EMP for Subproject “Repairing and Upgrading Critical Sections of Cau Chay River Left Bank Dyke from K0 to K42 in Yen Dinh District - Thanh Hoa Province - VN-Haz

March, 2012
THE SOCIALIST REPUBLIC OF VIETNAM

MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

Vietnam Managing Natural Hazards Project (VN-Haz)

Environment Management Plan (EMP) for Subproject “Repairing and Upgrading Critical Sections of Cau Chay River Left Bank Dyke from K0 to K42 in Yen Dinh District - Thanh Hoa Province

REEN.JSC
March, 2012
Currency equivalent

<table>
<thead>
<tr>
<th>Unit</th>
<th>Vietnam Dong (VND)</th>
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<tr>
<td>1 VND</td>
<td>= 0.00004878048 $</td>
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Abbreviations

- **BOD** Biochemical Oxygen Demand
- **CBDRM** Community-based Disaster Risk Management
- **CEP** Community Engagement Program
- **CNF** Commune Fatherland Front
- **CPC** Commune People Committees
- **CPMO** Central Project Management Office
- **CPO** Central Project Office of MARD
- **CSC** Construction Supervision Consultant
- **CSEP** Contract Specific Environmental Plan
- **DARD** Department of Agriculture and Rural Development
- **DONRE** Department of Natural Resources and Environment
- **EIA** Environmental Impact Assessment
- **ECOP** Environmental Code of Practices
- **EMDP** Ethnic Minority Development Plan
- **EMP** Environment Management Plan
- **ESMF** Environment and Social Management Framework
- **GoV** Government of Vietnam
- **LEP** Law on Environmental Protection
- **MARD** Ministry of Agriculture and Rural Development
- **OP** Operation Policy of World Bank
- **PESU** Provincial Environment and Social Safeguard Unit
- **PPC** Provincial People’s Committee
- **PPMU** Provincial Project Management Unit
- **QCVN** National Technical Regulations
- **RAP** Resettlement Action Plan
- **EA** Environment Assessment
- **RPF** Resettlement Policy Framework
- **TCVN** National Environmental Standards
- **UXO** Unexploded Ordnances
- **WB** World Bank

Unit

<table>
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<tr>
<td>m³</td>
<td>Cubic meter</td>
</tr>
<tr>
<td>m²</td>
<td>Square meter</td>
</tr>
<tr>
<td>kg</td>
<td>Kilogram</td>
</tr>
</tbody>
</table>
Note

(i) The fiscal year of Vietnam government ended on December 31st every year. The previous fiscal year represents the calendar year in which the fiscal year end, for example, fiscal year 2000 ended on December 31st, 2000.

(ii) In this report, “$” means United States Dollars (USD).
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EXECUTIVE SUMMARY

Background: The Subproject “Repairing and Upgrading Critical Sections of Cau Chay River Left Bank Dyke from K0 to K42 in Yen Dinh District - Thanh Hoa Province” is one of the six subprojects to be implemented in the first year of the Vietnam Managing Natural Hazards Project (VN-Haz project or the Project). The objective of the subproject is to rehabilitate and upgrade Cau Chay left bank river dyke from K0 - K42 and on-dyke structures for protecting lives and properties of more than 130,000 people on an area of 10,000 ha in 25 communes and towns of Yen Dinh District.

Description: The subproject activities will include repairing, upgrading the dyke and its 11 critical sections with a total length of about 2 kilometers (km) and 11 management houses; constructing and/or rebuilding 54 culverts; building approaching ramps to the dyke and 6 access roads (about 9 km); and constructing Yen Phu pumping station to drain floods for 893 hectares (ha).

Impacts and mitigations: The overall impacts will be positive. The main negative impacts would be due to (a) minor land acquisition, (b) site survey/clearance and construction activities, and (c) and risk due to inappropriate operation of culverts and inadequate maintenance and operation of dykes. No dredging will be required under the subproject.

The subproject area is mainly agricultural land, with no critical natural habitat. Total area of permanently and temporary acquired land is 147,337 square meters (m²) and 537,673 m², respectively. There are total of 697 households (HHs) with 3,144 people of the 11 subproject communes. Details on the number of the affected HHs and Project Affected People (PAPs) can be found in the Resettlement Action Plan (RAP) of the subproject. There are 03 graves of 03 HHs in the subproject area that will be affected. The affected population will be compensated in line with the Resettlement Policy Framework (RPF) and RAP. No ethnic minority will be involved in the subproject.

The potential negative impacts during site clearance and construction would be mainly due to embankment rehabilitation and access road construction activities which could increase the level of air, noise, vibration, and water pollution and local traffic volume. These impacts would be localized and temporary and could be mitigated by: (i) ensuring that contractors apply good construction practices by application of the Environmental Code of Practices (ECOP); (ii) maintaining close consultation with local authorities and communities throughout the construction period; and (iii) close supervision of field engineers as well as the environmental staff. The subproject ECOP has been prepared and it will be included as an annex to the bidding and contract documents and closely monitored and supervised by the construction supervising consultant and local community.

The potential impacts during operation will be limited to potential local flooding which may occur when maintenance (routine and/or periodic) of the dyke is inadequate, inappropriate operation of the culverts, and/or major flood events. To reduce the risks, the implementing agencies responsible for operation and maintenance of these facilities will be required to ensure adequate capacity and resources for these tasks as well as to implement a Community Engagement Program (CEP) to increase knowledge and awareness of the nearby communities on flooding issues.

Actions to be carried out under the subproject: To mitigate the potential negative impacts during pre-construction, construction, and operation phases the following measures will be
carried out during the implementation of the subproject in close consultation with local authority and communities, especially the affected households:

1. Effectively and timely implement RAP;
2. Incorporate ECOP into bidding and contract document and inform bidders;
3. Closely supervise and monitor safeguard performance of contractor to ensure effective implementation of measures to mitigate the impacts during site clearance and construction;
4. Prepare and implement a Community Engagement Program in close consultation with local communities;
5. Ensure effective operation of culverts and adequate budget for maintenance of dyke and assess road.

**Responsibility:** At subproject level, Thanh Hoa Provincial Project Management Unit (PPMU) will be responsible for ensuring effective implementation of the EMP for the Cau Chay subproject, including reporting the implementation progress and safeguard performance of contractors. PPMU will set up a Provincial Environment and Social Safeguard Unit (PESU) responsible for forging effective implementation of safeguard measures for the subproject, including incorporate appropriate ECOP in the bidding and contract documents and ensure that the bidders are aware of this commitment. PPMU will work closely with the local authorities, agencies, and communities to forge effective implementation of the mitigation measures. PPMU will also hire a group of national consultants to assist in the coordination and/or implementation of the EMP, including periodical supervision on contractors and monitor on environmental quality during the subproject implementation.

At project level, the Central Project Management Office (CPMO) will be responsible for overall supervision and monitoring the implementation progress of the subproject including safeguards. CPMO will hire a group of national consultant to assist in the supervision and monitoring of safeguard measures for the Project, including provide safeguard training to the subproject staff.

**Budget:**

- Cost for implementation of mitigation measures during construction, including training on environmental management for workers, consultation with local communities and water users, environment quality monitoring, sediment analysis, and compensation to damage (if any) will be part of the subproject construction cost. This cost will be included in the contract with the contractor and is expected to be 1% of the construction cost.
- Cost for the day-to-day supervision of contractor’s safeguard performance by the CSC as well as cost for periodic monitoring at the subproject level will be part of the subproject supervision cost. This cost is expected to be 1% of the construction cost.
- Cost for periodic monitoring at the project level will be part of the project management of CPMO;
- Cost for the implementation of the CEP will be part of the subproject mitigation measures cost and a budget of $50,000 has been allocated for the subproject. This cost is included in Component 3 of the Project;
- Cost for periodic supervision and monitoring at the project level will be part of the project management cost of CPMO.
★ Budget for safeguard training of staff will be part of the subproject management cost.

I. INTRODUCTION

The Subproject “Repairing and Upgrading Critical Sections of Cau Chay River Left Bank Dyke from K0 to K42 in Yen Dinh District - Thanh Hoa Province” is one of the six subprojects to be implemented in the first year of the Vietnam Managing Natural Hazards Project (VN-Haz project). The objective of the subproject is to rehabilitate and upgrade Cau Chay left bank river dyke from K0 - K42 and on-dyke structures for protecting lives and properties of more than 130,000 people on an area of 10,000 ha in 25 communes and towns of Yen Dinh district. The subproject activities will include repairing, upgrading the dyke and its 11 critical sections; rebuilding culverts; building approaching ramps to the dyke and access roads and for saving the dyke in emergencies; and constructing Yen Phu pumping station to drain floods for 893 hectares (ha). These activities may cause negative effects on the local environment and local community during preconstruction, construction, and/or operation. Safeguard screening in line with the criteria described in the Environmental and Social Management Framework (ESMF) suggested that the subproject will trigger the WB’s safeguards policies on Environmental Assessment (OP/BP 4.01), Involuntary Resettlement (OP/BP 4.12), and Physical Cultural Resources (OP/BP 4.11).

To ensure that the potential negative impacts are identified and mitigated during the subproject implementation and in compliance with OP/BP 4.01, an Environmental Management Plan (EMP) has been prepared in line with the guidelines provided in the ESMF. This EMP summarizes the subproject description, the environmental background, potential negative impacts, proposed mitigation measures to be carried out during the subproject implementation. It also includes an environmental code of practice (ECOP) prepared for the subproject and it will be incorporated into the bidding documents and construction contracts as well as an implementation arrangement scope for environment quality monitoring. A Resettlement Action Plan (RAP) has been prepared and presented separately.

The Government’s regulation on EIA requires submission of an EIA report for the subproject. An EIA report has been prepared, submitted to, and approved by Thanh Hoa Provincial People’s Committee.

II. SUBPROJECT DESCRIPTION

The subproject is located in 11 communes of Yen Dinh district, Thanh Hoa province. It spans along the communes of Yen Tam, Yen Giang, Yen Phu, Yen Thinh, Yen Lac, Dinh Tang, Dinh Binh, Dinh Tuong, Dinh Hoa, Dinh Thanh, Dinh Cong. The civil work will be carried out on the left bank of the existing Cau Chay River Dyke (see location in Figure 2.1).

The scope of the civil work includes: (see design diagrams in Figure 2.1&2.2):

a. Finalizing the cross-section and strengthening dyke surface:

In average, the dam crest height is elevated by 0.4 meters (m). The design parameters include dyke crest width: B=6.0 (m) of which the dyke surface is strengthened with normal concrete (M250) 20 centimeters (cm) thick, 5.0 m wide on a crush-stone compacted layer by 2 compactors in 20cm thick; two curbs are filled up with hill and rock soil, 0.5m wide each
curb, and provided with sign posts: 15x15x105cm; surface slope i = 1%, and curb slope i = 4%.

The riverside and fieldside of dyke slopes are planted with grass for anti-erosion purposes. The dyke section running through residential area shall be made with rural road at dyke toe at width: B = 3 – 5m, lean concrete paved (M200) 20cm thick and underneath is crush-stone aggregated layer in 15 cm thickness.

b. Strengthening and protecting the river bank at 11 critical sections:

The civil work includes strengthening the slope with riprap in 30cm thickness in concrete frame, and the slope toe is of stone pitching, 30cm thickness in concrete frames, and the toe is of rock blocks. Exceptionally, at Si bridge foot section is strengthened with pre-cast concrete blocks (M250) dimension: (40x40x16) cm with flexible joints in reinforced concrete frame created by vertical and horizontal beams; at toe is of rock blocks. Along the slope is provided with steps in combination with drains made of concrete. The both ends of the strengthened section are locked with concrete and reinforced concrete. The overall technical design parameters of the 11 critical dyke sections are presented in Table 2.1 below.

