

VINH PHUC FLOOD RISK AND WATER MANAGEMENT PROJECT

**ENVIRONMENTAL AND SOCIAL
IMPACT ASSESSMENT
EXECUTIVE SUMMARY**

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ABBREVIATIONS

ADB	Asian Development Bank
BD/CD	Bidding and Contract Document
BTNMT	Ministry of Natural Resources and Environment
CPC	Commune People's Committee
CSC	Construction Supervision Consultant
DARD	Department of Agriculture and Rural Development
DONRE	Department of Natural Resources and Environment
DPI	Department of Planning and Investment
DRCC	Development Research and Consultancy Centre
DSR	Dam Safety Assessment Report
EA	Environmental Assessment
ECOP	Environmental Codes of Practice
EHS	Environmental, Health, and Safety
EIA	Environmental Impact Assessment
EM	Ethnic Minority
EMDP	Ethnic Minority Development Plan
EMPF	Ethnic Minority Policy Framework
EMP	Environmental Management Plan
ES	Executive Summary
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Framework
ESMP	Environmental and Social Management Plan
EPC	Environmental Protection Commitment
ESU	Environmental and Social Unit
FS	Feasibility Study
FDI	Foreign Direct Investment
GoV	Government of Vietnam
GIIP	Good International Industry Practice
HH	Household
HSE	Health, Safety and Environment
IEMC	Independent Environmental Monitoring Consultant
IMC	Independent Monitoring Consultant
IP	Industrial Park

M&E	Monitoring and Evaluation
MPI	Ministry of Planning and Investment
NH	National Highway
NGO	Non-governmental Organization
O&M	Operation and maintenance
PCR	Physical Cultural Resources
PMO	Project Management Office
PMU	Provincial Management Unit
PPC	Provincial People's Committee
PPE	Personal Protective Equipment
PS	Pumping Station
PSC	Provincial Steering Committee
QCVN	Vietnam Technical Regulation
RAP	Resettlement Action Plan
RESA	Regional Environmental and Social Assessment
RPF	Resettlement Policy Framework
SA	Social Assessment
SEMP	Site-specific Environment Management Plan
SMF	Social Management Framework
TCVN	Vietnam Standard
TSS	Total Suspended Solid
TOR	Terms of Reference
TT	Circular
VSBK	Vertical Shaft Brick Kiln
VEC	Valuable Ecological Component
VPFRWMP	Vinh Phuc Flood Risk and Water Management Project
WB	World Bank
WHO	World Health Organization
WWTP	Wastewater Treatment Plant

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A. INTRODUCTION

Vinh Phuc is a land-locked province located in the upper reaches of the Red River Delta. The provincial city, Vinh Yen, is about 60 km northwest of Hanoi. Vinh Phuc is positioned in three main key development regions of Vietnam: the Red River Delta Region, the Hanoi Metropolitan Region, and the Northern Key Economic Region. Vinh Phuc is hydraulically divided into three drainage basins: (i) Northwest Basin (Basin A); (ii) Central and South Basin (Basin B); and (iii) Northeast and East Basin (Basin C). With these geographical advantages, Vinh Phuc has witnessed impressive economic growth and has become one of the key industrial hubs in Red River Delta and an attractive location for foreign direct investment (FDI).

Nevertheless, Vinh Phuc is facing a variety of challenges, including regular flooding, water pollution, lack of infrastructure and lack of institutional capacity that slows down the rate of economic and social development of the province. In particular, the Phan River basin, hosting 80% of the population and most of the FDI enterprises in manufacturing, and accounting for two thirds of the total area of the province, is frequently affected by floods. Floods have caused substantial loss of agricultural and industrial production, and affects quality of life through damage to infrastructure and increased rural and urban pollution. Therefore, controlling flooding and improving environmental management of the basin in the province is an urgent issue for economic sustainable development.

With the objective of addressing these challenges, The Government of Vietnam is currently preparing the Vinh Phuc Flood Risk and Water Management Project (the Project) which has been proposed for financing from the World Bank. The Project objectives are to strengthen flood protection capacity and prevent the rapid deterioration of surface water quality through the improvement of wastewater management in the central catchment of Vinh Phuc Province (the Province). These objectives will be achieved through (i) supporting the construction plan for flood risk control and rehabilitating the rivers (Component 1); (ii) improving the wastewater collection and treatment systems in towns and rural areas (Component 2); (iii) establishing a water resource, flood information and early warning systems; and (iv) institutional strengthening and training for departments, water sector practitioners and operation and maintenance (O&M) entities to better achieve an integrated river basin management in the Province.

The project is going to be implemented in order to: control the risk of floods for the Phan and Ca Lo Rivers, improve drainage, water storage and regulation for these rivers, and improve the water quality and ecological environment and create regulating lakes. This is in line with the overall planning of urban construction in Vinh Phuc province Vision 2030-2050, the provincial drainage masterplan, and the transportation masterplan.

The Environmental and Social Impact Assessment (ESIA) was prepared according to the World Bank (WB) policy and the national legislation and regulations of Vietnam. The ESIA provides an overview of the environmental and social baseline conditions on the direct impacted areas, summarizes the potential impacts associated with the proposed project and defines an Environmental and Social Management Plan (ESMP) which sets out the management measures required to mitigate any potential impacts. The ESMP is to be utilized by the contractor to be commissioned by ODA Project Management Unit, Vinh Phuc Province and will form the basis of site-specific management plans that will be prepared by the contractor and sub-contractors as part of their construction methodology prior to works commencing. The ESMP, as part of the ESIA, will be approved and disclosed by the World Bank and the relevant Vietnamese authorities prior to the start of civil works.

B. PROJECT DEVELOPMENT OBJECTIVES AND DESCRIPTION

1. Project development objective

The Project Development Objective (PDO) is to strengthen flood risk management capacity and improve wastewater management in the central catchment of Vinh Phuc Province.

2. Project description

Component 1 - Flood Risk Management (estimated cost USD117 million)

This component improves flood risk management through structural measures in Basin B (including sub-basins B-1, B-2 and B-3) and Basin C (see Maps in Annexes 1-5 of this Executive Summary). The measures include (i) construction and rehabilitation of three retention lakes with a total area of 260 hectares to increase regulation capacity; (ii) construction of three drainage pumping stations with total capacity of 145 m³ per second and related canals to divert excessive storm water from basin B to the Pho Day and Red Rivers; (iii) dredging key sections along 11.5 km of the Phan River and 21.38 km of Binh Xuyen Rivers to increase the discharge capacity; and (iv) construction of two flood control gates with associated embankments and rehabilitation of one 10-chamber gate to prevent storm water entering Basin B from Basin C.

Component 2 - Water Environmental Management (estimated cost USD17 million)

This component improves environmental conditions in densely populated small towns and rural communities, as well as overall water quality in the Phan River by providing wastewater and drainage services. The measures include the construction and rehabilitation of wastewater collection and treatment facilities in four district towns and thirty-three rural villages along the Phan River. Given that the source of pollution is mostly from domestic households, this component will focus on treating wastewater. Simple and low cost technologies that will not require sophisticated mechanical equipment, high power consumption and complicated operation & maintenance will be applied.

Component 3- Implementation Support, Technical Assistance and Institutional Strengthening (estimated cost USD16 million)

This component supports (i) project implementation including detailed engineering designs, construction supervision, safeguard monitoring and other related activities; (ii) water resource and emergency flood early warning, including consulting services, works, equipment and other related activities; (iii) operation and maintenance (O&M) for assets to be built under the project, including training, development of operation manuals, and provision of necessary equipment; and (iv) institutional development for river basin management and water related sectors in an integrated manner.

Project Financing

The estimated total project cost is USD220 million with USD150 million proposed to be financed by an IBRD (International Bank for Reconstruction and Development) loan. The estimated government counterpart funding is US\$70 million to cover the costs of resettlement, portion of construction, project overheads, front-end fees and interest during construction.

C. RELEVANT LEGISLATION AND REGULATIONS

1. Laws, Decrees, Circulars, and Regulations/ Standards of Vietnam

1.1. Environmental Regulations

The project is required to comply with the prevailing environmental laws in Vietnam, which include the 2014 Law on Environmental Protection and Decrees, Circulars, Decisions, standards and regulations of Vietnam on Environment. The most important of these are Decree No. 18/2015/NĐ-CP signed on 14/02/2015 by the Government providing environmental protection planning, strategic environmental assessment, environmental impact assessment and environmental protection plan, Circular No. 27/2015/TT-BTNMT dated 29/05/2015 by the Ministry of Natural Resources and Environment on strategic environmental assessment, environmental impact assessment and environmental protection plan and Vietnamese environmental standards.

1.2. Social Regulations

The project is required to comply with the regulations and norms for both land acquisition, compensation and resettlement and ethnic minorities development interventions. Regarding involuntary resettlement in Vietnam the Legal Framework involves what follows,

1. The Constitution of Vietnam, 2013.
2. The Land Law 2013 which has been effective since July 1, 2014.
3. Decree No.43/2014/ND-CP guiding in detail some articles of Land Law 2013
4. Decree No.44/2014/ND-CP providing methods for land pricing; adjustment to land price brackets, land price lists; specific land pricing and land price consultancy activities.
5. Decree No. 47/2014/ND-CP providing compensation, support, resettlement when land is recovered by the State
6. Decree No. 38/2013/ND-CP of 23 April 2013, on management and use of official development assistance (ODA) and concessional loans of donors.
7. Circular No. 36/2014/TT-BTNMT dated 30 June 2014, regulating method of valuation of land; construction, land price adjustment; specific land valuation and land valuation advisory
8. Circular No. 37/2014/TT-BTNMT dated 30 June 2014, regulating compensation, assistance and resettlement when the State acquires land.
9. Decision No. 1956/2009/QĐ-TTg, dated November 17 2009, by the Prime Minister approving the Master Plan on vocational training for rural labors by 2020;
10. Decision No. 52/2012/QĐ-TTg, dated November 16 2012, on the support policies on employment and vocational training to farmers whose agricultural land has been recovered by the State;
11. Other regulations or administrative decisions related to resettlement plan to be issued by Vinh Phuc Province People's Committee in relation to the Land Law 2014, and its relevant decrees and circulars.

With regards to ethnic minority peoples, the following legal documents applied to support the implementation of the EMDP prepared by the project:

Constitution of the Socialist Republic of Vietnam (2013) recognized the equality between ethnic groups in Vietnam. Article 5 of the Constitution in 2013 provides:

- a) Socialist Republic of Vietnam is the unified state of all nationalities living in the country of Vietnam.
- b) The nationalities equal, unite, respect and help each other to develop; prohibits any discrimination, ethnic division.
- c) The national language is Vietnamese. The nation has the right to use voice, text,

- preserving the national identity, promoting traditions, customs, traditions and culture.
- d) The State implements a comprehensive development policy and creates reasonable conditions for the ethnic minorities to mobilize resources, along with the development of the country.

The Vinh Phuc People's Committee prepared the required instruments for the implementation of the project including, the Resettlement Policy Framework, the Ethnic Minorities Policy Framework, three Phase-1 Resettlement Action Plans, and one Phase-1 Ethnic Minorities Development Plan.

2. Safeguards Policies of the World Bank

2.1. World Bank Environmental Safeguards Policies

The project must also comply with the safeguard policies of the World Bank, triggered by Project activities, and summarized in Table 1 below. The ESIA will also apply WBG Environmental, Health, and Safety Guidelines known as the "EHS Guidelines". The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP)¹.

- **OP/BP 4.01 - Environmental Assessment**

The Project is classified as a category A due to the potentially significant environmental and social impacts associated with the Project investments and activities. A full ESIA including an Environment Management Plan (ESMP) has been prepared for the Project

Social Assessments have been conducted for the Project. Social impacts were also considered in the ESIA.

- **OP/BP 4.04- Natural Habitats**

The policy is triggered as the project will impact the aquatic environment of rivers the Phan, Red, Pho Day, Ca Lo, Binh Xuyen River System and lakes i.e. Sau Vo, Rung, Nhi Hoang in the project area of influence. The ESIA has assessed project impacts on natural habitats for which provision of appropriate conservation and mitigation measures would be required.

- **OP/BP 4.37 - Safety of Dams**

The project will not involve any dam construction or rehabilitation or works on related reservoirs. However, there are two dams designed for irrigation and flood control purposes, namely Thanh Lanh and Xa Huong, respectively upstream of Tranh and Cau Bon River, which are used to meet the irrigation demand of Basin B during the dry season. Full Dam Safety reports have been prepared accordingly, and the mitigation actions proposed are incorporated into the ESIA.

- **OP/BP 7.50 - Projects on International Waterways**

Component 1 of the Project, Flood Risk Management, includes the construction of three pumping stations in Basin B, with a total capacity of 145 cubic meters per second (m³/s). Two of these pumping stations – Ngu Kien and Nguyet Duc – will discharge water to the Red River. As such, OP 7.50 is triggered, and the riparian state concerned – China – will be notified of the Project activities.

- **OP/BP 4.11 - Physical Cultural Resources**

The policies are triggered as the project involves large excavation activities. As such, chance find procedures will be incorporated into ESMPs, and added to construction contracts.

¹ <http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

2.2. World Bank Social Safeguards Policies

The investment of the project will require land acquisition, and will impact temporarily and permanently land, assets and livelihoods of local people, therefore the Bank's OP 4.12 for Involuntary Resettlement was triggered. Based on the screening, the presence of EM in the project areas was confirmed, therefore the Bank OP 4.10 (Indigenous Peoples) was triggered.

2.2.1 World Bank Policy on Involuntary Resettlement (OP 4.12)

The World Bank's policy OP 4.12 covers the economic and social impacts caused by the involuntary land acquisition whether or not it involves resettlement. The OP 4.12 defines the objectives, planning, and implementation of mitigation measures since resettlement may cause severe long-term hardship, impoverishment, unless appropriate measures are carefully planned and carried out. The WB's involuntary resettlement policy objectives are the following:

- I. Physical displacement, economic and physical adverse impacts should be avoided where feasible or, if not possible, minimized by examining all available design alternatives, technology, and site selection. Where avoidance is not possible, impacts shall be mitigated.
- II. Where resettlement cannot be avoided, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the people affected by the Project to share in benefits.
- III. Affected Persons should be meaningful consulted and should have opportunities to participate in planning and implementing resettlement programs.
- IV. Affected Persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-project levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

2.2.2 The World Bank's OP 4.10 on Indigenous Peoples

As EMs with the characteristics defined by the OP 4.10 were confirmed in the project area, the project requires to ensure EM receive culturally appropriated benefits, as well as, to define the mitigation measures for unavoidable adverse impacts, ensuring the broad EMs community support.

