expenditures</td>
<td>70% x NC</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Total survey estimate cost</td>
<td>T + C</td>
<td>Z</td>
</tr>
<tr>
<td>III</td>
<td>Other expenditures</td>
<td>K1 + K2 + K…</td>
<td>K</td>
</tr>
<tr>
<td></td>
<td>Formulation of plan and report on survey result</td>
<td>5% x Z</td>
<td>K1</td>
</tr>
<tr>
<td>2</td>
<td>Temporary accommodation expenditures</td>
<td>5% x Z</td>
<td>K2</td>
</tr>
<tr>
<td>3</td>
<td>Assessment and approval expenditures</td>
<td>Prescribed percentage x Z</td>
<td>K3</td>
</tr>
<tr>
<td>...</td>
<td>Other expenditures (if any)</td>
<td>…</td>
<td>K…</td>
</tr>
<tr>
<td></td>
<td>Total estimate value:</td>
<td>Z + K</td>
<td>G</td>
</tr>
</tbody>
</table>

Note: General expenditures and expenditure of formulation of plan and report on survey result and temporary accommodation expenditures will comply with Circular No. 14/2005/TT-BXD dated August 10, 2005 of the Ministry of Construction guiding the estimate and management of construction survey expenditures
ANNEX 3 - EXPENDITURE ESTIMATE OF BOMB, MINE AND EXPLOSIVE MATERIAL DISPOSAL  *(Issued with Circular No. 146/2007/TT-BQP dated September 11, 2007)*

<table>
<thead>
<tr>
<th>No.</th>
<th>Expenditure item</th>
<th>Method of calculation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct expenditure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Material expenditure</td>
<td>Total material expenditures VL</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Labor allowance expenditure</td>
<td>Total labor expenditures NC</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Performance expenditure</td>
<td>Total machine expenditures M</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Other direct expenditures</td>
<td>1.5% x (VL + NC + M) TT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total direct expenditures</td>
<td>VL + NC + M + TT T</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>General expenditures</td>
<td>40% * NC C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total construction estimate cost</td>
<td>T + C Z</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Other expenditures</td>
<td>K1 + K2 + K3 + … K</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expenditures of survey, formulation of technical plan</td>
<td>Prescribed percentage x Z K1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Expenditure of survey, formulation of technical performance plan - estimate</td>
<td>Prescribed percentage x Z K2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Expenditure of assessment and approval for technical performance plan</td>
<td>Prescribed percentage x Z K3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Camp expenditure</td>
<td>Prescribed percentage x Z K4</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Expenditure of performance quality inspection</td>
<td>Prescribed percentage x Z K5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Expenditure of destruction of detected bombs, mines and explosive materials</td>
<td>Prescribed percentage x Z K6</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Expenditure of acceptance, payment and finalization</td>
<td>Prescribed percentage x Z K7</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Expenditure of project or works management committee (if any)</td>
<td>Prescribed percentage x Z K8</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Expenditure of inspection or examination (if any)</td>
<td>Prescribed percentage x Z K9</td>
<td></td>
</tr>
<tr>
<td>…</td>
<td>Expenditureheti…</td>
<td>…</td>
<td>K…</td>
</tr>
<tr>
<td></td>
<td>Total estimate value:</td>
<td>Z + K</td>
<td>G</td>
</tr>
</tbody>
</table>

Note: General expenditure is equal to 40% according to Circular No. 04/2005/TT-BXD dated April 01, 2005 of the Ministry of Construction.
APPENDIX A13- SOME PICTURE OF CURRENT STATUS OF SUBPROJECT AREA

1. Pictures of current status of construction components

- Seepage through embankment
- Stream behind spillway
- Current status of downstream slope
- Current status top of dam
- Current status of service road
- Canal connecting Thach Ban reservoir to downstream area
Pictures of sampling, field surveying

Taking ground water  Taking surface water in irrigation canal

Taking surface water in Thach Ban reservoir  Taking sludge at dissipation yard behind spillway

Taking surface water in La Tinh river  Taking ground water
APPENDIX B – SOCIAL

APPENDIX B1 – METHODOLOGICAL NOTE

1. Materials collection

Summary of work in the process of project preparation by stakeholders; Feasibility studies, provincial project proposals, prepared materials of subprojects; Provincial socio-economic development reports, related current legal documents; available documents on customs, habits of the locals

2. Fieldwork

Fieldwork in the project area, questionnaire interview combined with field observations and group discussions, in-depth interviews with local leaders, representatives of AH and relocation groups. This activity will help collect general information of the socio-economic situation, socio-economic characteristics of people/localities in the project area, as the basis to propose appropriate measures in minimizing the adverse impacts directly and indirectly by the project.

- Socio-economic survey at household level by quantitative questionnaires: The consultant conducted a socio-economic survey on 22 households with land acquisition and among total 355 households which may be affected by water cut for construction and are also the beneficiaries. The Consultant selected and interviewed 100 households (including representatives of 60/80 accommodated households downstream). Interviews were conducted to collect information according to a designed questionnaire including available possible answers; there are also open questions for further comments, while serving for information assessment and reliability verification of information, considering needs for support, rehabilitation and risks of forced relocation.

- How to select the sample of households interviewed: Select 100% of land acquired households (23 households) and 20% of households that may be affected indirectly (100 households). Total 123 households were surveyed and interviewed.

- In-depth interview: Interviewers will include: PMU, DRC; Local government officials; Officials of local unions; affected households; representatives of beneficiaries.

- Group Discussion (FGD): The consultant worked with local leaders, subproject leaders to plan key FGDs. Each group consisted of 5-8 people. FGD invited participants were selected from representatives of households under the following criteria: APs (direct, indirect), representatives of beneficiary households, female headed households, especially difficult households (the elderly, disabled, policy families...).

- Observations: The Consultant took field visit, photographs of the situation and talked to people, to clarify the results of in-depth interviews, focus group discussions as evidence for assessment results.

Participatory rapid assessment (PRA): The Consultant used tools of participatory rapid assessment to assist communities to easily identify the issues that need priority attention on settlement related to raising awareness of objectives, potential positive and negative impacts of the project. Qualitative survey work includes in-depth interviews, focus group discussions,
consultations with objects selected in the table below:

**Table 1: Results of interviews and consultations dated 25/2/2015**

<table>
<thead>
<tr>
<th>Objects</th>
<th>In-depth interviews</th>
<th>FGD</th>
<th>Consultation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Affected households (direct, indirect) and representatives of beneficiary households</td>
<td>123 hhs</td>
<td>01 session</td>
<td>123 hhs</td>
</tr>
<tr>
<td>2. Management, operation officials</td>
<td>01 staff</td>
<td></td>
<td>02 staff</td>
</tr>
<tr>
<td>3. Local leaders</td>
<td></td>
<td>02 people</td>
<td></td>
</tr>
<tr>
<td>4. Social – political organizations, village head</td>
<td></td>
<td>01 session</td>
<td>02 organizations</td>
</tr>
<tr>
<td>5. Irrigation officer (CPC)</td>
<td></td>
<td>01 staff</td>
<td></td>
</tr>
<tr>
<td>6. Local State management agencies for agriculture, irrigation (DARD, Sub-dept)</td>
<td></td>
<td></td>
<td>03 agencies</td>
</tr>
<tr>
<td>7. Others (health agencies, media …)</td>
<td></td>
<td></td>
<td>06 agencies</td>
</tr>
</tbody>
</table>

**Total** | 9 staff and 123 hhs | 03 FGDs | 13 staff, agencies and 123 hhs |
The necessity of the construction of public health management plan

The activities of the subproject will generate impacts on the surroundings quality: air, water and soil environment, in addition it may arise disease. All these factors will affect directly 80 workers and households along the transport route (10 households). The consequence of these effects lead to increase occupational accidents, traffic accidents, diseases related to respiratory and intestinal system and eyes.