Table 2.1: Technical standards for 11 critical embankment sections

<table>
<thead>
<tr>
<th>No</th>
<th>Reinforced sections</th>
<th>Embankment top level</th>
<th>Embankment foot level</th>
<th>Embankment roof</th>
<th>Embankment length (m)</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Bank protection (Km9+325.5 to Km9+505.5)</td>
<td>9.00</td>
<td>5.00</td>
<td>m=2.0</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>Bank protection (Km12+436.8 to Km12+558.8)</td>
<td>6.0-7.5</td>
<td>3.50</td>
<td>m=2-3</td>
<td>122</td>
</tr>
<tr>
<td>3</td>
<td>Bank protection (Km21+341 to Km21+436)</td>
<td>7.60</td>
<td>2.20</td>
<td>m=2.0</td>
<td>95</td>
</tr>
<tr>
<td>4</td>
<td>Bank protection for the section connecting Cau Khai (Km21+781 to Km21+834)</td>
<td>11.60</td>
<td>7.00</td>
<td>m=2.0</td>
<td>53</td>
</tr>
<tr>
<td>5</td>
<td>Bank protection (Km29+463 to Km29+686.4)</td>
<td>6.70</td>
<td>2.50</td>
<td>m=2.0</td>
<td>223.4</td>
</tr>
<tr>
<td>6</td>
<td>Bank protection (Km29+712 to Km29+875)</td>
<td>6.00</td>
<td>2.42</td>
<td>m=2.0</td>
<td>163</td>
</tr>
<tr>
<td>7</td>
<td>Bank protection (Km31+463 to Km31+573)</td>
<td>6.70</td>
<td>2.25</td>
<td>m=2.0</td>
<td>110</td>
</tr>
<tr>
<td>8</td>
<td>Bank protection (Km33+933 to Km34+063)</td>
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<td>2.00</td>
<td>m=2.0</td>
<td>130</td>
</tr>
<tr>
<td>9</td>
<td>Bank protection (Km36+193 to Km36+313)</td>
<td>2.0</td>
<td>1.77</td>
<td>m=2.0</td>
<td>120</td>
</tr>
<tr>
<td>10</td>
<td>Bank protection (Km37+543 to Km37+853)</td>
<td>5.1-4.2</td>
<td>1.64</td>
<td>m=2.0</td>
<td>310</td>
</tr>
<tr>
<td>11</td>
<td>Bank protection (Km39+233 to Km40+043)</td>
<td>6.60</td>
<td>1.50</td>
<td>m=2.0</td>
<td>810</td>
</tr>
</tbody>
</table>

Source: Main FS report, 2011

c. Constructing and repairing 54 under-dyke culverts:

Repairing and upgrading 14 under-dyke culverts: these culverts are of reinforced concrete and in good condition however, the dyke cross-section is widened so the culverts shall be extended to match with the new dyke cross-section; the structure of the extension part: reinforced concrete (M250), foundation is treated with bamboo piles, dissipation section
at river side is repaired for anti-erosion purposes; replacing valve gates and hoisting equipment at capacity V3 – V5.

40 new under-dyke culverts will be constructed to replace rock or concrete culverts that are damaged. The culverts will take rectangular shape, be reinforced with concrete (M250), concrete valve gates, and hoisting equipment V3 – V5. The culverts are shown in Table 2.2.

Table 2.2: Technical design parameters for culverts

<table>
<thead>
<tr>
<th>No</th>
<th>Culvert Name</th>
<th>Commune</th>
<th>Section</th>
<th>Number of gates</th>
<th>Design Width (m)</th>
<th>Design Height (m)</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Nang</td>
<td>Yen Giang</td>
<td>Km6+492.7</td>
<td>1</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>2</td>
<td>Xe</td>
<td>Yen Phu</td>
<td>Km6+492.7</td>
<td>1</td>
<td>1.0</td>
<td>1.2</td>
</tr>
<tr>
<td>3</td>
<td>Nu</td>
<td>Yen Phu</td>
<td>Km10+216</td>
<td>1</td>
<td>1.5</td>
<td>1.8</td>
</tr>
<tr>
<td>4</td>
<td>Phuc Mon</td>
<td>Yen Thinh</td>
<td>Km11+029</td>
<td>1</td>
<td>0.8</td>
<td>1.2</td>
</tr>
<tr>
<td>5</td>
<td>Dong Soi</td>
<td>Yen Thinh</td>
<td>Km12+59.7</td>
<td>1</td>
<td>1.5</td>
<td>1.8</td>
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<td>6</td>
<td>Mo Yen Giang</td>
<td>Yen Thinh</td>
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<td>0.8</td>
<td>1.2</td>
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<tr>
<td>7</td>
<td>Tuoi</td>
<td>Yen Thinh</td>
<td>Km13+423</td>
<td>1</td>
<td>0.8</td>
<td>1.2</td>
</tr>
<tr>
<td>8</td>
<td>Giat</td>
<td>Yen Thinh</td>
<td>Km16+932</td>
<td>1</td>
<td>1.5</td>
<td>1.8</td>
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<tr>
<td>9</td>
<td>Mo</td>
<td>Yen Lac</td>
<td>Km18+798</td>
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<td>1.5</td>
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<td>Yen Lac</td>
<td>Km19+494</td>
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<tr>
<td>11</td>
<td>Khua Mat</td>
<td>Yen Lac</td>
<td>Km20+419</td>
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<td>1.40</td>
<td>1.60</td>
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<td>12</td>
<td>Vinh</td>
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<td>Km21+648</td>
<td>1</td>
<td>1.40</td>
<td>1.60</td>
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<td>13</td>
<td>Under-dyke irrigation culvert</td>
<td>Yen Lac</td>
<td>Km22+148</td>
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<td>14</td>
<td>Dinh Tang</td>
<td>Dinh Tuong</td>
<td>Km22+657</td>
<td>1</td>
<td>1.40</td>
<td>1.60</td>
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<td>15</td>
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<td>Under-dyke irrigation culvert</td>
<td>Dinh Tuong</td>
<td>Km23+706</td>
<td>1</td>
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<td>0.8</td>
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<tr>
<td>17</td>
<td>Under-dyke irrigation culvert</td>
<td>Dinh Tuong</td>
<td>Km23+874</td>
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<td>0.8</td>
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<tr>
<td>18</td>
<td>Loc Coc</td>
<td>Dinh Tuong</td>
<td>Km24+513</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
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<tr>
<td>19</td>
<td>Loc Coc irrigation culvert</td>
<td>Dinh Tuong</td>
<td>Km24+533</td>
<td>1</td>
<td>0.8</td>
<td>1.3</td>
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<tr>
<td>20</td>
<td>Phu Tho1</td>
<td>Dinh Tuong</td>
<td>Km24+926</td>
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<td>0.8</td>
<td>0.8</td>
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<tr>
<td>21</td>
<td>Phu Tho2</td>
<td>Dinh Tuong</td>
<td>Km25+227</td>
<td>1</td>
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<td>0.8</td>
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<tr>
<td>22</td>
<td>Phu Tho3</td>
<td>Dinh Tuong</td>
<td>Km25+411.5</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>23</td>
<td>Phu Tho4</td>
<td>Dinh Tuong</td>
<td>Km25+486</td>
<td>1</td>
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<td>0.8</td>
</tr>
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<td>24</td>
<td>Cau Lim pump station</td>
<td>Dinh Tuong</td>
<td>Km25+595</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
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<td>25</td>
<td>Phu Tho 5</td>
<td>Dinh Tuong</td>
<td>Km25+673</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
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<td>26</td>
<td>Phu Tho 6</td>
<td>Dinh Tuong</td>
<td>Km25+722</td>
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<td>Dinh Tuong</td>
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<tr>
<td>28</td>
<td>Phu Tho 8</td>
<td>Dinh Tuong</td>
<td>Km26+145</td>
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<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>29</td>
<td>Phu Cuong 1</td>
<td>Dinh Tuong</td>
<td>Km26+906</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>30</td>
<td>Boi Lim pump station</td>
<td>Dinh Tuong</td>
<td>Km28+025</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>31</td>
<td>Boi Lim village</td>
<td>Dinh Tuong</td>
<td>Km28+325</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>32</td>
<td>Chua Boi pump station</td>
<td>Dinh Tuong</td>
<td>Km28+753</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>33</td>
<td>Xi Rao pump station</td>
<td>Dinh Binh</td>
<td>Km29+337</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>34</td>
<td>Xi Rao</td>
<td>Dinh Binh</td>
<td>Km29+409</td>
<td>1</td>
<td>0.8</td>
<td>0.8</td>
</tr>
</tbody>
</table>
d. Constructing Yen Phu new drainage pumping station at K7+588.7:

A new drainage pumping station on the left bank of Cau Chay river will be constructed with 5 vertical pump units (HTD 4000-6), which drains for 865 ha in 3 communes: Yen Tam, Yen Giang and Yen Phu in Yen Dinh district. The pumping station will be supplied with power from a substation of (560 +320 +31.5) KVA -35/0.4 KV and 3,125 m of 35KV line which will be build by under the subproject.

e. Construction of 11 dyke management houses:

11 grade IV dyke management houses will be constructed with an area of 45 square meters (m²) each.

f. Constructing 6 rescue and relief access road sections

Construction of 6 rescue and relief access road alignments will be financed by the subproject including alignments in: Yen Phu, Yen Lac, Dinh Hoa, Dinh Tang, Dinh Binh, and Dinh Tuong communes. The total length is 9,000 m (9 km).

An estimation of the volume of construction materials is indicated in Table 2.3 below.

Table 2.3: Summary of the subproject construction quantities

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Main FS report, 2011
EMP for Subproject “Repairing and Upgrading critical sections of Cau Chay River left bank Dyke from K0 to K42 in Yen Dinh district - Thanh Hoa Province - VN-Haz 2011

<table>
<thead>
<tr>
<th>No</th>
<th>Name of borrow pit</th>
<th>Location</th>
<th>Volume (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Numbe 3 Cong Hoi</td>
<td>Yen Giang commune</td>
<td>86,000</td>
</tr>
<tr>
<td>2</td>
<td>Alluvial soil on river side</td>
<td>Yen Phu commune</td>
<td>310,000</td>
</tr>
<tr>
<td>3</td>
<td>Con Rong</td>
<td>Yen Thinh Commune</td>
<td>77,000</td>
</tr>
<tr>
<td>4</td>
<td>Ban Thon 9</td>
<td>Yen Thinh Commune</td>
<td>58,000</td>
</tr>
<tr>
<td>5</td>
<td>Phuc Mon, Village 2</td>
<td>Yen Thinh Commune</td>
<td>31,000</td>
</tr>
<tr>
<td>6</td>
<td>Cau Vang, Village 4</td>
<td>Yen Thinh Commune</td>
<td>31,000</td>
</tr>
<tr>
<td>7</td>
<td>Village 2</td>
<td>Yen Lac Commune</td>
<td>46,000</td>
</tr>
<tr>
<td>8</td>
<td>Alluvial soil on river side</td>
<td>Yen Lac Commune</td>
<td>55,200</td>
</tr>
<tr>
<td>9</td>
<td>Dong Lot</td>
<td>Yen Lac Commune</td>
<td>130,000</td>
</tr>
<tr>
<td>10</td>
<td>Da Con, Bai Trai Village</td>
<td>Dinh Tang commune</td>
<td>98,000</td>
</tr>
<tr>
<td>11</td>
<td>2 New Borrow pits</td>
<td>Dinh Tang commune</td>
<td>89,000</td>
</tr>
<tr>
<td>12</td>
<td>Alluvial soil on river side</td>
<td>Dinh Binh commune</td>
<td>65,000</td>
</tr>
<tr>
<td>13</td>
<td>Alluvial soil on river side</td>
<td>Dinh Hoa commune</td>
<td>77,000</td>
</tr>
<tr>
<td>14</td>
<td>Alluvial soil on river side</td>
<td>Dinh Thanh Commune</td>
<td>123,000</td>
</tr>
<tr>
<td>15</td>
<td>Alluvial soil on river side</td>
<td>Dinh Cong commune</td>
<td>230,000</td>
</tr>
</tbody>
</table>

Source: Main FS report, 2011

g. Activities at borrow pit sites.

There are total 15 borrow pits which have been identified according to the feasibility study report. All of them are within 0.5 km to the dyke. Site surveys have been conducted to determine the volume, composition, and quality of the borrow pit materials which are mostly hilly soil. The volumes of the borrow pits vary from 31,000 m³ to 310,000 m³. Table 2.4 gives summaries of the location and volume of the proposed borrow pits.
h. Project implementation schedule:
- Jan. 2011 - May 2011: Completing the project investment report
- Sep. 2011 - Feb. 2012: Detailed design and construction drawings
Figure 2.3 Location of the Subproject

Cau Chay River left-bank Dyke, Yen Dinh district Thanh Hoa province
III. ENVIRONMENTAL BACKGROUND

This part provides a summary of key environmental background of the subproject. Environmental quality is provided in more details in the EIA of the subproject.

Thanh Hoa has 4 river systems: Ma river (the catchment area: 28,400 square kilometers (km²), the length of river: 518km), Yen river (the basin area is 1,850 (km²), the length is 89km), Lach Bang river (basin area is 236 km², length is 34.5km), Hoat river (basin area is 250 km², length 55km). Characterized by complicated meteorological, hydrological, and topographic settings, the province is prone of most of frequent natural disasters in Vietnam: storm, tropical low pressure, flood, inundation, saline water intrusion, high tide, flash flood, drought, hurricane, lightening, land slide, river erosion, coastal erosion, forest fire, etc.

The subproject is located in Cau Chay river basin, a branch of Ma river. Cau Chay river originates in Ngoc Lac district, passing districts of Ngoc Lac, Yen Dinh, Tho Xuan, Thieu Hoa then joining Ma river. The river is 87.5 km long, with a catchment area of 551 km². The main river bed almost lies in the plain. The river section of which the left bank has a 42 km long river dyke is fully located on the territory of Yen Dinh district. The narrow and wandering channel of this section of the river impedes its flood release capacity.

