NGHE AN PROVINCIAL PEOPLE'S COMMITTEE
DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT
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DAM REHABILITATION AND SAFETY IMPROVEMENT PROJECT (WB8)

REPORT
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
SUBPROJECT: REHABILITATION OF KHE GANG DAM AND RESERVOIR - NGHE AN PROVINCE

Nghe An, 5/2015

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REPRESENTATIVE
OF THE PROJECT OWNER

Nghe An, 5/2015

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LIST OF ABBREVIATIONS

AH	Affected Household
AP	Affected People
BOD	Biochemical Oxygen Demand
CPO	Central Project Office (MARD)
CSC	Construction Supervision Consultant
DARD	Department of Agriculture and Rural Development
DO	Dissolved Oxygen
DONRE	Department Of Natural Resources and Environment
EMDP	Ethnic Minority Development Plan
ESMP	Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
GOV	Government of Vietnam
HH	Household
IMC	Irrigation Management Company
MARD	Ministry of Agriculture and Rural Development
MONRE	Ministry of Natural Resources and Environment
OP	Operating Policies of the WB
PMU	Provincial Management Unit
QCVN	National Technical Regulation
RAP	Resettlement Assessment Plan
RPF	Resettlement Policy Framework
SA	Social Assessment
TCVN	Vietnam Environmental Standards
WB	World Bank
WHO	World Health organization
WUA	Water User Association

EXCUTIVE SUMMARY

1. The "**Rehabilitation of Khe Gang Dam and Reservoir**" is one of the sub-projects being proposed for funding under the World Bank-assisted Dam Rehabilitation and Safety Improvement Project (DRSIP). The objectives of the subproject are: (i) to ensure the longterm viability of the dam and reservoir; (ii) to ensure the safety of 2,500 people within the immediate downstream of the dam and the protection of 1,500 ha of agricultural and natural area, and downstream infrastructures particularly community buildings and the exposed segments of the National Road 48b and the Nghia Dan – Quynh Luu Railway; (iii) to ensure stable water source for irrigation of 120 ha of rice and 55 ha of seasonal crops and for domestic use and animal production. This environmental and social impact assessment (ESIA) was undertaken to comply with the World Bank's Environmental Assessment Policy and the Vietnam's Law on Environment Protection.

2. The Khe Gang reservoir in Ngoc Son commune, Quynh Luu District was built in 1991. Ngoc Son is situated in the partly mountainous area of Quynh Luu District, along 48B road from Nghia Dan to Cau Giat, 9km far from Cau Giat district center in the south. The dam and reservoir is owned by Nghe An Department of Agriculture and Rural Development (NADARD) and managed by the Dai Son Agriceultural Cooperative of Ngoc Son Commune. It was built under the aid of Belgian Government with design reservoir storage capacity is 1.7 million m^3. The basin area is about 5.25 sq km. The resevoir is the source of irrigation water for the 120 ha of rice lands and 55 ha of vegetables and seasonal crops lands. The existing headworks consist of the following structures:

a) ***Dam:*** It is homogeneous earth dam with crest elevation of 26m, crest length of 460m and crest width of 3 to 4m. The maximum height of the dam is 12.5m;
b) ***Spillway:*** It is an earth and broad-crested free spillway, 45m in width and +23.6m of the overflow elevation;
c) ***Water Intake***: It is an unsubmerged box culvert with dimensions of 0.6m×0.6 m, length of 50m, and, inlet elevation of +18.30m; and,
d) ***Management/Access Road***: It is a 303.4-m long dirt road with irregular width of 2-5 meters.

3. The current state of the dam does not guarantee safety. Over the years, the earth dam has degraded with dam face now substantially reduced and crest height becoming uneven. The construction of this dam is of low quality with a crude trench that resulted in infiltration of water through the body and foundation of dam. The protective layer of quarry stone on the upstream face has been slipping while the protective layer of grass graft downstream face has been severely eroded. Moreover, the earth spillway which lies on the right side of the dam has also been eroded and damaged, especially towards the side of the contiguous abutment and the downstream spillway. There is currently no management house/office on site or duly trained dam management staff. There is also no operating procedures and plans for flood prevention or emergency preparedness plan (EPP).

4. There are about 2,500 people within the downstream of the reservoir, producing rice on 1,500 ha of land. A national road (48B) and a railway (Nghia Dan-Quynh Luu) pass through the area and serve as the life-line connecting the west of Nghe An with to the coastal districts. The deteriorating condition of the dam also threatens the safety of these infrastructure as well as the lives and assets of downstream communities. In the recent years, due to the deteriorating condition of the reservoir, the water supply capacity has been reduced, adversely affecting the economic development of Ngoc Son Commune.

4. Rehabilitation and Upgrading Works: The proposed repair and upgrading works are based on the recommendations of the Dam Safety Assessment conducted on the dam. These include: the repair and upgrading of the dam body and foundation, reinforcement of the spillway, replacement of the water intake, construction of a small 54.6-sqm floor area management house, and the rehabilitation and upgrading of the existing management/access road. Sufficiently detailed plans for the sub-project repair works and their implementation have been prepared and served as the basis for this ESIA.

5. Environmental and Social Screening: Based on the Environmental and Social Screening, the sub-project is eligible for financing under DRSIP. The subproject is a Category B under the World Bank's classification. It is not located within or near any sensitive environment or natural habitat and there are no structures or sites in the area of cultural and historical significance that will be impacted by the rehabilitation. There are also no ethnic minorities in the area. The dam to be rehabilitated is by definition a small dam.

6. Environmental and Social Impacts: The sub-project when implemented will improve dam safety, protecting downstream infrastructure and the lives and assets of local people downstream of the dam. The repair and rehabilitation works will also ensure stable and reliable supply of irrigation water for the 175 ha of rice paddies, vegetables plots and aquaculture ponds, and supplement the existing groundwater source for domestic use of local people in dry season. However, there will also be some negative social and environmental impacts. These include: (i) loss of land, crops and economic trees due to land and temporary construction easement requirements of the sub-project; (ii) likely interruptions in irrigation service during the dam repair which would affect crop production; and, (iii) other temporary impacts associated with construction activities.

6. A survey of the area indicates that about 0.5 hectare will be permanently used by the sub-project while a total of about 1.0 hectare will be temporarily used during construction. Portions of these lands are currently planted with perennial crops and commercial trees while the rest are covered with shrubs and low value trees. The use of land by the sub-project will not displace any house or structure. The land is owned by the People's Committee of the Ngoc Son Commune. The household currently using the land will be compensated and supported sufficiently to comply with the DRSIP Resettlement Policy Framework (RPF) through a Resettlement Action Plan/Compensation Plan. The planned rehabilitation works will not affect any religious, cultural or historical structure such as graves, temple and/or monuments.

7. The other impacts associated with construction activities include: possible land degradation within the vicinities of the construction and quarry sites due to construction spoils, boulders, materials and rubbish; increased concentration of particulate matter (mostly dust); elevated noise; increased sedimentation and turbidity of surface water; traffic disruptions; possible damage to existing roadways by the heavy equipment traffic; and, a slight increase in health and safety risks for the workers and local population due to exposure to hazards at construction site.

8. Mitigation Measures – An Environmental Management Plan (ESMP) has been developed as part of this ESIA to address these impacts. The ESMP requires the adoption/implementation of the various other safeguardes instruments which have been prepared for the sub-project such as, the Resettlement Action Plan/Compensation Plan, the Communication Plan, the Gender Action Plan, the Grievance Redress Procedure, the Chance Find Procedure, and the Unexploded Ordinance Procedure. Specific measures in the ESMP

include, close consultation with the affected farmers for the optimal scheduling and timing of construction activities to minimize cropping disruptions, proper housekeeping at the construction site, disposal of construction spoils to a properly sited landfill, regular sprinkling of roads in residential areas during dry days, and the preparation and submission by the Contractor of its own Environmental and Occupational Health and Safety Plan for the construction site, incorporating construction-related measures and standard construction EHS practices such as wearing of PPEs, provision of adequate water and sanitation facilities at campsite, medical screening of workers, installation of fences and warning signs at dangerous areas and good community relations. The ESMP also requires the installation of a capacitated Dam Management Unit and the preparation of Emergency Preparedness Plan as recommended in the Dam Safety Assessment Report.

10. Institutional Arrangements: The Central Project Office (CPO) is responsible for the overall supervision of the sub-project implementation, including the implementation of environmental protection measures proposed in the ESMP. The Nghe An Agriculture and Rural Development Project Unit (NARDU) will be responsible for preparing detail bids/tenders information, selecting the contractor, preparing contracts and ensuring effective implementation and close supervision of ESMP. The contractor will be responsible for implementing the sub-project as planned including measures that are related to construction site management. The CPO will associate closely with local dam management authority to ensure the effectiveness of stakeholder consultation and ensure compliance with the requirements and measures. The Department of Natural Resources and Environment of Nghe An province will bear responsibility of supervising the implementation of environmental policies as per regulated by Vietnam Government. After subproject completed, the operation organization will take responsibility of maintenance and periodic inspection subproject's works.

12. Budget allocation: The estimated cost of the implementation of the ESMP, including compliance monitoring is VND **948,358,000.** The total estimated cost of the sub-project including implementation of the ESMP is **43,008,000,000**VND.

CHAPTER I. INTRODUCTION

The "Rehabilitation of Khe Gang Dam and Reservoir" is one of the 12 sub-projects identified for first year implementation under the Dam Rehabilitation and Safety Improvement Project (DRSIP, WB8). The DRSIP is a World Bank-funded project in support to the Dam Safety Program of the Vietnam Government through the rehabilitation and safety upgrade of a number of priority dams and reservoirs. The main objective of the dam rehabilitation is to protect and infrastructure downstream of the dam while at the same time improving the long term viability and operational efficiency of the reservoir.

This Environmental and Social Impact Assessment (ESIA) is carried out in compliance with the Vietnam's Law on Environmental Protection (LEP) and the World Bank's Environmental Assessment Policy (OP/BP 4.01).

1.1. METHODS

1.1.1. Environmental Impacts Assessment Methods

The following methods were used:

Field Survey Method: Collecting, synthesizing results from studies related to the project; Collecting and analysis data on topography, geology; meteorological, hydrological conditions; socio-economic conditions in the subproject area. This method is used to review natural, socio-economic condition of the project area. *Sociological survey method:* Conducting field survey, interviewing affected people (AP), local authority in affected areas and beneficiaries.

Environment Survey: This involves:

- Conducting a survey on realistic environment by field sampling and analysis of criteria at the laboratory to determine the status of surface water quality, groundwater quality and soil quality in the subproject area and surrounding areas;
- Air quality is collected from the background environment reports of Nghe An province or from related projects in the project area in 2014.
- The quality of surface water, ground water was taken by water sampling device as regulated in TCVN 6663-6:2008 (ISO 5667-6:2005). Handling and storage of water samples as regulated in TCVN 6663-14:2000 (ISO 5667-14:1998);
- The samples were taken out at the locations, which are shown on the sampling map as in Appendix A2. Samples of soil, water after taking were preserved and delivered to the standardized laboratory of the Station of Environment Monitoring and Analysis to analyze.

Rapid Appraisal Method: Use the pollution factors of the World Health organization (WHO) established to:

- Evaluate the pollution load in wastewater and gas emissions.
- Develop measures to mitigate pollution;
- Estimate the load and concentration of pollutants generated during the construction and operation stages of the project, which evaluated quantitatively and qualitatively the impacts on the environment.

Comparison Method: Evaluating the impacts by comparison among the norms and standards for the quality of soil, water, noise, air and environmental standards related.

1.1.2. Social Impacts Assessment Methods

The following methods of social impact assessment were used:

Document Collection Method: In order to assess social impacts, the consultants have studied the following documents:

- The current policy and mechanism of the Government and of Nghe An province related to capital construction investment;
- The standards and regulations related to the subproject technical design;
- Feasibility study of the subproject "Repair and Upgrading of Khe Gang reservoir, Nghe An province;
- The technical and environmental reports;
- The documents of topographical and geological survey of the subproject area;
- The documents and data on natural, socio-economic conditions of Ngoc Son commune, Quynh Luu district, Nghe An province;
- The survey data measured on the current environment status in the subproject area;
- Investment and technical design report, volume, budget estimates and drawings in March 2015;
- Statistical Yearbook of Nghe An province;

Field Survey Method: Conducting field survey in Ngoc Son commune. The experts/specialists used the prepared questionnaire to interview in combination with field observations method and group discussions, in-depth interviews with local leaders, representatives the AP groups and beneficiaries. This activity helps to collect overview information of the socio-economic conditions and characteristics of the people and subproject area, as the basis to propose appropriate measures to minimize direct and indirect adverse impacts by the project.

Household Survey: The consultants carried out the interviews to collect information on affected and benefited households individually. Beside multiple choice questions, there are also open-ended questions to get more ideas, while serving for the assessment and verifying the reliability of the information, considering the needs of support, rehabilitation and the risk of forced resettlement.

Sociological Survey Method: Taking survey, interviewing people around Khe Gang reservoir and leaders of Ngoc Son commune, households benefited from the supply of water from the reservoir.

Group Discussion Method: Consultants have been working with the leaders of Ngoc Son commune to make plan for focus group discussions. A total of three times of group discussion with participation from representatives of HHs with the following criteria: AHs (direct, indirect), HHs with female headed HHs, particularly difficult circumstances household (elderly, disabled, policy family, etc.).

Rapid Rural Appraisal Method (PRA): Consultants have used the PRA tools such as a seasonal calendar, map, and demand assesment for the community to help easily identify the issues to be addressed on a priority related to raising awareness about the objectives, the positive effects and potential negative impacts of the project. Participants in PRA is affected groups and benefited groups of the project.

1.2. CONSULTING AGENCY

This ESIA was undertaken by a group of consultants from the Center for Environment and Development (CED) and the Institute for Water and Environment (IWE). Their contact details are as follows:

Center for Environment and Development (CED)
No.122 - Le Hong Phong road– Vinh city - Nghe An province
Tel: 038.3560532/038.3838721

Institute for Water and Environment (IWE)
No. 2, Lane 165, Chua Boc Street, Dong Da district, Hanoi

Tel/Fax: 04 35634809

Table 1.1:List of Specialists

No.	Name	Organization	Position
1	MSc. Đặng Nguyễn Tuấn Tú	CED	Environmental Specialist
2	MSc. Bùi Thị Ban Mai	IWE	Environmental Specialist
3	Eng. Lê Thị Ngọc	CED	Irrigation Specialist
4	Eng. Trần Văn Tam	CED	Meterology Specialist
5	MSc. Lê Phúc Hiệp	CED	Social Specialist
6	Ms. Lê Thị Vân Anh	CED	Computing Specialist
7	Ms. Trần Thị Hường	CED	Economical Specialist
8	Ms.Trần Thị Tú	CED	Biological Specialist
9	Ms. Nguyễn Thị Trang	CED	Social Specialist
10	Mr. Hoàng Đại Nghĩa	CED	Computing Specialist
11	ME. Nguyễn Thị Nguyệt	IWE	Water Resources Management Specialist
12	ME. Đặng Thị Hà Giang	IWE	Economic of Natural resources and Enviroment Specialist
13	MSc. Đinh Văn Hưng	CED	Historical Specialist
14	Dr. Lê Phương Hòa	CED	Economical Specialist
15	Ms. Doãn Thị Thúy Hằng	IWE	Computing Specialist
16	Ms. Trần Thị Hoa	IWE	Chemical Specialist
17	Mr. Nguyễn Thanh Danh	IWE	Environmental Specialist
18	Ms. Lưu Thị Hường	IWE	Environmental Specialist

CHAPTER II. SUB-PROJECT DESCRIPTION

2.1. OVERVIEW OF THE SUB-PROJECT

The Khe Gang reservoir was built in 1991 with funding assistance from the Belgian Government. In 2005 the water overflowed through the dam crest and after that the dam had been upgraded using local budget. However, the headworks have been degraded and damaged reducing the irrigation design capacity and threatening the safety of downstream infrastructure, farms and communities.

Objectives:

The rehabilitation is aimed at:

- Ensuring the longterm viability of the dam and reservoir;
- Ensuring the safety life of 2,500 people and protecting 1,500ha of natural area;
- Protecting the safety of national road 48B and the railway Nghia Dan – Quynh Luu;
- Supplying stable water sources to irrigate for 120 ha of rice and 55 ha of seasonal crops; and,
- Supplementing the present groundwater source for domestic water, livestock and poultry use of local communities.

Owner:

Department of Agriculture and Rural Development, Nghe An Province
No. 129, Le Hong Phong street, Vinh city, Nghe An Province

Representative: Mr. Ho Ngoc Sy
Position: Director
Phone number: 0383.835.993

Total investment:

Total investment in the subproject is **43,008,000,000 VND** *(Forty-three billion, eight million Vietnam Dong)*

Location of the sub-project:

The Khe Gang reservoir is located at Ngoc Son commune, Quynh Luu district, Nghe An province, 60 km far from Vinh city in the north, on the southwest of the mountains, lying on Village 4A of Ngoc Son Commune. The geographical and administrative boundaries of Khe Gang reservoir as follow:

- The North borders on Village No. 5, Ngoc Son, Quynh Luu District;
- The South borders on Village No.4A, Ngoc Son, Quynh Luu District;
- The East borders on mountainous part of Quynh My Commune, Quynh Luu;
- The West borders on mountainous part of Village No.1, Ngoc Son Commune, Do Luong District.