There are 10 households and 80 workers will directly contact with sources of pollution and disease from the activities of the project, although subproject have had measures to limit pollution such as dust, emissions, wastewater and epidemics, but there are potential impacts that we do not see immediately, so need to take measures for early detection of disease and sources of disease. The plan indicates the measures to minimize and prevent those impacts.

Objective

To control and prevent diseases, raise awareness of the people and the workers to protect health yourself; help people access fully medical services. Organize regularly medical examination to detect early disease due to impacts of the subproject; to build treatment plans for incidents related to diseases, occupational accidents and traffic.

Measure and content of public health management

- To train and raise awareness, prevent impacts on health
- Organize regularly medical examination for workers and people in the subproject region
- Build plan to minimize the impact on public health
- Build plan to prevent and treat diseases

Role and responsibility of agencies, organizations and individuals

Department of Agriculture and Rural Development (DARD)/ Project Management Unit (PMU):
- DARD and PMU are responsible for building materials about public health safety training.
- Coordinate all levels of authorities in Cat Son commune (local authorities, Fatherland Front, Women's Union, Farmers’ Union, Youth Union, hamlet representative) organize propagandic activities about health safety.

Department of Health, Cat Son district Preventive Medicine Center
- To coach and raise awareness for all basic levels, contractors and residents about prevention measures and treatments of diseases;
- Check the medical examination process;
- To direct promptly when epidemics appear, resolving incidents related to public health.

People’s Committee, Social Organizations
- To guide and organize the health safety work; to coordinate closely with contractor, Department of Health and Preventive Medicine Center when epidemics appear.
**Health Station:** To prepare the medical examination plan and guide water pollution treatment, adequacy prevention and treatment.

**Implementation Schedule**

Public Health Management Plan implemented at 3 stages of the subproject and extended 6 months at operation stage.

**Table B2-1 Implementation Schedule of “Public Health Management Plan”**

<table>
<thead>
<tr>
<th>No</th>
<th>Measure</th>
<th>Content</th>
<th>Responsible unit</th>
<th>Cost</th>
<th>Time</th>
</tr>
</thead>
</table>
| 1  | To train and raise awareness, prevent impacts on health | - Identify the impact on air and water environment, food safety.  
- Preventable measures (using a comforter when entering the affected area, treat water pollution by alum and chloramine B)  
- Cleaning household sector, ranch house | - DARD  
- Project Management Unit (PMU)  
- Cat Son district Preventive Medicine Center  
- Health Station at commune/ward  
- Contractor | 15,000,000 | 2 stages in the early and the mid-stage of the project |
| 2  | - Organize regularly medical examination for workers and people in the subproject region | - Check the health of workers 3 months/ time, residents in the affected areas 6 months / time  
- The diseases related to respiratory system, intestinal tract, eyes  
- To consult the affected people during examination  
- Advise or handle when the detection of abnormalities related to the impact of subproject (timely notify to the authorities and functional units) | - Department of Agriculture and Rural Development (DARD)  
- Project Management Unit (PMU)  
- Cat Son district Preventive Medicine Center  
- Health Station at commune/ward  
- Contractor | Budget of Cat Son district | 3 months/ time from the start of construction to 6th month |
| 3  | - Build plan to minimize the impact on public health | - Medical staffs at commune/ ward monitor regularly the implementation of the mitigation measures of construction units. | - Department of Agriculture and Rural Development  
- Project Management | Budget of Cat Son district and contractor | Continuously during the construction time |
<table>
<thead>
<tr>
<th>No</th>
<th>Measure</th>
<th>Content</th>
<th>Responsible unit</th>
<th>Cost</th>
<th>Time</th>
</tr>
</thead>
</table>
|    |         | - To treat timely occupational accidents and traffic  
|    |         | - To vaccinate completely children, pregnant woman | Unit (PMU)  
|    |         |                         | - Cat Son district Preventive Medicine Center | - Health Station at commune/ward | - Contractor  
|    |         |                         | - Women's Union | - Fatherland Front | |
| 4  | Build plan to prevent and treat epidemic | - To spray fly and mosquito- spray in the project area with the frequency of 3 months/time.  
|    |         | - To guide the water sanitation; use chloramine B for pretreatment of wastewater on work site and households.  
|    |         | - When appearing epidemic, we need localize epidemic, isolate infectious objects and spray chloramine B to disinfect. | - (DARD)  
|    |         |                         | - Project Management Unit (PMU) | - Cat Son district Preventive Medicine Center | - Health Station at commune/ward  
|    |         |                         | - Contractor | - Women's Union | - Fatherland Front |
|    |         |                         | Budget of Binh Dinh province (Departmen t of Health) and contractor | Continuously during the construction time (15 months) | |
APPENDIX B3 - PUBLIC CONSULTATION, PARTICIPATION AND COMMUNICATION STRATEGY

The necessity of the construction of communication plan

The subproject “Repair and Improvement for Safety of Thach Ban Reservoir, Binh Dinh Province” cause of impacts: (i) positive impacts: ensure safely 80 households in the downstream area, ensure stability source of irrigation water supply for 130 ha of arable land; (ii) negative impacts: acquire land and assets on land of 23 households, reduce economy and public health issue, impact on gender equality, etc.

The communication and public consultation plan is done throughout from the establishment of the investment project to the project operation. This helps local communities and managers to understand and visualize the entire impacts (positive, negative) to provide mitigation measures the impact on the natural environment and society, especially vulnerable objects include children, the elderly, women and sensitive ecosystem.

Information from communication and public consultation plan help managers, local authorities, monitoring unit to give decisions quickly or change timely decisions or plans during the project implementation.

Objective

To public information about sub-project and provide all materials on the action plan to government at various levels, social organizations, unions and resident in sub-project areas. To consult local communities and organizations for the plan will be made for each phase of the project. The feedback helps the investors and the management level to improve plans to meet the needs practical, prior to the implementation of the action plan.

Contents

- Information on the subproject and policies of interest will be disseminated to people by Project Management Unit (PMU);
- Environmental and Social Management Plan: (i) the PMU and consultancy units provide information of impacts and mitigation measures; (ii) To consult the local authorities and social organizations, unions, people around the project area.
- Resettlement Action Plan: Provides information about land acquisition, resettlement, compensation cost apply framework and support policies of the subproject and the provisions of Quang Binh Province and government at various levels, affected people
- Gender Action Plan: provides information about gender equality for the local authorities and social organizations, unions, people around the project area.
- Public Health Management Plan: provides information on the solutions, disease prevention plan, and medical examination periodically.
- Social security, traffic safety, social evils: provide information about law, legal education for workers, and people around the subproject area.
- Dam Safety: disseminate plans when occurring dam safety incidents in the construction
process and the rainy season.
- Operate mining and flood discharge: provide information and detailed plans for the flood discharge to people around the project area and downstream area; make protection plan for the people, the buildings in downstream of the dam.

**Forms of communication, community consultation**

In order to organize the effective communication activities, need understand the basic elements of the communication process and public relations of them.

**Diagram B3-1: The elements of the communication process**

- Organize the meetings to disseminate information for local authorities, social organizations, unions, people of the subproject region (Cat Son commune, Phu Cat district);
- Through the mass media, basis loudspeakers, commune and village boards.
- Issue the brochures, consultative questionnaires to local authorities, unions, people of the subproject area;
- Through the activities of organizations and clubs;
- Training;
- Other media and information forms.