The river dyke on the left bank of Cau Chay river has been included in the government program for river dyke upgrading up to year 2020 which was approved by the Prime Minister in the Decision No. 2068/QĐ-TTg dated 09/12/2009. However, due to the constraint of investment fund, this critical dyke section has not yet been upgraded, strengthened its capacity for flood protection and control.

3.1. General Characteristics and Land Use

Land in Yen Dinh district is mainly low land and most land area is used for agricultural production. Total natural land of 11 communes is 8,986 hectares (ha), mainly agricultural area of 5,496 ha (accounting for 61.17%); forest area of 452 ha (5.03%); unused land area of 446 ha (4.96%); other types are residential area, specialized land, aquaculture area.

Ma river basin’s ecosystem is characterized by both Northwest and North-Central ecosystems. Evergreen forests are the typical type of natural forests of the basin; lowland evergreen forests now only remain in some areas of Ben En National Park. The subproject site is located far away from national parks and nature reserves, 5 km from Dong Son Nature Reserves, 6.6 km from Tam Quy Nature Reserves, 10.7 km from Ham Rong Nature Reserve, and 25.6 km from Cuc Phuong National Park. The location of the subproject in relation to the national parks and nature reserves in the Ma river basin is indicated in Figure 3.1.
Figure 3.1 Location of the Subproject in relation to the National Parks in the Ma river basin

Legend:
- National parks and protected areas in Ma-river basin
- Cau Chay River left-bank Dyke, Yen Dinh district, Thanh Hoa province
3.2. Soil and Water Quality

- **Surface water:** The analysis result provided by Ha Thanh Environment and Land Survey Technical Company Ltd shows that all parameters meet the national standard on surface water quality QCVN 08:2008/BTNMT column B1 (which is suitable for irrigation purposes).

- **Groundwater:** The groundwater quality in the area is rather good, all parameters are within the allowable limit of the national technical standard QCVN 09:2008/BTNMT, except for Coliform and ammonia being a little higher than the standard.

- **Soil:** The soil has neutral pH. The content of nitrate, phosphorus, potassium is poor to average. The content of heavy metals like Cd, Pb, Hg, As in soil lies within the maximum allowable limit for heavy metals in soil (QCVN 03:2008-BTNMT: National technical regulation on the allowable limits of heavy metals in the soils).
  
  o Contents of Fe₂O₃ and Al₂O₃ in soil respectively vary between 0.5 and 1.4% and from 3.2 to 5.7%. Generally, contents of Fe₂O₃ and Al₂O₃ in the soil samples are not high.
  
  o pHKCl in the soil samples varies between 4.8 and 5.7, and therefore the soil in this area is mildly acidic.
  
  o Content of K₂O (total potassium) is poor, varying between 0.4 and 1.4%.
  
  o Content of total P₂O₅ (total phosphorus) is medium, varying between 0.03 and 0.10%.
  
  o Content of humus is rather high, varying between 1.6 and 3.9%.

Detailed results of water and soil quality analysis in the subproject area are presented in Annex 3.

3.3. Natural disasters in the subproject area

Natural disasters in the subproject area of Yen Dinh district are caused mainly by storms, inundation, rising water, and flooding.

Completion of this subproject will minimize the loss of life and property and damage to the environment and areas of historic importance. It will also contribute to sustaining social order, economic development and security.

IV. POTENTIAL IMPACTS AND MITIGATION MEASURES

4.1 Potential Positive Impacts

The positive impacts of the subproject would include: Prevention of floods, inundation and reduction of damage caused by natural disasters in order to ensure safeguard for life and property of 130,000 people living in the area and keep stable production for 10,000 ha of agricultural, forest land in the subproject communes.

The subproject would also help stabilize river banks, prevent landslide from happening on agricultural land and populated area, create traffic route serving local
transportation and dyke rescue in emergencies. At the same time, it would create a nice landscape, clean environment not to be polluted by floods.

4.2 Safeguard Screening and Identification of Issues

a) Initial screening

An initial screening process was undertaken in line with the guidelines provided in the Environmental and Social Management Framework (ESMF). The purpose of the screening is to identify potential significant adverse environmental and social impacts caused by the subproject activities which cannot be adequately mitigated by the subproject and to exclude subprojects that are equivalent to the Bank’s Category A project.

The subproject is eligible for project financing considering that the subproject will not involve possible high UXO risk and will not create possible adverse impacts on (a) critical natural habitats and/or protected area including proposed protected areas; (b) loss or damage to cultural property, including sites having archeological (prehistoric), paleontological, historical, religious, cultural and unique natural values, graves and graveyards; (c) water regime, particularly water flow and water quality; and (d) local traffic.

The potential negative impacts of the subproject could be minimized by applying the proposed mitigation measures developed for the subproject which is described in Sections IV and V.

b) Identification of issues

The technical screening was conducted in line with the guidelines provided in the ESMF to identify potential environmental and social safeguard issues (Table 5.1 of the ESMF). The results of this screening are shown in Table 4.1 which in consistent with the initial screening conducted during the preparation of the ESMF (Table A5.1 of Annex 5 of ESMF).

Table 4.1: Results of safeguard screening for Cau Chay subproject

<table>
<thead>
<tr>
<th>Safeguard issues likely to be involved</th>
<th>Safeguard document prepared</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1); (3); (4); (5); (8);</td>
<td>EMP, RAP</td>
<td>The subproject does not involve any natural habitats, or ethnic minorities</td>
</tr>
</tbody>
</table>

*Note: (1) Involve land acquisition and/or resettlement, (2) involve ethnic minority, (3) involve relocation of graves, (4) involve UXO risk; (5) involve civil works; (6) involve dredging; (7) involve dam safety; (8) likely to involve land/water use conflicts; (9) involve river mouth construction.

c) Potential negative impacts and mitigation measures

Site investigation and document review were conducted for identifying and assessing the potential adverse impacts, including consultation with the local communities and affected
Table 4.2: Potential negative impacts of the subproject

<table>
<thead>
<tr>
<th>Activities</th>
<th>Negative impacts</th>
<th>Impacts level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loss of productive land and/or residential land/assets that may cause adverse impacts on livelihoods and well being of project affected population (PAPs).</td>
<td>Significant, can be compensated, unavoidable,</td>
</tr>
<tr>
<td>1. Pre-construction Phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Land acquisition</td>
<td>- Total area of permanently and temporary acquired land is 147,337 m² and 537,673 m², respectively. There are total of 697 HHs with 3,144 people of the 11 subproject communes. Details on the number of the affected HHs and PAPs can be found in the RAP of the subproject.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- 03 graves of the 03 HHs in the subproject area will need to be relocated.</td>
<td></td>
</tr>
<tr>
<td>1.2 Site clearance</td>
<td>- Generation of waste, dust, noise, vibration, water pollution, social issues, etc. (38 affected HHs with structures being demolished; along 42 km of dyke, total about 4,300 trees will be cleared)</td>
<td>Medium, localized, temporary, can be mitigated, unavoidable.</td>
</tr>
<tr>
<td></td>
<td>- Loss of productive plots / trees affecting livelihoods and local habitats.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Discharging sediment and vegetation material into nearby water courses, rice paddies, and/or irrigation canal.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Safety risk of UXO is mainly at borrow pit sites because the construction activities are on the old dyke route.</td>
<td></td>
</tr>
<tr>
<td>2. Construction Phase</td>
<td>Generation of excavated soil and Estimated that 181,360 m³ of soil will be dug and dyked during the construction. Most soil is used for earthfill. The subproject still needs another 774,203 m³ to meet the requirement for earthfill.</td>
<td>Low to medium, localized, temporary, can be mitigated, unavoidable.</td>
</tr>
<tr>
<td></td>
<td>Increased dust air and noise pollution, vibration, and traffic volume due to transportation, loading and unloading of construction materials, and other construction activities.</td>
<td>Construction activities will be carried out along a large area spanning 42 km.</td>
</tr>
<tr>
<td></td>
<td>Domestic solid waste generated by construction workers, construction</td>
<td></td>
</tr>
</tbody>
</table>
### Activities

<table>
<thead>
<tr>
<th>Houses and 6 rescue and relief road sections.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Negative impacts</strong></td>
</tr>
<tr>
<td>- Hazardous wastes such as waste oil, spent lubricant, and contaminated materials resulting from leakage of oil and fuel.</td>
</tr>
<tr>
<td>- Increase safety risk, dust, noise, vibration, and other nuisance to local residents.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2 Transportation of construction materials (sand, soil, rocks, gravel, cements, etc.) and disposal of construction waste, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Negative impacts</strong></td>
</tr>
<tr>
<td>- Dust and other air pollution caused by trucks, vehicles, and loading and unloading activities.</td>
</tr>
<tr>
<td>- Noise and vibration due to transportation and loading and unloading activities.</td>
</tr>
<tr>
<td>- Water pollution caused by runoff water containing oil and grease.</td>
</tr>
<tr>
<td>- Temporary increase in volume of the local traffic system due to increasing traffic flow and.</td>
</tr>
<tr>
<td>- Increase safety risk to local residents and other nuisance.</td>
</tr>
<tr>
<td>- Damage to local roads.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.3 Other construction activities and operation of construction equipment and machinery, workers’ activities (about 100 workers), and impacts at the proposed borrow pits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Negative impacts</strong></td>
</tr>
<tr>
<td>- Air pollution due to fugitive dust and exhausted gases from trucks.</td>
</tr>
<tr>
<td>- Noise and vibration caused by vehicles, construction machinery.</td>
</tr>
<tr>
<td>- Domestic solid waste generated by construction workers, construction campsite, kitchen, toilets.</td>
</tr>
<tr>
<td>- Improper disposition of hazardous wastes such as waste oil, spent lubricant, and contaminated materials resulting from leakage of oil and fuel.</td>
</tr>
<tr>
<td>- Improper handling and storage of hazardous and chemical substances and construction materials.</td>
</tr>
<tr>
<td>- Erosion at borrow pit and the dyke site affecting irrigation canals and paddy rice fields.</td>
</tr>
<tr>
<td>- Temporary increase in volume of the local traffic system due to increasing traffic flow and.</td>
</tr>
<tr>
<td>- Generation of solid and liquid waste; increased use of local resources; potential conflict between workers and local people; health issues and social evils.</td>
</tr>
</tbody>
</table>

### Impacts level

| Houses and 6 rescue and relief road sections. | Low to medium, localized, temporary, and can be mitigated, unavoidable. |
| 2.2 Transportation of construction materials (sand, soil, rocks, gravel, cements, etc.) and disposal of construction waste, etc. | Low to medium, localized, temporary, and can be mitigated, unavoidable. |
| 2.3 Other construction activities and operation of construction equipment and machinery, workers’ activities (about 100 workers), and impacts at the proposed borrow pits | Low to medium, localized, temporary, and can be mitigated, unavoidable. |

### 3. Operation phase
### 3.1 Risk due to inappropriate operation of culverts and/or inadequate maintenance of dyke/roads

- May cause local flood and possible impacts on water quality and water uses.

**Impacts level**
Low, can be mitigated during detailed design. Institutional capacity building component could also help reducing the risk.

### 3.2 Risk due to increasing local flood due to increasing high of the dyke

- Potential increase in damage due to major flood event

**Impacts level**
Low, can be mitigated through community engagement activities

---

### 4.3 Social Impacts and Mitigation Measures

Table 4.3 summarizes the amount of land required and affected households, while the final affected land and pollution will be determined during the detailed design. Mitigation of these impacts will be in accordance with RAP of the subproject which has been prepared in line with the RPF and will be submitted for WB clearance. Details are provided separately. In addition, 03 graves of the 03 HHs in the subproject area will need to be relocated.

Relocation of the graves would be carried out by households whose graves are affected (as is the normal practice in Vietnam). Affected households will receive compensation payment to conduct the relocation on their own. Payment to the grave relocation includes costs of excavation, relocation, reburial, purchasing land for reburial (if any), and all other reasonable costs associated with necessary rituals by the local practice. Local ritual means relocation of graves will be carried out in accordance with local cultural practices, taking into account cultural preferences which are typical for each ethnic group. Relocation of graves will be done satisfactorily to the affected households prior to the commencement of construction.