The Khe Gang reservoir basin mainly covers the land of Villages 4A and 5, Ngoc Son Commune. The nearest resident area is about 500m and there are no cultural heritage

structures or sites in the area, nor are there sites or structures of national or local historical significance.

Figure 2.1: Location of Khe Gang reservoir, Ngoc Son commune, Quynh Luu district

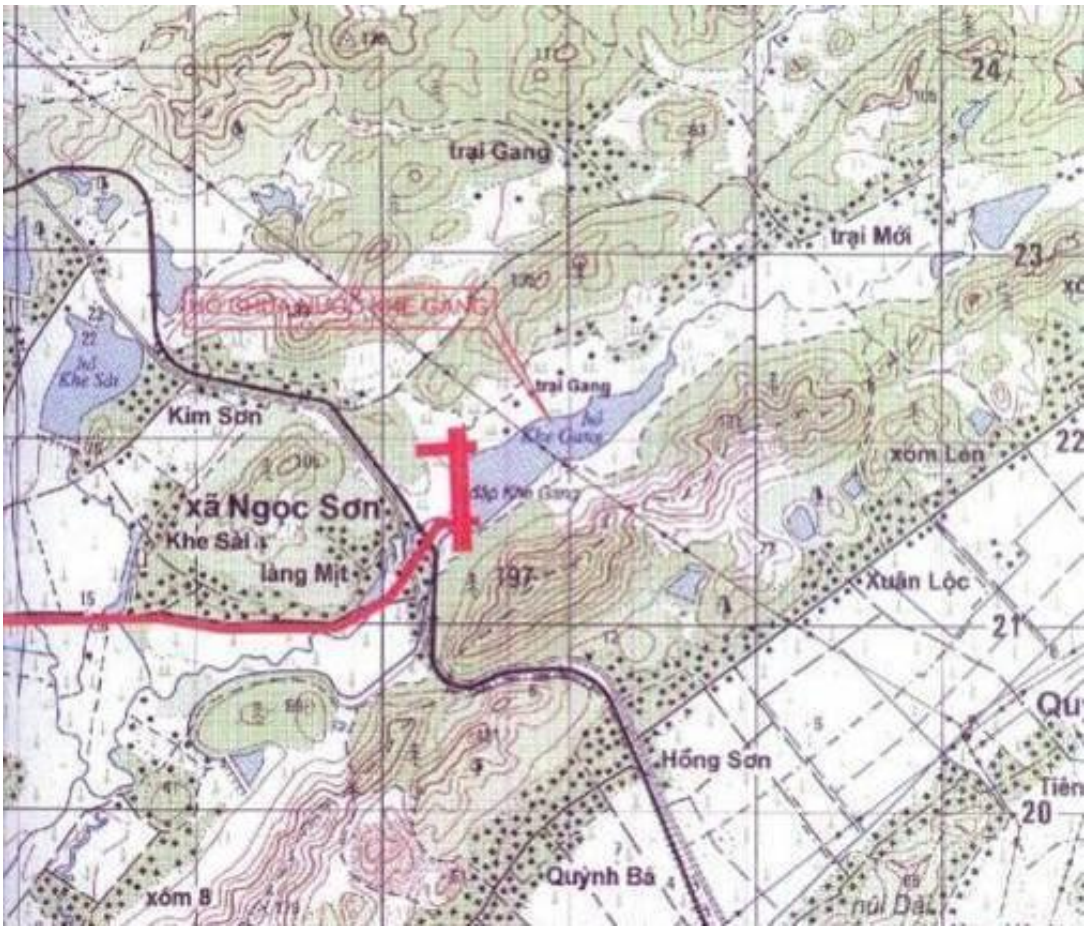

Figure 2.2: The site plan of Khe Gang reservoir

2.2. THE SUBPROJECT ACTIVITIES

2.2.1. Current status and Volume, Scale of items of the work and construction methods.

The subproject consists of the following major rehabilitation works:

Earth dam: additional embankment and reinforcement of the upstream face, planting of grass on the downstream face and construction of the downstream drain-ditch;

Spillway: Upgrading the spillway with the reinforced concrete, a chute and a cushioning pool.

Water Intake: Construction a of new culvert with the distance of 3m from the old one; Changing the size and form of water intake: from the box-shaped sized bxh = 600x600mm to a round-shaped tube with 800 mm diameter; and, installation of valve.

Management/Service road: Repair and upgrading of the 303.4-meters service road from the national road 48B to the dam.

Management House: Construction of a new single storey 54.6m^2 floor area Management House.

Table 2.1: Volumes and scales of the items and construction methods of Khe Gang reservoir

Items	Present Conditions/Configurations	Conditions/Configurations After Rehabilitation
Dam	*Parameters:* Homogeneous earth dam; length of 460m, maximum dam height of 12.5m. Crest elevation of + 26m; crest width of 3 - 4m. *Current status:* - Upstream face has been eroded and damaged many places. - Downstream face has been also eroded and the downstream face infiltration has not yet developed. Dam cross section is smaller than design. Infiltration occurs between the earth fill part and foundation in one-third right side of dam.	*Parameters:* Homogeneous earth dam, length of 486.5m; maximum dam height of 13m; crest elevation of+26.5m; crest width of 5.0m. ***Repair and upgrade:*** - Embank the upstream dam face with the compacted soil of γ_{tk} =1.67T/m^3. Upstream face coefficient: m=3; reinforced by the armoured concrete M200 of 12cm thickness from crest elevation of +26.50m down to +22.60m; from elevation of +22.60m down to +18.30m, stabilized by the placed rubble of 25cm thickness, below is 10cm of infiltration ballast and fabric filter bordered by frame of armoured concrete M200 of (5.0×5.0)m size and the dimension of the tie cross section (b×h) = (20×35)cm. - The downstream face coefficient m=2.5, from crest elevation +26.50m down to +19.50m is protected by planting grass bordered by the squares of (5×5)m and drainage ditch around. The toe drain of dam is developed at the foundation with the crest elevation of +17.50m, width of 2m, downstream face m=2. Elevation of infiltration attic of +19.5m includes 3 layers: 15cm sand, 15cm ballast, 30 cm protected paved rock outside. Develop the drainage ditches at two sides of downstream dam shoulder contiguous to the hill.
Spill-way	*Parameters:* The earth and submerged broad-crested	*Parameters:* The concreted and submerged broad-crested spillway with elevation of +23.6m

Items	Present Conditions/Configurations	Conditions/Configurations After Rehabilitation
	spillway with elevation of +23.6m,width of 45m. *Current status:* - The spillway shoulder and discharge canal is near the slipping mountain slope such that it is difficult to define accurately the spillway width. - No cushioning pool was constructed so the downstream of discharge canal has been heavy eroded, creating a deep ditch.	and width of 75m. *Repair and upgrade:* - Expand the width of spillway to 75m, reinforced by armoured concrete M200 and 30cm thickness. - A 40m-chute will be built with a slope of i=0.02, width of 50 - 75m, reinforced by armoured concrete M200 and20cm thickness; - Side wall: Gravity wall with armoured concrete M150, height of 1.5 - 2.7m, width of wall crest of 0.5m, width of bottom slab of 1.9 -:- 2.6m, 0.5m thickness; - Cushioning pool: length of 15m and depth of 1.2, bottom slab construction by armoured concrete M200, 30cm thickness; bottom elevation of +16.80m. - Reinforce the following discharge canal of 10m length after cushioning pool by armoured concrete M200, 20cm thickness.
Water intake	*Parameters*: The box-shape and unsubmerged water intake, reinforced concrete structure, vertical valve at upstream side. Elevation of 18.3m. *Current status:* - The box-shaped water intake has a dimension of 60×60 cm. - The stone made on-off gates have been damaged. Valves, scaffold, operation machine have been broken-down. - The old valve has been leaked and damaged rubber washers appearing at downstream infiltration flow.	*Parameters:* The round-shaped and submerged water intake, stainless steel tube, covered by armoured concrete M250, 30cm thickness, length L=49.0m. Elevation of upstream crest of +18.30m, slope i=0.001. *Repair and upgrade:* - The round-shaped water intake with Ø800cm diameter, 10mm thickness. - Dismantle the old one and replacing a new one with regulation valve and operation machine. The new is about 3.0m distance to the old one on the left. - Build the a small operation/control room at the downstream of water intake sized 2.6m × 2.6m height of 3.2m. The house structures are brick wall M75, 22cm thickness, reinforced concrete M200, 10cm thickness of ceiling and 02 VC800 on-off valves.
Management House	Not yet built.	Construct a new single-storey house with floor area of 54.6 sqm (i.e. 7.0m × 7.8m) to serve as management house. The structures are brick wall M75, 22cm thickness, mortar stone foundation M100, ceiling of reinforced concrete M200, and sun-baked tiles roof.
Manage-ment Road	*Parameters*: soil road, length of 303.4 m. *Current status:* - Narrow and muddy road in some sections. Other sections along the drainage canal are sloped and eroded. Motor vehicles cannot pass through during rainy season.	*Parameters*: Concreted road, length of 303.4m. *Repair and upgrade:* Expand the right of way width to 5m and the carriageway (pavement) width to 3.5 m. Replace embankments on eroded sections.

Plate #1: Erosion at downstream face

Plate #2: Infiltration at the contiguous body and foundation dam at downstream

Plate #3: Infiltration in right shoulder (turbid water flow)

Plate #4: Infiltration in right shoulder of dam

Plate #5: Spillway erosion

Plate #6: Spillway erosion hole

Plate #7: Spillway erosion hole

Plate #8: Damaged scaffold, operation machine and valve

Figure 2.3. Photos showing the existing conditions of the dam and facilities

2.2.2. The volume of construction works and transportation of soil, rock and materials

Table 2.2. Estimated transporting stone and construction materials activities

Items	Location	Quantity (exploring capacity)	Distance to construction site, transport routes
Quarry	Quarry A (Đ1) at mountainous area, Village 5. Quarry C (Đ2) at mountainous area, Village 1 of Ngoc Son commune.	96,000 cubic meters	0.5-1km
Landfill	At the Quarry A and C.	Enough capacity to accommodate all types of waste materials	1km
Construction materials supply	Cau Giat town	Ensuring adequate workload required	7km
Regrouping sites of Construction Materials	Both sides of dam shoulder, at Village 4A		0.1 – 0.2km

Location and volume of embankment materials: Embankment materials to elevate the dam from +19.90m up to crest will be taken from Quarry A and Quarry C. The details are as follows:

Quarry A (Signed as Đ2 on the map), 1km far from the dam.
Area: 1.3ha.
Average peeling depth: 0.4m.
Average exploiting depth: 2.0m.
Exploiting capacity: 26,000m^3.

Quarry C (signed as Đ1 on the map), 0.5km far from the dam.
Area: 2.8ha.
Average peeling depth: 0.4m.
Average exploiting depth: 2.5m.
Exploiting capacity: 70,000m^3.

Landfill areas are located at Quarry A and C.

The locations of the quarries, the landfill and the storage/stockyard for construction materials are shown on the map in Appendix A2.

Table 2.3. Majors construction volume of Khe Gang sub-project

Items	Unit	Volume
Concrete	m^3	5,436.3
Steel	Kg	221,070.2
Excavated soil	m^3	53,914.4
Filled soil	m^3	52,890.3
Casing	m^2	3,741.7
Paved stone	m^3	3,310.1

2.2.3. List of workers, machinery, and equipment for construction

The machineries and equipment that will be mobilized for the sub-project construction are as follows:

Table 2.4: Machineries and equipment to be mobilized during construction

Machinery/Equipment Specification*	For Use In	Quantity
Excavator (1.25 m^3)	Work and material excavation	04 + 01 back up
Sheep Foot Roller (9T)	Soil and concrete rammer reach the technical requirements	03
Dump Truck (10T)	Soil, stone, material transportation	10 trucks + 02 back up
Sprayer	Moisturising structures constructed	01
Bulldozer (110 CV)	Levelling construction	03 + 01 back up
Water Pump (320 m^3/h)	Foundation pumping	05
Concrete Mixer (500L)	Mixing concrete in construction	03
Vibrator cylinder (1.5KW)	Soil, concrete compaction	04
Vibratory Plate Compactor (1KW)	Concrete, dam rammer	04
Jumping Jack Compactor	Concrete, dam rammer	05
Electric Generator (75 KW)	Ensure electric for construction	1

*All machinery and equipment are expected to be in a good working conditions as will be required under the contractors contract.

2.3. CONSTRUCTION TIMETABLE

The total time estimated for the construction works of the subproject is 2 years.

Table 2.5. The expected construction schedule

Items	Construction time (yr.)	Start	Finish
Spillway	2	20/5/year 1	20/7/ year 1
Internal road construction, tents, regrouping sites of construction materials, construction works on management road and house	1	15/4/year 1	15/5/ year 1
Handling infiltration in upstream of dam	2	01/7/ year 1	30/8/ year 1
Water intake	4	20/5/ year 1	30/8/ year 1
Reinforce of the upstream and downstream face	4	20/5/ year 2	30/8/ year 2
Dam fill	1	20/5/ year 2	10/6/ year 2
The toe drain of downstream dam	4	20/5/ year 2	30/8/ year 2

The items are mainly constructed in dry season and in between cropping season when irrigation water is not needed. Moreover, the water level should be withdrawn only when constructing certain items such as water intake, when working on seepages/infiltration.

CHAPTER III. POLICY FRAMEWORK, INSTITUTIONS AND REGULATIONS

3.1. COUNTRY ENVIRONMENTAL AND SOCIAL SAFEGUARD POLICIES

3.1.1 Vietnam's EIA Process

The legal basis for the EIA in Vietnam is the Law on Environmental Protection (LEP) (1993). Decree 175 of 1994 as amended in 2005, provided guidance for the implementation of the law and additional regulatory documents made provisions for EIA. In August 2006, Decree 80/2006/ND-CP was issued, detailing the implementation of a number of articles of the LEP, specifically providing guidance in the implementation of the EIA, coverage, reporting and appraisal arrangements. The decree also outlines institutional responsibilities for EIA and EIA reporting requirements. This decree has since been amended by Decree No. 21/2008/ND-CP of February 2008 particularly in terms of coverage, environmental standards and community participation requirements and lately by Decree No. 29/2011/ND-CP. A number of Circulars and Decisions have also been issued. Among the important ones are: the MoNRE Circular 08/2006/TT-BTNMT which provides further guidance and instructions on the conduct of SEA, EIA and environmental protection commitments; and the Decision 13/2006/QD-BTNMT of September 8, 2006 promulgating the regulation on the organization and operation of the Council for Appraisal of SEA Reports and the Council for Appraisal for EIA Reports.

Coverage – Article 18 of the LEP broadly defines coverage of the EIA requirements. According to Decree 175/CP, EIAs are required for, among others, "projects being carried out within Viet Nam with the funds invested, assisted, granted or contributed by foreign organizations or individuals or international organizations". Based on this, DRSIP is clearly required to undergo EIA. The law is not clear how a project-wide EIA can be conducted for DRSIP since it consists of several sub-projects many of which will only be identified during implementation. Decree 21/2008 provides a detailed list of investment projects and activities in which EIAs are required. Under this lists, DRSIP subprojects fall within item 52 – Projects on reservoirs and irrigation lakes. Accordingly, an EIA is required if the reservoir capacity is 300,000 m3 or more. Other than this, there are no specific provisions for exemptions.

Administration - The Ministry of Finance, in cooperation with MoNRE leads in making reports, appraising and monitoring and implementation of EIA reports for national projects. The Department of Environment Impact Assessment and Appraisal (EIA&A) – Vietnam Environmental Protection Agency (VEPA) of Ministry of Natural Resources and Environment (MoNRE) is the central EIA authority for inter-sectoral and inter-provincial projects. The Provincial Department of Natural Resources and Environment (DoNREs) have been delegated to make decisions on numerous issues (including EIA) related to the use and management of local resources and environment. The People's Committee or Fatherland Front Committees act as responsible authority at community level. They also act as a go between for the local community and the proponents and may initiate public involvement. Appraisal Councils can be set up for the process of EIA appraisal. Finally, the LEP also provides for the National Assembly to consider and make decisions on projects with major environmental impacts. A schedule of such types of projects is determined by the Standing Committee of the National Assembly.

Timing and Process – Regarding the timing of the EIA process, Article 13 of the SEA and EIA Decree (2011) stipulates that the EIA report shall be made concurrently with the formulation of the feasibility study report of the investment project. The feasibility study is then also part of the dossier of request for the appraisal and approval of the EIA report.