**Role and responsibility of agencies, organizations and individuals**

Department of Agriculture and Rural Development represent of Binh Dinh province people’s committee is the investor, the Irrigation Project Management Unit is the project implementation unit.

**Department of Agriculture and Rural Development (DARD)/ Project Management Unit (PMU):**

- DARD and PMU are responsible for building materials about communication plan and participatory public consultation.
- Coordinate government at various levels in Cat Son commune (local authorities, Fatherland Front, Women's Union, Farmers’ Union, Youth Union, hamlet representative) organize propaganda activities for this plan.

**People’s Committee, Social Organizations**

- To guide and organize the propaganda activities and disseminate contents of communication, participatory public consultation.
- Direct news agencies, local propaganda agencies to spend the appropriate time for disseminating plans and the impact of the subproject.

**Land Clearance Committee**

- Provide information about land acquisition, resettlement, compensation cost apply framework and support policies of the subproject and the provisions of Quang Binh Province and government at various levels, the affected people.

Health Station: disseminate information on the disease prevention plan, medical examination periodically, solutions when having epidemic.

**Implementation Schedule**

The communication plan and participatory public consultation implemented under stages of the subproject; to provide completely information for local people and government at various levels.

**Table B3-1 Implementation Schedule of “Communication Plan, Consultation with Community Participation”**

<table>
<thead>
<tr>
<th>No</th>
<th>Stage</th>
<th>Content</th>
<th>Form</th>
<th>Responsible unit</th>
<th>Receptive unit</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Detail design</td>
<td>Disseminate information, consult the authorities about subproject: scale, type of investment, the main works, incidence, benefits of the subproject.</td>
<td>Organize meeting at government at various levels, mass organizations.</td>
<td>DARD and PMU</td>
<td>Binh Dinh PPC, DPI, DOF, Department of Natural Resources and Environment, Phu Cat People’s Committee, Government of Cat Son commune.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disseminate information about policies, compensation plan, the draft of resettlement</td>
<td>Meetings, leaflets, consultation votes at all government levels, the affected</td>
<td>PMU coordinate with design consultancy unit, resettlement action plan</td>
<td>Phu Cat DPC, Cat Son commune, Women's Union, Fatherland Front, Farmers’</td>
<td>2 times: to prepare and present a</td>
</tr>
<tr>
<td>No</td>
<td>Stage</td>
<td>Content</td>
<td>Form</td>
<td>Responsible unit</td>
<td>Receptive unit</td>
<td>Note</td>
</tr>
<tr>
<td>----</td>
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<td>------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>action plan.</td>
<td>households around the subproject area.</td>
<td>consultancy unit.</td>
<td>Union, Cadastral Division of commune/precinct, 378 HH in the project area.</td>
<td>draft of resettlement action plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Disseminate information about project, present the draft of ESIA and ESMP reports, gender plan, public health, communication, etc.</td>
<td>Meetings, leaflets, consultation votes at all government levels, the affected households around the subproject area</td>
<td>PMU coordinate with design consultancy unit, ESIA consultancy unit</td>
<td>Phu Cat DPC, Cat Son CPC, Women's Union, Fatherland Front, Farmers’ Union, Cadastral Division of commune/precinct, 378 households in the project area.</td>
<td>Perform 2 times: to prepare and present a draft of resettlement action plan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compensation and resettlement</td>
<td>Organize meetings to disseminate information about measure, costs, compensation plan, post information in noticeboard of commune/precinct and village/urban groups.</td>
<td>PMU coordinate with Compensation, Assistance and Resettlement Board</td>
<td>Cat Son CPC, Women's Union, Fatherland Front, Farmers’ Union, Cadastral Division of commune/precinct and 23 affected households.</td>
<td>Implement according to Resettlement Action Plan report.</td>
</tr>
<tr>
<td>2</td>
<td>Constru ction and Operation</td>
<td>Gender Action Plan</td>
<td></td>
<td>PMU and Social Supervising Consultant</td>
<td>Cat Son CPC, Women's Union, Fatherland Front, Farmers’ Union, Cadastral</td>
<td>Implement in 3 phases of the subpro</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public Health Management Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Stage</td>
<td>Content</td>
<td>Form</td>
<td>Responsible unit</td>
<td>Receptive unit</td>
<td>Note</td>
</tr>
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</tr>
<tr>
<td></td>
<td></td>
<td>Management Plan</td>
<td>Meetings, leaflets, basic broadcasting, consultation votes at government at various levels, the affected households around the subproject area</td>
<td>Division of commune/precinct and 378 AHH.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Environmental Management Plan</td>
<td>PMU and Environmental Supervising Consultant</td>
<td>DONRE, Cat Son CPC, Women's Union, Fatherland Front, Farmers’ Union, Health Station, Cadastral Division of commune/precinct and 378 AHH.</td>
<td></td>
<td>Implement in 3 phases of the subproject</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public order and social evils</td>
<td></td>
<td>Cat Son CPC, Women's Union, Fatherland Front, Farmers’ Union, Health Station, Cadastral Division and Police of commune/precinct</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic Safety and Fire Prevention and Extinction</td>
<td>PMU and contractor</td>
<td></td>
<td></td>
<td>Constrcution Stage.</td>
</tr>
</tbody>
</table>

Monitoring Assessment: PMU makes the monitoring report of communication plan and participatory public consultation to control communication content, synthesize feedback from the Supervising Consultant Unit, local government, social organizations, unions and citizens to supplement or amend policies and measures of the management plan to suit each stage of the subproject.

Implementation Cost

The implementation cost of this plan is integrated with other plans (communication content and methods will be acquired and build by other plans. Social Management Plan chairs other plans that related to social issues. Cost of this phase focuses primarily for broadcasting and organizations, the expected cost is VND 50,000 millions in 15 months processing.
APPENDIX B4 - GENDER ACTION PLAN

A gender action plan is needed to facilitate the full participation of women in the project construction stage, providing new opportunities for women to boost their income, without increased burden on their lives, and contributing to the enhancement of women’s role and status in the project area. The objectives of this plan include:

- The local contractors will employ at least 30% of female workers in maintenance, construction and repair works;
- For a similar type of work, female workers should be paid as much as male workers;
- Safety conditions must be equal to both men and women;
- The local contractors will not use child labor;
- The use of local labors is encouraged and the establishment of labor camps will be avoided;
- The Women’s Group and Union will be consulted about the design of subprojects;
- Training on gender mainstreaming will be provided for national, provincial and local authorities (i.e. PMUs, and other stakeholders);
- Training and capacity building is provided for women to engage in public decision-making and sub-projects in a way that makes the most sense (i.e. training in participation, negotiation skills, marketing skills, mathematics and literacy);
- The involvement of women in project study tours is ensured.
- The agricultural extension services aimed at women are designed and delivered to women;
- The awareness enhancement campaign on HIV/AIDS will be launched before the start of civil works. PMU is responsible for monitoring including the participation of women, target works and trainings, and HIV prevention campaigns;
- At least one woman shall be involved in the Supervision Board of a commune (about 1/3 of the members).