**Table 4.3. Summary of acquired land area in the 11 communes (Unit: m²)**

<table>
<thead>
<tr>
<th>No</th>
<th>Commune</th>
<th>Permanently acquired land</th>
<th>Temporarily acquired land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Residential</td>
<td>Agricultural</td>
</tr>
<tr>
<td>1</td>
<td>Yen Tam</td>
<td>0</td>
<td>300</td>
</tr>
<tr>
<td>2</td>
<td>Yen Lac</td>
<td>0</td>
<td>33,739</td>
</tr>
<tr>
<td>3</td>
<td>Yen Giang</td>
<td>143</td>
<td>8,793</td>
</tr>
<tr>
<td>4</td>
<td>Yen Thinh</td>
<td>2,732</td>
<td>29,875</td>
</tr>
<tr>
<td>5</td>
<td>Yen Phu</td>
<td>0</td>
<td>9,058</td>
</tr>
<tr>
<td>6</td>
<td>Dinh Thanh</td>
<td>1,851</td>
<td>8,179</td>
</tr>
<tr>
<td>7</td>
<td>Dinh Binh</td>
<td>259</td>
<td>1,921</td>
</tr>
<tr>
<td>8</td>
<td>Dinh Tang</td>
<td>575</td>
<td>21,028</td>
</tr>
<tr>
<td>9</td>
<td>Dinh Tuong</td>
<td>1,242</td>
<td>3,076</td>
</tr>
<tr>
<td>10</td>
<td>Dinh Hoa</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>Dinh Cong</td>
<td>0</td>
<td>2,149</td>
</tr>
</tbody>
</table>
4.4 Environmental Impacts and Mitigation Measures

Potential negative impacts would occur during site clearance, construction operation and activities at borrow pit sites and near-by. Key impacts and mitigation measures are as follows:

a) Construction phase

Impacts:

Impacts on the local environment during construction occur due to civil works such as site clearance, excavating and embanking, building drainage culverts, and construction of access roads for dyke saving in emergencies. Given that the 15 proposed borrow pits are located along the alluvial soil at the river side, and within 0.5 km from the construction sites, and the transportation routes for the excavated soil will not go through local residential areas, potential impacts on the community are not significant. Other impacts of the borrow pits on the environment include: loss of topsoil affecting productive land, land instability from incorrect earth removal or unstable deposition of spoil, leading to erosion; discharge of sediments into watercourses, dust emissions affecting health, and visual impacts. Field investigation indicates that using of these borrow pits will not affect flow of the river. Possible risk due to UXO at the borrow pits should also be investigated.

Existing quarries will be used for supplying materials for subproject construction activities. Since these commercial quarries are licensed by local authorities and have to comply with the government environmental protection regulation, their impacts on the environment are not expected to be significant.

The works will be conducted mainly along the existing dyke route and is of small scale, scattered over a large geographic area, in short construction time, and thus the amount of waste, dust from construction process, living waste of workers on site, overflowing rain water etc. is expected to be small, not significantly affecting the environment.

Mitigation measures:

The above impacts can be mitigated by: (a) ensuring that the application and supervision of ECOP. Associated mitigation measures during construction and operation as well as closure requirements of borrow pits can be addressed by applying mitigations measure included in the Environmental Codes of Practice (Annex 1, Section V, 5.4). For the borrow pits to be used exclusively for this subproject, closure plans for these pits will be prepared during the CSEP which is required by ECOP; (b) conduct UXO clearance at the proposed borrow pits as needed before the commencement of the construction. Details are as follows:

Application of ECOP: applying ECOP (Annex 1) prepared for the subproject together with the supervision of the Construction Supervision Consultant (CSC) and field engineers and in cooperation of the community and local authority. The ECOP will be incorporated into the bidding and construction contract documents. The CSC will be responsible for the day-to-day supervision and monitoring of contractor’s safeguard performance and this requirement will be included as part of the CSC’s TOR (see draft in Annex 2). The ECOP scope is briefed as follows:

- Part 1 (General provisions) requests contractors (a) to prepare the Contract Specific Environmental Plan (CSEP) stipulating detailed measures necessary for avoiding or
mitigating negative impacts during subproject implementation; (b) keep close contact with the local authority and community on the whole progress of construction; (c) ensure safeguard for the local residents, preventing conflicts between workers on site and the people.

- **Part 2** (Construction Management) describes specific requirements for mitigation measures under five specific sub-plans: i.e. Management of Construction Sites and Activities, Management of Environmental Quality, Management of Work Camp, Management of Stockpiles, Quarries, and Borrow Pits, and Management of Dredging and monitoring plan. Detailed on the sub-plans will be incorporated into the CSEP to be prepared by contractor and approved and supervised by the supervision consultant as required under Part 1.

**b) Operation phase**

The negative impacts on the environment and society during operation phase may be due to human activities and/or resulted from termite nests in the dyke foot. To restrict the scale and level of the impacts, the local authority needs to closely coordinate with the dyke management unit to patrol, guard, maintain the dyke, mobilize human forces, and materials to protect the dyke particularly in flood season. In addition, the risk of inappropriate operation of culverts during flood events may cause disaster of dyke break, flooding the field-side. However, strict compliance with operation procedures (2006 Dyke Law) as long with capacity building for culvert managers and close supervision and coordination among authorized agencies could reduce significantly this risk.

Upgrading of the existing dyke and/or rescue roads and/or operation of the proposed culverts could increase the level of land and water use conflicts. To avoid and/or mitigate these potentials, a quick assessment has been carried out from 24 to 28 October 2011 to indentify the areas/communities likely to be negatively affected by the subproject what will be required to mitigate the potential risks. If there is any specific issue, areas, and/or concerns related to land and water use and/or potential conflicts in the subproject area due to the implementation of the subproject, the mitigation measures will be proposed. The results of this survey can be summarized as following:

**Participants**

In the project area: Leaders of Commune People Committees (CPC); Presidents of Commune Fatherland Front (CNF); Youth Union, Women Union; Veteran Associations; the affected households from communes Yen Tam, Yen Giang, Yen Phu, Yen Thinh, Yen Lac, Dinh Tang, Dinh Binh, Dinh Tuong, Dinh Hoa, Dinh Thanh, Dinh Cong - Yen Dinh district - Thanh Hoa province.

The opposite areas (the right-hand side) include: Leaders of People committee; President of Commune Fatherland Front; residents from communes Thang, Xuan Minh, Xuan Tan, Xuan Vinh in Tho Son district and Thieu Ngoc, Thieu Vu, Thieu Thanh, Thieu Cong, Thieu Long, Thieu Giang in Thieu Hoa district.

**Summary of consultation results:**

100% CPCs, CNFs and Unions and Associations and the affected households understand the Project, beneficiaries and potential impacts and agree with the investment. There is no other conflicts related to land/water use were found except the following:
(i) Risk of the increased height of left hand side dyke will threaten the safety of the right hand side one in the extreme flood. However, the increase is not so much, the hydraulic calculation was done in the FS with the whole river and moreover, the AHHs on the right-hand side were informed of the new plan of upgrading their dyke in the near future.

(ii) Some concerns about the land acquisition (permanent and temporary) but the dyke is mostly upgraded, so the lost land will be small and this problem should be covered in the RAP report.

(iii) All participants wish for the subproject to be approved in a short time, so the subproject HHs can benefit soon.

(iv) All participants ask for the subproject to be implemented soon and ensure the work schedule and quality.

To mitigate the potential impacts, it is necessary to implement a Community Engagement Program (CEP) to improve knowledge and capacity of the local communities on flood risks and how to be responsive to them. Therefore the Component 3 activities should not only cover Dinh Hao, Dinh Thanh, Dinh Cong, Dinh Binh, Dinh Tuong, Yen Tam, Yen Giang – Yen Thinh district and Xuan Vinh- Tho Xuan district but also should consider the communes on the right-hand side, where they can be threaten by activities of the subproject. CBDRM should be conducted at district and commune level, including: development planning and developing plans or strategies of mitigation of disaster risks; training and capacity building for preventing and mitigating risks of disaster at commune level; investing in the small-scale infrastructure especially the ones for mitigating flood and drought. The training, capacity building for preventing and mitigating disasters at local level combined with structural measures of the subproject will enhance overall investment effectiveness.

4.5 Summary of Impacts and Mitigation Measures

Table 4.4 summarizes the potential negative impacts of the subprojects which is consistent with the initial assessment conducted during the ESMF preparation. Table 4.5 summarizes the mitigation measures proposed for the subprojects while the implementation arrangement and EMP cost is provided in Section VI.
Table 4.4: Potential Negative Impacts of the Subproject (Cau Chay)

<table>
<thead>
<tr>
<th>Components</th>
<th>Physical</th>
<th>Biological</th>
<th>Socio</th>
<th>Others</th>
<th>Off-site impacts</th>
<th>Key mitigation measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Air, noise, vibration</td>
<td>Land, soil, water</td>
<td>Solid waste, Sludge</td>
<td>Forest, natural habitats</td>
<td>Fish, aquatic life</td>
<td>Land acquisition, resettlement</td>
</tr>
<tr>
<td>Pre-const.</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>N</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>Construction</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>N</td>
<td>L</td>
<td>N</td>
</tr>
<tr>
<td>Operation</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Note: The following criteria are used for the assessment of level of impacts: None (N) – no impact; Low (L) – Small works, minor impacts, localized, reversible, temporary; Medium (M) – Small works in coastal/sensitive areas, medium scale works with moderate impacts of which most are reversible, reducible and manageable, localized, temporary; High (H) – Medium scale works in coastal/sensitive area, large scale works with significant impacts (socially and/or environmentally) of which many are irreversible and require compensation.
### Table 4.5: Mitigation measures proposed for the subproject

<table>
<thead>
<tr>
<th>Activities causing impacts</th>
<th>Mitigation measures</th>
<th>Responsibility entity and cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Repairing and/or upgrading and construction of the dyke, embankment, culvert, pumping station, dyke managing houses and rescue and relief roads</td>
<td>During detailed design: incorporate ECOP into the bidding and contract documents and inform contractors on this obligation.</td>
<td>PPMU: Cost for mitigation measures is part of the construction cost.</td>
</tr>
<tr>
<td></td>
<td>During construction: Prepare CSEP and carry out mitigation measures, including re-vegetation as needed.</td>
<td>Contractor; Cost will be part of construction cost.</td>
</tr>
<tr>
<td></td>
<td>During construction: closely supervise activities and monitor safeguard performance of contractors in cooperation with local community.</td>
<td>PPMU/CSC, local communities; Cost for monitoring and supervision is part of the supervision cost.</td>
</tr>
<tr>
<td></td>
<td>Periodical supervision and monitoring</td>
<td>PPMU and CPMO, cost for supervision is part of the project management cost, WB also conducts supervision.</td>
</tr>
<tr>
<td>(2) In operation process</td>
<td>Implement a Community Engagement Program (CEP) with the local community located along the right hand side of the Cau Chay River to increase their knowledge and capacity to be responsive to flood events</td>
<td>PPMU; Cost for implementation is part of the safeguard cost of the subproject</td>
</tr>
<tr>
<td></td>
<td>Ensure effective O&amp;M of the facilities</td>
<td>Dyke operator; Cost will be part of the operating cost</td>
</tr>
</tbody>
</table>

### V. SUBPROJECT MONITORING PROGRAM

This section describes the proposed monitoring program to be carried out during the implementation of the subproject. The program will include (a) monitoring of the safeguard performance of contractor and (b) monitoring effectiveness of the proposed mitigation measures. In this context, Subsection 5.1 briefly elaborates actions to be carried out while Subsection 5.2 describes scope of the monitoring program.

#### 5.1 Actions to be Taken during Subproject Implementation

The contractor will recruit a group of national consultants (the Environmental Contractor) to assist in the planning and implementation of safeguard measures to be carried out by the contractor, including preparation of the Contract Specific Environmental Plan (CSEP) and communication with local authorities and local communities. In particular, the Environmental Contractor would carry out the following tasks:
- Prepare a CSEP in compliance with the ECOP, identifying the impacts on safety of resident and general public, dust/noise suppression, waste management, and traffic congestion, etc.;
- Before the launch of the construction, confirm to the Construction Supervising Consultant (CSC) that all the safeguard issues related to the subproject during site clearance and construction have been addressed and CSEP have been approved by the concerned parties;
- During construction stage, monitor the compliance with the agreed environmental plan, and maintain close consultation with the community residents, and information disclosure and timely responsive to any possible complaints from residents and general public throughout the construction duration;
- At the completion of the construction, confirm the compliance with the agreed environmental plan, including re-vegetation and/or plantation of project area and inspect any damages incurred to be paid by the contractor. If necessary, prepare an order to compensate/restore the construction sites as specified in the contracts; and
- Prepare a periodical report to the contractor and the subproject owners as agreed in the CSEP.

During pre-construction, PPMU will carry out the following actions:
- Establish an environmental and social unit and assign at least one full time staff to be responsible for coordination and forging effective implementation of safeguard, including hiring of consultants to assist in the management and monitoring.
- In preparing detailed design, identify the required mitigation measures to be implemented to address the concerns from the affected population and key stakeholders and further reduce the negative impacts both from social and environmental aspects.
- In preparing the bidding document, include the ECOP (Annex 1) in the bidding and contract documents and ensure that the contractors are aware of the safeguard obligation and commit to comply. The Cost for mitigating the impacts during construction must be included as part of the subproject cost. The supervision and/or field engineers will be responsible for supervision and monitoring of safeguard performance of contractor and this responsibility will be included in the TOR for CSC and/or field engineers (see Annex 2);
- Implement RAP as soon as possible.