Therefore, the project developed a Social Assessment (SA), and free, prior and informed consultation, and information disclosure, encompassed the preparations of the Social Assessment, the Ethnic Minorities Development Framework (EMDF) and the Ethnic Minority Development Plan (EMDP). The EMDF that guided the preparation of EMDP, will also be used to prepare other EMDPs during the project implementation.

CHAPTER 2: BASELINE CONDITIONS IN THE PROJECT AREA

A. GEOGRAPHICAL AND BIODIVERSITY CONDITIONS IN THE PROJECT AREA

Vinh Phuc is a land-locked province located in the upper reaches of the Red River Delta with a total natural land area of 1,231km². The provincial city, Vinh Yen, is about 60 km northwest of Hanoi. Vinh Phuc is positioned in three main key development regions of Vietnam: the Red River Delta Region, the Hanoi Metropolitan Region, and the Northern Key Economic Region. Vinh Phuc is hydraulically divided into three drainage basins: (i) Northwest Basin (Basin A); (ii) Central and South Basin (Basin B); and (iii) Northeast and East Basin (Basin C).

The initial assessment results demonstrate that drainage capacity of rivers and lakes in the Project area is currently impaired by sedimentation, the meandering alignment and the poor environmental quality in the Basins.

The Project lies along three rivers. The Phan River originates from Tam Dao, flowing through districts of Tam Duong, Vinh Tuong, Vinh Yen City, Yen Lac before entering Ca Lo River in Huong Canh District and then flowing through Me Linh District (Hanoi) to Cau River. The average width of the river is from 10 m - 30 m, with an average depth of 1.5 m - 3.5 m. The Phan River serves as the main drainage system for the region, and is also a system of large irrigation supplying water for about 8000 ha of farming land. The survey showed no aquaculture activities in the vicinity of the Project area. There are only 8 households fishing on the river during off-season period.

The river water quality is now increasingly degraded and polluted by waste water from residential areas, agricultural areas, some craft villages and service businesses. In short, the variety of biodiversity in Phan River is assessed as poor. According to the information provided from Vinh Phuc DONRE and Department of Agriculture and Rural Development (DARD), there are no endangered and rare fish species in the Phan River section at the project area. No migratory, catadromous or anadromous fish were detected and recorded in the project area.

The Red River drains water from 3 pumping stations of the project, directly from Nguyet Duc and Ngu Kien pumping stations and indirectly from Kim Xa pumping station via Pho Day River. The river section has an average width of about 1.5 km and depth of 5.0m. According to the biodiversity on the existing condition of Red River (2010), there are some endangered species at the Red River confluence area with Da, Thao, and Lo Rivers - which is about 20 km upstream of the project area at Ngu Kien pumping station. Among 91 recognized species, 12 species belong to six families and four genera in the 2007 List of Threatened Species of Vietnam. However, according to the information provided from Vinh Phuc DONRE and DARD, there is no endangered and rare fish species in the Red River section at the project area. No migratory fish is detected and recorded in the project area.

Ca Lo River in the Project Area has an average river width of 20 m and depth of 1.7 m. There are no aquafarming activities in the river and about 22 households are fishing there during off-season period. According to the information provided from Vinh Phuc DONRE and DARD, there is no endangered and rare fish species in the Ca Lo River section at the project area. No migratory fish is detected and recorded in the project area.

Sau Vo Lake

The lake has a total area of 295 ha with average depth of 1.8m. In dry season, the area shrinks to about 250 ha. The area to be dredged and rehabilitated under the Project financing has a total area of 176.5 ha, of which 21 ha is currently being used for aquaculture

by 12 households every season (both dry and rainy) under the contract with town people committee renewed annually; and a lakeside area of 45 ha which is used for farming in dry season by 258 households. The survey found that the fish farmed by local households include barb, tilapia, grass carp and common carp. Other aquatic species are shrimp, crab, goby fish etc.

Nhi Hoang Lake

Nhi Hoang Lake has an area of 22.5 ha with average depth of 1.8 m. In dry season, the area of the lake is 20 ha with a depth of average 1.6 m. There are about 35 households fish-farming in contract basis of barb, tilapia, grass carp and common carp. The lake is surrounded by permanent agricultural land.

Under the VPFRM, Nhi Hoang Lake will be dredged and rehabilitated to an area about of 38.5 ha, to the depth of 1.8 to 2.0 m, with the capacity of 750,000 m³.

Both lakes are currently fish farmed on annual contract basis (and 35 households in Nhi Hoang Lake, 20 ha). Fish raised include barb, tilapia, grass carp and common carp. Other aquatic species are shrimp, crab, goby fish etc. No endemic or migratory species are found in these lakes.

Rung Lake

Rung Lake has a total area of 150 ha (surface area of about 140ha) with average depth of 1.5 m. During the dry season, the lake area is 140 ha. The lake is currently fish farmed on a contractual basis by 85 households, 139 ha. This lake is currently divided into several small ponds for aquafarming purpose. The lake is surrounded by residential areas of communes of Tu Trung, Ngu Kien and Vu Di and farming areas. Recently, Indian carp fish have been introduced into the lake.

B. ENVIRONMENTAL BASELINE IN THE PROJECT AREA

The monitoring of environmental quality included: ambient air (at 31 locations); ground water (25 samples); surface water (59 samples); wastewater (15 samples); soil environment in areas planned for construction (20 samples); dredged soil (31 samples); and sludge (29 samples).

The analysis of results showed that:

- **Air quality in the Project Area.** The results show that in all surveyed samples, the quality of ambient air is quite good with the concentrations of CO, NO₂, SO₂ and HC much lower than the limits as stipulated in the Technical Regulations QCVN 05:2013/BTNMT and QCVN 06:2009/BTNMT.

- **Surface water quality in the Project Area.** The surface water environment in the study area is mainly affected by agricultural production, industrial production, livestock husbandry, and aquaculture activities. Domestic wastewater from the residential areas along the Phan River is among the key factors affecting surface water quality in the project area. Water sampling was conducted in August and September, which was the rainy season of the Northern region; therefore, the concentrations of pollutants in the water were diluted. At other times of the year, the concentrations might be higher.

59 surface water samples were taken, monitored and analyzed in each location where civil works will be undertaken under the Project. The current status of surface water quality in the project area is as follows:

In terms of pH level, the measured pH values range from 6.5 to 7.1, which are within the permissible limits (5.5 to 9.0). This is the range to ensure a viable living environment for aquatic species.

All parameters, particularly BOD, NH_4^+ , and coliform, indicate that the surface water in the project area shows signs of contamination of organic matters. This result is consistent with the annual surface water quality monitoring results of Vinh Phuc Province as the monitoring results show that most of the water bodies in the area including Phan River, Ca Lo, Pho Day, and lakes such as Rung and Vac, have been contaminated with organic matters such as SS, NH_4^+ , oil and grease, and Coliform. Among the water bodies belonging to the project components, samples taken from Phan River usually have the highest concentrations of DO (SW43), BOD, COD, TSS, (SW 17, SW20 - B2), and Coliform (SW17 - B2).

It is also noted that the water quality in the town areas under Component 2 of the Project has greater signs of pollution than in other areas when most of the pollutant parameters have higher values than permissible standards. This shows that the surface water in the ponds and lakes in the towns under Component 2 has been contaminated due to domestic wastewater and waste from the densely populated areas as well as from the greater trading and services activities than other areas.

- **Soil quality in the Project Area.** 31 samples were taken at the locations of proposed project civil works. Analysis of results show that all of the parameters of the samples are within the permissible limits for hazardous waste. Compared to the National Technical Regulation QCVN 03:2008/BTNMT on permissible limits of heavy metals in soil, 24 out of 31 samples meet the standards while 7 samples exceed the permissible limit.

- **Surface sludge sediments in the Project Area.** The analysis of 29 samples of sludge sediments show that the accumulation of substances, particularly heavy metals, does not differ much among samples. Compared to the National Technical Regulation QCVN 07:2009/BTNMT on hazardous waste thresholds, all of the parameters of the sediment samples are within the permissible limits. Compared to the National Technical Regulation QCVN 43:2012/BTNMT on sediment quality, 28 out of 29 samples meet the standards, except for only one sample at Phan River (MS7-B2) that has Pb and Cu concentrations 1.27 times and 1.05 times higher than the permissible limits.

C. SOCIO-ECONOMIC PROFILES OF THE POPULATION IN THE PROJECT AREA

a. Overview of Vinh Phuc Province

Vinh Phuc is located in the Red River Delta belonging to the Northern midland and mountainous region, with co-ordinates: from 21o08' (Dao Tru Commune, Tam Dao District) to 21o19' North latitude (Trang Viet Commune, Me Linh district, Hanoi), and from 105o109' (*Bach* Luu Commune, Song Lo District) to 105o47' East longitude (Ngoc Thanh Commune, Phuc Yen Town).

The natural area accounts 1,231.76 km² (as at 31 December 2008) with a population of 1,014,488 people. The province includes 9 administrative units: Vinh Yen city, Phuc Yen Town and 7 Districts (Lap Thach, Song Lo, Tam Duong, Binh Xuyen, Tam Dao, Vinh Tuong, Yen Lac), *comprising* 112 communes, 25 of wards and towns located in the Red river delta region, in the middle of Vietnam's North and the transitional area between the mountainous and delta regions. Therefore, Vinh Phuc has 3 ecological regions, including the delta region in the South, midland in the North and mountainous region in Tam Dao district. Socio-economic condition of the province is summarized as follows:

- *Growth rate:* the growth rate always ranks high among the Red River Delta Region and the Northern Key Economic Region. In the period 2006-2010, the growth rate of Vinh Phuc province reached 15.6% per year while the growth rate of whole country in the same period, reached 6.9-7% per year. Vinh Phuc province has the highest annual growth rate in the Northern Region, followed by Quang Ninh, 13.3%, Bac Ninh, 15.2%, Hai Duong 11%, Hung Yen 14.1% and Hai Phong 13.2%.

- *Regarding GDP per capita:* The average growth rate is 26% per year by 2020, reaching VND 28.5 million/person, equivalent to US\$ 1,550-1,600, higher than the national average rate (reached \$ 1,220 / person by 2010) and ranked into the fourth position in the Northern key economic zone, followed by Ha Noi, Hai Phong (1.800-1.900 US\$/person) and Quang Ninh (1,757 US\$/person). In the period 2000-2015, the economic structure of Vinh Phuc province has changed rapidly: the proportion of industry and construction in GDP increased from 40.68% in 2000 to 62.1% in 2015.
- *Income and livelihood:* According to the General Statistics Office of Vietnam Living Standards, Vinh Phuc province growth rate of per capita income is high. In the period 2001 - 2005, per capita income increased at an average rate of 13.8% / year versus 6.05% of the country during the same period. The poverty rate in the province has decreased from 18.3% (according to latest national standards) in 2005 to 6% in 2010 and about 3% in 2014.
- *Cultural, historical and archeological aspects:* Vinh Phuc is well-known for its natural landscapes and cultural, historical and archeological richness. However, in the project area, there are no such historical or cultural sites affected by the project's construction activities. The screening of environmental **sensitive receptors** within the project zone of influence (schools, clinics, temples, churches, graveyards, military compounds, state offices etc.) was made and it confirmed that transport activities of dredged materials may have certain impacts to some sites in regards of dust, noise and limited access and nuisance. They include several schools, 01 market, 01 clinic house and 01 pagoda at a distance of 30-120m to the transport routes.

b. Socio-economic profile of Households

The project's socio-economic survey carried out in 21 communes/wards at 4 project basins included the *participation* of 965 surveyed households (with 3,770 inhabitants), involving 330 beneficiary households, and 635 affected households. A summary of some of the survey results is as follows:

- **Household Size:** The average number of inhabitants per household according to the survey is 3.9 persons, a figure which is similar to the national index.
- **Ethnic Groups:** The survey's results on ethnic groups showed that the project basins are occupied mainly by Kinh people, and some San Diu, and Cao Lan ethnic minority households in Tam Dao district; in Binh Xuyen. The area under Component 2 and basin C of the project, registered 96.6% Kinh people and 3.4% San Diu and Cao Lan ethnic minority people.
- **Education** The surveyed people having secondary school level accounted for the highest proportion of 40.7%; followed by high school level people that accounted for 37.9%. People with college/university or vocational level accounted for 9.4%, and 4.5% of respondents surveyed were illiterate
- **Occupation:** Households' (HH) income usually rely on more than one job, households heads generally work in agricultural production, and other HH member are state-salaried groups (including civil servants and the retired) who have relatively stable income. As for the poor and medium income households, they have unstable job, and income.
- **Income and Expenditure:** In the project area, the proportion of households engaged in agriculture is relatively high, it is the main households' income. They cultivate food crops (such as rice, corn) and some farm products (such as soybeans, beans, peanuts.). Currently, as flooding occurs regularly, there is one spring crop (on the lowlands) and 2-3 crops on uplands ground. Most of the households have average income of 4.45 million dong/household/month (or VND 1.14 million per capita per month).