The Project’s Gender Action Plan

<table>
<thead>
<tr>
<th>Achievements</th>
<th>Tasks and Indicators</th>
<th>People in charge</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement 1: Improvement of dam safety and irrigating conditions.</td>
<td>The contractors shall prioritize unskilled labor (through subcontracting); at least 30% of the total labor force is local unskilled ones; Among this 30% local labor, female workers shall be prioritized; Male and female labor will receive the same wages for the same type of work; The Contractors shall not employ children; Those locals wish to work for the project shall register at their PMU/Project Coordinator shall ensure the record of these terms in the Contract; the list of registered labor shall be submitted by communal officials the Contractor; Communal officials shall ensure the achievement of the targeted objectives.</td>
<td>PMU/Project Coordinator shall ensure the record of these terms in the Contract; the list of registered labor shall be submitted by communal officials the Contractor; Communal officials shall ensure the achievement of the targeted objectives.</td>
<td>During construction stage</td>
</tr>
<tr>
<td>Achievements</td>
<td>Tasks and Indicators</td>
<td>People in charge</td>
<td>Period</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Achievements 2: Enhance people’s capacity to make advantages of the Project</td>
<td>At least 30% of women shall participate in agricultural extension courses.</td>
<td>Staff of Provincial PMU, District staff, Communal staff.</td>
<td>During construction stage</td>
</tr>
<tr>
<td>Achievement 3: Enhancement of awareness on potential social evils of vulnerable objects, especially women and ethnic minorities</td>
<td>Programmes on HIV/AIDS and human trafficking. Programmes on community-based risk mitigation. Information about risk mitigation will be transferred to the communes and villages affected by the Project using the participatory approach with a focus on the poor and vulnerable households (e.g. ethnic groups, households headed by women, households with elderly and disabled people). The documents and information should be appropriate in terms of language, culture and gender, and especially translated into ethnic languages in the region: Women's Union, the representative of Centre for HIV/AIDS prevention and communal staff shall give training to communicators in each commune/village in the project area. The programs will be implemented at the communes and villages by two communicators (village chief and one member of the Women’s Union). The program will be implemented</td>
<td>The Provincial and Communal Women's Union shall organize and host the program (training and preparation of materials) in collaboration with the district/communal health center. The Village’s Women’s Union shall popularize and communicate information. The district/communal Health Centres shall support the communal Women’s Union. Project coordinator shall provide local and international gender experts and specialists on Ethnic Minorities. Gender experts and specialists on EM shall review existing materials and supplement the required ones for the Program.</td>
<td>Monthly, before and during construction stage</td>
</tr>
<tr>
<td>Achievements</td>
<td>Tasks and Indicators</td>
<td>People in charge</td>
<td>Period</td>
</tr>
<tr>
<td>--------------</td>
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</tr>
<tr>
<td>in the villages and on market-days through distribution of project/program materials and use of loudspeakers</td>
<td><strong>Program on risk mitigation during project construction stage:</strong> PMU and the contractor will coordinate closely with the health services in communes and districts to implement programs on awareness enhancement and education on disease prevention, diagnosis and treatment for laborers. All programs and documents are built with integration of gender issues, including vulnerability and needs of men and women. The Contractor shall: Implement awareness enhancement programs workers and communities, including education and communication on HIV infection and preventive measures. Provide free consulting services and encourage employees to do HIV tests so that they all know about their health status. Support the access to health services and encourage HIV-infected patients to admit their status; Provide free condoms for workers in the camps;</td>
<td>PMU&lt;br&gt;The Contractor&lt;br&gt;Local Health Centre&lt;br&gt;Communal staff&lt;br&gt;The Women’s Union shall perform general coordination for better HIV prevention.</td>
<td>During construction stage.</td>
</tr>
<tr>
<td><strong>Project Management</strong> Guidelines on Gender and Development and Education shall be provided for PMU staff, local agencies and Contractors. All capacity enhancement activities shall include the involvement of women and ethnic minorities.</td>
<td>Project implementation consultant&lt;br&gt;PPMU</td>
<td></td>
<td>During design and initial implementation stages</td>
</tr>
</tbody>
</table>
To perform this task, CPMU and PMU with assistance from consultants for protect socio / gender, will establish and implement an effective management system. This system will provide feedback on a number of indicators to show that is to avoid or mitigate the social risks associated with the project properly.

*Estimated funding for implementation of the gender action plan*

<table>
<thead>
<tr>
<th>No.</th>
<th>Content</th>
<th>Detail</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Women's group meetings (3-4 meetings / hamlet)</td>
<td>Package, 3 hamlets x 1,000,000 VND / hamlet</td>
<td>1,000,000 VND / hamlet</td>
<td>3,000,000</td>
</tr>
<tr>
<td>2</td>
<td>Training for hamlet women officers</td>
<td>2 people/ hamlet x 3 hamlets</td>
<td>500,000</td>
<td>3,000,000</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td>6,000,000</td>
</tr>
</tbody>
</table>
APPENDIX B5 - GRIEVANCE REDRESS MECHANISM

5.1 World Bank requirement OP 4.12

The concepts of social risk management and social license to operate have become an integral part of doing business in emerging markets. These dimensions of a company’s social and environmental strategy can be achieved with effective stakeholder engagement, based on active participation of and feedback from groups affected by the company’s operations. A mechanism to address affected communities’ concerns and complaints a grievance mechanism is an important pillar of the stakeholder engagement process, since it creates opportunities for companies and communities to identify problems and discover solutions together.

A Grievance redress mechanism (GRM) is an integral element in project management that intends to seek feedback from beneficiaries and resolve of complaints on project activities and performance.

The DRSIP Resettlement Policy Framework (RPF) requires each sub-project to establish a Grievance Redress Mechanism (GRM) for the main purpose of addressing resettlement-related claims, clarifications, concerns or complaints (Please refer to RPF part VIII for the details of establishing the GRM at the sub-project and provincial levels.)

Since the GRM is required for all sub-projects, including those that are not identified to have involuntary resettlement issues, the same mechanism to be established under the RPF will be utilized for all project-related grievances. A national grievance committee mirroring that of the provincial committees will therefore be set up to handle project-related complaints/clarifications that cannot be handled by or are beyond the provincial committee's mandate and capacity. In addition, a Grievance Officer shall be designated at each local dam management units (LDMUs), at the PPMUs and at the CPO who will perform the following functions:

- Receive, record and promptly acknowledge receipt of all grievances
- Conduct preliminary screening of grievances for the purpose of sorting out those that does not concern the Project and for determining the appropriate Project unit/office or committee to refer or forward the grievance to
- Maintain a database of grievances and monitor/track their status
- Periodically inform the complainants of the status of their complaints/claims/clarifications
- Prepare periodic report on the grievances, including pending grievances, to the Project Management.

To ensure that the GRM requirements are complied with in every sub-project, the sub-project owner (i.e. local dam/reservoir management units) and the PPMU will adopt their own GRM Procedure based on the Template provided in Annex 8– Generic Sub-project Grievance Redress Procedures for the PPMU. The adopted procedure will be included in the Sub-project document package that will be submitted to the CPO for review and clearance.

5.2 IFC approaches
Grievance mechanisms are an important part of IFC’s approach to requirements related to community engagement by clients under the Policy and Performance Standards on Social and Environmental Sustainability. Where it is anticipated that a new project or existing company operations will involve ongoing risk and adverse impacts on surrounding communities, the client will be required to establish a grievance mechanism to receive and facilitate resolution of the affected communities’ concerns and complaints about the client’s environmental and social performance. The grievance mechanism should be scaled to risks and adverse impacts of the project, address concerns promptly, use an understandable and transparent process that is culturally appropriate and readily accessible to all segments of the affected communities, and do so at no cost to communities and without retribution. The mechanism should not impede access to judicial and administrative remedies. The client will inform the affected communities about the mechanism in the course of its community engagement process.

A grievance mechanism should be able to deal with most of the community issues that are covered by IFC’s Performance Standards. Grievance mechanism requirements in relation to affected communities are explicitly stated with regard to security personnel, land acquisition and adverse impacts on indigenous peoples. Additional guidance is provided in the corresponding Guidance Notes.