During construction, PPMU will assign the responsibility for day-to-day supervision and monitoring to the CSC and/or field engineers and the results will be included in the subproject progress report. The contractor will recruit a group of national consultants (the Environmental Contractor) to assist in the planning, implementation of safeguard measures to be carried out by the contractor, including preparation of the Contract Specific Environmental Plan (CSEP) and communication with local authorities and local communities. The Environmental Contractor will be responsible for monitoring the compliance with the agreed environmental plan and maintaining close consultation with the community residents, including ensuring timely information disclosure and responding to any possible complaints from residents and general public throughout the construction duration. At the completion of the construction, the Environmental Contractor will confirm the compliance with the agreed
environmental plan and inspect any damages incurred to be paid by the contractor. If necessary, prepare an order to compensate/restore the construction sites as specified in the contracts.

To mitigate the potential impacts during operation, a Community Engagement Program (CEP) will be carried out for the local communities located along the right bank of the Cau Chay River to increase their knowledge and capacity to be responsive to flood events. The activities will basically follow the CBDRM approach however scope of the activities will be designed in close consultation with local authorities and communities during the subproject implementation. The PESU assisted by consultants will be responsible for implementation of this program in close coordination with the implementation of the CBDRM Component 3. The implementation progress will be included in the subproject progress report.

5.2 Environmental Monitoring Program

The environmental monitoring program would comprise of monitoring of contractor performance and monitoring effectiveness of the proposed mitigation measures. Objectives and scope of the monitoring are described below.

a) Contractor performance monitoring

Monitoring by subproject owner: PPMU will monitor safeguard performance of contractor throughout the construction period. PPMU will assign the construction supervision consultant (CSC) to carry out the day-to-day monitoring in line with the subproject ECOP and the approved CSEP given due attention to also mitigate potential negative impacts of the proposed borrow pits on local environment and local people. A generic TOR for the construction supervising consultant is provided in Annex 2. PPMU will also assign the PESU and its provincial environmental management consultant (PEMC) to conduct monthly monitoring of the contractor performance.

Monitor by community: It is a normal practice in Vietnam that local community will also set up team to monitor potential negative impacts during construction. This is to ensure that the potential negative impacts are adequately mitigated from the local resident point of view. When the environmental deterioration happens, people and local administration will report to the project owner. For this subproject, it is anticipated that the local community will also monitor the contractor performance. Details discussion will be made before commencement of the construction of each contract. The PPMU will coordinate connection between the contractor and local community.

b) Monitoring effectiveness of the proposed mitigation measures

At the subproject level, the PESU assisted by the provincial environmental safeguard consultants (PEMC in Table 6.1 below) will periodically monitor performance of the proposed mitigation measures during the detailed design/bidding and construction stages in close consultation with local authorities and communities. If needed the mitigation measures could be modified in line with the actual impacts on the ground and/or agreements of key stakeholders. Results/records should be properly kept in the project file for possible review by CPMO and the WB. The PESU will also report the progress of the CEP implementation in the subproject progress report. Cost for the monitoring of the proposed mitigation measures will be part of the PPMU supervision cost. In parallel to this monitoring, the PPMU will also ensure compliance with the Government approval conditions according to the EIA regulation.
At the project level, the Central Environment and Social Safeguard Unit (CESU) of CPMO will also conduct a six month monitoring of the proposed mitigation measures for the subproject.

VI. IMPLEMENTATION ARRANGEMENT

6.1 Organization and Responsibilities

The subproject owner: Thanh Hoa PPMU is the subproject owner and will be responsible for ensuring effective implementation of safeguard measures and timely reporting the implementation progress. The PPMU will set up a Provincial Environment and Social Unit (PESU) comprising at least one full time staff to be responsible for forging effective implementation of safeguard measures.

The safeguard consultant: To ensure effective implementation of safeguard measures at the subproject level, a team of qualified national consultant (Provincial Environmental Management Consultant or PEMC) will be hired to assist the PPMU during the implementation of safeguard activities for all the subprojects to be implemented by Thanh Hoa PPMU under the project, including providing guidance on supervision and monitoring of contractors as well as safeguard training to PESU staff and field engineers.

The Central Project Management Office (CPMO): CPMO and its safeguard consultant will be responsible for periodic monitoring of safeguard measures for the subprojects, including providing clarification on issues related to safeguard policies and requirements and safeguard training to the subproject staff/consultant.

Other entities: The Provincial and District’s People Committees and the Department of Natural Resources and Environment and (DONRE) are responsible for ensuring full compliance of the Government’s regulations. It is also a normal practice in Vietnam that local community and/or social entities will also monitor the contractor performance as well as actual environmental and social impacts.

Key responsibilities of these stakeholders are listed in Table 6.1.

WB’s safeguard training. Given that World Bank safeguard policy and procedures are relatively new to the agencies and key stakeholders, CPMO will carry out special training on issue related to World Bank safeguard policies for Thanh Hoa PPMU and the subproject at least one time during the first two year. The training costs will be part of the CPMO management cost. If needed additional safeguard training can be provided at the subproject level and the training cost will be part of the subproject management cost.

Table 6.1: Institutional responsibilities for the Subproject

<table>
<thead>
<tr>
<th>Organizations</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPMO</td>
<td>Periodically monitor performance of the subproject and include the safeguard performance in the project progress report and be the overall contact point with the World Bank. CPMO will be assisted by a team of qualified consultant at project level (CEMC).</td>
</tr>
<tr>
<td>Role</td>
<td>Responsibilities</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PPMU</td>
<td>As the subproject owner, Thanh Hoa PPMU is responsible for implementation of all the EMP activities to be carried out under the Project, including fostering effective coordination and cooperation between contractor, local authorities, and local communities during construction phase. PPMU will be assisted by a team of qualified consultants at subproject level (CSC and PEMC), the environmental staff, and/or field engineer.</td>
</tr>
<tr>
<td>Provincial Environmental staff (ESU) and Provincial Environmental Management Consultant (PEMC)</td>
<td>Assist PPMU in the implementation of the EMP, including training of field engineers and supervision of contractor monitoring and water quality monitoring.</td>
</tr>
<tr>
<td>CSC and/or Field engineer</td>
<td>Assist PPMU in the day-to-day supervision of contractor performance in line with the ECOP, including reporting and maintain close coordination with local community.</td>
</tr>
</tbody>
</table>
| Contractor                          | Take actions to mitigate all potential negative impacts in line with the objective described in the ECOP and the approved CSEP.  
- Actively communicate with local residents and take actions to prevent disturbance during construction.  
- Ensure that at least a staff is assigned to monitor the CSEP compliance during the site clearance and construction periods.  
- Ensure all the construction activities having sufficient documents from the related organization.  
- Ensure that all staff and workers understand the procedure and their tasks in the environmental management program.  
- Report to the PPMU on any difficulties and their solutions  
- Report to local authority and PPMU if environmental accidents occur and coordinate with agencies and keys stakeholders to resolve these issues |
| Local community                     | Community: According to Vietnamese practice, the community has the right and responsibility to routinely monitor environmental performance during construction to ensure that their rights and safety are adequately protected and that the mitigation measures are effectively implemented by contractors and the PPMU. In case of unexpected problems, they will report to CSC/PPMU. |
| Women Union and other mass organizations | These organizations could play a role as a bridge between the PPC/DPC, communities, contractors, and PPMU by assisting in community monitoring,  
- Mobilizing communities participation in the subproject, providing training to communities, and  
- Participating in solving environmental problems if any. |
6.2 Monitoring and Reporting

Field engineer and construction supervising consultant will report the safeguard performance of the contractor as part of the contract's progress report to the PPMU. The PPMU will submit a progress report to CPMO periodically, including the progress on the implementation of the safeguard performance of the contractor and the progress on the CEP implementation. CPMO will submit the following reports to WB: (a) Semi-annual progress report, including; (b) Mid-term Review Report; and Annual Environmental and Social Safeguard Monitoring Report, and the reports will also include the progress on safeguard implementation and performance of contractors. Frequency of reporting is illustrated in the Table 6.2 below.

Table 6.2 Reporting procedure

<table>
<thead>
<tr>
<th>Report Prepared by</th>
<th>Submitted to</th>
<th>Frequency of Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Contractor to the Employer</td>
<td>PPMU</td>
<td>Once before construction commences and monthly thereafter</td>
</tr>
<tr>
<td>2 Construction Supervision Consultant</td>
<td>PPMU</td>
<td>Monthly</td>
</tr>
<tr>
<td>4 Community Monitoring (if available)</td>
<td>PPMU</td>
<td>If any complains</td>
</tr>
<tr>
<td>5 PPMU</td>
<td>CPMO</td>
<td>Six-monthly</td>
</tr>
<tr>
<td>6 CPMO</td>
<td>WB</td>
<td>Six-monthly</td>
</tr>
</tbody>
</table>

6.3 Budget Arrangement

Budget arrangement will be as follows:

- Cost for implementation of mitigation measures during construction, including training on environmental management for workers, consultation with local communities and water users, environment quality monitoring, sediment analysis, and compensation to damage (if any) will be part of the subproject construction cost. This cost will be included in the contract with the contractor and is expected to be 1% of the construction cost.
• Cost for the day-to-day supervision of contractor’s safeguard performance by the CSC as well as cost for periodic monitoring at the subproject level will be part of the subproject supervision cost. This cost is expected to be 1% of the construction cost.

• Cost for periodic monitoring at the project level will be part of the project management of CPMO;

• Cost for the implementation of the CEP will be part of the subproject mitigation measures cost and a budget of $50,000 has been allocated for the subproject. This cost is included in Component 3 of the Project;

• Cost for periodic supervision and monitoring at the project level will be part of the project management cost of CPMO.

• Budget for safeguard training of staff will be part of the subproject management cost.

6.4 Consultation and Information Disclosure

Consultation was made during the preparation of the EMP. The EMP will be translated into Vietnamese language and disclosed in the country at CPMO as well as in the Thanh Hoa province.

During detailed design and before bidding, the PPMU of Thanh Hoa will consult with the local authority and community and inform them of the status of the subproject and measures that have been and will be carried out to mitigate the potential negative impacts. If necessary, mitigation measures should be adjusted suitably based on meeting opinions and mitigation plan will be announced to local community. Implementation result will be included in the progress report of the subproject.
ANNEX 1: STANDARD ENVIRONMENTAL CODES OF PRACTICE (ECOP) FOR THE SUBPROJECT

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  4.3 Coordination with Government Authorities and the Public
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V. Management of Construction
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  5.4 Management of Stockpiles, Quarries, and Borrow pits.
  5.5 Management of Dredging
  5.6 Monitoring of Potential Impacts
I. Introduction

1. Objective. This Environmental Code of Practices (ECOP) was prepared to guide the planning and implementation of the mitigation measures to be carried out by Contractor during construction. It sets out standard practices and procedures for managing the potential negative impacts on local environment and local communities of all civil works to be carried out under the Project. The ECOP will be included as a separate annex in all bidding and contract documents and the field engineers and supervisor will be assigned the responsibility to ensure compliance and reporting. The Contractor will be made aware of and commit to this obligation and know that cost for implementation of the measures is part of the construction cost.

2. Scope and application. This ECOP will be applied to all the subprojects to be implemented under Component 4. For the sake of clarity, “construction” in this document includes all site preparation, demolition of structures, spoil disposal, materials and waste removal and all related engineering and construction activities.

II. Relevant World Bank’s Safeguard Policies and Government’s Regulations

3. World Bank’s safeguard policies. This ECOP is prepared to satisfy the WB safeguard requirements under OP4.01 (EA) which requires planning, implementation, and monitoring of the mitigation measures during construction.

4. GOV’s regulations. There are a number of GoV regulations, standards, code of practices, etc. related to environmental and safety that are relevant to construction activities and environmental quality. In addition to the main laws and regulation outlined in the Environmental and Social Management Framework, the ones related to environmental quality and safety are listed below (not exhaustive) and have to be closely observed:

Water environment
- QCVN 01:2009/BYT: National technical regulation on drinking water quality
- QCVN 02:2009/BYT: National technical regulation on domestic water quality
- QCVN 08:2008/BTNMT: National technical regulations on surface water quality
- QCVN 09:2008/BTNMT: National technical regulations on groundwater quality
- QCVN 10:2008/BTNMT: National technical regulations on quality of coastal water
- QCVN 14:2008/BTNMT: National technical regulations on quality of domestic wastewater
- TCVN 5502:2003: Supplied water – Requirements for quality

Soil environment
- QCVN 03:2008/BTNMT – National technical regulation on the allowable limits of heavy metals in the soils;

Air environment
- QCVN 05:2008: Air quality – Standards for ambient air quality
- QCVN 06:2008: Air quality – Maximum allowable concentration of hazardous substances in the ambient air.
- TCVN 6438:2001: Road vehicles – Maximum permitted emission limits of exhausted gases
- QCVN 07:2009: National technical regulations for classification of hazardous wastes

**Vibration and Noise**
- TCVN 5949:1998/Acoustics - Noise in public and residential areas - Allowable level

**Labor Health and Safety**

Moreover, regarding planning and design of infrastructure, operation and management of the water supply systems, and water source option to serve domestic water supply systems the following standards are used:
- Decision No.628/BXD-CSXD of the Ministry of Construction (MOC) dated 14th December 1996: Vietnamese Construction Regulations and Standards;
- Design standards No. 20TCN-33-85 for water supply projects;
- Instructions for preparation and approval of town construction planning of MOC in 1998;
- Construction standard TCXD No.66:1991 on Operation of water supply and drainage systems - Safety requirements;
- Construction standard TCXD No. 76:1979 on Procedures for technical management in operation of water supply systems; and
- Construction standard TCXD No.233:1999 on criteria used for choosing surface water, groundwater sources to serve domestic water supply system.