- **Housing and Assets.** The type of housing chosen for construction in the past few years is one-floor house with concrete roof or strong two-floor house. Housing is generally separated from kitchens and auxiliary structures such as bathrooms or toilets.
- **Power Supply:** The survey result showed that in all the project basins, the people access the national power grid, 97.4% of households use electricity with a separate meter, only 2.6% of households share electricity with their neighbors.
- **Transportation** The survey showed that access roads to the households are mostly concrete roads (70.5%), followed by asphalt roads (8.6%), 7.5% of households surveyed said that the access roads to their houses are earth ones, and 13.5% stated the access roads are made of stones, gravel and bricks.
- **Water Supply** Clean water is one criteria used to define households living standards. According to the survey result, the water source for daily use of the households in the project area for most of households in the project area, is drilled wells accounting for 80.3%. The proportion of households using tap water accounted for only 12.9%. In addition, households using water from dug wells accounted 6.1%, and only a small proportion of households using rainwater for their daily activities.
- **Drainage and Flooding.** Poor drainage, flooding in the rainy season and stagnancy of waste in residential areas, especially in basins B1, B2 and B3 are main concerns for people that provided feedback during the survey. In detail, about 71.6% of the households responded that flooding occurred in the locality, specifically in basin C (77%), basin B3 (67.5%), basin B2 (71%), basin B1 (76.3%). Component 2 of the project is deployed in the communes of Hop Chau, Ho Son, and Quang Minh under Tam Dao district, which are located in the upstream area of 3 rivers in Binh Xuyen, not prone to flooding.
- **Vulnerability** It is estimated that 23.1% of households assessed are vulnerable, including 12.2% of women-headed households with dependents; 4.1% of households having the elderly and disabled people; 3.4% of households with ethnic minorities and 3.3% of poor households. Of the project basins, component 2 (Tam Dao district) has by far the largest number of vulnerable households, a site with many EM households, and higher poverty rates, than the other basins.

Various technical options were considered for the Project design. Proposed design alternatives were analyzed based on technical, economic/financial, social and environmental aspects in order to select the most viable option balancing the perspectives of environmental sustainability, beneficiary welfare, and cost-effectiveness.

A. THE 'NO PROJECT' ALTERNATIVE

The system of Phan River - Ca Lo River (the Project area) is the largest drainage basin of Vinh Phuc province accounting for nearly 60% of natural areas and 80% of the provincial population. The drainage catchment of the Project area includes the city of Vinh Yen (grade II urban area), Phuc Yen Town (grade III urban area) and most of the FDI enterprises of the province. The Project area contributes a large budget revenue of about 26.5 trillion VND in 2014. Currently the project area has become an industrial hub of the Red River Delta and is a focal area to attract foreign direct investment (FDI) in the country.

In case that the project is not implemented, the existing difficulties and obstacles will hamper socio-economic development of Vinh Phuc Province. These obstacles include:

- i) Severely reduced capacity for flood risk control, with resultant loss of life and lost productivity
- ii) Degraded regional water environment
- iii) Obstructing industrial and urban development in Vinh Phuc Province

B. THE 'WITH PROJECT' ALTERNATIVE

The Project's proposed investments are in line with the Vinh Phuc province master plans which have been approved by the Government. Alternatives were considered in the preparation of the master plans, which are also subject to review by environmental authorities as per Vietnamese laws. The social assessment was conducted taking into account the selected technical option. Alternatives were further considered where appropriate during the Project's feasibility study and related EIA preparation.

1. Component 1- Flood Risk Management

In this component, the project has many construction investment sections which are divided into 4 different basins. For each separate investment item, the Feasibility Study conducted for the Project assessed technical options while taking into consideration impacts on the local communities. After consultations with relevant agencies and local communities, investment options were determined based on location, scale and design.

1.1. Alternatives for scale and capacity of pumping stations

a. Basin B:

The construction and water drainage plan for the basin B is completely based on the state of natural conditions (drainage by gravity, flooding level, etc.). With each sub-basin B1, B2 and B3, four alternatives to capacity and scale of construction of pumping stations were considered. Precipitation frequency and design flow of repeating floods are calculated for 1 year, 2 years, 3 years, 5 years, 10 years, 15 years, 20 years, and 25 years.

Based on analysis of drainage capacity, controlled flood area, the potential environmental and social impacts by alternative, the options selected for the Project are as follows:

- For Kim Xa sub-basin (B1): Construction of pumping station of 30 m³/s, 38.5ha dredging Nhi Hoang detention lake, rehabilitating the control gate at K3+128 and the 10-door control gate.
- For Ngu Kien sub-basin (B2): Construction of pumping station of 35 m³/s, dredging detention Rung Lake and 11.5km long section of Phan River from Thuong Lap Bridge to the intake gate of Ngu Kien pumping station.
- For Nguyet Duc sub-basin (B3): Construction of pumping station of 80 m³/s; Constructing a new regulating lake in front of the pumping station of 21ha, dredging Sau Vo Lake of 176.51ha, rehabilitating 3.5km long Phan River from section of Phan River from Thuong Lap Bridge to the intake gate and rehabilitating inlet canal from Phan River to Sau Vo retention lake of 7.7km.

b. Basin C:

Two alternatives are proposed: 1) Dredging the existing river alignment with total length of 4 sections of 22,621m and 2) dredging in combination with adjust alignment in several sections of Cau Bon River and Tranh River with total length of 21,375m (Cau Bon River: 7,670m; Tranh River: 5,416m; Ba Hanh River: 7,507m and Noi River from Cau Bon to Tranh River of 782m).

Considering drainage capacity, investment cost and land acquisition impacts on local communities and environmental impacts during construction, Alternative 2 is selected.

1.2. Alternatives for siting of pumping stations

For each pumping station several alternatives to siting were proposed and considered with its auxiliary construction such as inlet canal, outlet canal, regulating lake in front of the station etc.

The consultant preparing the Feasibility Study has analyzed social and environmental impacts regarding soil excavation and backfilling volume, acquired land area, geographical conditions and durability of the construction work and possibility of utilizing the existing works. Based on this assessment, the following options were proposed:

- Kim Xa sub-basin: The pump station located at Km13 + 300, left dyke of Pho Day river, Hoang Yen commune, Tam Duong district, constructing a pumping station with capacity of 30m³/s; Improving culvert at K3 + 128 to ensure drainage flow at 56.3m³/s (corresponding to a total amount of flood frequency of 10%); 38.5ha dredging Nhi Hoang lake to depth of 1.8-2.00m; two concrete culverts at K3+128 and K13+300, excavation of a 313.0 m long discharging canal, 22.75 m long approaching canal; and improving 10 valves at the control culvert at K11+369 to separate irrigation basin area.
- Ngu Kien sub-basin: Location of Ngu Kien pump station capacity at 35m³/s at K17+00 on left dyke of Red River, within Ngu Kien Commune, Vinh Tuong District. Construction of a retention lake in front of the pumping station with the area of 30.9 ha, and excavation of a 3.96km of approaching canal, and 3.83km of discharging canal with a culvert at secondary dyke of Red River, dredging key sections along 11.5km of Phan River.
- Nguyet Duc pumping station: Location of Nguyet Duc pump station capacity at 80m³/s at K26 + 930 on the left dike of Red River, located in Yen Phuong Commune, Yen Lac District. excavation of a 7.71km of approaching canal from Sau Vo 2 sluice gate to lake in front of the pumping station; and 3.15km of discharging canal with culvert at secondary dyke of Red river, Constructing a new regulating lake in front of the pumping station of 21ha, dredging Sau Vo Lake to serve as a retention lake, with an area of 176.51ha to the depth of 1.5-3.0m, Rehabilitating Sau Vo 2 sluice gate and key section of 3.5 km of Phan River from gate out of Vac Lake outlet canal to Sau Vo sluice gate (0.5 km stone embankment and paved slope).

Constructing a new 5.7km of Sau Vo service road and Dong Mong disposal site with area of 52.8ha

1.3. Alternatives for disposal sites

Three locations were initially considered as disposal sites for dredged material.

There are 03 disposed sites are proposed for the Projects namely Kim Xa, Vinh Ninh, Dong Mong.

- For Dong Mong site, no alternative is considered for this disposal site. The only option for Dong Mong disposal site is located within the administrative boundary of Huong Canh Town in Binh Xuyen District. The disposal site area is 54.31 ha and of agricultural land without any house or structure built thereon. This conclusion stems from the consideration of the local natural conditions and technical requirements and in close consultation with local people and authority.
- Kim Xa site located in the lowlands within Pho Day river alluvial land area with initial design area of 10.3ha, was one selected site. The site is divided into 3 equal slots with design elevation + 17.0m while that of Pho Day dyke is + 18.9m to + 19.0m and the average elevation is + 11.0m and the elevation at the lowest location where the disposal site is planned is + 9.5m. The consultant analyzed this design and realized that it will affect the flood drainage of Pho Day River when flood level surpasses + 11.0m elevation. Hence it was recommended that dredged material with heavy metal content not exceeding QCVN 03:2008/BTNMT for agricultural land may be disposed of within the site but the elevation of the disposal site should not exceed surrounding area (+ 11.5m).
- Vinh Ninh disposal site is located outside the secondary dyke of Red River, at the flood plain of the Red River. The disposal site was proposed to be designed average elevation of +15.58 m while the elevation of the surrounding floodplain area is only 12.80 m; which leads to the consequence that the Red River flood drainage capacity will be greatly affected. Therefore, environmental assessment conducted for the ESIA recommended that Vinh Ninh disposal site be removed from options for consideration.
- Based on these recommendations, the Kim Xa disposal site area has been redesigned to 3.8 ha with an elevation of 11.5 m and Vinh Ninh disposal site will not be used for the Project.

2. Component 2- Water Environmental Management

2.1. Alternatives analysis to the types of drainage system for towns and rural areas

Three alternatives were considered for wastewater collection and treatment systems proposed for both towns and rural areas, including 1) using existing combined drainage system which has no interceptor, 2) construction of new separated system and 3) using existing combined drainage system. Considering economic costs and environmental and social impacts, the third option is selected, i.e. the efficiency of wastewater treatment and collection are relatively good, the cost is acceptable and it is consistent with the planning.

2.2. Alternatives to technologies used for the wastewater collection and treatment system

Based on projection of population, estimate of water consumption and average wastewater volumes in the rural areas and towns, scale of wastewater treatment facilities is recommended as follows: In towns: A total of 5 treatment plants of which 3 stations having a capacity of 1,000 m³/day-night or less and 2 stations with a capacity greater than 1,000 m³/day (1300 and 1700 m³/day);

- In rural area: 33 facilities with capacity range of 50-280 m³/day-night.

Based on the criteria of wastewater input quality and standard wastewater after treatment, 3 different treatment technologies were proposed. The proposed option for treatment technology was the choice of a septic tank in combination with ecologically sensitive plant filtration. The process will be wastewater → trash filter → septic tank → plant filtration → recipient source.

CHAPTER 4: IMPACT ASSESSMENT AND IDENTIFICATION OF MITIGATION MEASURES

Impact assessments and mitigation measures for each component with B1, B2, B3 and C basins investment were developed based on document reviews, meetings with key agencies, field visits to project sites and collection of environmental data (air, noise, vibration, sediment, sludge analysis, etc.). A checklist method was used to identify key issues and required mitigation measures, based on knowledge and experience in the country and taking into account good international practices. In addition to the ESIA, a Social Impact Assessment (SIA), subproject Resettlement Action Plans (RPs), an Ethnic Minorities Development Plan (EMDP); and Reports on Dam Safety (RDS) (Xa Huong and Thanh Lanh Reservoirs), have also been prepared in line with relevant Safeguard policies. These have all been taken into account in ESIA report preparation.

A. OVERVIEW OF THE PROJECT IMPACTS

1.1. Potential positive impacts

The project activities are not only important for controlling and minimizing flood impacts but also for improving the environment and ecology. They also contribute to improved ecological landscape and creating controlling lakes which are aligned with the masterplan of Vinh Phuc urban development until 2030 with vision to 2050.

In addition, in Component 2- Water Environmental Management, analysis of monitored surface water shows that the river water is polluted by such contaminants as BOD₅, COD or other microorganisms like Coliform, E.coli etc. This implies an urgent need for water management along with investments on flood control and prevention.

This project component was designed to support waste water collection and treatment for 4 districts towns and rural communities along the Phan River, including:

- Wastewater management for towns: construction of 5 collection and treatment schemes in 4 towns of Yen Lac, Tam Hong, Tho Tang and Huong Canh. Each scheme can provide services to around 15,000 to 25,000 people. The scheme in Huong Canh will include a collection system and boosting pump to drain waste water to Quat Luu WWTTP in Vinh Yen centre.
- Wastewater management for rural communities: from project survey results, there are 33 small scale waste water treatment schemes to be constructed under this project. Each scheme can serve at least 500 people for it can be built for a cluster of households/residential area.

1.2. Potential Negative Impacts

Potential negative impacts identified from the activities of the project include:

Involuntary land acquisition, and loss of income in the area as a result of the project investments will involve permanent and temporary adverse impacts. With regards to impact (temporary) related to fishing, aquaculture, a detailed consultation and Social Assessment conducted among households that will be affected by the dredging of the three lakes and the river systems. The consultation and detailed SA will be done when the detailed design and the construction measures are available to facilitate the detailed social assessment – both scope, magnitude of the social impact of the subprojects on the affected households, and mitigation measures. These affected households will include those who do fishing and aquaculture activities in the subproject lakes and rivers, and those who do farming in the riparian, which are using lake and river water for their crops. The SA findings will be used to

develop plan to address identified impacts on these households, including impacts related to livelihood, and impacts outside involuntary land acquisition, resettlement, among other things. In terms of graveyard, as part of census and detailed measurement survey, a detailed survey of graveyards in the subproject area will be undertaken during project implementation when the detailed design is available. The RAP will be updated to reflect findings related to graveyard prior to RAP approval and construction.

- The impact on the hydrological regime:

Impacts on hydrological regime in the Pho Hong and Pho Day Rivers through the operation of pumping stations and discharge canals: Evaluation results show that the water drainage system and construction of discharge canals from discharge channel of Kim Xa pumping station to Pho Day River with flow rate of $30\text{m}^3/\text{s}$ at Kim Xa commune, Vinh Tuong District. Ngu Kien pumping station with a capacity of $35\text{m}^3/\text{s}$ to Red River at Ngu Kien Commune and Nguyet Duc pumping station with a capacity of $80\text{m}^3/\text{s}$ to Red River in Trung Kien commune, Yen Lac district do not affect flood drainage regime of the river in flood season. The degree of influence by the water drainage from stations is considered negligible.