Table 3.1. Vietnam EIA Process and Requirements

EIA Steps	**Description**
(1) Screening	Screening decision is made by the Appraisal Council or Appraisal Services Organization formulated at National or Provincial level. Screening is done with a list provided as an appendix of the EIA Decree No. 29/2011/ND-CP. The list contains thresholds based on project feature size/capacities against which EIA requirement is determined. A preliminary EIA report is presented as part of the starting dossier for EIA licence application. This preliminary EIA report alongside a feasibility study (or investment report) of the project act to inform the screening decision authority on the level of EIA required. Provision for sensitivie areas.Provisions for protection and conservation of sensitive areas exist. A full EIA is required for any project with likely effects on such areas. The starting document is a package consisting of: • A letter of request from the proponent for appraisal and approval of EIA report (a sample letter is given as annex 5 of the EIA circular No. 08 of 2006); • Seven copies of a preliminary EIA report in a stipulated format; and • Feasibility or investment report.
(2) Scoping	Formal scoping requirement is not specified
(3) Assessment and Reporting	Proponents are required to send the assessment documents to People's committee and people council at community level. The council may request public involvement in case of contentious issues. It is required to record complains and deliberations during public meetings and include them as part of the EIA report. The EIA report shall contain the following: • Brief description of project (name, owner , location and contents); Description of EIA reporting process, consultation, methods; • Assessment of natural environment of project; • Assessment of impacts; • Mitigation measures; • Commitment to implementation of environmental measures; • Construction works and programs for managing and controlling environmental issues in the course of project implementation; and, • Cost estimation for constructions of environmental protection works.
(4) Review	The project owner shall submit a dossier of request for appraisal of an environmental impact assessment report to a competent agency. An appraisal agency shall check for completeness. The appraisal agency shall then set up an appraisal council or select an appraisal service provider. No further specifications are given regarding the EIA review process. On the basis of the appraisal agency's notice of appraisal results of the environmental impact assessment report, the project owner shall carry out one of the following activities: • Making another environmental impact assessment report and submitting it to the appraisal agency for appraisal, if its environmental impact assessment report is not approved. The appraisal time limit and procedures are the same as for the first report; • Modifying and supplementing the environmental impact assessment report and submitting it to the appraisal agency for consideration and

EIA Steps	Description
	submission to a competent authority for issuance of an approval decision, if the environmental impact assessment report is approved on condition of modification and supplementation. The time limit for modification and supplementation of the report is not counted in the time limit for appraisal and approval of the environmental impact assessment report; • Sending the environmental impact assessment report to a competent agency for issuance of an approval decision under regulations, if the report is approved without modification and supplementation. EIA reports are appraised by appraisal councils or appraisal service providers. Depending on scale and level of project, it may be the Department of EIA and Appraisal of MoNRE or other ministries/governmental bodies at national level or the People Committee at the local level which approve the EIA report. The Appraisal Council or Appraisal Services Organization is a multi-disciplinary team of representatives of management agencies directly related to environmental issues of the project, of specialists and of representatives of the public. It is not specified however if the specialists are academics or Ministry of Environment experts. The appraisal agency has to check whether the dossier of request for appraisal of the EIA report is complete and other respond within 5 working days. For EIA reports that are appraised by MONRE there is a time limit of 45 working days, for the ones that are appraised by other authorities it is 30 working days.
(5) Decision	EIA report approval is a requirement for, but separate from, the decision on required permits for project approval. Depending on scale and level of project, it may be the Department of EIA and Appraisal-MoNRE or other ministries/ Governmental bodies at national level or the People Committee at the local level which approve the EIA report. Once the EIA reports are approved, an approval decision is issued and the EIA reports are certified. The decision is made public. A report on the decision as well as the certified EIA report are sent to various institutions, depending on which level the approval decision has been taken. The time limit for approving an EIA is 15 working days. Appeals are made to MoNRE either at the central or to the People committee at the local level depending on the project (to be confirmed). Appeals can be made against decisions approving EIA report. The proponent, public/ NGOs and private parties.
(6) Monitoring, Compliance and Enforcement	An environmental control program is part of the EIA report and then serves as a basis for the development of an environmental control plan after the EIA report has been approved. The agency approving the EIA report is responsible for inspection. Suspension of permit of operation or other penalizing measures are issued if the proponent does not comply with measures in the already approved environmental protection plan.

Source: Netherlands Commission for Environmental Assessment, http://www.eia.nl/en/countries/as/vietnam/eia

Public Participation - The LEP as amended (2005) and the regulations under it (Decree No.80/2006/ND-CP, Decree No. 21/2008/ ND-CP, Decree No 29/2011/ND-CP) include provisions for public consultations at two stages - in preparation stage and in review stage of the EIA report. The consultation process during the process of EIA reporting is determined to be as follows: The people to be consulted are the People's Committee of the affected commune and representatives of the affected communities and organizations. The project owner has to send them a written request for consultation together with brief documents on the major investment items of the project, on environmental issues and on environmental protection measures. When necessary, the People's Committee may then convene the representatives of the affected communities and organizations to a meeting and notify the project owner of it. The project owner shall be part of the meeting. Its results have to be recorded in writing and signed by the present parties. Within 15 working days after receiving

the written request for consultation, the People's Committee should then send a written reply to the project owner and publish it. If it does not do so, it is assumed that the people agree to the project plan. Agreeing and disagreeing opinions will be summarized in the EIA report.

Disclosure and Information Dissemination - The current EIA legislation provides for disclosure of environmental information and data. The public can assess EIA reports, decisions approving EIA reports and plans for implementation of such decisions. Final EIA reports written in Vietnamese are supposed to be made available to the public at one or more of the following places: government agency offices, health posts, schools and libraries.

3.1.2. Vietnam Eminent Domain Policy

- All lands in Vietnam are deemed owned by the State. However individuals possess land use rights (LURs). Recovery of land by the State is basically a two-step process: Compensation and Clearance which are both the responsibility of the District Compensation Committee.

Compensation Procedures -The following are the main elements of the compensation process:

- Compensation for perennial croplands of households that are revoked by Commune People's Committee (CPC) and compensation for trees and crops on their land.
- Compensation in money under replacement value calculated based on the specific land price in the most recent land recovery decisions.
- The compensation for damages are performed democratically, publicly prescribed by law.

Clearance Procedures – The following are the main elements of the clearance process:

- Early notice to the local government as well as the people affected by the project before implementing clearance procedures .
- Determining exactly route direction of travel as well as works and assets that will be moved according to the designby using measures such as measuring machine, marking
- Avoiding conflicts with local people during the clearance process by close and serious monitoring the units and hired individuals of project owner, local government and people.
- Defining clearly the boundary of clearance area.
- Install the signs and inform the restricted time and transport routes.
- Do not transport the waste during 2 periods: 7am to 8am and 5pm to 6pm that easily cause traffic congestion.
- Moving quickly all waste to waste dump within the day.
- Cover the trucks that collect and transport waste to waste dump with canvas during the transport process, do not overcharge and ensure that no waste drop along transport routes.

3.2. APPLICABLE WORLD BANK SAFEGUARD POLICIES

Eight of safeguards policies of the World Bank are deemed triggered under DRSIP based on an initial assessment of the project concept. These are: (1) Environmental Assessment (OP/BP 4.01), (2) Safety of Dams (OP/BP 4.37), (3) Pest Management (OP/BP 4.09), (4) Natural Habitat (OP/BP 4.04), (5) Indigenous Peoples (OP/BP 4.10), (6) Involuntary Resettlement (OP/BP 4.12), (7) Physical Cultural Resources (OP/BP 4.11) and, (8) International Waterways (OP/BP 7.50) (See DRSIP Concept Note ISDS).

Environmental Assessment (OP/BP 4.01) - The World Bank Environmental Assessment Policy is deemed triggered under DRSIP as the project will support the physical rehabilitation of existing medium to large dams. This ESIA on Khe Gang Nghe An subproject is conducted in compliance with this policy (See DRSIP ESMF).

Safety of Dams (OP/BP 4.37) - This policy is triggered for DRSIP due to the planned rehabilitation of existing dams, many of them fall within the category of large dams as per definition in the World Bank OP/BP 4.07. The policy considers dam as large if they are at least 15 meters in height or has at least 3 million cubic meters of reservoir capacity. For large dams, the policy requires the engagement of independent dam specialists to (a) inspect and evaluate the safety status of the existing dam, its appurtenances, and its performance history; (b) review and evaluate the owner's procedures for operations and maintenance; and (c) provide written report of findings and recommendations for any remedial work or safety-related measures necessary to upgrade the existing dam to an acceptable standard of safety.

Natural Habitats OP/BP 4.04 - The project physical activities would only work on existing dams and are not expected to lead to any impacts on critical or semi-critical natural habitats. The locations of subproject are not known at this stage. The ESIA for each sub-project will scope, screen and assess potential impacts to natural habitants according to the ESMF. No separate instrument is required for natural habitats.

Forests OP/BP 4.36 – DRSIP will not have any impact on the health and quality of forests, the rights and welfare of people and their level of dependence upon or interaction with forests; or the management, protection, or utilization of natural forests or plantations. Integrated watershed management is potentially supported but is not expected to impact natural forests. This sub-project does not have any impact on the health and quality of forests.

Pest Management OP 4.09 – No -The project is intended to improve the safety of prioritized dams and reservoirs in order to protect the population and assets of downstream communities from the risk of dam failure. Irrigation expansion or agricultural water supply is not an aim of the project. The project will not finance any procurement of fertilizers and pesticides. Accordingly, the policy has not been triggered.

Physical Cultural Resources (OP/BP 4.11) - Yes - Some dams may have cultural property associated with them that may be impacted by dam strengthening activities. A Cultural Property Action Framework would be developed as part of the ESMF to safeguard these properties during rehabilitation. This safeguard policy has been triggered as advance precautionary measure.

Indigenous Peoples (OP/BP 4.10) - Since most of these works are located in the upstream/ mountainous areas where ethnic minority peoples may live, this policy is triggered. An Ethnic Minority Development Framework (EMDF) has been prepared for DRSIP. In compliance with this policy as well as OP/BP 4.12 a Social Assessment on the Khe Gang sub-project has been undertaken as part of this ESIA.

Involuntary Resettlement (OP/BP 4.12) - The Project will require land acquisition (permanent and temporary) for the rehabilitation of the selected dams. These activities may affect houses, assets, crops, perennial trees, graves and livelihood of the households living in the vicinity of the works. A Resettlement Policy Framework (RPF) has been prepared for DRSIP. A RAP has been prepared for this subproject.

Projects on International Waterways (OP/BP 7.50) – There are six transboundary river basins in the country; however Vietnam is an upstream riparian only in the Sesan-Srepok basin - a tributary of the Mekong, upstream of Cambodia, and the Bang Giang-Ky Cung basin, upstream of China. It is expected that some of the dams will be located on international river basins and therefore the policy is triggered, however there are not expected to be transboundary impacts as project activities are limited to rehabilitation. A waiver for notification will therefore be sought in accordance with the Operational Policy. This sub-project is not located in any of the abovementioned transboundary river basins.

CHAPTER IV. BASELINE ENVIRONMENT AND SOCIAL CONDITIONS IN THE SUBPROJECT AREA

4.1. NATURAL ENVIRONMENT

4.1.1. Geographic Location of Khe Gang Dam

As described earlier, the Khe Gang Dam is located in Ngoc Son Commune of the Quynh Luu District in the Nghe An Province. The following are general geographical description of the area:

Nghe An Province - Nghe An is located in the heart of North Central region, stretched along the North to South Highway and East - West highway, 300km from Hanoi capital to the South. Along the road No.8, it is about 80km to Viet – Lao border and nearly 300 km to Lao – Thailand border. There are all kinds of transportation in Nghe An: road, railway, navigation, airway, and sea route. Beside 419 km length of border and 82km length of coastline, Nghe An also has Vinh Airport, Cua Lo Port, being upgraded, expanded and new construction of infrastructure, all of these that have made a lot of advantages for Nghe An in economic-social exchanges with over the country, region and world. The province is also situated northeast of the Truong Son mountain range, with gradual slope from northwest to southeast. The natural area of province is 1,648,729ha, with ¾ area of mountains, mainly located in the west of the province. Narrow plain is only 17% of total area from South to North, faces to East Sea and mountains surrounded. The terrain of province is divided by dense river network and mountain range, so causing a lot of obstacle in transportation improvement and consume products.

Quynh Luu District - Quynh Luu is generally a coastal plain district, with 43,762.87ha of natural area, 279,977 of population (04/2013); 33 administrative units (including 32 communes and 1 town). It is 60km far from the district center, Cau Giat town, to province center of province, Vinh city. The South border of Quynh Luu district is Hoang Mai town, the East borders on the East sea, the West borders on Tan Ky district and Nghia Dan district, the Southwest borders on Yen Thanh district, the South borders on Dien Chau district.

Ngoc Son Commune - Ngoc Son is one of the mountainous communes of Quynh Luu district, 7km from district center to the West. The East borders on Quynh My and Quynh Hoa commune; the West borders on Quynh Lam commune, the North borders on Quynh Tan commune, the South borders on Dien Lam commune of Dien Chau district. The total natural area is 2889.43 ha, including 807.42ha of agricultural production land, 1439.73ha of forestry land, 387.52ha of none-agriculture land and 255.18ha of unused land. There are 12 villages with 9km total length and 4km width of commune. The population is 9,110 people with 1,890 households.

4.1.2. Climate and Hydrology

4.1.2.1. Climate and Meteorology

Khe Gang area of Ngoc Son commune has characteristic of tropical monsoon, called North Nghe An – South Thanh Hoa climate. There are two seasons in a year. Rainy season is from July to November; Dry season is from December to next June.

Temprature: The mean year temprature is 23.7^{o}C, the highest and lowest temprature are 40^{0}C and 9^{0}C respectively. The month of highest temprature is July and lowest is January.

Sunshine hour: The mean year sunshine are 1,772 hours. The months of highest and lowest sunshine hours are July and February respectively.
Air humidity: The mean year humidity is 85.4%. The months of highest and lowest humidity are March and January respectively.

Rainfall: The mean year rainfall is around 1,600mm. The major rainfall is concentrated in the rainy season, accounting for 80-85% of total year rainfall.

Table 4.1. Monthly and yearly rainfall of Quynh Luu meteology station

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (deg-C)	17.4	17.9	20.2	23.7	27.3	29	29.2	28.2	26.8	24.4	21.4	18.5	23.7
Hours of sunshine	87	58	76	134	223	203	227	189	175	162	152	114	1,772
Humidity (%)	86.3	88.5	90.2	89.9	85.3	81	79.7	84.5	87.1	85.5	83.6	83.3	85.4
Precipitation (mm)	19.9	23.4	30.0	55.1	106	129.7	125.1	2487	419.6	333.1	82.9	33.2	1,606.6

- *Evaporation*

+ The highest year evaporation: 1,055mm
+ The lowest year evaporation: 654mm
+ The mean year evaporation: 915mm

Table 4.2. Calculation results of reservoir evaporation

Unit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Z(mm)	**55.2**	**28.7**	**39.3**	**63.2**	**100.1**	**144.9**	**106.9**	**59.7**	**111.3**	**74.0**	**71.0**	**80.5**	**935**
Ratio	**0.059**	**0.031**	**0.042**	**0.068**	**0.107**	**0.155**	**0.114**	**0.064**	**0.119**	**0.079**	**0.076**	**0.086**	**1.00**
□Z(mm)	**27.2**	**6.9**	**12.9**	**27.1**	**48.4**	**74.6**	**52.2**	**29.9**	**60.0**	**38.1**	**36.5**	**42.0**	**455.8**

Wind: The wind in the region is divided into two distinct seasons: from May to October, the direction is Southeast with moisture come from East Sea. The other direction is southwest – hot and dry continental climate. From November to April, the wind direction is northeast, dry or windy drizzle. $V_{50\%}$= 20.7m/s; $V_{4\%}$= 35.0m/s.

4.1.2.2. Hydrology

Ngoc Son commune has 20 dams and reservoirs in total, with 170ha of water surface area, of which Khe Gang is the biggest reservoir with 1.5 million m^3 storage capacity. There are two biggest streams namely Khe Gang and Khe Sai and they cross each other at the end of irrigation area of Khe Gang reservoir and flow to Thai river at Quynh Lam commune.

To calculate hydrological characteristic for basin, we use measurement data at Khe La and Tay Hieu meteorological stations.

Khe La meteorological station (F=27.8Km^2) locates on Khe Thiềm stream with the geographical location of 105^{0}20'east longitude and 19^{0}06'north latitude. The parameters observed from 1970 to 1994 and the calculated results as follow:

The main flood flow:

Calculation frequency	0.5%	1%	1.5%	5.0%
Q (m^3/s)	132.8	120.8	108.7	79.5

Annual flow P=85%

Basin	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Khe La	0.208	0.169	0.103	0.129	0.142	0.236	0.050	0.330	0.282	2.700	0.364	0.141	4.854
Khe Gang	0.0446	0.0339	0.0207	0.0259	0.0305	0.0506	0.0107	0.0669	0.0572	0.5474	0.0738	0.0302	0.992

4.1.2.3. Natural Disaster

The subproject is located in a region prone to natural calamities brought about by hurricanes, tropical low pressure, flood, drought, whirlwind, thunderstorm, etc.

Storm and tropical low pressure: The subproject area is affected by 1 to 2 storms annually. It often occurs in the period from August to October. The highest wind velocity is at 12 level.

Flooding: In recent years, heavy rains have occurred more often in Quynh Luu district, especially the historical floods in the years 2000 and 2013 cause heavy losses of people's death and property.

Drought: Drought and water shortage often occurs in the region in dry season and is increasing recently. The unusual heat wave occur oftenly and increase intensity leading drought occurred more seriously caused by the extensive damages to agriculture.

Damaging cold: The abnormal damaging cold has occurred recently causing extensive damage to agricultural production and people's life. The typically damaging cold was in 2008, 2010-2011, 2013-2014.

Hurricanes: Due to the impacts of climate change, natural disasters such as hurricanes occurred more often in Nghe An province in recent years. There have been deaths of these extreme weather.

4.1.3. Topography

Khe Gang reservoir with catchment area F=5.25 km^{2}includes parts of Gang stream watershed originated from the Northern mountains of Ngoc Son commune. The watershed is relatively flat and low hill-land; small and flat reservoir foundation, mainly the lowland area of stream and be heavy sediment, strongly growth of grass. Surrounding area is arable land of local people.

The topography of the reservoir area: the lowest elevation of reservoir foundation is + 14.00m. The water level can be storaged at + 28.00m. The reservoir is stretched towards the northeast.