### III. Responsibilities

5. The subproject owner (PPMUs) and the contractor are the key entities responsible for implementation of this ECOP. Key responsibilities of the subproject owners and the contractors are as follows:

(a) **Subproject owner**

- General: The subproject owner (PPMUs) on behalf of the Central Project Management Office (CPMO) is responsible for ensuring that the ECOP is effectively
implemented. The subproject owner will assign a group of qualified staff to be responsible for preparation and management of environmental and social safeguard of the subproject throughout its life, including supervision of contractors. The subproject owner is responsible for preparing the safeguard reports and submitting to the CPMO.

- During construction, the subproject owners will assign the Construction Supervision Consultants (CSCs) and/or field engineer to be responsible for monitoring and supervision of the compliance of the contractors to fulfill the agreed CSEP (see below). Responsibilities of the CSCs would include the following: (a) monitoring the contractors’ compliance with the environmental plan, (b) taking remedial actions in the event of non-compliance and/or adverse impacts occur, (c) investigating complaints, evaluating and identifying corrective measures; (d) advising to the Contractor on environment improvement, awareness, proactive pollution prevention measures; (f) supervising the Contractor’s activities in responding to the complaints; (g) providing guidance and on-the-job training to field engineers on various aspects to avoid/mitigate potential negative impacts to local environment and communities during construction.

(b) Contractors

- Contractors have the responsibility of carrying out contracted works through fulfilling the agreed CESP (Contract Environmental Specification Plan as defined in General Provisions below). In doing so, the contractors will establish and maintain contact with the subproject owner and local residents, and keep them informed of construction matters likely to affect them. This may include regular and frequent distribution of newsletters and attendance at meetings at the request of the subproject owner with representatives of local residents groups.

- Contractors will provide information and reporting telephone “Hot Line”, staffed at all times during working hours. Contact details should be prominently displayed at the sites. Information on the construction progress, including the projected activities that might require closure of traffic or may cause safety risk should be timely provided.

- Contractors have the duty to secure appropriate permits and licenses before undertaking the works or moving heavy equipment. It is the responsibility of the Contractors to monitor the development and implementation of new environmental legislation and regulation and to use the appropriate standards prevailing at the time of awarding contracts. Contractors must comply with all prevailing legislation at the time of construction, including any requirements under health and safety.

IV. General Provisions

4.1 Contract Specific Environmental Plan (CSEP)

6. Contractors will be required to prepare a CSEP describing how the Contractor intends to operate construction at works sites as well as other specific measures necessary to avoid and/or reduce the potential negative impacts as required in the ECOP, especially those related to management of the construction site; transportation of construction materials, especially dredge materials; control of dust, noise, and vibration; solid and liquid waste management; and public health. Given different scope and nature of civil works, scope and nature of the
CSEP could be differ and all the CSEP will be reviewed and approved by the EMC to be assigned by the subproject owner.

4.2 Non-compliance Reporting Procedures

7. Contractors must comply with the CSEP, and must ensure that their Sub-Contractors (if any) also comply with it. To ensure that necessary action has been undertaken and that steps to avoid recurrence have been implemented, the EMCs and/or Contractors must advise the subproject owner within 24 hours of any serious incidents of non-compliance with the CSEP that may have serious consequence. In the event of working practices being deemed dangerous either by the subproject owners, the local authorities, or the other concerned agencies, immediate remedial action must be taken by the Contractors. The Contractors must keep records of any incidents and any ameliorative action taken. The records on non-compliance that could be practically addressed (not cause serious impacts) should be reported to the subproject owner on a monthly basis.

8. The Contractor will be responsible for dealing with any reports forwarded by the subproject owner. Police or other agencies by (following instruction from the subproject owner representative as appropriate) as soon as practicable, preferably within one hour but always within 24 hours of receipt by either the Contractor. The EMCs will monitor and ensure that the Contractor has taken appropriate action. Where appropriate, approval remedial actions may require an agreement from the local authorities and/or other GOV agencies. Procedures should be put in place to ensure, as far as is reasonably practical, that necessary actions can be undertaken to avoid recurrence and/or serious damage.

4.3 Liaising with Authorities and the Public

9. Prior to the commencement of subproject activities and throughout the construction duration, the Contractors will work closely with the local authorities and other agencies to ensure full compliance with GOV regulations and will also provide adequate information on the Project to the General Public, especially those that may cause public safety, nuisance, and sensitive areas and the locations of storage and special handling areas.

10. The Contractor will provide information and reporting telephone “Hot Line” staffed at all times during working hours. Information on this facility shall be prominently displayed on site hoardings.

4.4 Community Relations

11. Contractors will assign a community-relation personnel, who will be focused on engaging with the community to provide appropriate information and to be the first line of response to resolve issues of concern. Contractors will take reasonable steps to engage with residents of ethnic minority backgrounds and residents with disabilities (or other priority groups as appropriate), who may be differentially affected by construction impacts.

12. Contractors will ensure that local residents nearby the construction sites will be informed in advance of works taking place, including the estimated duration. In the case of work required in response to an emergency, local residents shall be advised as soon as reasonably practicable that emergency work is taking place. Potentially affected residents will also be
notified of the ‘Hotline’ number, which will operate during working hours. The “Hotline” will be maintained to handle enquiries regarding construction activities from the general public as well as to act as a first point of contact and information in the case of any emergency. All calls will be logged, together with the responses given and the callers’ concerns action and a response provided promptly. The helpline will be widely advertised and displayed on site signboards.

13. The Contractor respond quickly to emergencies, complaints or other contacts made via the ‘Hotline’ or any other recognized means and liaise closely with the emergency services, local authority officers and other agencies (based on established contacts) who may be involved in incidents or emergency situations.

14. The Contractor will manage the work sites, work camps, and workers in a way that is acceptable to local residents and will not create any social impacts due to workers. Any construction workers, office staff, Contractor’s employees, or any other person related to the Project found violating the “prohibitions” activities listed in Section A2 below may be subject to disciplinary actions that can range from a simple reprimand to termination of his/her employment depending on the seriousness of the violation.

4.5 Mitigation Objectives and Special Considerations

15. Main objective of this ECOP is to minimize the potential negative impacts during construction on local environment, local community, and human and environmental safety and disturbance. The Contractor is expected to implement the activities in line with the following approach as much as possible in close consultation with the supervision and/or field engineers who will be assigned by PPMU to supervise the contract. Key approaches include, but not limited, to:

- Minimize impacts and restore damages;
- Replanting trees in project areas;
- Control erosion and sedimentation during construction;
- Proper control of suspended solids during dredging;
- Use main roads when possible;
- Heavy traffic restrictions;
- Control (collection, disposal) of wastes (solid and liquid);
- Minimize disturbance to local population; Frequent meetings with local people and provision of timely and adequate information to the project affected peoples (PAPs) so that their living and production conditions could be managed;
- Engage and provide labour opportunity for local population;
- Application of proper safety and warning measures in the construction sites, especially in dredging activities;
- Provision of temporary crossings and bridges during construction of bridges; Application of proper safety and warning measures;
- Conduct public information campaign and outreach program, including training and capacity building.

4.6 Implementation of “Chance Find” Procedures
16. If Contractors discovers archeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the Contractors will carry out the following steps:

- 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. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the National Culture Administration take over;
- Notify the supervisory Project Environmental Officer and Project Engineer who in turn will notify the responsible local authorities and the Culture Department of Province immediately (within 24 hours or less);
- Responsible local authorities and the Culture Department of Province would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archeologists of National Culture Administration. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;
- Decisions on how to handle the finding shall be taken by the responsible authorities and Culture Department of Province. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage;
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities; and
- Construction work could resume only after permission is given from the responsible local authorities or Culture Department of Province concerning safeguard of the heritage.

4.7 Prohibitions

17. The following activities are prohibited on or near the Project sites:

- Cutting of trees for any reason outside the approved construction area; Hunting, fishing, wildlife capture, or plant collection; Buying of wild animals for food; Having caged wild animals (especially birds) in camps; Poaching of any description; Explosive and chemical fishing; Disturbance to anything with architectural or historical value;
- Building of fires; Use of unapproved toxic materials, including lead-based paints, asbestos, etc.; Use of firearms (except authorized security guards); Use of alcohol by workers in office hours; Driving in an unsafe manner in local roads;
- Washing cars or machinery in streams or creeks; Maintenance (change of oils and filters) of cars and equipment outside authorized areas; Creating nuisances and disturbances in or near communities; Disposing garbage in unauthorized places; Indiscriminate disposal of rubbish or construction wastes; Littering the site; Spillage of potential pollutants, such as petroleum products; Collection of firewood; Urinating
or defecating outside the designated facilities; and Burning of wastes and/or cleared vegetation.

V. Management of Construction

5.1 Management of Construction Sites

18. This section outlines the requirements relating to site management practices that should be implemented during site operation. These relate to working hours, site layout and appearance and good housekeeping as well as operations of equipment and vehicles. Monthly inspection/meeting should be conducted to ensure that these procedures are adhered to. The Contractor must follow a ‘good housekeeping’ policy at all times. The site should be cleared by the Contractor on completion of the construction.

19. The Contractor is required to minimize, as far as reasonably practicable, any adverse environmental impact of their construction activities. All appropriate licenses and consents in respect of site operations will be timely secured. Key measures are as follows:

(i) General requirements on construction sites. A construction site must satisfy the following requirements

- **Site layout.** The overall site layout must be designed and approved under regulations to suit the construction location, the site’s area, natural and climate conditions in the place of construction, facilitate the construction and ensure safety for human, machines and equipments at the construction site and the surrounding areas affected by construction activities.

- **Site arrangement.** Supplies and materials are placed neatly according to the approved overall plan design. Supplies, materials and obstacles are not placed on roads, emergency exits or fire entrances. Flammable and explosive material warehouses are not arranged near the place of construction and tents. Waste materials are removed and discharged in prescribed places. Water drainage systems are regularly cleared to ensure that the construction ground is always dry.

- **Signs.** At the construction site there are signs according to Article 74 of the Construction Law. At the main entrance, a plan of the overall ground of the construction site and working regulations is displayed. Safety measures and rules are publicized at the construction site for compliance. At dangerous places at the construction site, such as trenches and foundation pits, there are fences, warning signs and instructions for accident prevention. At night, signal lights are turned on.

- **Good housekeeping:** The Contractor will follow a ‘good housekeeping’ policy at all time for the workers and the surrounding environment. This will include, but not necessarily be limited to the following: dust and noise control; waste treatment, keeping the site clean and tidy. To sites located near residential areas, wastes must be covered and collected and properly disposed off. Construction and waste materials during transportation must be properly covered to ensure safety and environmental sanitation. In case the Contractor does not comply with environmental protection regulations, the project owner and environmental authorized state agencies will have the power to suspend the construction operations. Persons responsible for adverse
environmental impacts during the construction will be held responsible and compensate for any damages caused at his fault.

- **Power safety:** Motive and lighting power grids at the construction site are separate and installed with general circuit-breakers and sectioned circuit-breakers for cutting off power in part or the whole of the construction area. Ensure power safety for workers, construction machines and equipment at the construction site. Electric equipment are safely insulated during the construction process. Workers are guided on power safety techniques and ways to give first aid to persons who get electric shock in power accident.

- **Fire and explosion safety:** The Subproject Management Unit needs to set up a commanding board for fire and explosion prevention and fighting at the construction site, which has its own working regulations on its specific duties and powers. Fire and explosion prevention and fighting plans are appraised and approved under regulations. The contractor organizes a fire and explosion prevention and fighting brigade which has its own working regulations on its specific duties and tasks. At the construction site, local fire fighting equipments are arranged. At fire-prone places, inflammable signboards and fire fighting and alarm equipment are installed to promptly detect fires and take remedies.

(ii) **Requirements during construction.** During construction, the following requirements must be satisfied:

- **Working hours:** Core working hours will be from 08:00 to 18:00 on weekdays and 08:00 to 13:00 on Saturday. Individual site requirements which differ from the above will be considered on a site by site basis. Noisy operations shall not take place outside these hours without prior approval from the subproject owner. All construction related traffic will abide by the agreed hours of working for each site. Any exemption will require an agreement with the Subproject owner, subproject, and/or local authorities.