Impact on the downstream areas of Basin C: From results of hydraulic calculations with 10-year flood cycle, along with the rehabilitation of control gates of Sate Bridge and Ton Bridge and dredging of rivers in Binh Xuyen and construction of pumping stations in 3 sub-basins B1, B2 and B3, the impact on downstream areas of Ca Lo River Basin is positive in controlling and mitigating floods for the entire project area and Ca Lo River Basin. The impact of dam safety of Thanh Lanh and Xa Huong Dams downstream of the Project area: Two large earth-filled dams with reservoirs are upstream of rivers in basin C (which contains activities within the Project area). The first is Xa Huong, the second highest dam in Vietnam, in Xa Huong village, Minh Quang commune, Tam Dao district, Vinh Phuc province. With a maximum height of 41 meters, and a total storage of 14.13 million m^3 , is categorized as a large dam under OP 4.37. The second dam upstream is Thanh Lanh, located in Trung My commune, Binh Xuyen District, Vinh Phuc. With a total reservoir storage of 10.62 million m^3 , and a maximum dam height of 29 meters, it is also categorized as a large dam under OP 4.37.

- An independent dam safety team, comprising competent specialists, prepared dam safety reports for both dams in November 2015 and these were updated in December 2015 based on the discussion with the Bank team dam safety specialist. The reports include the following: (a) an inspection and evaluation of the safety status of the existing dams, their appurtenances, and their performance history; (b) a review and evaluation of the owners' operation and maintenance procedures; and (c) findings, conclusions and recommendations for remedial work or safety-related measures necessary to upgrade the existing dams to an acceptable level of safety. Based on the conclusions of these two reports, Xa Huong Dam was classified as an unsafe dam, which requires major remedial works (including dam body seepage control, upgrade of spillway, renovation of irrigation tunnel and its intake, and installation of instruments), and Thanh Lanh Dam as a safe dam, which requires only minor works (including installation of instruments and monitoring devices). According to the updated DSRs, seepage control works (curtain grouting as Phase I and blanket grouting on upstream slope as Phase II) of Xa Huong Dam were completed in January 2016 and construction of spillway upgrade started in January 2016 and will be completed in April 2016. Upon the completion of spillway upgrade, the Xa Huong Dam will be upgraded to an acceptable safety level. To complete all proposed remedial works, Vinh Phuc Province has submitted to Ministry of Agriculture and Rural Development (the MARD) an application for including the

remaining minor dam safety-related works, such as renovation of irrigation tunnel and its intake of Xa Huong Dam and installation of instruments of both dams, in another Bank supported project: the Vietnam Dam Rehabilitation and Safety Improvement Project.

- In addition, according to the reports, adequate Operational and Maintenance Manuals (O&M Manuals) and Emergency Preparedness Plans (EPPs) were required to be prepared and put in place for these two dams as immediate actions to be taken. Vinh Phuc Province hired the same dam safety team to prepare the O&M Manuals for these two dams and selection of the consultant to prepare the EPPs for two dams is in progress. A detailed action plan on dam safety related activities is under preparation. Details of the evaluation and measures to ensure dam safety are described in the safety assessment report for dams of Thanh Lanh and Xa Huong (RDS).

- - Dam safety

Vinh Phuc completed dam safety remedial works of blanket grouting on the upstream slope of the dam, from the top of vertical curtain grouting to the dam crest in January 2016. The construction of spillway expansion, increasing the width of spillway opening from 10m to 14m and the installation of two control gates started in January 2016 and will be completed in April 2016. With the completion of this spillway expansion, the major remedial works will be completed and the dam's safety will be upgraded to an acceptable safety level. In addition, the Vinh Phuc Province had submitted to MARD an application to include the remaining minor remedial works in the Bank financed Vietnam Dam Rehabilitation and Safety Improvement Project. The works include the Xa Huong Dam's irrigation tunnel and its intake renovation and the installation of monitoring instruments for both dams. It is under DARD screening process. In the meantime, the Vinh Phuc PPC has committed to allocating government budget to carry out these remaining works in case this proposal is not materialized.

Potential impacts that are related to OP 4.12, but are covered by OP 4.01

Dong Mong landfill: 12 HHs will be temporarily affected during the subproject construction. Some temporary impacts may take place during the disposal process such as, noise, odor, and dusts. During the preliminary assessment it was confirmed that few households live in the area adjacent to the disposal site. In cases of all temporary impacts, additional treatment measures (i.e. use of biological chemical) would be considered to de-odor or others required. However, all temporary impacts, not related to land and income losses will be confirmed, during the project implementation. These impacts are covered by the ESIA and the ESMP.

Sau Vo Lake: HHs who practice aquaculture would be temporarily affected, in an area of about 21 hectares. The magnitude of impact (exact number of households) could not be estimated yet, since it will depend on the dredging technique. During the RAP preparation, while the survey of detailed impacts was not carried out, consultation with a number of 12 pre-identified and potentially affected HHs was conducted. It was confirmed that the 12 HHs are not vulnerable and most with an income of various sources (farming, animal raising, salary, hired wage) been fishing a seasonal activity. The HHs were informed about the project, compensation payments, and support to be provided, consistent with the contracts they hold with the ThanhTown People Committee.

For subprojects that involve dredging on the lakes or rivers, fisheries and aquaculture may be potentially affected during the construction. Those affected relying on fishing, should be consulted when the detailed designs of the subprojects are available. Aquaculture activities in lakes do not have land use right certificate, local government issues rental contracts for these activities purposes. Where aquaculture households are affected, they will be compensated for, as per agreements made in the rental contract in observance of the legal agreements, and on the assessment of income impacts. Effort should be made to ensure operation takes into account the low fishing season for impacts to be minimized. If impacts are not avoidable, compensation will be provided to the affected households- as per RPF. In addition, regarding impacts on the aquatic ecosystems in the lakes and rivers due to dredging, will be further assessed and ESMP updated based upon a study.

For fishing activities on the rivers, at that time, the exact numbers of households engaged in such activities have not yet identified. According to the verification of the CPCs, the number of households fishing on the rivers is seasonal and thus fishing is generally not a main income generation activity. These HHs will be identified and consulted, when the detailed engineering designs as well as the dredging location and construction time are confirmed. If there is any impact identified, these HHs will be entitled to compensation and support - as per the project's RPF.

For aquaculture activities within the lakes, the PC, manages the lake surface and all users sign rental contracts to be renewed every year. Fishing without contract is banned and currently 180 ha are rented. As such, affected HHs will be compensated for their income losses in accordance with the project's RPF during construction period (See Section 3.2.2 in the RPF on how temporary impact are compensated). Within the project area, and estimated number of 132 HHs would be compensated/supported. For Sau Vo Lake currently there are 12 HH renting, and other HHs identified during project implementation will entitled to compensation and support as per the RPF.

The inland rivers in Vinh Phuc Province are not used for transportation purposes, except for the Red River, through districts of Vinh Tuong and Yen Lac with total length of 41km and downstream area in Melinh District of Hanoi. The project does not involve construction in the Red River, so there will be no impact on the downstream users of the waterways during construction phase. Because the number of households relying on river fishing is small – as confirmed by the CPC, the impact estimated, is small. These specific impacts will be assessed before dredging operations take place and respective RAPs would be updated to reflect the identified households and compensation package, as needed.

B. IMPACTS AND MITIGATION MEASURES DURING THE SITE CLEARANCE, CONSTRUCTION AND OPERATION

1. Environmental Impacts and mitigation

Several key site-specific impacts of the Project have been identified in the ESIA report and mitigation measures, and are explained below:

- A. Risk of erosion and subsidence of river banks and lake banks: Collapse and subsidence of the works during the construction are possible, especially at the important locations which need to be embanked and where the bridges are improved.

Mitigation measures

Conduct geological and hydraulic surveys prior to the construction

Dredging should be implemented in segments and the dredging area needs to be surrounded closely by fences to ensure the dredging activities are contained.

- B. Local inundation: The risk of local inundation during the construction of the works over the river flow may happen if prior to the construction, no proper measures for the flow direction and construction are applied by the contractor.

Mitigation measures:

The PMU will ensure that detailed design will provide installation of temporary and permanent drainage to avoid potential flooding, and disruption to the irrigation system in the project site during construction and operation.

- C. Impact of dredging process to water quality and aquatic life and downstream users:

According to the analysis of the TSS content of water samples in water bodies in the basin B (Sau Vo Lake, Nhi Hoang Lake, Rung Lake, Phan River) and basin C (Tranh, Cau Bon, Ba Hanh and Noi Rivers), TSS concentrations in most samples excess QCVN: 08/2008/BTNMT - column B.

For aquatic ecosystems in the lakes and rivers, the dredging of the bottom layer of sludge will lead to an increase in the current water turbidity and level of TSS level, which consequently affects the water quality and aquatic life. For standing water bodies such as lakes of Nhi Hoang, Sau Vo and Rung, the turbidity will increase around the area to be dredged within a radius of about 10 m. For running water bodies such as Phan River, the turbidity will increase from the point of dredging about 150m downstream and about 10 meters upstream. From the assessment of the current state of biodiversity in Phan River, there is no endangered and rare species in these lakes. In addition, only 08 households fishing on Phan River during off-season will be impacted. Thus, the impact of the dredging process to aquatic life and downstream users is assessed as low.

During implementation, a detailed fishery survey of the three lakes, including fish diversity and productivity (open and capture fishery) will be undertaken prior to dredging and impacts of dredging and the project as a whole on fishery be further assessed and ESMP updated based upon this survey/study.

Mitigation measures:

i) The dredging process will be carried out in successively in section, with the application sheet piles surrounding each section to prevent the impact to other surrounding sections/area; (ii) Dredging activity shall only be carried out in dry season; (iii) stream diversion will be carried out to ensure that flow is not being disrupted.

- D. Construction of disposal sites

The impacts due to the construction of disposal sites include the dust, odor and gases generated from dredged sludge, impact on the landscape, improper disposal of contaminated excavated materials to the designated disposal site, garbage disposal from surrounding areas - the risks that the disposal sites will be used by local people as domestic dumpsites and waste from other construction works nearby will be disposed of at the site; land subsidence risk at Dong Mong disposal site during construction.

According to the calculation result, the total excavation volume of the construction works in the Basin B is 7.24 mil m³, in which the volume of the dredged materials that could be reused as consolidating or backfilling materials is 6.14 mil m³. The remaining 1.1 mil m³ is sludge or light organic soil unable to be used and that must be transported to the disposal sites of Dong Mong and Kim Xa. According to the initial analytic result of the dredged materials, the content of heavy metals at some locations of the river are higher than stipulated in the standard QCVN03:2008/BTNMT for cultivating soil.

Part of dredged material from construction activities of the wastewater treatment schemes, pumping stations and wastewater collection systems of 5 WWTPs and 33 wastewater treatment schemes in Component 2 is also transported to Dong Mong and Kim Xa disposal sites.

Mitigation measures

- The disposal of waste at the disposal sites may generate dust; therefore, surrounding these disposal sites, plant green trees to minimize dust into the air and at the same time create a more sustainable and pleasant environmental landscape for the area.
- If the disposed sludge materials still generate odors and gases, spray daily with biological products and sprinkle with lime to prevent odor.
- Awareness raising and coordination with local authorities to ensure that these sites will not be used as the dump site for local people and other projects in the province.

To prevent the soil erosion and land subsidence risk at Dong Mong disposal site, the site will be divided into 13 cells and material will be filled in successively in each cell. During the disposal process, the cell will be compacted carefully and soil embankment surrounding each cell to prevent soil erosion.

Other impacts will also arise from: (a) site clearance, including unexploded ordinance (UXO) clearance, and earthworks, (c) increased traffic during construction, runoff from freshly excavated areas, and disposal of waste materials, including dredged material from lakes, rivers and canals, of which some may be contaminated with heavy metal and other pollutants.

During the detailed design of the project works, attention will be given to mitigating these impacts to the extent possible by incorporating mitigation measures into the designs, bidding documentation, and construction contracts. Specifically, the bidding documents and the contracts will reflect (i) the provisions of the comprehensive Environmental Codes of Practice (ECOPs) for small-scale urban construction works that have been prepared for the project and (ii) site specific impact and mitigation measures that have been prepared for each of the project works where impacts and mitigation measures are beyond, or in addition to, the provisions of the ECOPs. Full details on the ECOPs and the site-specific measures are included in the ESIA.

In the Project area, there are several graveyards that will need to be relocated from the Dong Mong disposal site. As the cemetery area was flooded during the survey period; it was not possible to ascertain the exact number of graves to be relocated. There is also a risk that Project activities will have an impact on Thien Phuc church and the Great Banyan tree (in Chua village) in Van Xuan commune. Given that the Project involves large excavation activities, chance find procedures are detailed in the ESIA, and will be incorporated into bidding documents.

2. Social Impacts and mitigation measures:

2.1. Positive Impacts

The VPFRWMP project will support the water sustainable development for a long-term socio-economic growth of the Vinh Phuc province. The project will focus on ensuring flood control in the central basin of the province and prevent the rapid degradation of surface water quality. According to urban planning, by 2030 the Vinh Phuc province will entail three areas: (1) urban, industrial and services area; (2) areas for agriculture, forestry and fisheries development; and (3) area for nature conservation and tourism development. The urban, industrial and services area are expected to cover the entire Vinh Yen city, part of Phuc Yen town and part of Binh Xuyen, Tam Duong, Yen Lac and Vinh Tuong district. According to

the urban planning, Vinh Phuc would take advantage of lakes and rivers constituting a network of greenery and open water surface, while protecting the ecological environment of existing rivers. For the Vinh Phuc province the project is a major opportunity for the improvement of environmental conditions, sanitation of residential areas along rivers, and development of urban ecology areas in Sau Vo, Dam Vac and Dai Lai lakes. The urban areas around the Vinh Yen city are expected to become large number of tourists' destination, mainly from Hanoi.

2.2. Adverse Impacts and Mitigation Measures

a. Involuntary Resettlement

Assessment of Adverse Impacts. Assessing the project impacts indicates that land acquisition as a result of the project is unavoidable. It is anticipated that Component 1&2 involve construction and rehabilitation of the rivers, retention lakes, irrigation and drainage/sewerage infrastructures that will imply land acquisition and resettlement and its concomitant impacts. In the preparation stage, a close cooperation with the Vinh Phuc PMU and the consultations with relevant local authorities at district/commune levels, confirmed that there was a process of looking and identifying options for the planned works location, and attempting to minimize the resettlement impacts on the vulnerable and poorest people. The exact location and size of the dredging area, irrigation and drainage/sewerage systems, and landfill have not been identified yet. Thus the estimation of the scope of land acquisition as well as accurate number of households affected by the sub-projects is not defined at this point. However, it can be confirmed that involuntary resettlement is inevitable and an estimated number of 6,229 households could be affected throughout project life (not including 65 households to be temporary impacted), of which an estimated 1,916 would be affected households under the first batch of works for the first 18 months implementation.