IFC client companies will be asked to design the mechanism according to the extent of risks and adverse impacts of the project. Impacts on communities are evaluated within the Social and Environmental Assessment for a project. Based on the results of this assessment, IFC’s project sponsors may be required to develop or improve their social and environmental management and community engagement, and to include appropriate steps in their action plans. However, all issues arising over the life of a project cannot be anticipated and preempted during the assessment process. While an upfront comprehensive social and environmental assessment can serve to reduce the likelihood and volume of grievances in the future, the need for a mechanism to address community grievances will always exist.

IFC views grievance management as one of the pillars of stakeholder engagement for all clients. Grievance mechanisms inform and complement but do not replace other forms of stakeholder engagement. Stakeholder engagement also includes stakeholder identification and analysis, information disclosure, stakeholder consultation, negotiations and partnerships, stakeholder involvement in project monitoring, and reporting to stakeholders. If strategically applied throughout the project life, an integrated range of stakeholder engagement approaches can help build trust, contribute to maintaining broad community support for the project, and ultimately help companies promote the long-term viability of their investments.

As part of the Performance Standards framework, the Compliance Advisor Ombudsman (CAO) responds to complaints from affected communities around IFC-financed projects, and thereby serves as an independent accountability body for IFC.

This Note is based on IFC’s experience in applying its Performance Standards and is no prescriptive in its approach. It should be used in conjunction with Performance Standards and IFC Guidance Notes, which contain basic requirements to be followed when developing grievance management procedures under the IFC Policy and Performance Standards framework. However, this document does not intend to duplicate existing IFC social and environmental policy requirements.
5.2.1 At the sub-project level

A project-level grievance mechanism for affected communities is a process for receiving, evaluating, and addressing project related grievances from affected communities at the level of the company, or project. In the context of relatively large projects, this mechanism may also address grievances against contractors and subcontractors.

Project-level grievance mechanisms offer companies and affected communities an alternative to external dispute resolution processes (legal or administrative systems or other public or civic mechanisms). These grievance mechanisms differ from other forms of dispute resolution in that they offer the advantage of a locally based, simplified, and mutually beneficial way to settle issues within the framework of the company community relationship, while recognizing the right of complainants to take their grievances to a formal dispute body or other external dispute resolution mechanisms. It should be noted, however, that complex issues that arise from high environmental and social impacts are seldom resolved in a relatively simple way. In such cases, projects should anticipate involvement of various third parties in the resolution process to achieve solutions with affected communities. These include, but are not limited to, various national and international mediation bodies, independent mediators and facilitators with sector and country specific expertise, and independent accountability mechanisms of public sector financiers.

5.2.2 Benefited communities and responsible

A project’s grievance mechanism should be specifically designed with a focus on local communities affected by the project. The task of understanding who will be potentially affected by project operations, and who will therefore use the company grievance mechanism to raise complaints, is not always straightforward and depends on the project’s particular circumstances. Thus, it is beneficial to review who may be affected by the project, and the nature of the potential impact, during the broader stakeholder analysis phase of the Social and Environmental Assessment.

The focus of the grievance mechanism on the needs of affected communities is substantiated by the fact that they are directly, and in some cases significantly, affected by project operations but often lack viable options or capacity for raising their concerns through formal structures such as the courts.

For a grievance mechanism to be effective, all project stakeholders need to understand and support its purpose. Affected communities must be aware of and understand the grievance mechanism’s benefits to them. Other stakeholder groups need to understand why the grievance mechanism is not open to them or their issues and concerns (such as commercial or political disputes) and be informed of the avenues available to them to raise their complaints.

A company’s grievance mechanism and its overall community engagement strategy are linked and should be mutually reinforcing. A transparent and legitimate process that is the product of a joint effort between the company and the community enhances their relationship, improves communication, and increases trust. When grievance mechanisms are designed with the participation of all affected groups and enjoy their support, the process is able to address concerns effectively and in a manner that is mutually beneficial to companies and communities.
Properly designed and implemented grievance management processes can benefit both the company and communities by increasing the likelihood of resolving minor disputes quickly, inexpensively, and fairly with solutions that reasonably satisfy both sides. Grievance mechanisms can also help identify and resolve issues before they are elevated to formal dispute resolution methods, including the courts.

Recognizing and dealing with affected communities’ issues early can benefit the company by reducing operational and reputation risks that may result from leaving such issues unresolved. These risks can have a significant and direct business impact. Protests, road and bridge blockages, violence, suspension of operations, and plant closures are just a few examples of how the unsatisfactory handling of community concerns can directly affect a business’s bottom line.

A grievance mechanism also gives the company access to important information about the project’s external environment, and can help the business identify and correct weaknesses in its management systems or production processes.

For companies as well as communities, escalation of conflict to courts and other formal tribunals can be lengthy and costly, and will not necessarily deliver satisfactory results for either party. For companies, the negative publicity can cause even greater damage. By creating a project-level structure, the company can address the source of the problem more efficiently. For example:

- Project level mechanisms offer locally tailored solutions and, unlike many government mechanisms, can cater to local needs and incorporate provisions to accommodate different groups within communities especially the disadvantaged (such as women, minorities, marginalized groups).
- Where government mechanisms are slow, ineffective, and costly, communities may welcome an opportunity to voice their complaints and receive free, locally based, speedy, and satisfactory resolution.

5.2.3 The role of third party

Third parties such as nongovernmental organizations, community-based organizations, local governments, local community and religious organizations and councils can sometimes be involved in companies’ grievance mechanisms. They can serve as process organizers, places to bring a complaint to be passed on to the company, or as facilitators, witnesses, advisors, or mediators. In some cases, it may be beneficial to place part of the responsibility for the process on external entities formed within the communities themselves or acceptable to them while the company maintains ultimate responsibility and accountability for the process. Third parties can help increase the level of trust from communities as well as overcome certain limitations of project-level mechanisms, such as lack of transparency, insufficient company resources, possible conflict of interest, and biases, provided that they themselves are perceived to be unbiased and impartial relative to both the company and the communities.

To have an effective project level grievance mechanism, companies need to understand the roles of third parties before engaging them. For example:

- Community self-governance structures (such as village councils, elders councils, tribal councils). Take these into account when developing a grievance mechanism—to ensure
cultural appropriateness, community involvement in decision making, and efficient and effective use of existing community resources

- Local and international NGOs. Identify those that are active in the area of project or company operations, learn about their interactions with the affected communities, determine what contribution they can make to effective resolution, and discuss options for an NGO to administer the project’s grievance mechanism or a part thereof. Sometimes NGOs can also represent local communities and help them build their capacity to understand the process and its benefits, participate in decision making, and articulate grievances and bring them to the attention of companies. Such organizations can be viewed as a voice of communities, and companies should be prepared to deal with grievances brought by NGOs on behalf of communities

- Local government authorities. Communities sometimes bring their project-related complaints to local governments. In cases where this is the established practice, consider partnering with local authorities to facilitate receipt of grievances from communities. Local governments can also be a resource to help companies resolve complaints, since local authorities may have an established relationship with the communities. They can participate as third parties and advisors in company-initiated resolution processes.

5.3 Vietnam Grievance Redress Mechanism

The grievance redress mechanism (GRM) is an integral project management element that intends to seek feedback from beneficiaries and resolve of complaints on project activities and performance. The mechanism will ensure that (i) the public within the project influence are aware of their rights to access, and shall have access to, the mechanism free of administrative and legal charges; (ii) that these rights and interests are protected from poor project performance, especially of beneficiaries and/or affected persons; and (iii) concerns arising from project performance in all phases are addressed effectively.