The topography of the irrigation area: The elevation of irrigation area changes from + 12.00m, to + 8.00m.

4.1.4. Geology

a. Geology of the dam

Layer 1: From medium to heavy loam mixed gritted macadam, yelow-grey and brown-grey colors. It's originated from filled soil of the dam.

Layer 1a: Medium loam mixed gritted macadam, grayish brown, brown-grey and and ash-grey. It's hard-plastic structure and low compactness. It's originated from filled soil of the dam.

Layer 2: Ash-grey clay. It's hard-plastic structure and medium compactness. It's originated from alluvial (aQ).

Layer 3: Heavy loam mixed with lasterit, light yellow mixed brown-grey and red-grey. It's half-hard structure and medium compactness. It's originated from alluvial (aQ).

Layer 4: Clay mixed grit, yellow-grey, white-grey and red-brown. It's half-hard structure and medium compactness. It's originated from alluvial (aQ).

Layer 5: Medium loam mixed grit, yellow-grey mixed brown-grey and red-brown. It's hard to hard-plastic structure and medium compactness. It's originated fromresidue soil (deQ).

Layer 6: Decayed rock completely to light and medium loam mixed grit and splinter, the rock core imcompletely colors white-grey mixed yellow-grey and red-brown. It's half-hard to hard structure and medium compactness. It's originated rock structure.

Layer 6a: Strong decayed arenaceous rock, brown-grey and brown mixed white-grey and red-brown. It's thick layer divided structure, coarse grain, strong crack and cavity filled with the clay. The core drilling has been broken in small pieces and gritted loam softly.

Layer 6b: Medium decayed arenaceous rock, light blue-grey. It's thick layer divided structure.coarse grain, medium to strong crack and cavity filled with secondary minerals, rough face and iron oxigen sticked. The core drilling has been broken in desiccation breccias and some pieces sized 5-10cm, relatively hard.

b. Geology of the Spillway

Layer 6: Decayed rock completely to light and medium loam mixed grit and splinter, the rock core imcompletely colors white-grey mixed yellow-grey and red-brown. It's half-hard to hard structure and medium compactness. It's originated rock structure.

4.1.5. Water environment

4.1.5.1. Surface water

The Centre for Environment and Development in collaboration with the Station of Labour Monitoring and Environment Analysis under the National Institute of Labour Protection to survey, sample and analysis. The surface water samples were taken at the following locations:

+ NM1 sample at the south of dam, co-ordinate (N:$19^0$11'04,0" &E: 105^o35'45,1");
+ NM2 sample at the north of dam, co-ordinate (N:$19^0$11'19,4" &E: 105^o35'45,0");+ NM3sample atback channel of dam,co-ordinate (N:$19^0$10'54,2" &E: 105^o35'35,3").
Results of surface water analysed are showed in table 4.3

Table 4.3. Results of surface water analysis

Parameter	Unit	Results			QCVN 08:2008/ BTNMT (B1)
		NM1	NM2	NM3	
Temperature	oC	22.3	21.8	23.7	-
Turbidity*	NTU	1.23	1.98	0.85	-
pH	-	7.02	7.00	6.98	**5.5-9**
EC	µS/cm	181.2	154.2	148.3	-
DO	mg/L	4.53	4.61	5.58	**≥4**
SS	mg/L	27	13	11	**50**
TDS	mg/L	115.9	98.7	94.9	-
COD	mg/L	18.5	13.3	12.7	**50**
BOD_5	mg/L	6.5	4.1	3.9	**15**
NO_2	mg/L	<0.01	<0.01	<0.01	**0.04**
NO_3^-	mg/L	2.23	1.98	3.24	**10**
NH_4^+	mg/L	<0.06	<0.06	0.15	**0.5**
PO_4^{3-}	mg/L	<0.05	<0.05	<0.05	**0.3**
SO_4^{2-}	mg/L	<5	<5	<5	-
Cl^{-*}	mg/L	35	27	46	**600**
Fe	mg/L	0.124	0.131	0.152	**1.5**
As	mg/L	<0.0016	<0.0016	<0.0016	**0.05**
Pb	mg/L	<0.0016	<0.0016	<0.0016	**0.05**
Cd	mg/L	0.0010	0.0009	0.0014	**0.01**
Coliform	MPN/100ml	4,600	5,100	3,900	**7.500**
Clostridium perfringens	MPN/100ml	KPH	KPH	KPH	-

(Source: Station of Labor Environment Monitoring and Analysis,, 2015)

According to measurement and analysis results, the criteria of surface water quality in the subproject area in the survey time are under the allowed limitation. Therefore, there is no signal of surface water contamination in the subproject area.

4.1.5.2. Ground water

Ground water samples were taken in 02 locations as following:
+ NN1 sample at the household of Pham Thi Luyen, co-ordinate (N:$19^0$11'12.1" &E: 105^o35'38.1");

+ NN2 sample at the household of Trịnh Xuân Điền, co-ordinate (N:19^{0}10’54.0” &E: 105^{o}35’35.0”).

Results of ground water analyzing are showed in table 4.4.

Table 4.4. Results of ground water analysis

Parameter	Unit	Result		QCVN 09:2009/ BTNMT
		NN1	NN2	
Temperature	oC	19.7	20.3	-
Turbidity *	NTU	0.21	0.66	-
pH	-	5.91	5.98	**5,5-8**
Conductivity EC	µS/cm	134.4	650.0	-
$CaCO_3$ *	mg/L	70	268	**500**
SS	mg/L	<2	<2	-
TDS	mg/L	86.0	416.0	-
DO	mg/L	2.32	1.98	-
COD	mg/L	<0.4	<0.4	**4**
NO_2^-	mg/L	<0.01	<0.01	**1,0**
NO_3^-	mg/L	1.04	1.54	**15**
NH_4^+-N	mg/L	<0.06	<0.06	**0,1**
PO_4^{3-}	mg/L	<0.05	<0.05	-
SO_4^{2-}	mg/L	<5	<5	**400**
Cl^-	mg/L	12	17	**250**
Fe	mg/L	<0.035	<0.035	**5**
As	mg/L	<0.0016	<0.0016	**0.05**
Pb	mg/L	<0.0016	<0.0016	**0.01**
Cd	mg/L	0.0010	0.0009	**0.005**
Coliform	MPN/100 ml	KPH	KPH	**KPH**
E.coli	MPN/100 ml	KPH	KPH	**KPH**
Clostridium perfringens	MPN/100 ml	KPH	KPH	-

(Source: Station of Labor Environment Monitoring and Analysis, 2015)

According to measurement and analysis results, the criteria of ground water quality in the subproject area at the survey time are under the allowed limitation. Therefore, there is no signal of ground water contamination in the subproject area.

4.1.5. Air environment

Air samples were taken at the following locations:

+ K1 at the south of dam, co-ordinate (N:19^{0}11’03,6” &E: 105^{o}35’44,2);
+ K2 at the north of dam, co-ordinate (N:19^{0}11’19,7” &E: 105^{o}35’44,8”);
+ K3 at National highway No. 537A, co-ordinate (N:19^{0}10’54,2” &E: 105^{o}35’35,3”).

Results of air analysed in physical and chemical criteria are showed in the table 4.5 and 4.6.

Table 4.5. Results of physical parameter analysis

Location	Noise (dBA)	Temperature (^{0}C)	Humidity (%)	Wind speed (m/s)	Vibration * (dB)
K1	40.2	17.5	70.8	0.4-0.8	26
K2	39.7	17.6	72.8	0.7-0.9	28
K3	55.8	18.0	71.1	0.5-1.2	35
QCVN 26:2012/ BTNMT (from 6:00 to 21:00)	70	-	-	-	-
QCVN 27:2010/ BTNMT (From 6:00 to 21:00)	-	-	-	-	75

(Source: Station of Labor Environment Monitoring and Analysis,, 2015)

Table 4.6. Results of chemical parameter analysis

Location	Dust ($\mu g/m^3$)	SO_2* ($\mu g/m^3$)	NO_2* ($\mu g/m^3$)	CO* ($\mu g/m^3$)
K1	96	55	31	<5,000
K2	87	52	32	<5,000
K3	193	69	37	<5,000
QCVN 05:2013/BTNMT	300	250	200	30,000

(Source: Station of Labor Environment Monitoring and Analysis,, 2015)

According to measurement and analysis results, the criteria of air environment quality in the sub-project area at the survey time are within the allowed limitation.

Conclusion: There is no signal of air environment pollution in the subproject area.

4.1.6. Soil Environment and Deposit

Soil sample MĐ1 was taken at the south of dam, coordinate MĐ1 (N:19^{0}11'03,9" &E: 105^{o}35'43,3"); and deposit sample was taken at the irrigation canal, coordinate MTT1 (N:19^{0}10'54,2" &E: 105^{o}35'35,3").

The results of soil and deposit analysis are in Tables 4.7 and 4.8 below:

Table 4.7. Results of soil analysis

Parameter	Unit	Result	QCVN 03:2008/ BTNMT (Forestry land)
		MĐ1	
pH_{H2O}	-	7.23	-
pH_{KCl}	-	7.84	-
Sludge	%	1.8	-

Parameter	Unit	Result	QCVN 03:2008/ BTNMT (Forestry land)
Total nitrogen	%	0.12	-
Total phosphor	%	0.08	-
Total Kalium	%	0.06	-
Active nitrogen	mg/100g	7.2	-
Active phosphor	mg/100g	12.8	-
Active kalium	mg/100g	11.5	-
Mechanical composition			
Sand (0,5-1mm)	%	16.13	-
Limon (0,002-0,5mm)	%	29.21	-
Clay (<0,002mm)	%	54.66	-
Ca	mg/Kg	225.3	-
Mg	mg/Kg	182.4	-
As	mg/Kg	0.53	**12**
Cd*	mg/ Kg	<0.89	**2**
Cu*	mg/ Kg	8.22	**50**
Pb*	mg/ Kg	11.51	**70**

(Source: Station of Labor Environment Monitoring and Analysis, 2015)

Table 4.8. Deposit analysis results

Parameter	Unit	Results	QCVN 43:2012/BTNMT
		MTT1	
pH_{H2O}	-	5.76	-
pH_{KCl}	-	6.41	-
Total humus	%	9.75	-
Mechanical composition			-
Sand (0,5-1mm)	%	7.73	-
Limon (0,002-0,5mm)	%	62.43	-
Clay (<0,002mm)	%	28.84	-
Total nitrogen	%	0.35	-
Total phosphor	%	0.21	-
Total Kalium	%	1.32	-
Active nitrogen	mg/100g	13.76	-

Parameter	Unit	Results	QCVN 43:2012/BTNMT
		MTT1	
Active phosphor	mg/100g	16.90	-
Active kalium	mg/100g	22.80	-
Fe	mg/Kg	114.25	-
Al^{3+}	mg/Kg	34.14	-
Ca	mg/Kg	46.33	-
Mg	mg/Kg	32.54	-
As	mg/Kg	0.93	**17.0**
Cd*	mg/Kg	<0.89	**3.5**
Pb*	mg/ Kg	<0.89	**91.3**
Cu*	mg/ Kg	8.22	**197**
Zn*	mg/ Kg	11.51	**315**

(Source: Station of Labor Environment Monitoring and Analysis, 2015)

According to analysis results, all the criteria of soil and deposit samples are within the allowed limitation of QCVN 03: 2008/BTNMT – technical standard for soil environment quality.

Conclusion: There is no signal of soil and deposit contamination in the subproject area.

4.2. BIOLOGY ENVIRONMENT

4.2.1. Flora

There are no national parks, nature reserves or sites of important ecological values within or around the dam area. Within Ngoc Son commune, the flora consists mainly of plantation tree species such as Eucalyptus, Acacia, and Melaleuca; other perennial plants and shrubs. There is no primary forest. The area is also not known to harbour any rare and/or endangered plant species and this was confirmed during the site inspection and interviews with the locals.

As with the other upland regions, the farmers in the sub-project area have been engaged in intensive production of rice and upland crops for long time. The varieties of rice planted by farmers however have changed over the years, increasingly towards varieties that are suited to soil and climate conditions of the region. Rice are typically planted in spring and winter season with average yields of 400-500 kg per ha. Together with rice, other seasonal crops and food crops such as corn, potato, and certain kinds of melon are also planted.

4.2.2 Fauna

Because this area is widely cultivated, the fauna diversity is relatively poor. There are only a few species of birds (e.g., crows, sparrows, etc.), small reptiles (e.g. lizards, snakes, etc.) and insects (e.g, bees, locusts, grasshoppers, praying mantis, etc.). The area is not known to

harbour any endangered or rare terrestrial species of fauna and this was confirmed during the site survey and interviews with the locals. .

The underwater animals: The reservoirs are used to supply water for domestic use and agriculture purposes. Animals in reservoir only include common species such as carps, snake-heads and shrimps. There are no endangered or rare aquatic species in the reservoir.

4.3. ECONOMIC-SOCIAL AND CULTURAL ENVIRONMENT

4.3.1. Population

As of 2013, Ngoc Son has a population of 8,910 inhabitants, of which, male: 3,591 people, female: 4,389 people with 1,848 households divided into 12 villages. The population density is 308 people per sq. km. The population of the commune is entirely Kinh which constitutes Vietnam's mainstream ethno-linguistic group.

The working age population is 4,795, in which, male: 2,158 people, female: 2,637 people. The actual number of people who are gainfully employed is 4,415, distributed as follows: 63.5% in Agriculture; 23.8% in Industry and Handicrafts; and 12.7% in the Services sector. The are 1,341 skilled laborers, accounting for 27.3% of the labor force; in which: University and college: 93 people, vocational school 210 people, primary school 415 people, skilled worker 623 people.

The labor force is relatively abundant, mostly graduated from high school, some of them have been technical expertise trained, satisfying with basic need of workers for companies and factories. Currently, a part of workers at ages of 20-30 are working for industrial zone in the southern provinces or working abroad. Most of laborers work in agricultural sector without scientific and technical training.

4.3.2. Socio-economic

4.3.2.1 General view of socio-economic condition in the subproject area:

The main economic activities of Ngoc Son commune are agriculture production, livestock and small business enterprises. People near and downstream of the dam site rely on agricultural production for their livelihood.

Economic condition: Ngoc Son economy is a typical rural agriculture economy. Agricultural production accounts for *68- 72% of total production value: 73% in 2005 and 68.3% in 2010.* According to the Socio-economic Development Plan in 2015 of Ngoc Son commune, the total production values are 127.9 billion VND in 2014, reaching 101.6% of the target. In terms economic growth, the commune grew at an annual rate of 14.3% or 110% of target. Per capita income reached 10.4 million VND or about 97.2% of official target. As of 2014, the Agriculture, Forestry and Fisheries sector still account for the greatest contribution to the economy at 59.5%, followed by Services at 26.5%, and Construction and Handicrafts at 14%.

4.3.2.2.The Socio-economic Conditions in the Subproject Area

a) Socio-economic Condition from Field Survey:

Demographics **-** The average household size in the samples surveyed is 4.8, which is higher than the national average of 3.89 (Statical yearbook, 2013). Household size for women-headed household is smaller on average than men-headed households (4.85 people compared with 4.91 people, respectively) which is expected as most of them are single parent households.

Table 4.9: Average member and labor in a household

	Household Size (Group Average)	**Members in a household (%)**			
		1-2 people	**3-4 people**	**5-8 people**	**9 people and more**
Total	**4.8**	**17.5**	**36.2**	**35.3**	**11.0**
Commune/ward					
Ngoc Son commune	4.8	17.5	36.2	35.3	11.0
Group of gender					
+ Headed men household	4.91	17.5	34.6	36.7	13
+ Headed women household	4.85	21.9	31.9	31.2	15.0
Group of income					
Group 1 (poorest)		17.0	26.9	36.2	19.9
Group 2		15.5	32.1	34.6	17.8
Group		15.3	3.5	37.5	13.7
Group 4		8.7	49.7	34.7	6.9
Group 5 (richest)		13.5	49.3	35.2	2.0

Source: Survey data

The data showed that in the sub-project area large household size is relatively in higher proportion than in other areas of Vietnam. In general, large household size means more labor for the family in the rural areas thus contributing to the relatively lower poverty rate in the area.

Occupation **-** The agriculture, forestry and fishery sector provides the main source of employment for the inhabitants in the sub-project area, accounting for 41.6% of the working age population. Still significant percentages are reported to be working in the trading services (14.3%) and handicrafts (15.6%).

Table 4.10: Main occupation of laborers (included all household laborers)

	Incapa-citated	Agricul-ture-forestry-fishery	Trading services	staff-officers	Pupil - student	Handi-craft	Hired labor	Un-employed	None	Other
Ngoc Son commune	5.0	41.6	14.3	3.0	5.8	15.6	7.9	6.3	0	0.5

The survey also reveals that a significant percentage of the working age population (17.1%) are dependents, of these 6.3% are unemployed, 5% are incapacitated and about 6% are currently attending schools.

Education- Nearly of 90.0% of the population graduated from elementary school or higher with about 80.3% having at least a high school level of education. The illiteracy rate is only 1%. The rate of preschool people at survey area is 8.0%, which is higher than the national average as stated in the Statistical Yearbook 2013 (6.0%). It is noteworthy that 17% have college level education.

The illiteracy rate in the poorest income group (group 1) is 7 times higher than it of the richest income group (7.5% vs. 0.5%). The percentage of children at the 6-18 ages that dropped out of school is 5.0%.