Mitigation Measures. Potential adverse social impacts due to land acquisition and other assets triggered World Bank's OP 4.12. In compliance with the provision of the policy, the project required the preparation of a RPF and RAPs. The RAPs addressed the potential impacts due to relocation and others on livelihoods impacting communities and households. The Vinh Phuc PPC and authorized PMU ensured that any involuntary resettlement will be carried out in accordance with the agreed RPF/RAPs. To meet the World Bank Policy requirements, payment for all assets (including land, structures, crops, and other assets) must be based on the replacement cost survey. Displaced people's living conditions should be restored to at least the pre-project level. In the community meetings and consultations, local authorities expressed their appreciation with regards to livelihood restoration of the affected people and assistance for poor and vulnerable households, considered by the Banks's policies

b. Impacts on Ethnic Minority.

Assessment of Adverse Impacts. The potential project's impacts assessment was estimated on the basis of consultations and in-depth interviews with key stakeholders. According to the assessment temporary impacts during the construction phase caused by the dredging activities of River Network in Binh Xuyen, will include land, and local income. However, these impacts are to be clearly defined and confirmed when the detailed engineering design will be finalized and available.

Mitigation Measures. The Social Assessment (SA) indicated that ethnic minority communities of Cao Lan and San Diu, Nung and Dao are present in the proposed project area and could be potentially affected. A process of free, prior informed consultation with affected EM's communities during the project design was carried out and will be done for new subprojects to be identified during project implementation to ensure there is a broad community support. The EMPF and EMDP were prepared on the basis of: a) social assessment prepared for the whole VPFRWMP project, and results of the environmental impact assessment; b) consultation with EMs present in the project areas; and c)

consultation with key project stakeholders, including Vinh Phuc Provincial's Department of Planning and Investment, and the Committee for Ethnic Minority Affairs. The EMPF and EMDP aim to ensure that: (i) affected EM peoples receive culturally appropriate social and economic benefits, and (ii) when there are potential adverse effects on EM, the impacts are identified, avoided, minimized, mitigated, or compensated for.

c. Impacts on Livelihood (Income Generating Activities) and Sources of Income

Assessment of Adverse Impact. Apart from land acquisition, the project interventions will have other impacts, both positive impacts (e.g. reduction of flooding; increasing agriculture production) and adverse impacts (e.g. reduced sources of income due to loss of agricultural land and temporary loss of income (minor) from fishing activities (Sau Vo, So, Nhi Hoang and Rung retention lakes); changing alignment of existing drainage and sewerage that may cause temporary flooding and water provision cuts.

Mitigation Measures. For subprojects that involve dredging on the lakes, and or rivers, fishing may be potentially affected. It is anticipated that those households relying on fishing as secondary income generation activities, should be consulted when the detailed design of the subprojects are available, and the construction measures become clear. Effort should be made with regards to looking at the low season, when fishing activities are minimal, to minimize construction impacts. In case, impact is not avoidable, compensation should be provided to the affected households – as per RPF, to ensure their livelihood will not be worse off as a result from the project construction. The same should be addressed for other activities that could potentially impact local communities and households such as animal breeding.

d. Gender Action Plan and Gender Monitoring Plan

The SA results indicated that women mainly participate in agricultural and aquaculture activities. The project preparation, ensured women's participation in community meetings, in-depth interviews, as well as, in the household survey, at rate of 20-40%. As the project implementation would temporarily impact HHS agricultural land and aquaculture, it could disproportionately affect women's livelihoods. Some other potential impacts on women could involve traffic safety, discrimination for being hired as unskilled laborers, so these should be addressed.

Mitigation Measures. Project's impact among HHs affecting vulnerable women, will be addressed through the establishment of programs such as vocational training, and capacity building. Campaigns will be focused on raising women's awareness on sanitation, traffic safety and prevention of other social impacts. Women will be prioritized for job opportunities during the construction phase. The Gender Action Plan and Gender Monitoring Plan in the Annex 1 of the Social Assessment details measures to address the gender issues. Additionally, poor women and female-headed households in the project area are at risk to lose productive assets (houses, business, farm land) due to land acquisition.

e. Sexually Transmitted Infections

The project preparation identified potential HIV/AIDS risks due to increased flow of workers in the area, having women at larger risk than men.

Mitigation Measures. To mitigate and address the risks related to HIV/AIDS and other endangering women during construction, the HIV/AIDS awareness and prevention program should pay particular attention to women at the construction sites and in the communities, developing peer educators and community monitoring, combined with awareness on safe migration. The PMU and Women Unions of project communes will be monitoring and supporting public campaigns. In addition, the project should address the women's needs on information regarding drug abuse.

Temporary Impacts

During construction period, the project may cause some temporary negative impacts on certain peoples' economic activities, limiting access to certain resources (e.g. limited access to Sau Vo Lake); impacting fishing, aquaculture, and potential inland river transportation, as well as impacting communities due to dust, noise, and road safety.

Mitigation measures. The project should conduct a detailed survey to examine the magnitude of temporary impacts on livelihoods to define the proper compensation and support required.

Assessment of Potentially Linked Project

The SA indicated that the ADB Green Cities Program, to be implemented from 2016-2021 in Vinh Yen city, does not have any investments linked with the WB financed project. The ADB Green Cities Program has an approved SA and PSSA, including measures to bridge the gap between ODA donor and GoV regulation. The due diligence for this link project is presented in Annex 5 of Social Assessment Report.

C. CUMULATIVE IMPACTS

1. Cumulative Environmental Impacts

The ESIA conducted a review of related large, recently completed and ongoing investments in the project to identify possible linkages and potential cumulative impacts of existing and planned projects with regard to their effect pollution loads within the Phan River and the associated Basin. The ESIA:

(a) Identified key project-related contributions to cumulative effects on selected resources of concern. These key Valuable Ecological Components (VECs) were initially determined to be:

1. **Water quality.** Given the dredging activities and wastewater treatment activities under the project, the inclusion of water quality as a resource of concern was a logical choice, as both these activities have impacts on water quality, in the first instance, potentially negative impacts, and in the second instance, positive impacts.
2. **Aquatic Biodiversity.** Discussions with DONRE and DARD, and a review of the literature, ultimately determined that there is no threatened aqua fauna in the river, and that therefore cumulative impacts on aquatic biodiversity is limited.
3. **The quality of life of local communities.** One of the key project objectives is to improve the lives of local communities through enhanced flood control and provision of basic services (wastewater treatment).
4. **Downstream water use.** Downstream water use was included as there are fisheries activities along the river, although more detailed surveys ultimately indicated these activities to be relatively limited.

Aquaculture. Although aquaculture was considered for inclusion as a VEC, aquaculture is only carried out during the rainy season (about April – September) while dredging activities can only be carried out during the dry season. As such, there is no cumulative impact on aquaculture due to dredging activities. Moreover, only a total of 180 ha of the three project lakes is devoted to aquaculture.

(b) Identified other linked and associated infrastructure projects within the spatial boundary of the Project Area, either recently completed, or planned for construction to coincide with the Vinh Phuc FRM project. Identified the impact of industrial parks, borrow pits, and sand extraction operations within the spatial boundaries of the Project Area;

(c) Assessed the significance of the cumulative effects of projects on the VECs, by order of magnitude.

(d) The existence of the dredge disposal sites and extrajudicial sand extracting activities in the Project Area continues to place pressure on river water quality, and it is suggested that Vinh Phuc authorities, in collaboration with the Department of Natural Resources and Environment, prepare a management plan to curb and regulate these activities, and restrict release of these materials into the river.

Based on the assessment and due diligence review, negative cumulative impacts from these linked and associated projects are deemed to be limited because most of them are either existing or will be completed by the time the VPFRWMP project will commence implementation, . Only one project - the Green City project is under implementation at the same time as the Vinh Phuc FRM. However, based on the analyses on the design and construction plans, the timing of project activities, as well as the location of the project site, it is assessed that there will be no significant negative cumulative impact on water quality of Phan river due to dredging. In addition, negative cumulative impacts due to construction activities and material transportation are assessed as limited. Several projects will have a positive cumulative impact on the VPFRWMP by reducing the pollution load on waterways, through treating sanitation, which will allow the drainage and sanitation components of the VPFRWMP to operate more efficiently. Some measures, such as the Green City Project, will improve flood control in the Phan River basin, which will improve the quality of life for local communities.

Vinh Phuc Province, with the support of the Vietnamese Government, donors and international funding institutions, has been implementing various development programs and projects province-wide and in the Phan River region in particular. Key infrastructure projects include:

1. Programme of grade 2 urban development (Green City Project) for Vinh Yen City, Vinh Phuc province (financed by the ADB) .The project will improve water quality in the Phan River and contribute to effective flood control in the Project Area. The project involves: (i) rehabilitation dredging, and embankment of Vac Lake (60/163 ha) and 2 km long canal connecting Phan river and Vac Lake, (ii) construction of a park (44.2 ha)-using dredged material from the project, on the existing low land area next to the lake; and (iii) construction of waste water collection and treatment systems for 07 wards in Vinh Yen city. During construction, negative cumulative impacts due to construction activities and material transportation are assessed as limited.

2. Vinh Phuc Improving Investment Environment Project (VPIIE) (financed by JICA). The project completed construction in 2014.This project will help improve water quality of Phan River as the main recipient source.

3. Urban road integrating Dam Vac embankments (from the Dam Vac golf to Yen Lac - Vinh Yen road (financed by the Vinh Phuc province). The project will be completed by the end of 2016. The rehabilitation, diversion and dredging of the 1.4km Phan River section could have negative impacts on water quality if the disposal of dredged materials is improperly handled, so dredge disposal sites must be carefully monitored. However, in the operational stage, the constructed route will form a dyke to control water from Vac Lake to Vinh Yen city urban area, contributing to flood prevention in the area, which has a positive cumulative impact.

4. Domestic wastewater treatment plant (WWTP) at Lung Hoa commune, Vinh Tuong District, Vinh Phuc Province (financed by Vinh Phuc Province). This project was completed in 2013, and has improved the water quality of the Phan River.

In assessing cumulative impacts, in addition to the positive and negative impacts of related infrastructure projects, impacts of industrial parks, sand extraction and borrow pits within the Project area are also to be evaluated.

In addition to the abovementioned infrastructure project in Vinh Phuc, there are 8 large scale industrial parks (IPs) All wastewater from industrial parks must be collected and treated to meet discharge requirements before discharging into the receiving water. In the only one running, Khai Quang IP, its own wastewater treatment plant is operating and the post treatment water quality is assured by DONRE monitoring as satisfying environmental standards.

There are borrow pits with legal permits in Districts of Tam Duong and Tam Dao. The environmental impact will increase if the project exploits the pits for use as backfill material. However, current calculation proves that all backfilling works will utilize dredged material from components in the Project and there is limited requirement for material from these borrow pits.

There are several sources of quarry and construction materials (sand extraction points) in Vinh Phuc. These are all legitimate sources which are permitted by Vinh Phuc Department of Industry and Department of Natural Resource and Environment. However, it must be noted that the extrajudicial presence of sand extracting activities will contribute to increasing pressure on river water quality as well as the erosion risk of river banks.

Cumulative impacts of the ongoing and proposed projects in the Project Area are positive, in that through the installation of waste water treatment plants in both residential areas and industrial parks, the pollution load of untreated waste on the river is reduced. Moreover, several projects lead to improved flood control, which has economic and health and safety benefits to local communities. The existence of the dredge disposal sites and extrajudicial sand extracting activities in the Project Area continues to place pressure on river water quality, and it is suggested that Vinh Phuc authorities, in collaboration with the Department of Natural Resources and Environment, prepare a management plan to curb and regulate these activities, and restrict release of these materials into the river.

2. Cumulative Social Impacts

The SA conducted a review of related documents, including the Feasibility Study, Hydraulic Modeling, the Environmental and Social Impact Assessment Report, to examine if there are any potentially cumulative impacts, particularly flooding, as a result the project intervention. The review confirms there is no cumulative impact, indicative of unexpected flooding, that could be identified at the stage of project preparation.

During project implementation, when the detailed engineering designs for all subprojects are available, additional review to screen for cumulative impact (flooding) and the impact will be confirmed. In case, the investments of the project may be result in unusual flooding to a particular land area, impact assessment will be further done to confirm the magnitude of the impact. If the impact affects adversely the income generating activities and livelihoods of the local people, and these impacts (permanent or temporary) could not be avoided, the affected people will be compensated for – as per project's RPF.

CHAPTER 5: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

A. BASIC PRINCIPLES

As part of the Regional Environmental and Social Impact Assessment (ESIA), the Environmental and Social Management Plan (ESMP) is a safeguard instrument that is typically used in many projects and consists of information and guidance for the process of mitigating and managing environmental adverse impacts throughout the project implementation. It is common in Vietnam that an ESMP includes a list of typical mitigation measures to be implemented by the contractors, an environmental monitoring program, organization arrangements, and an estimated monitoring cost.

There is a comprehensive regulatory framework in Vietnam related to the process of preparing environmental and social impact assessment, environmental standards, protection, land management and land use, cultural properties, and other aspects related to the construction and operation of facilities and infrastructure in Vietnam. This ESMP is consistent with those provisions.

To facilitate effective implementation of the ESMP, VP ODA-PMU will:

- (a) Establish Environmental and Social Unit (ESU) who is responsible for timely EMP implementation including monitoring, reporting, and capacity building related to safeguards regulations.
- (b) Assign Construction Supervision Consultant (CSC) who is responsible for monitoring the implementation of environmental mitigation measures taken by the contractor, which is a part of the construction contract and this requirement will be included in the Terms of Reference (TOR) of the Construction Supervision Consultant.
- (c) Recruit a qualified national consultant as Independent Environmental Monitoring Consultant (IEMC) to support the VP ODA-PMU in performing the tasks.