- **Before starting construction,** an approved design of construction measures is required, including labor safety solutions for workers and construction machines and equipment for each job, which has explanations about technical and use instructions.

- **During construction,** the approved design as well as regulations, standards and technical processes are complied with. Jobs dependent on the quality of previous jobs are performed only after the previous jobs have been tested to meet quality requirements under regulations.

- **Construction measures and safety solutions** are periodically or extraordinarily examined for modification according to practical conditions at the construction site.

- **Organizations and individuals** are fully capable in the jobs they perform under regulations. Operators of construction machines and equipment and performers of jobs with strict labor safety requirements are trained in labor safety and possess labor safety cards under regulations.

- **Construction machines and equipment** with strict labor safety requirements are inspected by and registered with competent agencies under regulations for operation at the construction site. During operation, they comply with safety processes and measures. If construction equipment is operated outside the construction site, the investor approves safety measures for construction-affected people, machines,
equipment and works inside and outside the construction site. If due to construction conditions, equipment have to be placed outside the construction site and while not in operation, if they operate outside the construction site, such is permitted by authorized agencies under local regulations.

- Workers at the construction site are provided with medical checks-up and safety training and adequate personal safety equipment under the labor law.

(iii) Clearance and rehabilitation of construction site after completion:

- On completion of the works the Contractor will clear away and remove all materials and rubbish and temporary works of every kind. The site will be left clean and in a condition to the satisfaction of the PPMU. Any potentially hazardous defects to the works will be made good, prior to permanent reinstatement

5.2 Management of Environmental Quality

(a) Water quality

20. The Contractor must take all the efforts to prevent wastes (solid and liquid) discharge into all rivers and coastal water and to protect surface and groundwater from pollution and other adverse impacts including changes to water levels, flows and general water quality. Discharge of engine oil and oily waste from dredgers and construction machines to the rivers will be strictly prohibited. Engine oil, used oil, and other toxic substances and hazardous wastes must be properly collected, stored, treated, and/or disposed off. Key measures are as follows:

- Used oil/engine oil: The oil container at the construction site (especially when the site is located less than 10 meters from the waterways) must be of sufficient strength to ensure to prevent leakage. The container must be situated within a secondary containment system (bundled), which will prevent the release of any leaked oil. The Contractor must make provisions to ensure that all hazardous substances including oil drums or containers on site are properly labeled and properly stored and that no oil or other contaminants are allowed to reach water courses or groundwater.

- Wastewater from sites: Whenever possible, the Contractor must minimize the amounts of wastewater that need to be discharged and find alternative means of disposal. The Contractor will ensure that any seepage and wastewater arising from the works and camp sites must be collected and discharged via a settlement tank. The standards for wastewater treatment prior to discharge must be agreed in advance with the ESA. Contaminated water or water of an uncertain quality must be discharged into sewers by tankers or other approved means of disposal.

- Drainage. Water drainage must be designed to avoid stagnant conditions that could create bad smell and unsanitary condition. The Contractor must agree with the ESA in advance, details of the methodology to be employed, prior to commencement of the construction. Particular attention must be given to regular pest control treatment (particularly rats and flies); removal of sludge and other debris after drainage; reducing smell nuisance from sludge and algae by measures including deodorizing, hosing down etc. Safety measures must also be taken to protect both the general public and employees and to prevent fly-tipping and illegal access during the development works.
- Water quality monitoring: The Contractor must ensure continuous compliance with all the above conditions under the monitoring of the Subproject Owner and/or field engineer, including undertaking water quality monitoring at specific sites and are in compliance with government regulation related to wastewater management and water quality monitoring.

(b) Dust, noise, vibration

21. The Contractor must take all the efforts to control dust, noise, and vibration levels from the site, as far as is reasonably practicable. Excessive noise/vibration generation activities must be in accordance with GOV standards. For critical areas, the Contractor may be required to conduct noise measurement in close consultation with the local residents and establish appropriate measures to control and manage noise level. Measures for reducing dust and other air pollution, noise, and vibration are provided as follows:

- Inform the residents: Prior to commencement of work at any site, the Contractor will be required to inform the local authority and residents regarding the construction plan and potential noise and vibration that may occur from the construction activities, including measures to reduce noise and vibration.

- Dust control: The Contractor will ensure that no burning of waste materials on site; adequate water supply is available on site; dry sweeping of large areas is not allowed; Cover all trucks carrying loose or potentially dusty materials (soil, mud, etc.) to and from construction site; Water or sprinkle the construction areas periodically, especially at site located near residential area; avoid overloaded of trucks; routinely clean public roads and access routes; Ensure vehicles working on site have exhausts positioned such that the risk of re-suspension of ground dust is minimized (exhausts should preferably point upwards), where reasonably practicable; Control driving speed on un-surfaced haul routes and work areas; Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; Mix large quantities of cement, grouts and other similar materials in designated areas; Store materials with the potential to produce dust away from site boundaries where reasonably practicable; Minimized the amount of excavated material held on site; Sheet, seal or damp down unavoidable stockpiles of excavated material held on site, where required; Seal or re-vegetate completed earthworks as soon as reasonably practicable after completion.

- Care must be undertaken during the transportation of dredge spoil to and from the construction site; the spoil must be covered at all time. Fly-tipping will not be permitted. Loads must only be deposited at designated sites. The Contractor will be responsible for all the trucks delivering to, or exiting from, a worksite and will clean up all damage that may occur to public road and other public facilities. Care should be taken when loading or unloading vehicles or dismantling scaffolding or moving materials to reduce impact noise. Loading or unloading bays may have to be housed in suitable acoustic enclosures.

- The installation of sheet piling with a diesel or air driven impact or drop hammer may not be acceptable on some of the sites. Use of hydraulically operated or vibratory hammers may be necessary in these circumstances to drive and extract sheet piling.
provided the soil strata are suitable for such equipment. Where practicable, rotary drills and busters actuated by hydraulic or electrical power should be used for excavating hard material. Noisy plant or equipment will be sited as far away as is practicable from noise sensitive buildings. The use of barriers, (e.g. soil mounds), site huts, acoustic sheds or partitions to deflect noise away from noise sensitive areas must be employed wherever practicable.

- The Contractor will be obliged to comply with the vibration levels established by agreement with the ESA on a site by site basis given due attention to minimize human exposure (1 Hz to 80 Hz) and protection of damage to nearby structures.

**d) Solid waste control and treatment**

1. **Solid wastes from subproject construction activities.** The subproject construction activities will generate a big amount of escaped soil and stones, cement bags and other surplus materials (oily wastes, miscellaneous woods, etc.). Although solid wastes discharged in this stage are not toxic or dangerous (except for some oily wastes such as oily cloths after cleansing machines and equipments, etc.), proper measures for waste collection and treatment are required to avoid contaminating the environment and affecting local landscape. The Contractor must make a commitment to collect all escaped soil and stones and transport to designated areas or reuse them for dyke/road construction. Bags and other solid wastes will be collected for recycling or burning or taken to temporary dumps in the area (solid wastes disposed at these temporary dumps must be buried or covered in a sanitary way). In addition, during subproject construction, uncontrolled discharging of solid wastes into the environment needs to be minimized to reduce impacts to environmental landscape, transportation and daily activities of local residents, and the environment (water quality, soil quality and natural habitats).

2. **Domestic solid wastes.** During subproject construction, the Contractor must carry out appropriate measures for waste collection and treatment. The domestic wastes will be collected in plastic or wooden bins with lids placed in convenient places and in worker canteens. Periodically, at appropriate time, transport those bins to the dumping lot (the Contractor will select a proper location for the dumping lot, at least 500 m away from residential areas, 200 m away from work camps and surface water sources, and not in the prevalent wind direction of the area) to dispose of the wastes, from which the local Urban Environmental and Construction Company will be hired to carry out proper removal and treatment. The Contractor must sign a contract with the Urban Environmental and Construction Company to collect and treat solid wastes generated during the subproject construction. In case the wastes cannot be transported to the dumping lot (for example, due to lack of appropriate transport route), wastes must be buried at temporary dumps in the project area in a sanitary way – a waste layer covered by a layer of soil, and when the dump is filled, it is covered by a soil layer about 50 cm thick. Temporary dumps must be located at least 500 m away from residential areas, 200 m away from work camps and surface water sources, and not in the prevalent wind direction of the area. Upon completion of works, cover the entire temporary dumps with soil, ensure land and landscape restoration for the subproject area.

**d) Traffic and Transportation**
The Contractor will be required to use designated construction traffic routes as directed by the local authorities and the Police. The number of truck movements, hours of operation and any truck holding areas will be agreed in advance with the local authority and the Police. Plans will be required for each site showing the site entrances/exits and the agreed access roads for use to the nearest main road, and the routes to be used by truck to and from the strategic road network.

- The Contractor will maintain an up to date log of all drivers that will include a written undertaking from them to adhere to the local authority’s approved routes for construction traffic. In the case of non-compliance, the Contractor and/or their sub-contractor(s) would be in breach of contract, necessitating disciplinary action against individual drivers.

- The Contractor may be required to provide truck stickers uniquely identifying the group of construction sites included in each contract, details of which shall be submitted to the local authority for approval. For identification purposes the Contractor will fix these in a prominent position on all trucks frequently serving the construction site. The identification will need to be sufficiently large to be easily read from a distance of 20 meters. Trucks waiting to enter or leave the site must switch off their engines to avoid unnecessary engine noise and emissions. Restrictions on the size and weight of vehicles accessing each site may be imposed depending on agreed access routes.

- For construction that interference with a carriageway or footway, the Contractor will inform the local authorities, responsible agencies, and local residents before commencing the works and proposed measures to minimize the safety risk and inconvenience to the public. All necessary consents and licenses must be obtained in advance. The safety of the public must be ensured. In the case of temporary footways, reasonable access shall be provided for people in accordance with the following requirements: (a) Any temporary footways and carriageways will be constructed to the reasonable requirements of the local authorities and should have uniform surfaces as much as possible; (b) Clear signing must be provided at all times for pedestrian routes with the minimum number of changes to all temporary layouts in order to reduce confusion. Advance warning should, if possible, indicate alternative existing wheelchair-accessible routes; (c) After completion of the works all materials arising from the works will be cleared from the highway leaving the same in a clean and tidy condition to the reasonable requirements of the local authorities; and (d) The Contractor will be responsible for any damage caused by their activities to the roads and public facilities in the vicinity of the worksite. Any defects caused by the Contractors must be rectified immediately if dangerous or otherwise within 24 hours.

- Any street furniture (electrical or non electrical) cannot be removed or relocated by the Contractor or any of its sub-contractors without written agreement from the responsible agencies.

(d) Excavation Materials and Demolition Materials

3. Earth excavation must be carefully handled to reduce dust and possible obstruction and causing nuisance and health impacts to local residents. Excavation that affects public roads (such as pipeline and bridges) must be properly planned in consultation with local authority and informed to the residents in advance. All dredged spoils as well as excavation materials will be reused for dyke/road construction and/or land
filling at or nearby the work site. Demolition materials must be properly disposed off. The Contractor must consult ESA on the final selection of disposal sites and methods.

(f) Protection of natural habitats

4. During the construction stage, if mitigation measures of air, noise, water and soil pollution, the project will create negative impacts on the growth and development of some animal and plant species in the area, especially aquatic species. Proposed mitigation measure is to develop a detailed plan and speed up the construction progress. The Contractor must observe the national and local regulations and policies related to protected areas/species, wildlife sanctuaries. No trees in sensitive areas shall be cut without obtaining prior agreement with the authorities. Strengthen monitoring the contractor’s compliance with environmental protection commitments. In addition, organize training courses to improve environmental protection awareness of the staff and local communities.

5.3 Management of Work Camp

27. The Contractor will consult with local authority regarding the location of the worker camps and will provide appropriate water supply, garbage collection, toilets, mosquito net, and other health protection measures to all workers. Fishing, wildlife hunting, and other social disturbance to local societies are prohibited. Training of workers on safety, good hygiene, and prohibitions activities is required. Detail measures as follow:

(i) During the preconstruction stage:

- Contractor will consult with local authority and subproject management unit regarding the location of the worker camps

- Once work camp location is identified, the Contractor will set up temporary accommodation for all the workers throughout the construction or maintenance period. In terms of supply and storage of domestic water at the work camp area, the Contractor will comply with the following requirements: (a) Provide adequate drinking water supply for the work camps in appropriate tanks/containers. The Contractor will identify appropriate public water source for drinking in consultation with the local authority; (b) in case no appropriate source of water is identified, the Contractor will take water from other sources which will be tested and treated before supplied to the work camps; (c) All water supply and storage areas must be away from the wastewater storage area, drainage system or other sources of contamination according to the regulations. Water from drains or contaminated water must not be used as domestic water at the site.