Table 4.11: Education level of household members (Unit %)

	Highest education level							
	Illiteracy	**Primary School**	**Junior high school**	**High school**	**College/ University or above**	**Not suitable**	**Pre-school**	**No formal schooling**
Ngoc Son commune	1	10.5	33.2	30.1	17.0	0.0	8.0	0.2
By income								
Group 1 (the poorest)	7.5	34.3	22.5	13.5	0.8	6.6	9.9	4.9
Group 2	1.8	22.7	32.5	21.5	10	3.6	6.9	1.0
Group 3	1.9	21.8	32.3	26.1	5.0	3.3	7.0	2.6
Group 4	2.6	14.8	35.5	29.5	6.9	1.5	7.3	1.9
Group 5 (the richest)	0.5	9.4	24.0	42.9	9.8	2.5	6.9	4.0

Health - More than half of the surveyed households (60.5%) have reported to be ill at least once within the month before the survey. This is a relatively high rate compared to the average. There are no large differences in morbidity rates between rich and poor income groups.

Table 4.12: Health and health care conditions

	With sick person in the past one month	**With medical insurance**
Total	**60.5**	**75.0**
By commune		
Ngoc Son *commune*	60.5	75.0
By income		
Group 1 (the poorest)	60.5	65.4
Group 2	55.1	70.4
Group 3	45.5	80.1
Group 4	53.3	75.8
Group 5 (the richest)	50.2	95.5

The number of surveyed households having all kinds of insurances is relatively high at 75.0%. As expected the proportion with health insurance is highest among the richest group and lowest among the lowest income group.

Based on the interview with the respondents, there are five main reasons for the poor health conditions of the people. These are, from most frequently mentioned to least frequently mentioned reasons: (1) polluted water; (2) polluted environment; (3) foods insecurity; (4) more diseases; and, (5) lack of safe drinking water. When asked what is the most important factor in public health, the respondents rated water pollution (25.8%) and lack of water (26.1%) as the two most important factors.

Land **-** Land is the main production resource in the area. Almost all households surveyed reported to have their own residential lot (99.5%). All have paddy rice (100%) and more than half (65.5%) have lands devoted to vegetables production. Some households reported to have lands devoted to industrial trees (25.6%) and fish ponds and water bodies (15.3%). Therefore, the demand for irrigation for agriculture in these regions is very high. Any interruption in the water supply will certainly impact on the life of local people.

b) Water Use and Reservoir Management

Domestic Water Use **-** The majority of surveyed households in the subproject area use digging and drilling wells (95%) for bathing and daily activities, the usage of other water sources is low. No HHs use water from ponds, lakes or rivers; no households use the tap water, 1.4% use other water sources and 3.6% use rainwater.

Irrigation and Reservoir Management **-** The tasks of Khe Gang reservoir are water supply for irrigation of 175ha agricultural land and domestic use of people in dry season. At the present, Khe Gang reservoir and canal system are managed by Dai Son Cooperative. The staffs of cooperative are unkownledged on irrigation in general and reservoir in particularly. Recently, staffs of cooperative participated in training class about Dam safety for operators under the sponsorship of World Bank, under Vietnam Disaster Management Project.

Head Works **-** There are no reservoir operational procedures, open and close gate and monitoring are mainly based on visual observation and experience. Monitoring, checking and repairing are not performed regularly as prescribed.

Canal System **-** Water distribution operation in canal system is executive by 01 vice-chairman of the cooperative, and directly contract with irrigation team of the villages. Before each season, the cooperative makes plan to dredge and repair canal. However, due to limited funding, only minor damage was fixed.

4.3.3. Community Facilities and Infrastructure

a) Education and Health

Health Facilities - The commune has health clinic with relatively good quality of treatment and prevention services. The initial care for people is concerned, the target health programs implemented more effectively. Propaganda, preparation and prevention are done well to prevent outbreak disease in the province.

Schools - There are 2 kindergartens, 01 primary school, 01 secondary school in the commune.

Socialization in education is promoted and state administration of education is enhanced. Besides, percentage of pupil goes to school in all level is high. Universal primary school and secondary school are also be fortified. Management staff is gradually standardizing the professional level as well as the political level.

b) Infrastructure

Transportation **-** The road from highway 48B to construction site is rural road with 304.5 m length, need to be renovated for material transport heavier trucks and moving equipment to the construction site. The system of inter-village, inter-commune roads as planned is 5-8m width eligible for small and medium load vehicle to transport material.

Electricity **-** 100% of households have access to electricity.

Water Supply System **-** The main source for water supply is traditional digging well, and water quality is not a concern. In dry season, due to the low level of ground water, water shortage occurs in almost wells for domestic, livestock and poultry uses.

4.3.4. Local Culture and Institutions

a) Tangible and Intangible Cultural Assets

There is not cultural heritage such as temple, shrine, church, etc. in the sub-project area. The sub-project construction will not affect or relocation of graves.

b) The Role of Men and Women

Population **-** There is no ethnic minority inside Khe Gang reservoir construction area. 100% of Kinh. Average member of family is 4.8 people. Number of headed women household is less, accounting for 0.03%.

Economic **-** The income of men is often greater than women: for men, average income is 12 million Vietnamdong per year, but it is only 9 million Vietnamdong per year for women. The decisions are often made by men in their family. However, men and women share ownership of land.

Health **-** The health insurance in local done well. Men often decide to have children. However, women are primarily responsible for food distribution and nutrient level in family. There is no domestic violence in local area.

Education: It is equal between male and female. However, dropout rates are higher in males than females. Therefore, enrollment and literacy rates of women is higher than men.

In general, women have the same role and position with men in family. They are involved in the decision making of important things in family. In society, women are actively engaged in social activities such as participating in the movement, local media activities. Besides, women also work in the unions, government agencies such as CPC, Clinics, and schools.

g) The Social, religious organizations

Youth Union **-** this is well done in force gather, and mobilization union members to

participate actively in productive labor, studying, and application of new scientific techniques for high efficiency production. It was classified on successful completion tasks

Women Union **-** Promoting traditional "Heroic, indomitable, faithful and competent", actively emulation in production, technological advanced application, restructuring crop and livestock for economic development. It was classified on successful completion tasks.

Farmers Union **-** Always at the forefront of the application of scientific and technological advances in production and feeding; promoting development of Union, increasing member; mobilizing members to properly implement the policy of the Party, state laws and local regulations.

Veterans Association **-** Promoting traditional Uncle Ho's solider, well done in youth education; participate actively in building stronger Party, government.

g) Other services:

Sanitation services **-** There are two points of temporary garbage collection; CPC is developing environmental management project; after handling garbage dumps of district located in the commune, it will be organizing the collection and processing under the project.

In addition, the regularly activities for green, clean and beautiful environment such as: organizing complied with hygienic regulations for offices, schools, health clinic, and agencies implement in every Friday afternoon; monthly requirements of every villages to organize clearance corridor and drains, tidying up house of culture and roads in residential area; mobilizing people to build family dust-hole to collect and process. Painted propaganda slogan at the point of offices, schools, rural culture.

4.4. PAST INCIDENTS, THEIR IMPACTS, MEASURES UNDERTAKEN AND PRESENT CONDITION

4.4.1. Past incidents and their impacts

The big flood in 2005 overflowed water through the crest of dam, caused serious erosion on the face of upstream and downstream dam;strong water flow also eroded on spillway downstream apron.

- 120 hectares of rice fields were affected; floodwater level inundated about 300 local households andflooded taking place for1 day and nightdamaged the assets such as rice, corn and some means of living of people; some livestocks such as pigs, chickens and ducks werebeing washed away during the flood. A number of local households in the 4A village in the dowstream of Khe Gang Reservoir had to evacuate people and property to safety places during the flooding night.

- The communal roads system were eroded and washed out caused the difficulty in travelling of the local people.

- Affecting tophysical and spirit life of the local people, especially flooded households. After the floods, the landscape and environment were negativechanged, especially the drinking water source from wells; disease can spread to humans and livestocks.

The drought occurred in 2008, led to a shortage of water for production and people's daily life; due to the water receded under the dead-level of the reservoir resulting in not enough waterflow via water intake, the pumps must be installed at reservoirs to supply water to production and living of the people. It affected on productivity and production of crops; not enough water for people life and cattlesbreeding.

4.4.2. Measures Undertaken to Repair the Dam

For the flood **-** Forthe Khe Gang reservoir: The rock fillon upstream dam face and the additional earth fill on the dam body were conducted. For the local roads: Facilitating the travel of local people by handling the damaged roads. Visiting the local households that inundatedby floods and lossed their assets. Implementing the hygiene of drinking water sources;disinfectionspraying to prevent the spread of disease to humans and livestocks.

For the drought **-** Pumping from Khe Gang reservoirto supply water to production and living of the people as well as livestocks.

Mobilizing people to dig wells near thestreams and riverstosupply clean water; or pumping from Khe Gang reservoir in order to making seepage flow into the wells.

4.4.3. Present Condition of the Dam

The headworks of the Khe Gang reservoir has deteriorated. The flood spillway was eroded, dam body is in poor condition and the water intake and distributtion ditch systems have sustained damage and degraded causing loss of water in reservoir. People are mainly dependent on water for production and daily activities from the Khe Gang reservoir so the situation of water shortage are common occurrences when drought occurs.

CHAPTER V. IMPACT ASSESSMENT

5.1. RESULTS OF THE ENVIRONMENT AND SOCIAL SCREENING

5.1.1. Environmental and social impacts screening

Based on the results of the Environmental and Social Screening, the sub-project is eligible for financing under DRSIP. It is not located within or near any critical natural habitat as defined under World Bank Natural Habitat Policy. The area is not known to harbor any rare or endangered species and this was confirmed during the site survey and through interviews with the local residents. The sub-project will not affect any physical cultural property as there are no structures, monuments or sites of cultural, religious or historical significance in the sub-project construction site. The screening also places the subproject under Category B of the World Bank's classification. However, as agreed with the World Bank, an ESIA was still conducted as the sub-project is one of the first 12 subprojects identified for implementation during the first year of DRSIP.

5.1.2. Ethnic minority screening

There is no need for the preparation of Ethnic Minorities Development Plan (EMDP) as there are no indigenous population or communities of ethnic minorities in the area. A Resettlement Action Plan/Compensation Plan (RAP) has been required for one household who stands to lose a number of commercial trees planted on the 0.5 hectare that the sub-project plans to use for the construction of the Management House. Moreover, the Khe Gang Dam is by definition a small dam, having height of less than 15 meters and reservoir capacity of less than 3 million cubic meters. See Appendix A4 for the completed Environmental and Social Screening Form.

5.2. ENVIROMENTAL AND SOCIAL IMPACTS

The repair and upgrading of the Khe Gang Dam and facilities would only have minimal adverse social and environmental impacts. In terms of environmental impacts, the significant ones include: (i) potential land and soil degradation at construction sites and vicinities due to construction litters, excavations, and compaction; (ii) loss of vegetation in about 1.5 hectare of land including about 400 plantation trees and 100 trees of low value; (iii) temporary increase in sedimentation and turbidity of receiving water bodies, including the reservoir due to significant earthmoving activies; (iv) emission of dusts and noise due to heavy equipment and vehicular traffic; and, (v) other impacts associated with construction activities such as increase health and safety risks at construction sites.

In terms of adverse social impacts, the significant impacts include: (i) loss of access by one household to a 0.5-hectare land and perennial trees; (ii) possible damage to existing roadways due to the mobilization of heavy equipment and hauling of embankment materials from the quarry to the dam site; and, (iv) disruptions in the delivery of irrigation water during construction.

5.3. IMPACTS DURING SUBPROJECT PREPARTION STAGE

The activities during sub-project preparation include activities that have already been completed such as the conduct of feasibility study and this environmental and social assessment. Other activities that still need to completed are the preparation of detailed

engineering and program of work and the land and temporary easement acquisition and procurement. Throughout this period, residents, farmers, women and other sectors in the community may experience apprehensions about the impacts opportunities offered by the sub-project. These would include loss of lands, crops and structures due to land acquisition or temporary easements for the construction activities and the likely disruptions in water supply which could lead to loss of crops or entire cropping season. Some people may also wish to be hired during construction. The people need to be consulted and provided opportunities to input into the design and plans of the sub-project.

Table 5.1. Impacts on the environment and society during the subproject the sub-project preparation period

Impacts	Assessment	Description of the Impact
General apprehensions by residents, farmers, women, other sectors about the impacts of and opportunities in the sub-project, which may lead to speculations and adverse perceptions about the sub-project and to conflicts.	High, Temporary	Some individuals or sectors within the communities may experience anxiety over rehabilitation's impacts and opportunities. They would most probably include apprehensions about loss of access to lands, loss of crops and structures due to land and easement acquisitions/recoveries by the sub-project, as well as water supply/irrigation interruptions during construction which may lead to worries and about potential losses crops or entire cropping season; access to employment opportunities in the construction activities.

5.4. IMPACTS DURING CONSTRUCTION STAGE

Impacts during construction

The activities in the construction stage will include clearing and grubbing, equipment installation, building of construction camps, clearing and preparation of easements, hauling of materials, excavation, embankment works, concreting, and construction of operation house, access/service road, works on the canal, cleaning of reservoir, demolition, clearing and site restoration. The negative environmental impacts of these activities are mostly localized and except for the change in land use of 0.5 hectare of land, temporary. The social impacts which may include loss of land, crops or entire cropping season, could have long term consequences on the affected persons.

Table 5.2. Impacts on the environment and society the during construction period

Impacts	Assessment	Description of the Impact
Land/soil degradation	Medium, localized, medium term	Lands in the vicinity may degrade due to change in landscape, construction spoils/solid wastes (i.e. cut soils, excess materials, herbage, trees, food wastes and litters), loss of vegetation cover, loss of, loosening or compaction of top soils, on quarries, campsite, temporary access and easements.
Impact on biodiversity and ecosystem	Low, localized, temporary	The few birds and other wildlife may temporarily migrate farther distance from the site due to increase human activities. They are however expected to return once construction activities wind down.
Impact on air quality	Low, localized, short term	Temporary and short term increase in particulate matter and noise due to earthmoving and heavy machineries and equipment traffic, the hauling of embankment and construction materials. Minimal changes in the air quality parameters such as SOx, NOx, VO, CO from emissions of machineries and equipment.

Impacts	Assessment	Description of the Impact
Impact on the surface water quality	Medium, temporary	There will be increased turbidity in surface waters due to increased sedimentation from earthmoving activities at construction and at quarry sites. This impact will be temporary.
Impact on the soil and groundwater quality	Low, very localized, short term	This will come from fuel and used oil spillages within the camp site and motor pool areas. The impact is expected to be very localized and minimal.
Loss/change/land use conversion	Low, localized, permanent	A total of about 0.5 hectare will be permanently converted for use in the project.
Loss of crops, trees and livelihood source	Low	The total land area to be affected is only 1.5 hectare, including 0.5 hectares to be permanently used by the sub-project. Only a portion of these lands are planted to crops and commercial trees. The rest are secondary growth shrubs and trees with low economic value.
Damage to existing roads due to hauling and equipment mobilization	High, Localized, Temporary	Construction routes are available and hence the sub-project does not require construction of temporary roads. The existing roadway, especially from the quarry site to the dam is likely to sustain damage or increase wear and tear from the hauling of embankment materials and mobilization of heavy trucks and other equipment. It should be noted these routes have deteriorated and some bridges may be weak hence temporary detours or makeshift brides may need to be constructed.
Interruption in irrigation water supply	High, localized, short term	Interruption of about 1-2 months in some portions of the irrigation's service area is expected during construction
Occupational health and safety	High, localized, short term	Workers are exposed to short term health and safety hazard at construction sites during the operation of the machineries and equipment.
Public health and safety	High, localized short term	Residents are exposed to short term health and safety hazard due to construction activities, construction wastes and emissions, and possible new diseases due to the contacts with construction workers from other areas. During construction the dam may also be exposed to high risk of breach especially with occurrence of natural calamities.

Loss of Land, Tree Crops and Livelihood Source **-** Only one household is affected by the land acquisition of the subproject. This household is currently using the 0.5 hectare land to grow commercial trees (mostly Melaleucas and Acasias) through a contract agreement with the Ngoc Son Commune People's Committee. This 0.5 hectare land currently being used by the household will be permanently used as lot for the proposed Management House. Another 1.0 hectare land which will be temporarily used during construction (i.e. for temporary facilities, storage yard, vehicle and equipment parking area, camp, corridors and easements) is also owned by the Ngoc Son Commune People's Committee.

Table 5.3: The permanently and temporary land recovery area of the subproject

		Land permanently acquisition			Land temporary acquisition
		Garden land	Rice Paddy	Perennial crops land	Perennial crops land
Ngoc	**Area (m^2)**		-	5,000	10,000

		Land permanently acquisition			Land temporary acquisition
		Garden land	Rice Paddy	Perennial crops land	Perennial crops land
Son	Affected households	-	-	Managed by the CPC (used by 1 household)	Managed by the CPC

(*Source: Main Report – Nghe An Irrigation Construction Consultancy J.S.C*).

Portions of these lands contain an estimated total of 400 commercial trees and about 100 trees of low value (Table 5.4). The rest of the lands is bare or covered with shrub species. There are no structures or houses within these lands.

Table 5.4. Number of effected crops and trees

Crops	Unit	Quantity
Melaleucas, Acacias and timber	Tree	400
Low quality wood	Tree	100

Another household has been contracted by the Ngoc Son Commune People's Committee to undertake aquaculture production in reservoir. The breeding species are mainly carp, tench, and tilapia. The contract however is set to expire in 2015 in time for the start of the sub-project and therefore the household's livelihood will not be affected by the sub-project. No new contract is expected to be issued until after the dam repair is completed.