The Department of Planning and Investment (DPI), Department of Agriculture and Rural Development (DARD), Department of Natural Resources and Environment (DONRE), together with the DPCs and CPCs in the project area will be responsible for implementing mitigation measures during the project operation process. These agencies will ensure that the mitigation measures are implemented and provide adequate budget. The Provincial Steering Committee (PSC) led by the Chairman or Deputy-Chairman of the PPC will provide overall policy guidance and oversee the project implementation. The roles and responsibilities of the specialized agencies and DPI, DONRE will also be very important.

The mitigation measures proposed in ESMP are divided into two key parts:

- Firstly, Environmental Codes of Practice (ECOPs) include generally typical impacts expected to occur during the construction process of the project. The mitigation measures to address these impacts will be provided in ECOPs and a number of measures will be incorporated into the contract with construction contractors and design consultants.
- Secondly, the site-specific impacts and their respective mitigation measures which are not covered in ECOPs, or which are of an order of magnitude that require mitigation measures not covered in the ECOPs, are described in more details in the EMP.

With regards to land acquisition and resettlement activities, or impacts related to EM peoples, mitigation measures are presented in separate Plans (Resettlement Plan, and Ethnic Minority Development Plan).

Some components of the project will finance environmental measures, above and beyond mitigation measures as described in the ESMP. This is the case for Component 3 - Implementation Supporting and Institutional Strengthening.

B. MANAGEMENT ORGANIZATION AND RESPONSIBILITIES

1. Environmental Management

Environment management responsibilities have been defined in the ESIA and the related ESMP. Environmental management during construction involves the PMU of the Vinh Phuc province their CSCs, contractors, and the Independent Environmental Monitoring Consultants (IEMC) that Vinh Phuc province will be required to select and appoint. Details of these responsibilities are provided in section E below.

2. Social Management

The following section specifies the key responsibilities of relevant stakeholders with respect to implementation of SA/RAP/EMDP for site specific civil works/ subprojects that will be finalized/determined during project implementation.

Vinh Phuc Provincial People's Committee

As a line agency, Vinh Phuc PPC is responsible for the overall outcome of any SA/RAP/EMDP that will be prepared and implemented under this project. VP PPC will maintain an overall oversight of the RAP preparation and implementation, and will provide guidance to relevant Departments, District People's Committee to ensure effective and timely collaboration and coordination between these agencies in the preparation and implementation of site specific RAP. When a Resettlement Action Plan is prepared, VP PPC will ensure the RAP is prepared in accordance with the requirements set forth in this RPF. Once a RAP is concurred by the World Bank (via a No Objection), VP PPC will approve the final SA/RAP/EMDP, or designate a relevant District PC to ratify the SA/RAP/EMDP to enable SA/RAP/EMDP implementation. The VP PPC will also assure it will cover all the costs related to compensation to affected, and their resettlement, if any, under this Project, and ensure the compensation. Resettlement and livelihoods restoration of affected households will be implemented and monitored in accordance with the project SA/RPF/EMPF.

Department of Planning and Investment

The Vinh Phuc Department of Planning and Investment is the project owner that is fully responsible for managing and supporting Vinh Phuc ODA PMU in the project implementation, which includes approval of updated resettlement plan(s) and managing the implementation of Resettlement Plan(s)

Relevant Provincial Departments

The Department of Finance (DOF) shall be responsible for appraising the compensation rate proposed by the relevant authorities based on results of independent land price appraisal and submitting to the PPC for approval. In the beginning of RP implementation, the DOF will closely coordinate with DOC, Department of Natural Resources and Environment, Department of Transport, Department of Industry, District People's Committee in appraising unit prices and proposing PPC to adjust if necessary to ensure that compensation rate is replacement cost at time of compensation for the project-affected persons.

Department of Finance:

- a) Coordinate with the relevant agencies to submit prices of land and assets to the PPC for approval.
- b) Coordinate with Department of Natural Resources and Environment to appraise compensation, assistance and resettlement plan and compensation cost.
- c) Checking the compensation payment, assistance and related costs.

Department of Natural Resources and Environment:

- a) Guiding to determine categories and area of land as well as entitlements to compensation when the State acquires land.
- b) Coordinating with DPI, DOC, DOF to submit to the PPC for making decision on land acquisition scope.
- c) Being chairman for appraising the compensation, assistance and resettlement option, evaluating and selecting compensation, assistance and resettlement plan and compensation cost.
- d) Submitting to Vinh Phuc Provincial People's Committee for making decision on land acquisition scope.

Department of Construction:

- a) Guiding to determine scope, area and legal status of the structures attached to the acquired land.
- b) Re-appraising quality of houses, structures, museums, ports and other construction works.
- c) Determining price of houses and structures built on land for calculating compensation value to submit to the PPC for approval.
- d) Coordinating with the competent authorities to determine position and scope of the resettlement sites.

Vinh Phuc ODA PMU

Vinh Phuc ODA PMU shall take general responsibility for the project's operations, including resettlement. The PMU includes technical, financial, accounting, social and resettlement divisions. PMU will be responsible for:

During RAP preparation:

- a) Work closely with the WB to prepare the agreed RAP in accordance with the RPF.
- b) Develop and provide orientation training on the requirements of the RPF to ensure District PC, and relevant stakeholders involved in RAP planning and implementation understand the requirement for RAP – as set forth in this RPF.
- c) Coordinate with the relevant departments under VP PPC and relevant District PC to obtain their comments/suggestions, and their consensus on RAP preparation and implementation.
- d) Ensure the RAP is prepared in accordance with the RPF.

During RAP implementation:

- a) Take lead in recruitment of consultants who will carry out a replacement costs survey, and independent monitoring of RAP implementation.
- b) Ensure the required budget for RAP implementation is timely allocated and available for compensation payment/resettlement. Update RAP and conduct internal monitoring of RAP implementation as per requirements set out in the RPF.
- c) Designate staff with profound experience in resettlement and familiar with Bank's OP 4.12 as a social focal point for PMU. This/these staff will provide regular support to provincial governments in RAP implementation. If such experienced staffs are not available, a consultant should be recruited. ToR for this consultant is subjected to Bank's prior review.
- d) Prepare bi-annual progress reports and submit to the WB
- e) Conduct training on requirements of project's RPF and RAP; work closely with District's People's Committee and District Resettlement Board in updating RAPs following the completion of detailed measurement survey, consultation, and replacement costs survey.
- f) RAP of the Vinh Phuc PPC must reflect the replacement costs surveys, local

compensation rates, and consultation with affected households. The RAPs must be submitted to the Bank for prior review and no-objection prior to proceeding with civil works and compensation payment

Responsibility for preparation and implementation of EMDP are as follows:

- The general responsibility of the elaboration and implementation of the EM policy framework belongs to the Vinh Phuc ODA PMU. The PMU should assign social staff or shall employ consultants, if required to work in close coordination with such relevant agencies as Departments at provincial level, district People's Committees involved in the project and affected communities to prepare the EMPF. This EMPF will be cleared by the WB and approved by the Vinh Phuc PPC prior to the time of Agreement Negotiation.
- The EMDP of each sub-project will be made by social specialist hired by the PMU on the basis of principles of the EMPF. The Vinh Phuc PPC will be responsible for approving and implementing the EMDP.
- The fund for the preparation of EMDP of the sub- project will come from the counterpart fund of the Vinh Phuc province.
- The PMU, via Environment and Resettlement Division, shall be responsible for ensuring effective implementation of the EMPF and the EMDPs in close consultation to the same level departments and project districts.

Responsibility for preparation and implementation of SA are as follows:

The Vinh Phuc PPC will be the owner of the project, through Vinh Phuc ODA PMU, implements the mitigation program in Social Action Plan under the SA, in cooperation with District People Committees, Provincial Department of Labour, Invalid and Social Affairs, Provincial Steering Committee of HIV/AIDS, drug and prostitution, Vietnam Women's Unions, Vietnam Fatherland Fronts and Mass Organizations.

A team of Project Implementation Consultants will be engaged in building capacity of the implementing agencies, Women's Union Mass Organization and facilitating the implementation of the program.

District People's Committee

- a) Directing, organizing, disseminating propaganda and motivating all concerned organizations and individuals to comply with the compensation, assistance and resettlement policies.
- b) Directing the DRC to prepare and implement the compensation plan.
- c) Coordinating with the departments, divisions, organizations and the Employer to implement the project.
- d) Solving grievances related to compensation, assistance and resettlement.

Provincial Center for Land Fund Development (LFDC)

Vinh Phuc PPC makes decision on establishing LFDC as resettlement unit fully responsible for the project resettlement implementation. Responsibilities of the LFDC is as following:

- a) Preparing and organizing the implementation of compensation, assistance and resettlement plan.
- b) Inspecting and taking responsibility for the compensation calculation for households and summarizing volume of compensation payment to submit to the PPC for appraisal and approval, then directly payment to the affected households right after receiving the compensation fund.
- c) Reflecting expectations and participating in solving DPs' grievances related to compensation entitlements and policies.
- d) Closely coordinating with the independent monitoring agency.

- e) Working under the principle of collective decision by majority rule.

Ward People's Committee (WPC)

The Ward/Commune PC will assist the LFDC in implementing the RAP. Specifically, the Ward/Commune People's Committee will be responsible for the followings:

- a) Assist the DPC, LFDC in organizing public meetings, consultations and information dissemination during RAP implementation;
- b) Form working groups at the commune and direct their functions, assign commune officials to assist the LFDC to conduct Detailed Measurement Survey, prepare land acquisition dossiers for the project, prepare and implement resettlement activities;
- c) Identify replacement land for the affected households who are eligible and propose income restoration programs appropriate to the conditions of the people and the locality;
- d) Supervise and implement the resettlement support measures and cooperate with LFDC to find resettlement land for the relocating households;
- e) Resolve complaints at the first level as prescribed by the existing law;
- f) Actively participate in the land acquisition, compensation payments, and in other related-resettlement activities and concerns.

C. ENVIRONMENTAL AND SOCIAL MONITORING

1. Environmental monitoring

It is essential to design the monitoring program and monitoring frequency appropriately to be able to record both the overall performance of the project works as well as the short-term impact due to construction activities. The environmental monitoring program will be implemented during the pre-construction and construction phases at 3 levels:

- Monitoring the level of compliance with mitigation measures,
- Community-based monitoring, and
- Monitoring the environmental parameters set out in the ESIA.

2. Social monitoring

The PMU should be assisted by a team of social development specialists to implement the proposed social interventions. A selected team of specialists should have experience in implementing M&E and skills training. The monitoring and evaluation of the proposed implementation plans should be done from the project commencement through the rest of the project cycle. The independent monitoring consultants will be contracted for monitoring of the resettlement implementation. In addition a consultant to monitor implementation of social action plans described above will be hired.

D. ENVIRONMENTAL AND SOCIAL SUPERVISION

1. Environmental supervision

Environmental supervision during construction will be the responsibility of the CSCs, who will be required to include in their supervision teams personnel with experience in supervising the environmental aspects of projects financed by international agencies such as the World Bank. They must also be familiar with the environmental legislation requirements of the Government. In accordance with their supervision contracts, and with the provisions of the construction contracts, the CSCs will be responsible for supervising all construction activities, including the mitigation measures that have been incorporated into the contracts on the basis of the ESMPs, and more broadly for ensuring that any negative

environmental impacts of the project are minimized.

2. Social supervision

Internal monitoring of the SA/RAP implementation is the main responsibility of the PMU, inter alia, in addition to project implementation and management. Monitoring of SA/RAP implementation does not only focus on actual SA/RAP implementation, but also on SA/RAP preparation to ensure the SA/RAP is timely and appropriately prepared and implemented in accordance with the project's RPF. Monitoring of SA/RAP implementation is required by PMU, on a monthly and quarterly basis, to ensure the SA/RAP implementation is on track and that any emerging issues/shortcomings; including complaints from affected households are timely solved.

E. INDEPENDENT ENVIRONMENTAL AND SOCIAL MONITORING CONSULTANT (IESMC)

1. Independent Environmental Monitoring Consultant (IEMC)

The monitoring and related audit of the subprojects will be carried out by Independent Environmental Monitoring Consultants (IEMC) appointed by Vinh Phuc PMU. The IEMC will be responsible for carrying out environmental sampling and monitoring with according to the frequency in ESIA of project, on all environmental-related issues regarding the works. They will check, review, verify and validate the overall environmental performance of the respective subprojects through regular inspections and review. This review will provide confirmation that the results reported by the contractors to the construction management consultants and the PMU are valid and that the relevant mitigation measures and monitoring programs provided in the subproject ESMP is being fully complied with. The IEMC will also supply specialized assistance to the PMU and, if required, to the CSCs, on environmental matters.

2. Independent Social Monitoring Consultant (ISMC)

In addition to internal monitoring by PMU, an independent monitoring agency (an academic or a consulting firm with proven track record in resettlement monitoring and evaluation) will be recruited by PMU to carry out monitoring of the SA/RAP implementation.

The contracted independent monitoring agency will provide independent monitoring and evaluation of the implementation of the SA/RAP. The service of independent monitoring will be maintained during project implementation until restoration of livelihoods of affected households has been re-established to pre-project levels.

The main indicators of independent monitoring include:

- a) Full payment of compensation for land, housing and other assets to PAPs prior to land acquisition.
- b) Adequacy of compensation in enabling PAPs to replace affected assets.
- c) Provision of technical support for house construction to affected households who rebuild their structures on their remaining land, or build their own structures in new places as arranged by the project, or on newly assigned plots.
- d) Provision of income restoration support.
- e) Restoration of productive activities.
- f) Restoration or replacement of community infrastructure and services
- g) Operation and results of grievance procedures (to check if the GRM functions properly and if grievances are fully and timely addressed to ensure the objective of RAP is met).
- h) Throughout the implementation process, household income trends will be observed and surveyed. Any potential problems in the restoration of living standards will be

reported.

During SA/RAP implementation, PMU (internal monitoring), PMU's consultant (independent monitoring), and the World Bank's Task Team are expected to work closely with each other. A Terms of Reference for the Independent Monitoring Consultant will be prepared by PMU and approved by the World Bank. Technical support will be provided by the Bank in the finalization of the ToR. Monthly and Quarterly Internal Monitoring Reports should be submitted to Bank for coordination and support purpose. Besides that, the PMU will be also responsible for the overall implementation and internal monitoring of this EMDP/RAP, and the same independent monitoring consultant (who is responsible for external monitoring RAP) will monitor the implementation of EMDP/RAP. Monitoring reports will be submitted to the World Bank for review and comments, by semi-annual basis.