5.3.1 Access

CPO, PPMUs, and the relevant local dam management will make the public aware of the GRM through public awareness campaigns, training and capacity building in I-SUPPORT. Any person who has feedback or complaints regarding the performance or activities of the project and its subprojects during pre-implementation, implementation and operation phases, shall have access to the GRM mechanism.

Contact details in support of the mechanism will be publicly disclosed and posted in the offices of concerned communities and in strategic places of the project’s area of influence. These will also be incorporated in DRSIP information materials, such as Project brochures, flyers and posters.

5.3.2 Grievance Officer

The CPO and the PPMUs shall each designate and train one of their officers to be a Grievance Officer for project-related issues. The GOs will be responsible for the initial screening of feedbacks and complaints, as well as, the organization of preliminary meetings with concerned parties to establish the critical path to resolution. A registry of feedback or grievances received will be maintained by the GOs for reporting to PCO. Feedback/grievance registries will be consolidated by the CPO for discussions on how to further enhance DRSIP implementation.
5.3.3 Grievance Investigation and Resolution Process

Households or groups of households wishing to provide feedback and/or complain about the effects of PRDP activities on their property, production system, economic well-being, spiritual life, environmental quality, or any other assets of their lives shall make their complaint using the standard complaint form provided by the GO through the local dam management. The Grievance Investigation and Resolution procedure is outlined in Annex 1.

Complaints relating to any matter of the Project will be settled through negotiations aimed at achieving consensus. The complaint will pass through three stages before it can be filed to the court. The Enforcement Body will incur all administrative and legal fees relating to complaint handling.

The complaints relating to the Project shall be settled in compliance with Article 138 of the Land Law 2003; Article 28 of the Law on Complaints; Article 63 and 64 of Decree No.84/2007/ND-CP; Clause 2 of Article 40 of Decree No.69/2009 and regulations on complaints in Decree No.75/2012/ND-CP dated 20/11/2012. According to Clause 2 in Article 138 of the Land Law 2003 and 2015:

(i) In case of complaints against administrative decisions and administrative actions on land management first settled by the Chairman of the People's Committees of districts, towns and cities under the province, without contentment of the complainant, the complaints can be filed to the People's Court or appealed to the Chairman of the People's Committees of provinces and centrally-run cities. In case of appeal to the Chairman of the People's Committees of provinces and cities under central authority, the decision of the Chairman of the People's Committees of provinces and cities under central authority is the final one.

(ii) In case of complaints against administrative decisions and administrative actions on land management first will be settled by the Chairman of the People's Committees of districts, towns and cities under the province, without contentment of the complainant, the complaints can be filed to the People's Court.

(iii) The time limit for complaints against administrative decisions and administrative actions on Land Management is thirty (30) days after the date of receipt of the administrative decision or being informed of that administrative decision. Within 45 days from the date of receipt of the first complaint resolution decision, the complainant, if disagree, can make an appeal to the state authority or the People's Court.

In terms of complaint settlement, in Law on Complaints, Article 14: Rights and obligations of the person competent to settle first-time complaints:

(i) The person competent to settle first-time complaints should:

- Ask the complainant, relevant agencies, organizations and individuals to provide information, documents and evidence within 07 days of the request as a basis for complaint settlement
- Determine to employ or cancel the emergency measures as defined in Article 35 of this Law

(ii) The person competent to settle first-time complaints should perform the following
obligations:

- To receive the complaint and issue a notice in writing to the complainant, agencies, organizations, or individuals entitled to appeal and the state inspection agencies at the same level of acceptance of resolving complaints against administrative decisions and actions
- To settle the complaints against administrative decisions and actions if required by the complainant
- To open a dialogue with the complainant and agencies, organizations and individuals concerned
- To decide complaint settlement and be responsible before the law for settlement results. In case of complaints from authorized agencies, organizations and individuals, the results shall be notified to agencies, organizations and individuals in accordance with law
- To provide information, documents and evidence relating to the complaint for the complainant when they are required by the complainant for second-time settlement or appeal to the People’s Court.

(iii) To compensate for first-time settlement and damages due to administrative decisions and actions in accordance with regulations on the State responsibilities.

(iv) The person competent to settle first-time complaints should perform their rights and obligations as stipulated by Law.

In terms of announcement of complaint settlement decision: In Article 12 of Decree No.75/2012/ND-CP dated October 3rd, 2012 of the Government detailing the implementation of some articles of the Law on Complaint.

(i) Within 15 days from the date of decision of complaint settlement, the person competent to settle the complaint for the second time shall announce the complaint settlement decision by one of the forms specified in Clause 2 in Article 41 of the Law on Complaints.

(ii) In case of announcement at a meeting, the attendees of the meeting must include: the person issuing the complaint settlement decision, the complainant or their representatives, the person subject to complaint and agencies, organizations and individuals concerned. Before conducting a public meeting, the person competent to settle complaints must send a notice to agencies, organizations and individuals involved 3 days in advance.

(iii) The announcement of complaint settlement decision shall be made on the mass media (television, radio, printed and electronic newspaper). If the agency of the person competent to settle complaints has their own portal or website, the complaint settlement decision should be made public on this portal or website. The minimum number of announcement is 02 times on radio, television, and printed publications. The period of announcement on electronic publications, portals or websites should be at least 15 days from the date of notification.

(iv) In case of notice at the office or the Reception Room of agencies and organizations competent to settle complaints, the period for the notice of complaint settlement decision to be posted up is at least 15 days.

Assure that the mechanism described above is pragmatic and acceptable to PAPs, consultation with local authorities and affected communities about this mechanism is needed, particularly
consultation with vulnerable groups. The procedure for complaint settlement consists of 4 stages as below:

- **The first stage in the Communal People’s Committee**: An aggrieved APs may bring his/her complaint to the One Door Department of the Commune/Ward People’s Committee, in writing or verbally. The member of CPC/WPC at the One Door Department will be responsible to notify the CPC/WPC leaders about the complaint for solving. The Chairman of the CPC/WPC will meet personally with the aggrieved APs and will have 30 days following the receiving date of the complaint to resolve it. The CPC/WPC secretariat is responsible for documenting and keeping file of all complaints handled by the CPC/WPC.

- **The second stage in the District People’s Committee**: If after 30 days the aggrieved affected household does not hear from the CPC, or if the APs is not satisfied with the decision taken on his/her complaint, the APs may bring the case, either in writing or verbally, to any member of the DPC or the DRC of the district. The DPC in turn will have 30 days following the receiving date of the complaint to resolve the case. The DPC is responsible for documenting and keeping file of all complaints that it handles and will inform the DRC of district of any decision made. Affected households can also bring their case to Court if they wish.

- **The third stage in the Provincial People’s Committee**: If after 30 days the aggrieved PAP does not hear from the DPC, or if the PAP is not satisfied with the decision taken on his/her complaint, the PAP may bring the case, either in writing or verbally, to any member of the PPC or lodge an administrative case to the District People’s Court for solution. The PPC has 45 days within which to resolve the complaint to the satisfaction of all concerned. The PPC secretariat is also responsible for documenting and keeping file of all complaints that it handles. Affected households can also bring their case to Court if they want.

- **The final phase, the arbitration by the Court**: If after 45 days following the lodging of the complaint with the PPC, the aggrieved PAP does not hear from the PPC, or if he/she is not satisfied with the decision taken on his/her complaint, the case may be brought to a court of law for adjudication. Decision by the court will be the final decision.

Decision on solving the complaints must be sent to the aggrieved APs and concerned parties and must be posted at the office of the People’s Committee where the complaint is solved. After three days, the decision/result on solution is available at commune/ward level and after seven days at district level.