Elevated Community Health and Safety Risk-As soon as contractors enters the area, local residents will be exposed to health and safety hazards due to construction activities, including vehicular traffic, falling materials and debris, construction wastes and emissions, and possible new diseases due to the influx of construction workers from other places. Residents, especially children could venture into areas of deep excavations, operating equipment, weak grounds or scaffolds. Also, during construction the dam may be exposed to high risk of breach especially during extreme weather events. Moreover, the process of demolition, clearance, and pit excavation may reveal the toxic substance buried earlier in the project area, including unexploded ordnance.

Impacts on Biodiversity and Wildlife – As discussed earlier the area does not have significant wildlife population. The cutting trees, shrubs and clearance of vegetation will be confined within the 1.5 hectare land to be used. Therefore impacts would be very minimal. Also, the small population of birds, reptiles, rodents and insects will likely migrate to nearby vegetated areas. In general, the noise and daily commotion of construction activities will temporarily drive the animals further away from construction site but are expected to return once the construction activities wind down. In terms of aquatic life and habitat, the reservoir contains only aquaculture species which can be replenished. During the repair the spillway and the fixing of the seepages, the reservoir is not expected to be emptied.

Impact on Surface Water Quality – Impacts on the surface water, if any, would be coming from three sources: sediments from clearing and earthmoving activities; domestic wastewater from workers; and, washings from heavy equipment and machineries. Sediments would mostly come from loose and exposed soils and embankment materials at the quarry sites, at dam and the cleared areas within the 1.5 hectare land. This will cause increased sedimentation

and turbidity in the receiving water bodies, including the reservoir and irrigation canals, during rains. This impact would be temporary and can be easily mitigated.

The wastewater from the construction workers, assuming a peak of 20 workers on site, may not be a significant additional burden to the carrying capacities of water bodies, but analysis indicate that, the wastewater, if discharged directly into the environment will not be able to comply with the national standards for wastewater. According to National Standard TCXDVN 33:2006 on Water supply - External Networks And Facilities – Design Standard, average volume of water for domestic purpose is 100 litres/day/person. The actual working on site showed that amount of water consumed by a worker is 60 liters-peron-day. With number of 20 workers, volume of waste generating every day is of about 960 litres/day (the 80% of water supply will be discharged). Table 5.5 shows the parameters, discharge criteria and waste load of workers at the construction site.

Table 5.5. Waste load in domestic wastewater in construction stage (based on estimated 20 workers at construction site)

Parameters	**Discharge indicator (g/person/day)**	**Load (kg/day)**
BOD_5	45 - 54	0.9 – 1.08
COD	72 - 102	1.44 – 2.04
Suspended solids	70 - 145	1.4 – 2.9
Total nitrogen	6 - 12	0.12 – 0.24
Total phosphorus	0.8 – 4.0	0.016 – 0.08
Total coliform	10^6 – 10^8 MPN/100ml	-

(Source: Report on curremt status of urban wastewater – Institute for science and environmental technology - University of technology Hanoi)

Table 5.6. Estimated concentrations of pollutants in domestic wastewater of 20 Workers at the construction site

Pollutant	**Load (kg/day)**	**Concentration (mg/l)**	**QCVN14:2008/BTNMT (Cmax value, Column B)**
BOD_5	0.9 – 1.08	938 – 1,125	**50**
COD	1.44 – 2.04	1,500 – 2,125	**-**
TSS	1.4 – 2.9	1,458 – 3,000	**100**
Total Nitrogen	0.12 – 0.24	125 – 250	**50**
Total Phosphorus	0.016 – 0.08	16– 83	**10**
Coliform	-	-	**5000 MPN/100ml**

The calculation above showed that the concentration of pollutants in domestic wastewater exceeds permitted standards. Without measure to collect and treat wastewater, it may be poured and overflow surface and seep into the ground and contaminate soil and groundwater environment or pour into the water sources causing water pollution for the receiving sources. However, additional of 20 people, assuming they all come from the outside the village may not be a significant added burden to the carrying capacities of the recieving water bodies and the recervoir.

Wastewater from construction activities – Wastewater from the washings of equipment will be insignificant source of pollution, except in cases of accidental spillage of fuel or oil into the stream. The likely source includes washings from construction machineries and equipment which settled dust, mud, soil on the surface. These will cause the water pollution of water receiving areas. Wastewater is also generated from the process of temper and concrete placements. Characteristics of this waste are the high concentration of Suspended Solids and low pH. Wastewater from washing the vehicles and machinery will contain high levels of oil and suspended solids. However, the workload is not so much and constructed as rolling up leading to the low used of the machines for construction. In addition, this machines will not be concentrated in one place but scattered, thus, the amount of water used to wash the machines are not regular and substantial, the total volume of wastewater from washing machines, equipments and construction at each construction site is about 1 m3/day.

Impacts on Air Quality **-** During the construction stage, most of the activities are likely to cause air pollution, the main pollutants are from vehicles transporting materials and construction equipment.

Dust - Dust, noise due to cutting trees, shrubs and plant clearance are should be air pollution sources but just affect at low level. Sources of pollution are dust generated from these materials, dust generated by the friction between the vehicle and road surface, emissions from construction equipment. Demolition and site clearance works (dam, management road, etc.) may also give rise to dust, noise at small scale.

Air pollution agents in the construction stage are mainly dust. Dust is generated from the transportation and unloading and gathering materials, etc. Concentration of dust is expected to increase in sunny days, spreading scale can range up to 200m in days with large wind.

Table 5.7. The total volume of construction materials

Materials	Unit	Quantity	Specific weight	Volume (ton)
Reinforced concrete M200	m^3	1,646	2.5	4,115
Concrete M200	m^3	985	2.5	2,462.5
Concrete M150	m^3	422	2.2	92.4
Concrete M100	m^3	390	2.2	858
Rubble bricks concrete	m^3	164	1,6	262.4
Ashlar	m^3	2,411	2.75	6,630.3
Standard ballast aggregate	m^3	160	1.6	256
Bedding sand	m^3	396	1,500	594
Filter fabric	m^2	5,418.20	1	5.42
PE tarpaulin	m^2	10,743	1	10.74
Asphalt fabric 2 layers	m^2	1,113	1	1.11
Excavation	m^3	53,914.40	1.4	75,480
Brick	m^3	36	1.5	54
Tile	m^2	90	60	5.4
Earth fill	m^3	52,890.30	1.4	74,046.4
Grass planting	m^2	7,040	240	1,689.6
Reinforcing round steel	kg	221,070.20	-	221
Casing	m^2	15,877	40	635.1
Weathering take off	m^3	2,745	1.4	3,843
Steel structure	m^2	19	45	0.86
Total				**172,099**

As the above calculation, total volume of material for construction is about 172,099 tons. As estimated, the project will use vehicle type with an average weight of 10 tons to transport material. Number of vehicles required to transport materials are: 172,099/10 = 17,029 trucks. Conventionally, every 2 unloading trucks equal to 1 loading truck. So, the total number of vehicles used to transport materials are: 17,209 + (17,209/2) = 25,813 trucks. During construcion time of 24 months, there will be 1,075 trucks/month, equivalent to 36 trucks/day. The average distance to transport materials from the supplier to the project is 7km.

With the similar way, the concentration of dust in the air during the material transportation can be calculated as below:

The level of dust pollution depends on the road quality, material transport means and material loading and unloading. The concentration of dust will increase in the dry, sunny and windy days.

Calculation the load of dust during material transportation (According to Assessment of Sources of Air, Water, and Land pollution, Part one: Rapid inventory techniques in Environmental Pollution, WHO, Geneva, 1993) as following:

$$L = 1{,}7K\left[\frac{s}{12}\right]x\left[\frac{S}{48}\right]x\left[\frac{W}{2{,}7}\right]^{0,7}x\left[\frac{w}{4}\right]^{0,5}x\left[\frac{365-p}{365}\right] \quad (*)$$

Where:

L	: Load of dust (kg/km/truck);
K	: Particle size of material (0.2);
s	: The amount of soil on the road (30%);
S	: The average speed of vehicles(30 km/h);
W	: Loaded weight of the vehicle (8 tons);
w	: Number of wheels (10 wheels);
P	: Number of operating days in the year, P = 300 days.

From the equation (*), with the real parameters, we get L = 0.32 kg/km/truck. So, the load of dust pollution is calculated: M = 0.32 kg/km /truck x 7km x 12,906 truck/year = 28,909kg/year corresponding to 96.36 kg/day or 12.04 kg/h (working hour: 8h/day) during construction process.

The total load of pollutants: E = Average generated load (kg/h)x10^6/(average road distance) x 10^3 x 3,600) (mg/m.s).

$$E = 12.04 \times 10^6/(7 \times 10^3 \times 3{,}600) = 0.46 \text{ (mg/m.s)}.$$

To assess the impact of dust pollution, we use the Sutton computational model - determine the concentration of pollutants at any calculated point. The concentration of pollutants are calculated by the following equation:

Where:

C: dust concentration in the air (mg/m^3).
E: load of pollutants from source(mg/m.s).
z: the height of the calculated point: 1(m).
h: the height of the road surface comparison with surrounding: 0,5 (m).

u: The average speed of wind in construction area: 1,5 (m/s).
x: coordinates of calculated point(m).
δ_z : dust diffusion coefficient under z direction,is defined by the equation::

Where x is the distance under wind directionatcalculated point comparison with waste source (m), the pollutant diffusion coefficient is calculated as following:

Table 5.8. Dust diffusion coefficient under z direction

x	3	5	10	15	20	25
δ_z	1.1607	1.9345	3.869	5.8035	7.738	9.6725

(Centre for Environment and Development)

With the values of δ_z in table 5.8, we get C - dust concentration in the air as table 5.9 below:

Table 5.9. Dust concentration in the air

x (m)	**3**	**5**	**10**	**15**	**20**	**25**	**QCVN 05: 2013/BTNMT**
C (mg/m^3)	0.7	0.3	0.13	0.08	0.062	0.055	0.3

(Centre for Environment and Development)

The dust generated in the material transportation will impede the vision and affect to the health of workers and local people in the sub-project area. Dust also affects animals and plants. The dust covered on the surface of leaves will reduce the photosynthetic capacity and affect to the growth and development of plants. According to the results of above calculations, the concentration of dust in the air approximately exceeds to the limits of 05 QCVN: 2013/BTNMT at the distance of 3 meters from the source. Therefore, the sub-project owner should focus more sprinklers water in this distance, in order to minimize the impacts to workers and local people in the construction area.

Vehicular Engine Exhausts - Emissions from vehicles contain gas included SO2, CO2, CO, NOx, VOC, etc. This kind of air pollution depends on number of construction vehicles, machinery and methods of construction. As estimated, there are about 15 construction trucks travelling on road every day. Forecast load of pollutants from vehicles using diesel as follows: Currently in Vietnam, there are no specific standards for the level of emissions from construction vehicles, thus, in here, the calculation of emissions from construction vehicles is estimated based on the pollution load coefficients provided by *Prof. Dr. Pham Ngoc Dang (air environment - Basic Theory, dust pollution, toxic air pollution, thermal pollution, climate change, noise pollution, the risk of environmental hazards and handling methods to reduce the pollution):*

Table 5.10. Emission coefficients by a vehicle in traffic load

Vehicles	**Unit (U)**	**TSP (kg/U)**	**SO_2 (kg/U)**	**NO_x (kg/U)**	**CO (kg/U)**	**VOC (kg/U)**
- Small diesel trucks< 3.5 tons.	1000km	0.2	1.16S	0.7	1	0.15
	Tons of diesel oil	3.5	20S	12	18	2.6

Vehicles	Unit (U)	TSP (kg/U)	SO_2 (kg/U)	NO_x (kg/U)	CO (kg/U)	VOC (kg/U)
- Large diesel trucks 3.5 – 16 tons.	1000km	4.3	20S	55	28	2.6
	Tons of diesel oil	1.6	7.26S	18.2	7.3	5.8
- Heavy diesel vehicles> 16 tons.	1000km	1.4	6.6S	16.5	6.6	5.3
	Tons of diesel oil	4.3	20S	50	20	16

(Source: Calculated by using the pollution load coefficients provided byProf. Dr. Pham Ngoc Dang (air environment - Basic Theory, dust pollution, toxic air pollution))

The total truck turns used to material transport are: 17,209 trucks,with average length of the distance to transport from the original source to the construction area is 7km.

The number of km of transportation is temporarily calculated: 17,209 trucks x 7km/truck = 120,463km.

The number of litre of diesel oil is temporarily calculated: 120,463km x 0.2 litre/km = 24,092 litters.

According to the conversion of diesel oil (0.5% S) from litres to kg is: 1 litre of diesel oil = 0.85kg diesel oil, then, *we can get the number of kg of diesel oil: 24,092 litres x 0.85kg = 20,478 kg = 20.478 tons of diesel oil.*

With the consumption of diesel oil during the material transportation and the total construction period is expected to be 24 months (600 days). Based on pollution coefficient at table 5.8, the emissions generated from the material transportation to adapt the construction process can be calculated as follows:

Table 5.11. The total amount of emission generated from the material transportation in the Khe Gang reservoir project

Emission	Quantify of emisstion (kg/Tonof diesel oil)	The total amount of emission(Kg)	Generated emission (kg/day)
TSP	1.6	32.76	0.05
SO_2	7.26	148.67	0.25
NO_x	18.2	372.70	0.62
CO	7.3	149.49	0.25
VOC	5.8	118.77	0.2

(Source: Calculated by using the pollution load coefficients provided byProf. Dr. Pham Ngoc Dang (air environment - Basic Theory, dust pollution, toxic air pollution))

Formula for calculating the average concentration of emissions:

Average concentration (mg/m^3)= Load (kg/day)x10^6/8/V(m^3).

Working hour: 8h:area of affected region is distance of transport road and construction site:

Area of transport road: S_1 = d x R. Where: d = 7km (average length of the distance to transport soil, sand, rock and other materials), R = 10 m (average width of road base): S_1 = 7,000m x 10m = 70,000m^2.

Area of construction site: $S_2 = 15{,}000m^2$.
Total area of affected region: $\sum S = S_1 + S_2 = 220{,}000$ (m^2).
$\sum S = 220{,}000m^2$, H = 10m (average height of spread of meteorological parameters within 10m).
$V = S \times H = 220{,}000m^2 \times 10m = 2{,}200{,}000(m^3)$.

Table 5.12. Estimate of emission generated (in theory) by the transport process

Pollutants	Concentration of emissions (mg/m3)	QCVN 05:2013/BTNMT Average: 1 hour (mg/m3)
TSP	0.003	0.3
SO_2	0.014	0.35
NO_x	0.035	0.2
CO	0.014	30
VOC	0.011	-

From estimated concentration in table 5.12 and in comparison with national technical standard 05:2013/BTNMT, the concentration of TSP, CO, SO2 and NOx generated are under allowed limitation. Particularly, concentration of VOC of 0.029 mg/m3 is not identified in QCVN 05: 2013/BTNMT.

Noise - Noise is generated mainly from excavation and earth filling activities by equipment, transport vehicles, etc. It can affect workers in the working areas harmfully and causes discomfort for people who live in neighbouring regions. Exposuring to high level of noise for a long time will lead to decrease of audibility, fatigue, stress, insomnia as well as reducing labor productivity; if people bear too noisy level continuously for 8 hours and lasting for many years, they may be influenced as blood pressure increase, nervous system and occupational deafness disease, etc.
According to national technical standard QCVN 26:2010/BTNMT, allowed noise in public and residential area is 55 – 70dBA (from 6am to 9pm).

When noise spreads in the air environment, it will be absorbed by environment as the model (**) below and decreased gradually intensity by distance.

$$L_P(X) = L_P(X_0) + 20.\lg(X_0/X) \quad (**)$$

Where:

$L_P(x)$: noise level at the calculated point(dBA);
$L_P(x_0)$: noise level from the source 1m (dBA);
x_0 : $x_0 = 1$ m;

Table 5.13. Noise level by transportation and construction machinery

Kinds of machine	**Noise level at 1m of distance**		**Noise level corresponding to distance**					
	Distance	**Average**	**5m**	**10m**	**20m**	**50m**	**100m**	**200m**
Truck	82-94	88	74.0	68.0	62.0	54.0	48	42
Concrete mixer	75-88	81.5	67.5	61.5	55.5	47.5	41.5	35.5
Loader	75-98	86.5	72.5	66.5	60.5	52.5	46.5	40.5
Excavator	75-86	80.5	66.5	60.5	54.5	46.5	40.5	34.5
Compactor	75-90	82.5	68.5	62.5	56.5	48.5	42.5	36.5
QCVN 26: 2010/BTNMT: 70 dBA (6am-9pm); 55 dBA (9pm-6am)								

(Source: Prof. Dr. Pham Ngoc Đang, Air environment, Publisher of Science and Technology, Ha Noi – 1997)

Noise -
Higher noise level compared with the allowed standard will impact to health of workers as well as insomnia, fatigue or cause psychological discomfort. High noise level will cause reduction of labor productivity, staff's health, workers who work at construction site. Exposuring to high level of noise for a long time will result in decline of hearing which leads to occupational deafness.

According to statistical data from the Ministry of Health and the Institute of Labour Protection Technique and Science of Vietnam General Confederation of Labour that the noise adversely affects most parts of the human body. The impacts of noise on the human body in different frequency bands are shown in Table 5.14 particularly.

Table 5.14. The harmful effects of high noise levels to human health.