F. COST OF ESMP

1. Cost of EMP

The cost for resettlement and compensation will not be included in the cost of ESMP implementation, instead it is covered the government counterpart fund. The ESMP cost for project will comprise: (a) cost for implementation of the mitigation measures by contractor, (b) cost for supervision by the CSC, (c) cost for the independent environmental monitoring consultant (IEMC), (d) monitoring of environmental quality, and (e) PMU safeguard management costs. Costs for the implementation of the mitigation measures during construction will be part of the contract costs while the costs for monitoring by the CSC is provided for in the construction supervision contracts. Costs for PMU operations related to the EMP are provided for in the project management budget of the PMU.

Estimated cost for IEMC is 176,683 USD include cost of Environmental quality monitoring. The environmental quality monitoring is USD 93,613 and IEMC costs are consistent with the national regulations for reference purpose. Budget arrangements for environmental and social monitoring are reflected in the project procurement plan. However, the final costs needs will be updated during detailed design process.

Table 3. Estimated EMP implementation cost (mil. USD)

Expenditure item	Cost (\$US)	Funding sources
(a) Implementing mitigation measures during construction	Part of the contracts	WB
(b) Supervising safeguards during construction	Included in construction and supervision contracts	WB
(c) ESU under PMU	From provincial budget for environmental protection	Counterpart fund
(d) IEMC	176,683	WB
(e) Environmental safeguard capacity building program	25,000	WB

2. Cost of implementation of resettlement (3 phase 1 subproject, plus estimate for the remaining, costs estimate from EMDP implementation, costs estimate form gender action plans

All the activities proposed in the mitigation program above would be implemented with national resources, and there are no international technical assistance requirements for

these activities. Beneficiaries of the programs are based on criteria of: a) vulnerability; b) poverty/income; and c) female-headed households. The table below summarizes the activities by component and year, in which requirement for compensation for 1st year is about US\$ 13.5 million and for EMDP support is about US\$38,000.

Table 4.1: Estimated Budget for RPF/RAPs/EMDP Implementation (USD)

No	Content	Total
A	Resettlement Activities	36,219,452
B	Ethnic Minority	38,000
C	Social Action Plan (<i>including GAP, Health Action Plan and Information Disclosure Campaign</i>)	32,666
	TOTAL	36,290,118

CHAPTER 6: PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. PUBLIC CONSULTATION DURING PREPARATION OF THE ESIA

Two public consultations were carried out during the preparation of project ESIA. In line with the Government's consultation procedures the first consultation was conducted to collect opinions from Department of Planning and Investment (DPI), Department of Natural Resources and Environment (DONRE), Department of Construction (DOC), DOT (Department of Transportation), DARD (Department of Agriculture and Rural Development), representatives from 7 districts/city of Vinh Yen, Phuc Yen, Tam Duong, Tam Dao, Binh Xuyen, Yen Lac and Vinh Tuong. There are 229 participants as leaders of PC of commune, wards, townships, community representatives, leaders of hamlets/neighborhoods in 56 wards/communes/townships in the project area. All comments and concerns expressed during the consultation have been taken into account during the preparation of the project's feasibility studies. The second consultation focused on the results of the impact assessment and the proposed mitigation measures. Details are provided in the ESIA reports and summarized in Table 4.

Table 4- Summary of Public Consultation Programs

Date	Purpose	Community's opinions
The first public consultation		
14 th August 2015	Disclosing information of project contents and proposed activities for the community, relevant NGO organizations, and local government in project areas; Gathering opinions of the government, community, organizations and advisory expert group in terms of environmental issues, especially undefined environment problems in the report. Based on this, public opinions are noted and integrated into project design as well as environment management plan; Ensuring accurate evaluation of entire environmental impacts and proposal for mitigation measures of environmental impacts with best results.	- Need to ensure electrical provision for affected households ○ - Manage waste strictly on site and assist job-placements for affected households whose production land will be acquired ○ - During project implementation, the project owner and construction contractors are required to comply with the contents presented in the ESIA - Overall the community is satisfied with EIAs and agreed to support the project.
The second public consultation		
December 30th, 2015	- Consultants sought opinions of leaders, unions, and organizations, and representatives of residents living in the Project-affected areas on the contents of draft environmental impact assessment	

In addition to the two public consultations required by the Government and World Bank policies, two local government agencies, the Provincial People's Committees and

Fatherland Front Committees, were also consulted. Their letters containing comments on the project can be found in the ESIA appendices. The ESIA report was disclosed at the World Bank's InfoShop in Washington DC by December, 2015. The ESIA report in Vietnamese will be disclosed at the office of the relevant District People's Committees and on the project website.

B. PUBLIC CONSULTATION DURING PREPARATION OF THE SA, RPF, EMPF, RAPS AND EMDP, EMDP

Main objectives of the public consultation under SA/RPF/EMPF preparation is to ensure the affected communities, households, local authorities, relevant agencies are provided with information, on the selection of technical options, potential impacts on land, income and non-land assets. During the implementation, consultation with communities, local authorities and relevant agencies aims at minimize conflicts and risks, increase investment efficiency and social soundness the project.

During preparation of RAP/EMDP, public consultations were carried out in different rounds and with methods, summarized as follows:

- I. A survey that include 965 households consulted through a questionnaire covering 21 wards in 7 project districts of Vinh Phuc province.
- II. Qualitative research was conducted through in-depth interviews, with 246 key informants. These include: a) leader of population group/chief of villages, b) leaders of Ward/commune People's Committee, c) Agriculture extension officials, d) head of medical stations, e) women's union, f) households located in the project area (including the affected households and beneficiary households), and g) affected and beneficiary households.
- III. In addition, 21 focused group discussions (including 172 peoples) and community meetings (including 392people) were carried out. These consisted on representatives from social unions of villages/hamlets and vulnerable households, ethnic minority households, household-headed women.

A *Stakeholder communication and Consultation Strategy* for the project implementation will ensure affected communities, households, local authorities, relevant agencies to be provided with information about the project, and for consulting about selection of technical options, potential impacts on land, income and non-land assets, among others.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSION

1. Environmental Aspect

The project implementation is consistent with the Vinh Phuc socio-economic development masterplan. The ESIA was prepared to identify all potential positive and negative impacts to the natural environment, local economy and society, to propose mitigation measures, and to delineate an environmental management and monitoring plan.

The assessment of potential negative impacts as identified in the report, include general impact and site-specific impacts for each component and each basin (B and C). The impacts are assessed according to the phases of the project including project preconstruction phase, construction phase and operation phase.

An environmental monitoring and supervision program has been proposed, in accordance with the scale of the project and the regulations of the government of Vietnam and the World Bank on environmental monitoring during project implementation in which the responsibilities of each unit are well indicated. The monitoring and supervision results will be submitted to the environmental authorities of Vietnam and the World Bank on a regular basis.

The ESIA has also been disclosed to the local authorities and people in the Project area and constructive and mostly positive comments were received from stakeholders consulted.

2. Social Aspect

The Project will generate positive environmental, social and economic impacts during the operational phase. This includes: (i) Increasing flood drainage capacity, water storage capacity and regulating water for Phan and Ca Lo rivers, meeting the water demands for communes along these rivers; (ii) improving of ecological environment and forming the regulatory lakes, compatible with overall planning of urban construction of Vinh Phuc province until 2030 and vision to 2050; (iii) implementing step by step drainage solution planning for entire Phan and Ca Lo river basin in Vinh Phuc; (iv) upgrading infrastructure of rivers, drainage channels in the event of heavy rain causing flooding and (iv) creating trust to attract FDIs into the exploitation of infrastructure and connection with Trans-Asia route of Hanoi - Lao Cai, focusing on attracting investments into the development of Binh Xuyen, Ba Thien, Tam Duong Industrial Zones and inland ICD port.

The alternative designs were reviewed carefully. However, involuntary resettlement is inevitable. It is estimated that 6,229 households could be affected throughout project life, of which an estimated 1,916 would be affected households under the three year-one subprojects. None of EM peoples are potentially affected as a result of permanent land acquisition although some 20 EM households could be potentially temporarily affected during the construction of the Binh Xuyen subproject as a result of land acquisition and possible fishing activities.

B. RECOMMENDATIONS

1. Environmental Aspect

As a large-scale project Vinh Phuc Flood Risk and Water Management aims to bring more socio-economic benefits to Vinh Phuc province. Therefore, during the implementation of the project the cooperation and coordination of related agencies, especially the support from the World Bank for financial and technical assistance, is needed.

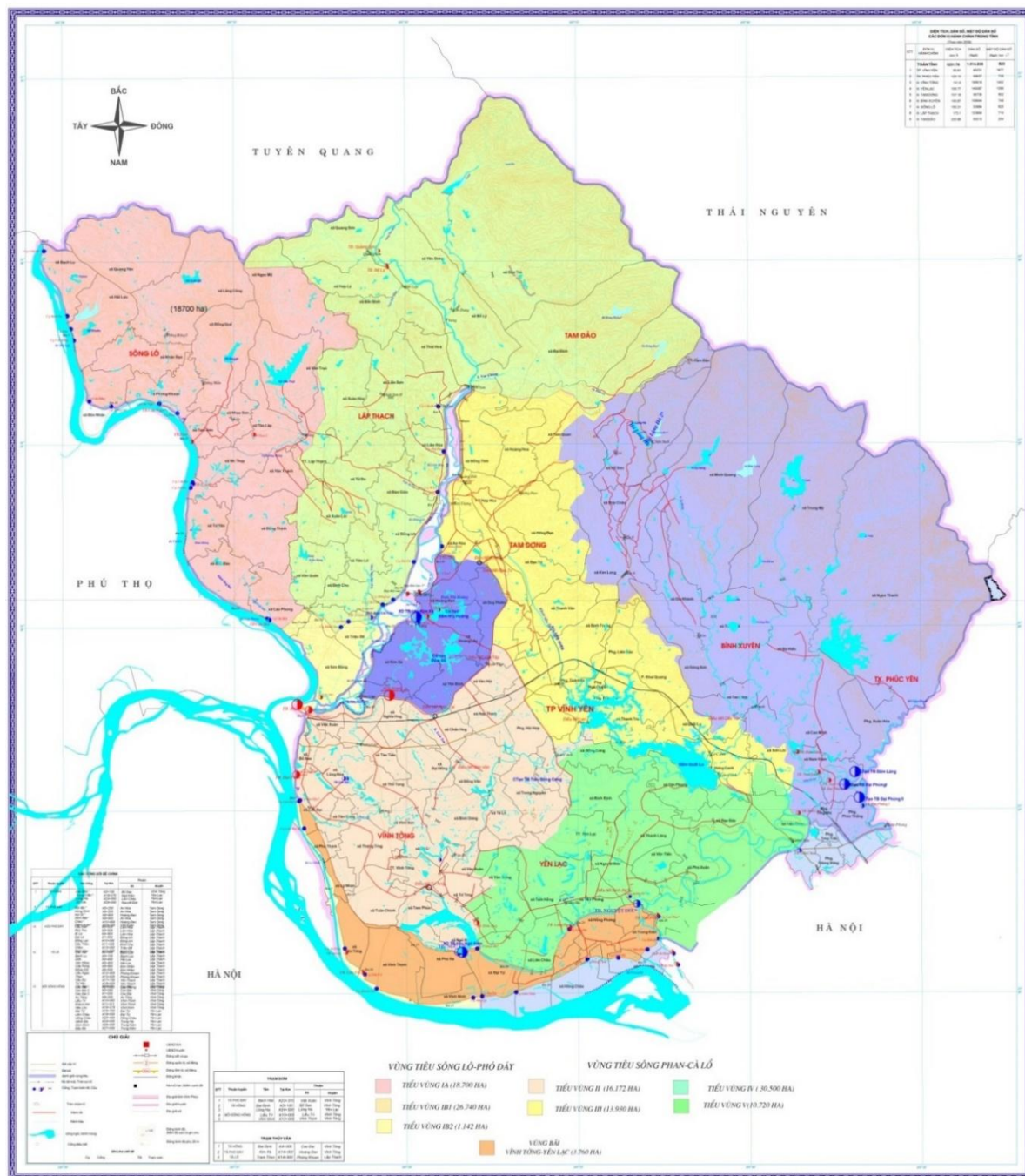
The project implementation will generate some potential negative impacts, therefore measures to minimize environmental impact in accordance with ECOPs and EMP must be executed throughout the project life and community and local governments should work together to strengthen supervision.

2. Social Aspect

The main negative social impacts related to the project includes: i) involuntary resettlement; ii) loss of livelihoods; iii) impacts on vulnerable groups; iv) impacts on safety and health. These impacts will be mitigated through a number of plans and programs prepared for the Project:

- Resettlement Policy Framework
- Ethnic Minority Policy Framework
- Ethnic Minority Development Plan
- Resettlement Action Plan;
- Social Action Plan
- Gender Action and Monitoring Plan
- Community Health Action Plan
- Stakeholder Communication and Consultation Plan

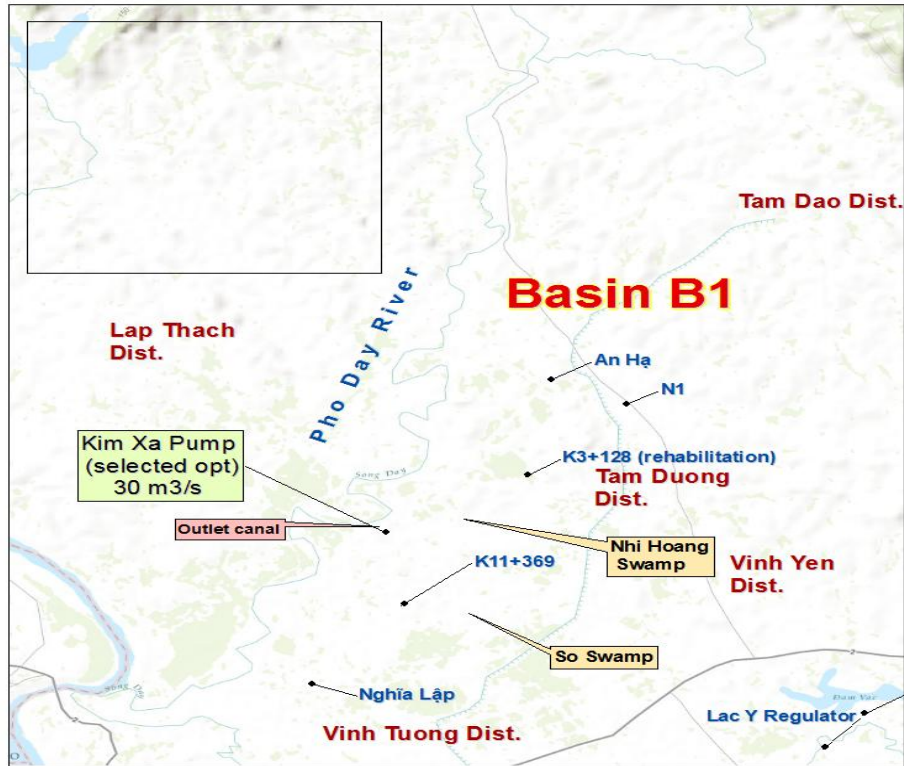
The PMU will be in charge of the implementation of these plans and programs and will ensure appropriate implementation in order to minimize negative impact to livelihood of local people, propose PMU to develop micro finance programme, agricultural Extension Services and training course on business development skills for affected households.