- At all construction sites, facilities for washing and necessary and appropriate tools must be provided by the Contractor. Bathrooms must be provided separately for male and female workers. Such facilities must ensure convenience for use and cleaning.

- Waste discharges, wastewater must be properly collected and disposed off.

- First aid/Emergency aid kit. The first/emergency aid kit must be available at the work camp area and managed by a responsible person. This person must
be trained on emergency/first aid. Injured or seriously sick people must be taken to the nearest hospital.

- Community relations. The Contractor will ensure that conflicts between the workers and local population are avoided.

(ii) Construction stage:

- Work camps must be kept clean and tidy, unaffected by oil spill and construction wastes. Any oil spilt or leaked must be cleaned immediately to avoid soil and water contamination. Some actions to carry out are as follow:
  (a) avoid oil leakage into surface water or groundwater; (b) wastewater must not be disposed directly to natural water areas; (c) solid waste materials are removed and discharged in prescribed places at frequent intervals; (d) First/Emergency aid supplies and materials and cleaning tools are regularly provided.

- PPMU will monitor the housekeeping of work camp areas and ensure these areas are kept clean throughout the construction period.

(iii) Construction completion.

- During this stage, all work camps and facilities will be cleared away and removed from the site. The site will be rehabilitated to ensure the operation of the works.

5.4 Management of Stockpiles, Quarries, and Borrow Pits

28. Commercial quarries and borrow pits approved by local environmental agencies should be used as much as possible. If non-commercial quarries and/or borrow pits are used, in consultation with the Construction Management Consultant (CSC) and/or field engineers, the Contractor will comply with the following requirements:

- Large-scale borrow pits or stockpiles will need site-specific measures that go beyond those required in this ECOP.

- All locations to be used must be previously identified in the approved construction specifications. Sensitive sites such as scenic spots, areas of natural habitat, areas near sensitive receptors, or areas near water should be avoided.

- An open ditch shall be built around the stockpile site to intercept wastewater.

- Stockpile topsoil when first opening a borrow pit and use it later to restore the area to near natural conditions.

- If needed, disposal sites shall include a retaining wall.

- If the need for new sites arises during construction, they must be pre-approved by the responsible local authorities.

- If landowners are affected by use of their areas for stockpiles or borrow pits, they must be included in the project resettlement plan.

- For any stockpile, quarry, or borrow pit sites involved in this project, but not to be used afterwards. The contractor will prepare and implement a Contract Specific
Environmental Plan (CSEP) in compliance with the ECOP that includes management of borrow pits and their closure plans.

- If access/rescue roads are needed, they must have been considered in the environmental assessment. The alignment for each of these roads must be clearly determined with its impacts and mitigation measures.

5.5. Monitoring of Potential Impacts

31. The Contractor will be required to carry out the following monitoring program and a monitoring plan will be included as part of the CSEP:

<table>
<thead>
<tr>
<th>IMPACT</th>
<th>PARAMETERS</th>
<th>EXAMPLE LOCATIONS</th>
<th>FREQUENCY</th>
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<td>Air emissions</td>
<td>Dust level</td>
<td>Vicinity of clearing works</td>
<td>In windy conditions</td>
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<td>Noise and vibration generation</td>
<td>Noise levels to meet TCVN/QCVN requirements</td>
<td>In the vicinity of sensitive receivers</td>
<td>In response to complaints</td>
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<td>Erosion and sedimentation</td>
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<td>Erosion and sediment controls</td>
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<td>Surface water quality deterioration</td>
<td>TSS, pH, BOD, salinity, coliform</td>
<td>Upstream and downstream of dredging and/or construction works, especially when other beneficial uses (aquaculture, water supply sources, etc.) are located.</td>
<td>Regularly during construction works</td>
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ANNEX 2: GENERIC TOR FOR CONSTRUCTION SUPERVISION CONSULTANT (CSC)

General

In order to prevent harm and nuisances on local communities, and to minimize the impacts on the environment during the construction of the civil works under the CRSD, Environmental Code of Practices (ECOPs) and subproject EMP (if available) have been prepared and should be adhered to the Contractors and his employees.

The Construction Supervision Consultant is to provide professional technical services ("the Services") to help ensure effective implementation of the ECOP and subproject EMPs.

Scope of Services:

The general services to be provided by the CSC are to inspect, monitor the construction activities to ensure that mitigation measures adopted in the ECOPs/EMP are properly implemented, and that the negative environmental impacts of the project are minimized.

On behalf of the PPMU, the CSC will conduct the following tasks:

- Conduct regular site inspections;
- Review the status of implementation of environmental protection measures against the EMP and contract documents;
- Review the effectiveness of environmental mitigation measures and project environmental performance;
- As needed, review the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions. Where necessary, the CSC shall seek and recommend the least environmental impact alternative in consultation with the designer, the Contractor(s), and PMU;
- Verify the investigation results of any non-compliance of the environmental quality performance and the effectiveness of corrective measures; and
- Provide regular feedback audit results to the contractor’s Chief Engineer according to the procedures of non-compliance in the EMP;
- Instruct the Contractor(s) to take remedial actions within a specified timeframe, and carry out additional monitoring, if required, according to the contractual requirements and procedures in the event of non-compliances or complaints;
- Instruct the Contractor(s) to take actions to reduce impacts and follow the required EMP procedures in case of non-compliance / discrepancies identified;
- Instruct the Contractor(s) to stop activities which generate adverse impacts, and/or when the Contractor(s) fails to implement the EMP requirements / remedial actions.
For contracts that Contract Specific Environmental Plan (CSEP) is required

The CSC shall provide the final review and recommend clearance of all Site Environmental plans which may affect the environment. These include, but are not limited to: dredging areas, borrow pits and disposal sites, worker’s camp plans. The CSC will review and approve the CSEP presented by the Contractors. Where these plans are found not to comply with the EMP, EIA or RAP, the SES shall work with the PPMU and Contractor to establish a suitable solution.

Addressing Complaints:

Complaints will be received by the Contractor’s Site Office from local residents with regard to environmental infractions such as noise, dust, traffic safety, etc. The Contractor’s Chief Engineer or his deputy, and the CSC shall be responsible for processing, addressing or reaching solutions for complaints brought to them. The CSC shall be provided with a copy of these complaints and shall confirm that they are properly addressed by the Contractors in the same manner as incidents identified during site inspections.

Certification for Monthly Payments:

The CSC shall confirm the monthly payments for environmentally related activities implemented by the Contractor.

Reporting: the CSC shall prepare the following written reports:

- Bi-weekly report of non-compliance issues
- Summary monthly report covering key issues and findings from reviewing and supervision activities

At the end of the project the CSC shall prepare a final report summarizing the key findings from their work, the number of infringements, resolutions, etc. as well as advice and guidance for how such assignments should be conducted in the future.
## ANNEX 3: RESULTS OF SAMPLE ANALYSIS

### Table 1: Result on Surface water quality in Subproject area

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<td>7.6</td>
<td>8.8</td>
<td>9.2</td>
<td>9.9</td>
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<td>0.55</td>
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<td>0.08</td>
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<td>0.3</td>
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<td>0.84</td>
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<td>0.02</td>
<td>&lt;0.01</td>
<td>0.03</td>
<td>0.02</td>
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<td>0.01</td>
<td>0.03</td>
<td>0.3</td>
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</tr>
<tr>
<td>10</td>
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<td>&lt;0.01</td>
<td>-</td>
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<tr>
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<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.01</td>
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<td>0.2</td>
<td>0.2</td>
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<td>Oil &amp; grease</td>
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<td>0.04</td>
<td>0.02</td>
<td>0.03</td>
<td>0.05</td>
<td>0.01</td>
<td>0.01</td>
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<td>Vegetation</td>
<td>μg/l</td>
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<td>&lt;0.001</td>
<td>0.001</td>
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<td>&lt;0.001</td>
<td>&lt;0.001</td>
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<td>0.004</td>
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<tr>
<td>15</td>
<td>Total coliform</td>
<td>MNP / 100 ml</td>
<td>5.70</td>
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<td>4.50</td>
<td>5.5</td>
<td>7.90</td>
<td>9.7</td>
<td>2.1</td>
<td>6.90</td>
<td>1.90</td>
<td>5.70</td>
<td>7.30</td>
<td>7.500</td>
</tr>
</tbody>
</table>

### Sampling location
- M1: Don village, Yen Tam commune;  
- M2: Da Ngoc village, Yen Giang commune  
- M3: Bui Ha village, Yen Phu commune  
- M4: Yen Thinh PC, Yen Thinh commune  
- M5: Ba village, Yen Lac commune
EMP for Subproject "Repairing and Upgrading critical sections of Cau Chay River left bank Dyke from K0 to K42 in Yen Dinh district - Thanh Hoa Province - VN-Haz 2011

M6: Hoach village, Dinh Tang commune
M7: Thanh Phu village, Dinh Tuong commune
M8: Si bridge, Dinh Binh commune
M9: Noi Thon village, Dinh Hoa commune
M10: Dinh Thanh PC, Dinh Thanh commune
M11: Cam Chuong village, Dinh Cong commune

See Map of sampling location

(*) QCVN 08:2008/BTNMT Column B1: National technical regulations on quality of surface water for irrigation purposes

### Table 2: Result on Ground water quality in subproject area

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Unit</th>
<th>N1</th>
<th>N2</th>
<th>N3</th>
<th>N4</th>
<th>N5</th>
<th>N6</th>
<th>N7</th>
<th>N8</th>
<th>QCVN 09:2009</th>
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<tbody>
<tr>
<td>1</td>
<td>pH</td>
<td>-</td>
<td>70</td>
<td>69</td>
<td>68</td>
<td>66</td>
<td>70</td>
<td>68</td>
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<td>67</td>
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<td>2</td>
<td>Hardness calculated on CaCO₃</td>
<td>mg/l</td>
<td>120</td>
<td>100</td>
<td>230</td>
<td>100</td>
<td>97</td>
<td>84</td>
<td>110</td>
<td>186</td>
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<td>Cl</td>
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<td>4</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>5</td>
<td>N-NO₃</td>
<td>mg/l</td>
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<td>1.8</td>
<td>1.6</td>
<td>3.0</td>
<td>1.8</td>
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<td>3.1</td>
<td>2.2</td>
<td>15</td>
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<tr>
<td>6</td>
<td>Fe</td>
<td>mg/l</td>
<td>0.6</td>
<td>0.5</td>
<td>1.2</td>
<td>0.4</td>
<td>0.4</td>
<td>0.3</td>
<td>0.7</td>
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<td>Mn</td>
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<td>0.08</td>
<td>0.09</td>
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<td>0.06</td>
<td>0.04</td>
<td>0.02</td>
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</tr>
<tr>
<td>8</td>
<td>Pb</td>
<td>mg/l</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
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<td>Cd</td>
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<td>-</td>
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<td>-</td>
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<td>3.5</td>
<td>1.5</td>
<td>0.8</td>
<td>1.9</td>
<td>2.0</td>
<td>13</td>
</tr>
<tr>
<td>11</td>
<td>Total coliform</td>
<td>MNP/100ml</td>
<td>36</td>
<td>25</td>
<td>4</td>
<td>35</td>
<td>41</td>
<td>29</td>
<td>20</td>
<td>19</td>
<td>3</td>
</tr>
</tbody>
</table>

**Sampling location**

N1: Don village, Yen Tam commune;
N2: Da Ngoc village, Yen Giang commune
N3: Bui Ha village, Yen Phu commune
N4: Yen Thinh PC, Yen Thinh commune
N5: Ba village, Yen Lac commune
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N7: Thanh Phu village, Dinh Tuong commune
N8: Si bridge, Dinh Binh commune

See Map of sampling location

(*) QCVN 09:2008/BTNMT: National technical regulations on quality of groundwater
### Table 3: Result on Soil quality in subproject area

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Analysis results</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH(_{KCl})</td>
<td>-</td>
<td>D1</td>
</tr>
<tr>
<td>Total P(_2O_5)</td>
<td>%</td>
<td>0.08</td>
</tr>
<tr>
<td>Total K(_2O)</td>
<td>%</td>
<td>0.5</td>
</tr>
<tr>
<td>Total N</td>
<td>%</td>
<td>0.5</td>
</tr>
<tr>
<td>Humus content</td>
<td>%</td>
<td>3.6</td>
</tr>
<tr>
<td>Fe(_2O_3)</td>
<td>%</td>
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</tr>
<tr>
<td>Al(_2O_3)</td>
<td>%</td>
<td>3.2</td>
</tr>
<tr>
<td>Residue of vegetation protection chemicals of organic chlorine group</td>
<td>mg/kg</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

**Sampling location**
- D1: Don village, Yen Tam commune;
- D2: Da Ngoc village, Yen Giang commune
- D3: Bui Ha village, Yen Phu commune
- D4: Yen Thinh PC, Yen Thinh commune
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- D7: Thanh Phu village, Dinh Tuong commune
- D8: Si bridge, Dinh Binh commune

*See Map of sampling location*