Noise level (dBA)	The impact to listeners
0	Hearing threshold
100	Starting altering heartbeat
110	Stimulating strongly the eardrum
120	Brassy threshold
130 ÷ 135	Causing neuropathy, vomiting, weaken tackle and muscles
140	Brassy effect to ears, causing dementia, crazy
145	The maximum limit that humans can tolerate noise
150	Eardrum by listening for a long time
160	It is dangerous by listening for a long time
190	It is dangerous by just listening for a short time

The area should be noted is the construction sites. But noise pollution will only localize. The sub-project area is located in the mountainous valley and far away from residential areas (the nearest residential area is about 500m), so noise only directly impacts to workers within the sub-project construction site. The influence of noise to the surrounding residential area is negligible.

Land and Soil Degradation

During the construction, the amount of solid waste is generated as: rock, lime waste, packaging materials, garbage workers working in the field .etc. For these resources if they are discarded directly instead of collected and processed completely that will be a source of environmental pollution and causing loss of landscape. A part from domestic sewage, rainwater containing sand, sludge, grease and wastewater from construction seeped into the area will affect to soil quality (hardened soil and reduction of the amount of soil organisms). According to the technical design report, the volumes of excavated soil are about 53,914m^3.
Change of soil environment can be depended by direction change of terrain, physical and chemical property changes. The layer of plant is altered by motor vehicles, levelling and bulldozing machinery for ground and road. The construction will create grooves on the ground, and erosion if the drainage measures are not considered carefully. The excavation activities will take loam layer of surface, loss of vegetation and organism's populations.

These disturbances can lead to changes in the proportion of soil, reducing moisture and natural drainage capabilities.

Solid waste generated during construction - The removing of waste materials can cause temporary or permanent loss of land. The process of stripping discharges 2,745 tons of soil and rock. The area of temporary land lost is mainly due to uncontrolled land occupation for temporary material dumps and landfills. If the waste and materials area contain in a long period that can cause unhygiene, impacting to soil and water environment by rainwater flowingthrough the living area, affecting the people removal, transportation and loss of landscape.
Solid waste - The number of workers concentrated at the construction site at the maximum would be 20 people. The impact of domestic waste of workers on environment will be similar at each construction site. On average, a worker will generate a waste of about 0.3 - 0.5 kg per day. Consequently, the amount of waste discharged by 20 people during this period is of about 6-10 kg per day, in which the organic matters accounts for 60-70%, other components including paper, plastic, packaging etc. are about 30 – 40%.

Construction can generate hazardous waste such as fluorescent light bulbs, batteries, mops involving oil, waste oil .etc. Uncontrolled disposal of these wastes could cause land/soil degradation within the construction site vicinities (i.e. landscape becoming unsafe, elevated concentration of heavy metals, death of microorganisms affecting yield of plant, etc.).

Impacts on agricultural production **-** At the construction stage, the headworks construction will not affect negatively on agricultural production in local area, because the old intake water can still be used to take water for irrigation until the new one completed. A border dyke will be developed for new intake water construction. The headworks such as dam, intake water will be constructed in the period of changing season, for example after May-rain flood from 20/5 to 10/6 of the first year of construction. This time is changing season from Winter-Spring to Summer-Autumn, the water requirements for agriculture production is low. Some headworks construction requires reducing water level to the death level (Wc = 370,000m^3). At this level it is still possible to pump water directly into the irrigation canal.

Impacts on Existing Roadway **-** During the construction stage, the large trucks will be used for material transportation. The large trucks moving on the local roads will cause damage or deteriorate the roads through village 1 and 4A.

5.5. IMPACTS DURING OPERATION STAGE

The activities during the operations stage include daily operations and periodic maintenance of the dam facilities, including the management house, the access road and the intake valve and the spillway. The long term benefits of the sub-projects would be realized during this stage. Table 5.15 below summarizes both the positive and negative impacts of the completed and operational sub-project.

Table 5.15. Impacts during operation stage

Impacts	Assessment	Description of Impact
Increased reliability of irrigation water	High, Direct, Long term	The repair and upgrading of the dam and the installation of improve operation and maintenance program for the reservoir will redound to increased reliability of irrigation water in the service area, which means more stable irrigation water to 120 hectares of rice paddies, the 55 ha of vegetable farms and aquaculture ponds. There will also be reduced occurrence of water shortage during dry season.
Improved safety of downstream communities and increased security of farms, properties and infrastructure downstream	High, Direct, Long term	The repair and reinforcement of the dam, spillway and the replacement of the water intake as well as the adoption of a better operation/management system that takes into consideration dam safety will certainly redound to: (1) reduced probability of dam breach; (2) enhanced flood control function of the dam; (3) increased resilience of the reservoir against extreme weather events and earthquakes; and, (4) improved perception of safety among the downstream residents.
Improved socio-economic conditions in the sub-project areas and the region	High, Indirect, Long term	The increased reliability of irrigation water supply is expected improve farm productivity and hence farmers income in the service area. This, together with favorable perception of dam safety is expected to encourage investment on the downstream farms and properties as well as around the dam area, particularly along the National Road 48b and the Nghia Dan – Quynh Luu Railway, contributing to improved socio-economic conditions in the area.
Improved access by community residents to market, school and other social services	High, Direct, Long term	The upgrading of the dam of Khe Gang reservoir will increase the ability to access to social services, transport of local people because in fact the dam is main road line of commune. Beside that the upgrading of management road will also help people surrounding Khe Gang reservoir can travel more easily and create favorable conditions for economic and social development and cultural and economic exchange with neighboring regions. The easy travel also helps people can save time, reduces transport cost and increases business chances of agricultural products between communes. The women will have more time for other production or have more time for care of their babies.
Increasing awareness of local people and local authorities in the management of disaster risk and dam's safety	High, Direct, Long-term	The dam's upgrading and communications activities of local authorities and Project Management Board will increase awareness of local people and local authorities in the safety of dam and reservoir via stakeholder's consultation activities, meeting and participation in construction activities.
Solid waste, wastewater arising at the operation house during the reservoir regulation.	Negligible, Direct, Long-term	The volume of garbage, night soil and wastewater to be generated from the new Management House would be insignificant given the size of the facility (i.e. 49 sqm floor area). The building must be also provided with adequate toilets as required under the Ministry of Health's regulation.
Increased use of pesticides	Low, Indirect, Long term	Increased reliability of irrigation water in the service areas may lead to intensification of agricultural production resulting in increased used of agrochemicals including pesticides.

. Benefits and Positive Impacts

The socio-economic benefits from the sub-project:
*The irrigated area with the stable water supply ensured are 120ha of 02 rice seasons cultivation and 55ha of vegetable. This is potential fertile land area, if the subproject implemented in combination with intensive cultivation, it will bring high economic efficiency for local people.
*After the project completed, the irrigation water will meet the crop requirements. This will facilitate the reclamation and rehabilitation of bare land. Beside the economic benefits, it is a great significance for the improvement of ecological environment and landscape.
*This is a big subproject for agricultural production, but it impacted greatly on all aspects, not only at benefited area but also in the whole region. The subproject will contribute to change the face of rural area in the region. Economic development, people's life stability is a precondition for investment, addressing social issues such as health, education and security.
*The cost-benefit evaluation of the subproject construction showed that the subproject benefits are not only on economic, but also on social and environment in difficult mountainous area.

CHAPTER VI. ALTERNATIVE ANALYSIS

6.1. NO ACTION ALTERNATIVE

6.1.1. Existing subproject facilities

Khe Gang reservoir consists of a 460m long earth dam, 5.25sqkm of the basin area, 45m wide spillway, 50m long water intake and 303.4m long management road. The storage capacity of the reservoir is 1,776 thounsand cubic metre and irrigating for 120ha of rice and 55ha of seasonal crops. All these facilities are existing.

6.1.2. Dam and Reservoir safety characteristics

Khe Gang reservoir, Ngoc Son commune was constructed in 1991. Due to long time operation, the earth dam is now seriously degraded with the small dam crest, low and roughness dam. The previously filled soil of dam has low quality, and untreated ant leakage, therefore infiltration occurred some points in body and foundation of dam (especially 1/3 part of right dam). Upstream face is protected by rubble with peeling, damaged in some areas. Transplant grass at downstream face is eroded in many places and no drainage equipment. On the other hand, spillway is earth spillway located in right shoulder of earth dam. Spillway is damaged, eroded, specially the contiguous dam shoulder and downstream spillway.

According to the former design, the flood frequency prevention is P = 2%. Due to the impacts of climate change, the heavy rain and flood have occurred more often, flooding faster causes of deforestation. Based on National technical standard QCVN04-05-2012/BNNPTNT, the safety design for flood prevention is P = 1.5%, so the risk of broken dam is large if heavy rain. At the downstream of Khe Gang dam, local people had settled to live and stable produce (include 2,500 people and 1,500 ha of land), about 300m from foot dam to downstream with highway 48B and Nghia Dan – Quynh Luu railway, which are two arterial roads liking the western district of Nghe An with the coastal plain district. If dam breaks, the losses of lives and property of people will immeasurable.

6.1.3. Existing reservoir operation

Khe Gang reservoir is currently managed and operated by Dai Son agriculture cooperative, Ngoc Son commune. This is a self-experience-operation reservoir.

It has not met the safety dam standards in operation and exploitation of Khe Gang reservoir such as: not enough profile of reservoir management, untrained management staffs, no operation regulation, no flood control and prevention plan and no Emergency Preparedness Plan (EPP).

And there is also no environment and social measures applied for the reservoir.

6.2. WITH SUBPROJECT IMPLEMENTATION ALTERNATIVE

6.2.1. Repair and upgrading facilities of the sub-project

Earth dam: additional embankment and reinforcement of the upstream face, planting of grass on the downstream face and construction of the downstream drain-ditch;

Spillway: Upgrading the spillway with the reinforced concrete, a chute and a cushioning pool.

Water Intake: Construction a of new culvert with the distance of 3m from the old one; Changing the size and form of water intake: from the box-shaped sized bxh = 600x600mm to a round-shaped tube with 800 mm diameter; and, installation of valve.

Management/Service road: Repair and upgrading of the 303.4-meters service road from the national road 48B to the dam.

Management House: Construction of a new single storey 54.6m2 floor area Management House.

6.2.2. Reservoir safety operation improvement

After reservoir facilities repaired and upgraded, it will be transfer to Bac Nghe An Irrigation Management Company for operation and management to ensure complying with current management regulations of big reservoir. The following measures to improve reservoir safety operation applied:

- Install lighting facilities and witness mark for dam monitoring;
- Build the protective fence to prevent buffalo and cow grazing in the dam face;
- Instrall monitoring equipments of dam body such as filtartion and displacement equipments and water level equipments at spillway and water intake and gauging equipment.
- Formulate and approval operational regulation;
- Develop Emergency Preparedness Plan;
- Apply environment and social measures in construction and operation of reservoir.

CHAPTER VII. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

7.1. ESMP OBJECTIVE

The objectives of ESMP are:

- Ensure to comply with regulations, laws, standards and application manuals at the provincial and national levels.
- Guarantee to have sufficient allocated sources based on project budget to implement ESMP activities.
- Ensure the environmental and social risks of subproject have been managed properly.
- To cope with unanticipated and undefined environmental issues in environmental impact assessment of project.
- Feedback to continue to improve environmental activities results.

7.2. MITIGATION OPTIONS

7.2.1. Mitigation options

7.2.1.1. Mitigation measures during preparation stage

Table 7.1. Mitigation measures during preparation stage

Impact	Source Activity	Mitigation Options	Evaluation of Options
General apprehensions by residents, farmers, women, other sectors about the impacts of and opportunities in the sub-project, which may lead to speculations and adverse perceptions about the sub-project and to conflicts.	Feasibility study preparation ESIA	Conduct information drive and consultations with local communities	Consultation with the local communities during the conduct of the EIA/ESIA is required under the World Bank's OP/BP 4.01 as well as under Vietnam's LEP. The LEP requires public consultations at two stages: during the EIA preparation and during the review of the EIA report.
	Detailed Engineering and Program of Work	Prepare and implement a Communication Plan Prepare and implement a Gender Development Plan	If farmers are not informed or consulted about the timing and strategy of construction, there may be heightened apprehensions about potential crop losses and some farmers may develop negative attitude about the sub-project. If consulted, farmers can help determine the best timing of the construction activities. This will also allow them to plan ahead. On the other hand other sectors in the community such as women may have different needs or use of the facilities such as the use of reservoir water for washing of clothes and other chores that could be improved by certain design enhancements.
	Land, road right-of-way and/or	Preparation of RAP according the World Bank OP/BP 4.12	This is mandated under World Bank policy. The policy provides for consultation with affected persons, fair and just compensation, and

Impact	Source Activity	Mitigation Options	Evaluation of Options
	easement acquisition		resettlement in case of displacement of homes or livelihood. A Resettlement Action Plan/Compensation Plan has been prepared.
	Procurement and Bidding	Prepare and implement a Communication Plan	Periodic updates and open communication on the progress of the sub-project preparation will increase the people's ownership of the sub-project and will eliminate any speculations and apprehensions.

7.2.1.2. Mitigation measures during construction stage

Table 7.2. Mitigation measures during construction stage

Impacts	Source Activity	Mitigation Options	Evaluation of Options
Land/soil degradation	Construction spoils and waste materials Quarrying operation Campsite and stockyard operation	Compel the contractor to adopt good housekeeping at the construction site; Dispose of construction spoils (i.e. excess embankment materials) in the designated landfill. Restore any deformed lands before demobilization	Degradation of land/soil within and around construction site usually results from improper disposal of construction spoils and wastes. Lands construction sites could be deformed by boulders of gravel, soils, excavations and construction wastes and would need substantive clearing in order to restore them. Usually implementation of good housekeeping practice (proper sorting, orderly storage and retrieval of materials, cleaning and waste disposal system) at construction sites is sufficient. This not only minimizes land/soil degradation but also improves efficiency and safety. The contract with contractors should include provisions for site restoration.
Impact on biodiversity and ecosystem	Land conversion (1 ha) and temporary use (0.5 ha) Construction activities: visual and noise nuisance	Avoidance of activities and excessive lighting at night Restoration/revegetation of temporary easement and unused land	Wildlife will likely migrate farther away the busy areas of the sites and return when the construction activities wind down. Impact on biodiversity if any would be negligible. Banning of construction activities at night may help minimize disturbance for nocturnal birds, bats and insects but allowing night-time activities may also shorten the construction period. The restoration of unused opened up after construction areas may also facilitate return of wildlife. However, as noted in the baseline study there are not much wildlife in the area and measures such as restoration may not be commensurate or cost effective measure.
Impact on air quality	Air emissions (SOx, NOx, COx) from equipment and machineries Dusts generated from	Regular spraying of roads with water during dry days Ensure only equipment with properly maintained engines are used.	Under normal conditions, air quality changes from emissions of construction equipment and machineries should be negligible. Emissions from improperly maintained engines could become a nuisance. Dust could easily become a significant nuisance and hazard during long dry periods. Spraying the sites with water is an effective measure against dusts. Community

Impacts	Source Activity	Mitigation Options	Evaluation of Options
	earthworks and traffic		leaders should be able to prompt contractors to address dust, noise or emission nuisance when needed.
Increase noise nuisance	Operations of construction equipment and machinery	Avoidance of construction activities at night Hammering, grinding and blasting to be done only during daytime	Noise could become a nuisance and disrupt community activities. Banning of certain activities such as hammering, grinding and blasting could be imposed during periods of rests and relaxation of residents. However, a more effective measure would be to enable/allow community leaders to call the attention of the contractor when noise becomes a nuisance.
Impact on the surface water quality	Sediments from quarry and earthmoving activities	Excess embankment materials to be disposed of in the designated landfill which is situated on a naturally depressed area Provision of silt traps around stockpiles of embankment materials Immediate stabilization and/or compaction of exposed/loose soils	All these measures are feasible. The designated landfills have been identified. If temporary stockpiles of the dirt and loose materials are necessary, care must be taken to locate these away from strong runoff. A canal around the stockpile may be provided to serve as silt trap. Loose bare soils on slopes should be immediately stabilized by compaction or by re-vegetation.
Impact on the soil and groundwater quality	Fuel and waste oil spillage	Contractor to implement good housekeeping policy at the sites Contractors fuel storage tank to be placed on a concrete platform and provided with perimeter oil traps Fuel and used oils to be contained in barrels and stored in designated area	These measures are standard practice in construction site management.
Loss of land/land use rights, tree crops	Acquisition of 0.5 hectare of land for the construction of Management House Acquisition of 1.0 ha temporary easements during construction	Implementation of the RAP/Compensation Plan	This is required under the World Bank OP/BP 4.12.
Damage to existing road routes	Hauling of construction embankment and materials	Contractor's contract to include regular repair maintenance of construction road routes during construction	The contract with contractors should include the commitments to undertake repair and maintenance of the routes. Against the alternative of the local commune undertaking the regular maintenance, this option is the more

Impacts	Source Activity	Mitigation Options	Evaluation of Options
		period. Temporary detours may be established to avoid weak bridges.	effective and efficient as the contractor will have the incentive to take care of the road routes.
Interruption in irrigation water supply	Repair of the dam embankment and intake	Implement a staggered or modular construction strategy Consultation with farmers on the timing and construction strategy to minimize cropping disruption Provide alternative source of water during construction	In the preparation of the detailed engineering and program of work, the minimal disruption of irrigation water should be priority consideration. Construction activities can be divided into modules and carefully sequenced for minimal disruption of irrigation water delivery. The timing of the disruption should also coincide with the period of less water demand from croplands. The provision of alternative water source should also be explored.
Occupational health and safety	Construction activities; operations of heavy equipment	Compel contractor to practice good housekeeping Installation of proper warning signs and notices Require wearing of PPE for workers and visitors Installation of water and sanitation facilities at campsite Proper collection and disposal of garbage Domestic/kitchen waste to be discharged into a soak pit	The contractor should have a designated environment and safety officer who has adequate authority. This officer could be the project engineer himself. His job is to ensure that standard personal protective equipment should be provided and worn by workers and proper warning signs and barriers will be installed where they are needed. In terms of domestic wastes (i.e. daily garbage and kitchen wastewater) generated, the construction will generate very little (about 20 workers). These wastes can be handled by the existing waste collection and disposal system in the village. The kitchen wastewater can be easily disposed of through a simple soak pit.
Increased public health and safety risk due to hazards at construction sites, traffic accidents and opening of areas not previously access by people.	Construction activities Contact with migrant workers	Installation of warning signs and notices of off limits. Fencing off of dangerous areas Provision of sanitation facilities including toilets at the site Medical screening of workers	On-going constructions of structures, excavations and traffic of heavy equipment pose hazards to the local residents who may pass by or venture into the area. These areas can be identified by the Contractor and provided adequate warning signs or fenced off from residents. The possibility of encountering unexploded ordinance or land mines from the previous war is unlikely in the area but a standard procedure is available and can be implemented in case of chance encounter. Medical screening of workers for infectious disease can be required of the contractor. Proper sanitation should be implemented within the construction site.