ANNEX 1. Vinh Phuc Province Basin Map



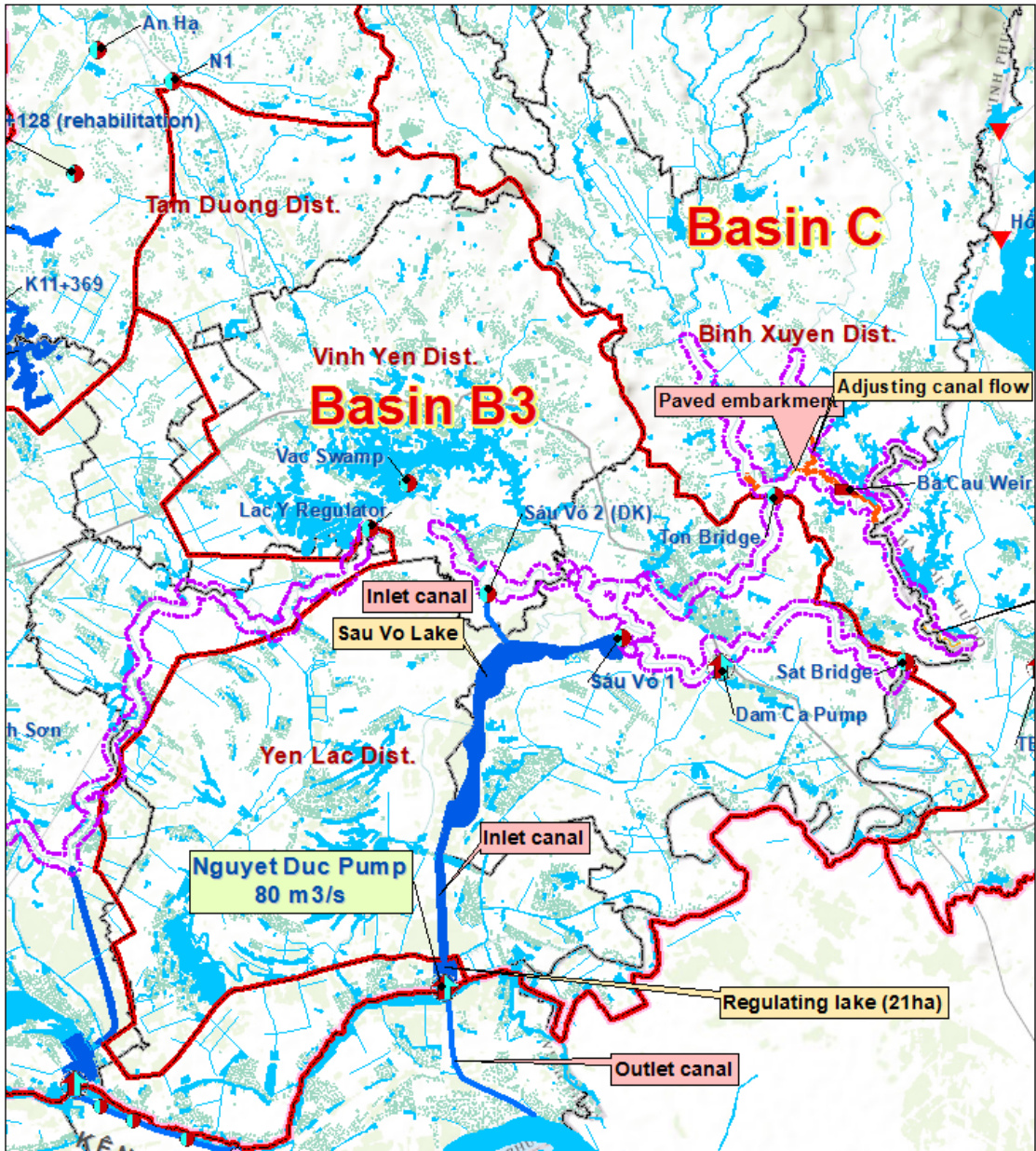
ANNEX 2. Layout of the basins and project investments



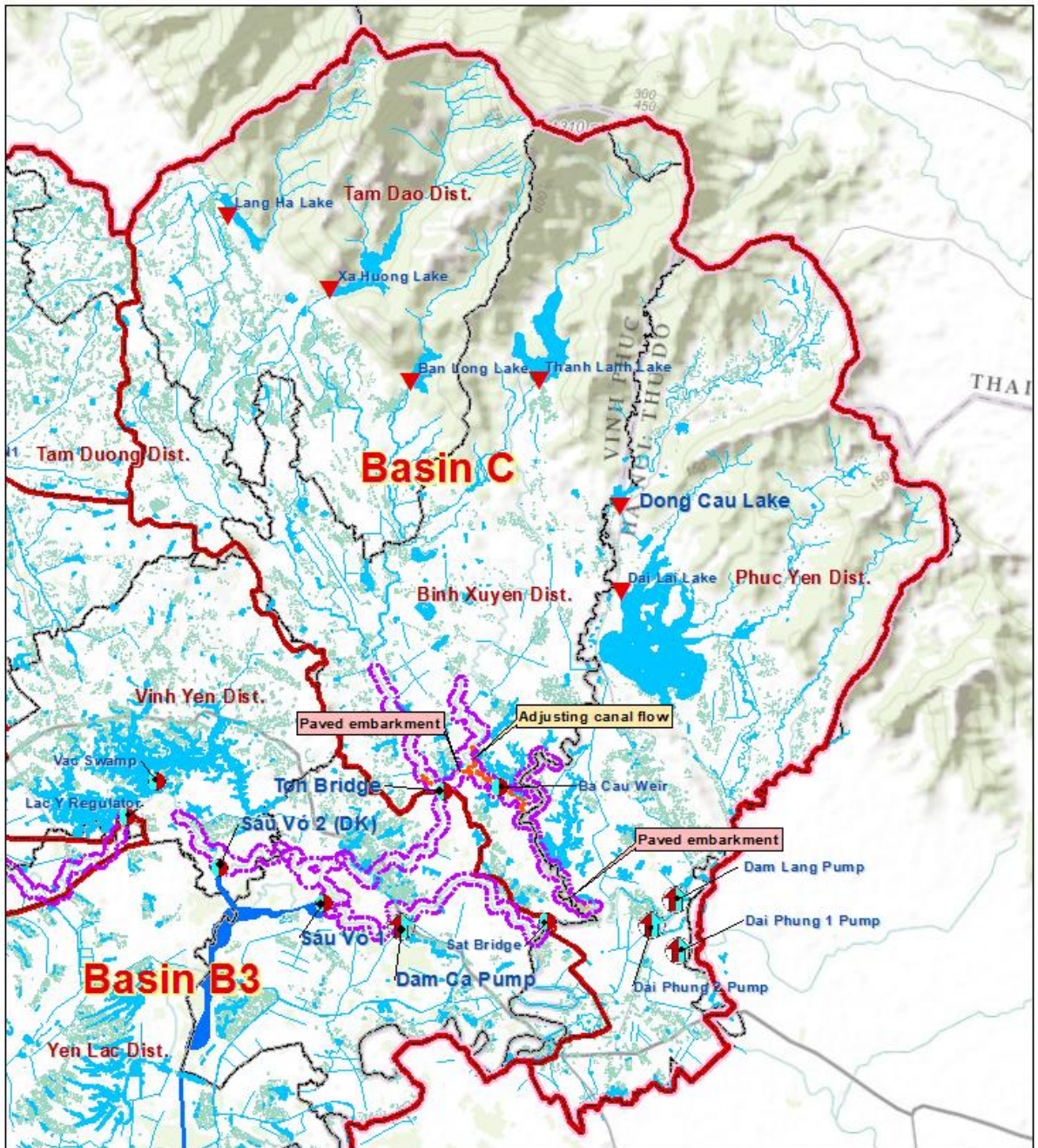
ANNEX 3. Map of Sub-basin B1



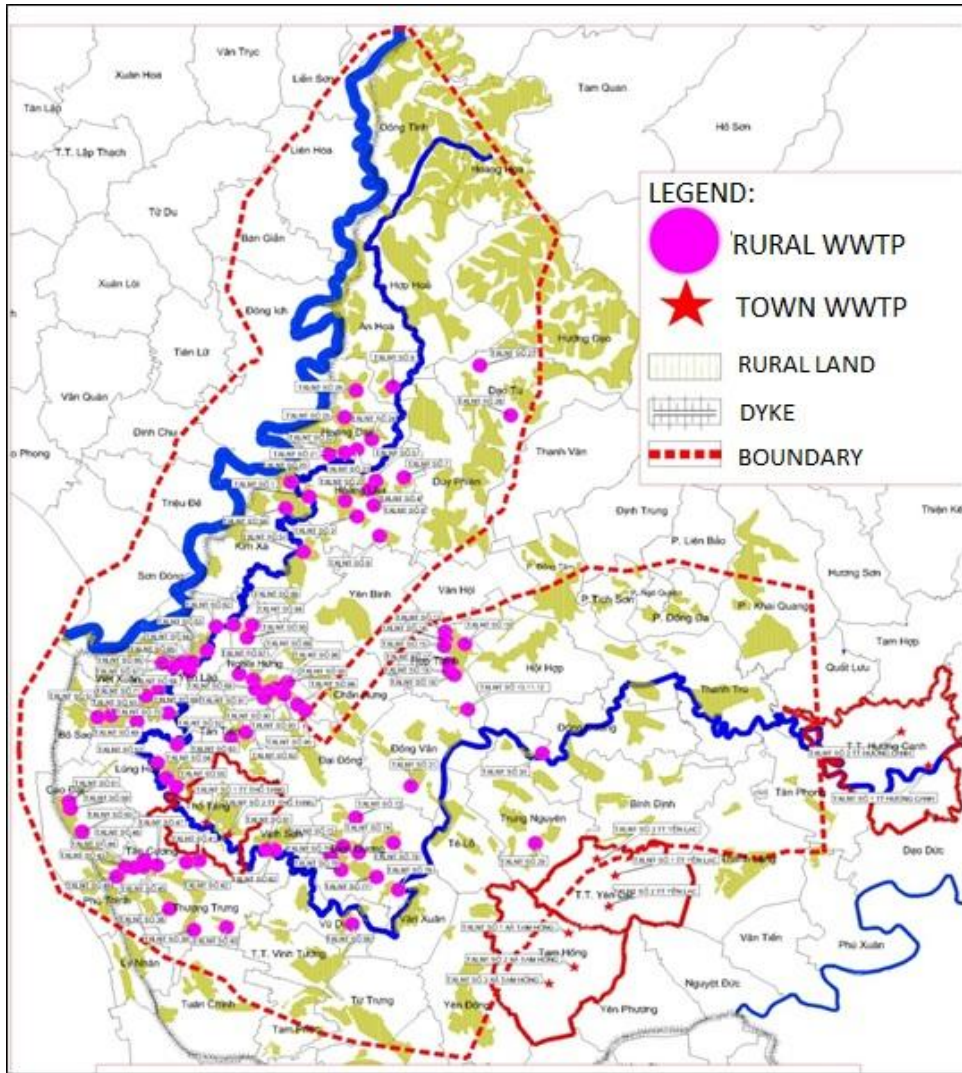
ANNEX 4. Map of Sub-basin B2



ANNEX 5. Map of Sub-basin B3



ANNEX 6. Map of Basin C



Annex 7. Locations of proposed wastewater treatment facilities of the Project Component 2

ANNEX 8 - Project Cost and Financing by Components

No	Project cost items	Construction costs after taxes (USD)	WB loan (USD)	Counterpart fund (USD)
A	Phase 1: 30% of the project value	37,298,344	33,568,510	3,729,834
I	Construction costs	35,815,151	32,233,636	3,581,515
II	Equipment costs	1,483,193	1,334,873	148,319
B	Phase 2: 70% of the project value	83,170,962	74,853,866	8,317,096
I	Construction costs	54,721,080	49,248,972	5,472,108
II	Equipment costs	28,449,882	25,604,894	2,844,988
III	Total of construction and equipment costs	120,469,306	108,422,376	12,046,931
IV	Component 3	14,545,450	13,090,905	1,454,545
	Total costs of Components 1, 2 and 3	135,014,756	121,513,281	13,501,476
V	Project management costs	1,500,390	-	1,500,390
VI	Construction consulting fees	3,959,644	805,714	3,153,930
VII	Other costs	7,389,126	3,485,355	3,903,772
VIII	Costs for compensation, support and resettlement	31,553,246	-	31,553,246
IX	Contingencies	26,185,302	18,216,107	7,969,195
	Quantity contingencies for additional work load	17,941,716	12,580,435	5,361,281
	Inflation contingencies for cost escalation	8,243,586	5,635,672	2,607,913
	Interest cost	13,640,475	5,979,984	7,660,491
	Total investment costs	219,242,940	150,000,440	69,242,500