In order to minimize complaints to the provincial level, PMU will cooperate with the District Resettlement Committee to participate in and consult on settling complaints.

Personnel: The Environmental and Resettlement staff assigned by PMU will formulate and maintain a database of the APs’ grievances related to the Project including information such as nature of the grievances, sources and dates of receipt of grievances, names and addresses of the aggrieved PAPs, actions to be taken and current status.

In case of verbal claims, the reception board will record these inquiries in the grievance form at the first meeting with affected people.
The independent monitoring Consultant will be responsible for checking the procedures for and resolutions of grievances and complaints. The independent monitoring Consultant may recommend further measures to be taken to redress unresolved grievances. During monitoring the grievance redress procedures and reviewing the decisions, the independent monitoring agency should closely cooperate with the Vietnam Fatherland Front as well as its members responsible for supervising law enforcement related to appeals in the area.

The grievance resolution process for the Project, including the names and contact details of Grievance Focal Points and the Grievance Facilitation Unit (GFU), will be disseminated through information brochures and posted in the offices of the People’s Committees at the communes and districts and PMU.

At the same time, an escrow account for resettlement payments should be used when grievance is resolving to avoid excessive delay of the project while ensuring compensation payment after the grievance has been resolved.

- To ensure that the grievance mechanism described above are practical and acceptable by APs, it were consulted with local authorities and communities taking into account of specific cultural attributes as well as traditional-cultural mechanisms for raising and resolving complaints and conflicting issues. The ethnic minority objects and efforts were also identified and determined which are culturally acceptable ways to find the solution.
APPENDIX B6 - INFORMATION DISCLOSURE, ACCOUNTABILITY AND MONITORING

1. Consultation and announcement

The main objectives of information announcement and public consultation is to ensure the participation of affected communities, households, local governments and organizations concerned in sharing the Project information, consulting the selection of technical plans, planning impacts on land, income and assets on land... The announcement is an important contribution in accelerating the Project progress during implementation and preparation, as well as when the project is put into operation with the consensus of the community, government, and PMU. This will minimize the possibility of conflicts and other risks and increase the investment efficiency and social significance of the Project.

The public consultation and announcement should ensure:

The local authorities as well as the representatives of the people affected shall be involved in the project planning and decision making process. The PMU shall work closely with the commune/district during the implementation of the Project. The involvement of the people affected in the implementation process shall be remained by asking the commune/district to invite the representatives of the affected people to be a part of the Council on Compensation and Resettlement as well as in resettlement activities.

All information about the items and activities planned for the Project should be shared to the people affected.

The demands and priorities of the affected people, as well as their responses to the proposed policies and activities, should be collected.

The affected people should be fully informed of the decisions influencing directly their income and lives, and can be involved in activities and making decisions on issues directly affecting them.

The transparency in all activities relating to land acquisition, compensation, resettlement and rehabilitation should be ensured.

For the World Bank, those people affected by the project should be fully informed and consulted on resettlement and compensation plans. Consultation is the starting point for all activities related to resettlement. The people affected by resettlement may be afraid that their livelihoods and community relations can be affected, or their rights can not be guaranteed. Being involved in resettlement planning and management helps to alleviate these fears and bring the affected people the opportunity to participate in decisions that affect their lives. The implementation of resettlement without consultation may lead to an inappropriate strategy and ultimate ineffectiveness. Without consultation, the affected people may have negative reactions to the project, causing social problems, significant delay or even cancellation in completion of goals, thereby increasing the costs. As a result, with consultation, the initial resistance can be translated into the constructive participation.

For Vietnam, a further key step in strengthening democracy at grass-roots level is the Directive No.30-CT/TW of the Central Committee of the Communist Party of Vietnam in "Building and implementing regulations on grassroots democracy" and the Decree No.79/2003/ND-CP also on this issue. The key point of this legislation is the famous slogan, which is "People know, people discuss, people do and people inspect." The Ordinance No.34/2007/PL-UBTVQH11 has addressed the matters that should be consulted by local governments and communities before decision-making by the authorities, including building
compensation and resettlement plans relating to the project and works in the commune/ward. The Clause 2 in Article 39 of the Law on Land 2003 requires the announcement of resettlement issues such as reasons, land acquisition plans, relocation plans, overall compensation plans, and land clearance to the people affected.

Thus, consultation and participation is an innovation in the implementation of projects in Vietnam. This policy will address the shortcomings in the implementation of the projects, as both the locals and the person in charge of project implementation are inexperienced in this field.

The following points should be noted to encourage the participation of stakeholders in the consultation process of the project:

Identify and attract all stakeholders, especially people living in the project area and those affected (men, women, the poor, ethnic minorities...), in the process of consultation and participation;

Develop participatory strategies for Project planning, implementation, monitoring and evaluation.

Develop the topics and content needed for promotion and popularization campaigns, as well as negotiation procedures for the affected people on their benefits.

Attract stakeholders in decision making at all stages of the project (e.g. design plans, compensation methods, implementation schedule, etc...).

Establish a schedule for completion of activities such as campaigns to provide information, the extents and forms of compensation, benefits, location and relocation plan.

Develop procedures for complaint settlement.

The public consultation should be regularly carried out for the units in charge of preparation and detailed design of the project categories. This helps to ensure the participation of communities in the proposed designs and limit the adverse impacts on the community. This also helps works to be friendlier with the community and users.

The consultation should also be performed with related parties, including the units to be in charge of management and operation of works to ensure that they are consulted and commented on the designs.

During the construction stage, the Project owner should announce promotion in mass media regarding construction activities and expected schedule, measures to support the people affected and the procedure for receipt of feedbacks from the community. The affected persons shall be informed of the Project policies and procedures to ensure no many changes in their future lives. In case of any questions about the Project, they can inform and obtain the support from the PMU.

The content and method of public consultation / announcement is as follows:

<table>
<thead>
<tr>
<th>Items</th>
<th>Method of public consultation/announcement</th>
<th>Period</th>
<th>Person in charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Detailed design drawings: Alignment alternatives</td>
<td>Meeting with the government of the ward/commune and relevant units; the representatives of the affected households.</td>
<td>Survey and design stages</td>
<td>the Consultant, PMU</td>
</tr>
</tbody>
</table>
2. Land acquisition, clearance and compensation.

| The ward/communal staff, together with PMU staff, shall consult with APs for initial assessments. Land acquisition and compensation plans shall be developed and discussed with APs before submission to authorities for decision. Policy announcement and explanation shall be made in meetings with APs. | Prior-implementation stage | the Communal People’s Committee, PMU |

3. Project implementation progress, monitoring mechanism and accountability

| Meetings in residential blocks, posters and notices in public | The commencement stage and during implementation stage | the Communal People’s Committee, PMU |

4. Employment and wages of local labor.

| Meeting between the Construction unit, local authorities/supervision board and the local | Prior-construction stage | The construction contractor, local authority and the community |

5. Potential adverse impacts and mitigation measures

| Combined with Item 2 and 3 above | Prior and during implementation stage. | PMU, construction contractor, the communal people’s committee |

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2 Social accountability

The announcement of the proposed plans of the Project to the affected people and stakeholders during community consultation and field survey by the social assessment consultants is to make a paradigm for continuing public information during the project implementation. Moreover, as required at all public meetings, the affected always wish for meetings to regularly exchange information with PMU at the headquarters of CPC where the community will suffer from impacts during project implementation. Therefore, reports on resettlement plans and environmental management plans should reflect the responsibility of PMU in ensuring the regular announcement of information to the public.

In addition to regular meetings between the PMU and the affected communities in CPC offices, the public meetings in all communes where public consultation has been conducted have identified the need to establish the tight connection for easy and quick contact with the PMU. The best way is to provide the phone number and address of the PMU in charge in all
locations of the Project’s items and the headquarters of all the communes of the entire Project’s components.

3. Participatory supervision

In order for the project components to ensure its efficiency and necessity, it is necessary to have a monitoring plan with the participation of stakeholders such as the Department of Natural Resources and Environment, Department of Construction, Department of Planning and Investment, Department of Transport ... After completion, the direct management and operation agency/unit of the project items should be involved in the design and construction processes.

Together with the independent monitoring unit of the project, there should have a community-level supervision division to monitor project activities, especially activities related to resettlement, sanitation and the construction of various items. The supervision division will include representatives of local authorities, representatives of organizations such as the Women's Union, Fatherland Front, Veterans, Association, representatives of local people... This The supervision division in collaboration with independent monitoring unit of the Project will monitor the project activities based on indicators of social safety. Indicators of rehabilitation, production, environmental sanitation, traffic will be built to serve the monitoring plan of the Project. The grasping reality will help community supervision division report information related to the project progress, problems arisen during the project implementation to the PMU for promptly actions. The responsibility of this division is to collect feedback from the people and competent authorities as well as from the PMU. At the same time, people are also involved in the supervision, safety guarantee and sanitation in the construction phase.

The Community supervision division should be involved in the training plan on strengthening monitoring and evaluation of project activities, training on monitoring activity skills as a part of the participatory monitoring plan of the Project.

It is noted that the Resolution 80/ CP on community supervision for construction works in localities should be applied.
APPENDIX B 7: GUIDELINES ON PHYSICAL CULTURAL PROPERTIES
MANAGEMENT

7.1 General

There are a number of historical sites and/or sites with a cultural value in each of the provinces. These sites have been well-protected by local communities and government. No proposed investments will affect any of the known cultural sites. Projects will be screened for impacts on PCR based on the list provided in Annex-C, C1.

As stated in the World Bank Physical Cultural Resources (PCR) Safeguard Policy Guidebook, The PCR policy applies to projects having any one or more of the following three features:

- Projects involving significant excavations, demolition, movement of earth, flooding or other major environmental changes
- Projects located within or in the vicinity of a recognized PCR conservation area or heritage site
- Projects designed to support the management or conservation of PCR

The sub-projects under the Dam Rehabilitation and Safety Project will involve significant excavation works, movement of earth and temporary flooding. The provinces have religious institutions, sites of archaeological importance, old academic institutions, public libraries, community centers, which can be considered PCRs. However, the sub-project area of influence may or may not intersect these regions (since the sub-projects are generic in nature, actual locations of most of them still undetermined). Therefore a generic impact assessment of Physical Cultural Resources is outlined in this section.

7.2 Guidance on identification of PCR

In the context of project, the probable examples of PCR may be the following:

- **Human made:** Religious buildings such as temples, mosques, churches, exemplary indigenous or vernacular architecture Buildings, or the remains of buildings of architectural or historic interest, Historic or architecturally important townscapes Archaeological sites (unknown or known, excavated or unexcavated), Commemorative monuments
- **Natural:** historic trees, natural landscapes of outstanding aesthetic quality
- **Combined man-made or natural:** Sites used for religious or social functions such as weddings, funerals, or other traditional community activities (community centers), burial grounds, family graves, cultural landscapes
- **Movable:** registered or unregistered artifacts in temples or mosques, paintings, statues of important historical figures, religious artifacts, cultural artifacts etc.

7.3 Assessment of Probable Impacts due to Activities

Below is a list of project activities or features under the context of the project which may commonly give rise to negative impacts on PCR, divided into two periods: construction phase and operational phase.

**Construction phase:**
• Establishment of work camps: Vandalism, theft and illegal export of movable PCR, and of pieces of monumental PCR accessible directly or indirectly to migrant laborers, - Desecration of sacred sites.

• Excavation, construction and soil compaction: - Direct physical damage to natural, manmade and buried PCR on site

• Construction traffic: Vibration, soil, air and water pollution causing damage to natural or manmade PCR on site; Noise pollution can interfere with the use and enjoyment of PCR such as tourist destinations, historic buildings, religious establishments and cemeteries.

• Mobilization of heavy construction equipment: - Damage to natural or manmade PCR on site; - Soil compaction, damaging buried PCR (archaeological) onsite, and damaging pipelines and drains serving built PCR in the vicinity.

• Flooding and Inundation:
  - Submergence or destruction of human-made, natural or buried PCR.
  - Barrier to access of all types of PCR.
  - Raised water table can lead to damage to all types of PCR.
  - Damage to aesthetics of scenic landscapes.

• Waste disposal or landfill: Burial or damage to natural, buried or underwater PCR.

**Operation phase:**

• Access Roads:
  - Increased human traffic enjoying improved access to PCR of public interest leading to increased wear and damage, sacrilege of sacred sites, theft and vandalism of movable and, breakable PCR.
  - New highways cutting off access to living-culture PCR by residents of settlements on other side of the highway.
  - Increased air pollution and vibration from traffic causing damage to man-made PCR, particularly monuments and buildings.

  - Increased noise pollution interfering with enjoyment of people in tourist destinations, historic buildings, religious establishments and cemeteries.
  - In scenic areas, obtrusive highways having a negative visual impact on the landscape.
  - Roads and bridges which themselves constitute PCR being damaged by increased traffic.
  - Positive impacts may also occur, through the discovery of hitherto unknown sites and artifacts and generation of tourism.

• Induced development:
  - Induced development leading to increased wear and damage, sacrilege of sacred sites, theft and vandalism of movable and breakable PCR, and damage to the aesthetics of scenic landscapes and townscapes.

• Area development:
- Changes in demography or settlement patterns leading to abandonment and neglect of older residential areas/settlement containing built PCR such as vernacular architecture.
- Developments which are out-of-character with their surroundings diminishing the aesthetic value of the settlements, decline in property values and ultimately, neglect of built PCR in the area.
- Damage to the aesthetics of scenic landscapes.

7.4 Guidelines for Archaeological Impact Assessment

To reduce the possibility of damaging archaeological objects, in case they are found while undertaking excavation works for different types of constructions, the PPMU will immediately ask an authorized archaeological unit or at least an archaeologist to monitor the site periodically. The archaeologist, according to the Rules and Regulation of the Government of Vietnam will study, make inventory and record it for the future.

7.4.1 Tasks:

The key tasks of the archaeologist are:

- Conduct archaeological impact assessment where necessary.
- Execute sampling excavation and assess the significance of the materials found, propose mitigation measures to safeguard buried archaeology or erected/surface remains and suggest future research activity.
- Assess risks to these archaeological materials by the proposed infrastructure and suggest changes to the infrastructural works.
- Identify suitable mitigation measures and prepare management plan.

7.4.2 Investigation

Archaeological impact assessment in the project area and its vicinity to identify impacted sites/remains in relation to the infrastructural work proposed. A team of experts need to conduct an extensive study and survey at the sub-project areas. The objective of this survey will also be to develop proposal of appropriate mitigation measures to be undertaken to safeguard the buried or surface archaeology. The other objective is to suggest for changes, if any, to the proposed infrastructure works which could better assure the safeguarding of archaeological materials of cultural and historical significance and also suggest for future archaeological research and excavation of the buried archaeology.

The team can adopt three different methods for this purpose:

- Examination of available cartographic and other photographic records.
- Review of available literature, reports of archaeological researches and explorations conducted at the project sites and surrounding areas.
- Through site inspection to unveil the historical facts.
- On-site interaction with local people and to investigate clues if any in their traditions and legends.