***. Impact mitigation measures during construction:**

1. Rocks and dropping material deposits the Khe Gang reservoir, channels, and rice fields during clearance, soil excavation and material transport.

+ Avoid clearance activities in the rainy season, clean up the completed work before moving on to a new line.
+ Install the sewer grates in the drainage ditch;
+ Dredge canals in the rainy season(if necessary) if the canals have a lot of sedimentation.
+Clean and dredge soil, sand and rubble that spill down to paddy fields, canals ...from the vehicle being dumped.

- Highly effective, without technology or complex technical, and easy to implement.
- These mitigation measures will depend on the progress of implementation of the project, experience and responsibilities of the construction unit. Therefore, the commitment of the construction unit will be needed.

2. Soil pollution from spilling and leaking oil and other chemicals.

+ Chemicals (oil, additive chemicals, etc.) for construction should be contained in containers, boxes that suit for each type of chemical and store in a safe area, with concrete floors and water resistant roof;

+ Vehicles and construction equipment should be maintained in a good condition.
+ Unused chemical and petroleum should be wrapped carefully before transporting to the qualified store. The box contains chemical waste that can not reuse should be separately collected and transported to specialized units to handle.

- The mitigation measures are simple, easy to implement, and do not need the complex technology and technique. However, the contractor must prepare the warehouse and yard before starting construction.

- It should be coordinated between the specialized units to ensure that the waste is being handled.
- These measures will bring good results if the construction contractors and workers are aware and educate about environmental protection, and they are tested by the project owner and other stakeholders.

3. Water and aquatic environmental pollution from waste, chemicals, effluent or contaminated lands.

+ Oil should be stored in a safe area, with concrete floors and roof that avoid rainwater and floodwater;

+Vehicles and construction equipment should be maintained in a good condition.
+ Camp for workers require to have 2 toilets by the standards of the Ministry of Health.
+Soil spillage should be collected and processed regularly to prevent clogging in canals and water resources in the region.
+ No chemical preparation close to the water source
areas
+ Do not wash tanks, boxes containing materials.

+ Do not leave waste in the ranges of 10m in the water sources.

- The mitigation measures are simple, easy to implement, no complex technology and technique, without raising machines.

- However, the contractors must prepare the warehouse and yard before starting construction. - It should be coordinated between the specialized units to ensure that the waste is being handled. These measures will bring good results if the construction contractors and workers are aware and educate about environmental protection, and they are tested by the project owner and other stakeholders.

4. Irrigation channels and reservoirs construction interrupt supplying water for downstream and rice fields.

+ Most of the activities that upgrading the system should be carried in the dry season.
+ Accelerate repairing system in the construction stage.
+ Technical measures such as temporary water channels should be created.
- Highly effective, without complex technology or technique, and low budget.
- The mitigation measures will depend on the progress of the project, experience, and responsibilities of the construction units. Therefore, the commitment of the construction units should be needed.

5. Dam safety risk

+ Most of the activities that upgrading the dam, drain water should be carried in the dry season.
+ Speed up the construction.

- Highly effective, without complex technology or technique, and low budget.
- The mitigation measures will depend on the progress of the project, experience, and responsibilities of the construction units. Therefore the commitment of the construction units should be needed.

6. Air pollution due to dust or other emissions (CO, NOx, SOx, etc)

Carry measures to minimize dust and air pollution, as follows:

+ Cover the trucks that transport constructive materials with canvas during the transport process.
+Vehicles and construction equipment should be maintained in a good condition.
+ Regulate the limited speed (15kph) and guide the driver to know and comply with it.
+ The contractor will perform the proposed construction plans, approved by the PMU to minimize the time for clearance and construction, and temporary material storage.

-These mitigation measures are feasible, simple, easy to implement, and consistent with the ability of the contractor. It will be effective under close and serious monitoring.

- However, these impacts can only minimize, not being able to completely overcome.

7. The noise generate from construction equipment.

+ The motor vehicles, construction equipment must be maintained periodically.

+ Avoid performing construction activities near residential areas in the lunch hour, or after 8 pm.
+ Inform the construction plans regularly to communities and local government by phone, speakerphone, text, or on the notice board of the Ngoc Son Commune people's committee.
- These mitigation measures are simple, easy to implement, do not need the technology or complex technical, suitability to building contractors. It will be effective under close and serious monitoring.
- However, noise impacts can only mitigate, not being able to completely overcome.

8. Obstruct traffic, increase risk of traffic accidents and reduce the ability to access to social services (schools, markets, health centers ...) in the subproject area.

+ Install the signs and lights in the construction area to guide traffic;
+ Create a temporary way for people to travel when necessary;
+ Do not set the material before the passage of local people and other busy spots
+ Notice the construction plan for the community.

- These mitigation measures are simple, easy to implement, and do not need the complex technology and technique.
- However, there must be a commitment by construction contract between building contractors and project management unit.
- The risk of accidents can be entirely prevent. However obstructing traffic and reducing the ability to access to social services can only mitigate, not being able to completely overcome.

9. Materials waste arising from the construction activities on site and from activities of workers
+ Cleaning and carrying the waste from the construction to the dump regularly.

+ Put the trash in the proper position in the field and worker's camps.
+ With the hazardous waste (e.g. sludge, grease and other related products from surplus oil, if any), install the collective system, temporary store around the site, contacting with the specialized unit to handle.
- These measures are highly effective, feasible and easy to implement. It needs the participation in the form of a contract between the contractor and the functional units for collection, disposal, and treat regular waste as well as oil waste.
- It should have the consistency between the construction contractors. There should be a strict sanctions and the closely monitored.

10. Constructive workers temporary stay in the locality may cause social problems, affecting the lives of people

+ Consult local authorities about rent house for workers instead of setting up camp. It has more advantages in solid waste management.
+ Orientate workers how to communicate with the community, guiding them about protecting their health, sanitation, prevention of infectious diseases.
+ Orientate workers how to prevent infectious diseases such as HIV / AIDS, other social evils such as gambling, whoredom, theft, ..
+ Workers should be strictly banned to exploit the local resources.
- These measures are workable, consistent with the ability of the contractor.
- However, the effect also depends on the consciousness of the workers and the responsibility of the construction unit.

- Communities should be monitored and detected the violations to fine.
- The construction units and related parties should have an agreement.

11. The threats to the worker's health and labor safety in the project area.

Safety measures in the construction area:

+ Safe staff should be arranged to implement safety measures at construction sites. Safe staff should be trained in emergency first aid.
+ Provide adequate equipment and personal safety for employees (such as helmets, gloves, belt, etc.) and training them to use;
+ Install safety regulation table in the field.
+ Install fencing around the construction.

Reduce the risk from material transport processes along the route:

+ The speed should be limited along the route (management road and dam) but it should be compliant with the residential areas and intersection segments.
+ The contractor should conduct meetings or informing with commune staff and local people regularly, informing them about the progress of construction and traffic safety, and helping residents aware of the risks to beware.
+ Limit material transport in the wet season and the vehicle should be avoided overloading than the standard of roads and bridges.
+ Damaged pavements should be repaired timely. Implement measures to reduce dust as stated;

- The above measures can fully implement and they will have highly effective if they are in full compliance with the above provisions.

- However, it depends largely on the self-consciousness and the observance of workers.

12. Theimpacts generate from the temporary dump materials such as dust, noise, etcand impacts on water quality.

+ Store material along the route, dam or near the construction site to avoid congestion;

+ Materials should be stored in a reasonable way to avoid affecting the vehicle and pedestrians passing through the construction area;
+ Install fences around the area where contain the material to prevent the entry of people and animals;
+ Reasonable compensation for the agricultural produce of the local residents that affected by putting materials as well as using cultivated land as a temporary dump material;

- These measures are highly effective, feasible, easy to implement, and do not need complex technology or techniqueand consistent with the ability of the contractor.

- However, the effect also depends on the consciousness of the workers and the responsibility of the construction unit.
- Communities should be monitored and detected the violations to fine.
- The construction units and related parties should have an agreement.

13. Impacts generate from exploitation activities of land mines, stone and sand such as dust, noise, safety and the soil and water pollution and others.

In the land and stone mines, contractors should follow the environmental protection issues, including:

- Machines and construction equipment need regular maintenance, in accordance with quality requirement during operation.

- The hazardous waste such as oil and other chemicals must be strictly managed, stored in separate areas around the constructive area, waiting the treatment from competent authorities. Workers need to be equipped with protective tools while working in the made ground.
- Mining area must have fences, the entrance gates must have protective latches in order to prevent the entry of people and animals;
- During dry days, the land mine areas should be sprayed with water.
- The contractor must select the material provider that has the suitable business license.

- These mitigation measures are simple, easy to implement, and do not need the complex technology and technique.
- However, the contractor must prepare the constructive machines, warehouse, and yard before starting construction.
- It should be coordinated between the specialized units to ensure that the waste is being handled.
- These measures will bring good results if the construction contractors and workers are aware and educate about environmental protection, and they are tested by the project owner and other stakeholders.

7.2.1.3. Mitigation measures during operation stage

Table 7.3. Mitigation measures during operation stage

Impacts	**Source Activity**	**Mitigation/Enhancement Options**	**Evaluation of Options**
Increased reliability of irrigation water	Operation of fully repaired and upgraded dam and facilities	Adoption of watershed management plan	A Reservoir Management and Operations and Safety Plan will be prepared and implemented as part of the sub-project.
Improved safety of downstream communities and increased security of farms, properties and infrastructure downstream	Operation of fully repaired and upgraded dam facility Implementation dam management system that takes into consideration safety	None	
Improved socio-economic conditions in the sub-project areas and the region	Operation of fully repaired and upgraded dam facility	None	
Improved access by community residents to market, school and other social services	Opening of the dam access road for use by the public	None	
Increasing awareness of local people and local authorities in the management of disaster risk and dam's safety	Implementation of the dam management system which incorporate dam safety plan	Conduct regular drills or information/awareness drive with the host communities	
Increased use of pesticides	Intensification of agricultural production in the irrigation service areas	Introduction and/or support by MARD of an Integrated Pest Management program within the area.	
Drowning/accident hazards at the dam	Opening of the dam site and facilities to the public	Provision and maintenance of adequate warning	

Impacts	Source Activity	Mitigation/Enhancement Options	Evaluation of Options
	Use of the reservoir and canals for recreation by local residents/children	signs, fences and guard rails. Provide a designated recreational area and organize residents to provide regular watchers or lifeguards.	

7.2.1.4. Recommended Enhancements of Benefits and Positive Impacts

1. Natural disaster caused the insecurity of Khe Gang Reservoir

-Khe Gang operational management unit – Khe Gang irrigation works management periodically checked the safety of the reservoir.

-Khe Gang operational management unit closely coordinates with the COMMUNE PEOPLE'S COMMITTEES (CPCs) and the local people to promptly report the risks related to the dam safety for timely handle measures.

-At the time that the safety might be prone to insecurity as the rainy season, the reservoir should be monitored regularly to ensure the reasonable water regulation.

- For the flood discharge problem, the flood inundation mapping for downstream area will be made. The plan will be informed to people at least 01 days before to prevent people and reduce the damage.

-Build a safe corridor for the flood (if necessary) based on forecast scenarios on the impact of space due to dam failure.

- These measures will reduce the impact during operation if they are implemented strictly.

- These measures also require the strict implementation of the principle of irrigation works protecting corridors under the ordinance exploitation of irrigation works.

2. Reservoir regulatory, flood discharge in the case of large flood affecting downstream

- Managerial and operational unit must notify prompt and accurate about flood discharge in order to help people in the community have the prompt response.

- At the time that the safety might be prone to insecurity as the rainy season, the reservoir should be observed regularly to ensure the reasonable water regulation.

- People and the local governments should have an active plan to cope with the disasters based on community.

- This measure has the highly feasible.

-However, themonitoringsystem should be equipped to supportoperating officers in the forecast work.

With these above-mentioned conclusions, to ensure safe, effective dam activities, the consulting unit should recommend the Employer to take measures to survey and research to address some of the following issues:

- It is necessary to promptly repair, upgrade the dam:

+ Dam Crest: expand the dam crest to guarantee in compliance with current regulations; clear plants and solidify the dam crest; add lighting equipments; marker the station for monitoring the dam.

+ Upstream dam slope: clear plants, remove off the old tile stone layer, re-equip with the protective device for the slope with concrete or stone, tile stone in the frame within the slope as prescribed against the impact of waves.

+ Downstream dam face:

* Downstream dam face is huge deformed, it is necessary to clear plants, remove off the covering layer before re-filling;

* To avoid the slope sliding, it is necessary to supplement surface water drainage system and grass on the downstream dam face;

* Build barricades to limit grazing on the dam surface;

* The scope appearing the seepage through the dam body and foundation needs a drill for detailed survey to assess the seepage causes, extent and scope to waterproof accordingly. Need adding drainage equipments for the dam body and riverbed cross-sections, slope drainage equipment for the hillside cross-section. The scope of strong seepage in the right shoulder foundation might consider by doing the drainage ditch.

- Re-equip a new intake to ensure increased efficiency of use and avoid risks for the dam. Demolish or remove off by old culvert concrete.

- Re-work the spillway with reinforced concrete structures. Refer to the spillway size B = 75m in free-flowing form, low pragmatic threshold proposed by the dam safety consultant.

- Construct management house, equipments serving for the management and operation of the dam, add electrical and lighting systems;

- Complete management and operation road system;

- Survey and propose solutions to the phenomenon of downstream slope termites.

- Arrange with the monitoring equipments of dam body and water level such as monitoring seepage, displacement, water level (at the culvert and spillway) and even rain gauge. Add the station on the dam crest for the easy management;

- Prepare and submit for approval of the process of reservoir operation;

- The reservoir downstream’s population is crowded, need to have emergency preparedness plan

EPP;

- The work should be managed by the unit having full managerial functions and operational and using capacity for the reservoir with a large volume consistent with the existing regulations.

7.2.2. Environmental and Social Management Plan

This ESMP is prepared in order to address critical environmental and social impacts/issues identified in the assessments and to provide common reference for all those involved in the implementation of the sub-project. This will also help guarantee that sufficient resources are allocated to implement the agreed measures.

Table 7.4. Environmental and Social Management Plan

Impacts	Activity Causing the Impact	Agreed Mitigation Measure	Est. Cost (VND)	Responsible Org.
Preparation Period				
General apprehensions by residents, farmers, women, other sectors about the impacts of and opportunities in the sub-project, which may lead to speculations and adverse perceptions about the sub-project and to conflicts.	Feasibility study/ESIA preparation Detailed Engineering and Program of Work Land, road right-of-way and/or easement acquisition Procurement and Bidding	Conduct information drive and consultations with local communities Prepare and implement a **Communication Plan (Appendix B3)** Prepare and implement a **Gender Action Plan (Appendix B4)** Preparation and implementation of a **Resettlement Action Plan/ Compensation Plan** in accordance with the World Bank OP/BP 4.12 Preparation and implementation of a **Grievance Redress Procedure (Appendix B5)**		Project Owner and DARD
Construction Period				
Land/soil degradation in the construction site vicinities due to construction spoils, gravels, wastes materials and litters causing land deformation, compaction and changes in soil structures.	Construction spoils and waste materials Quarrying operation Campsite and stockyard operation	Require contractors to submit a **Contractor's Environment and Occupational Health & Safety Plan** incorporating construction-related measures identified in this ESMP, including relevant measures in **Public Health Management Plan (Appendix B2)** and standard construction practices of EHS. Dispose of construction spoils (i.e. excess embankment materials) in the designated landfill.		Contractor under DARD and Project Owner supervision
Impact on biodiversity and ecosystem	Land conversion (1 ha) and temporary	Avoidance of activities and excessive lighting at night		Contractor under Project Owner

Impacts	Activity Causing the Impact	Agreed Mitigation Measure	Est. Cost (VND)	Responsible Org.
	use (0.5 ha) Construction activities: visual and noise nuisance	Prohibit workers from poaching/hunting of birds and other wildlife in the area		supervision
Impact on air quality	Air emissions (SOx, NOx, COx) from equipment and machineries Dusts generated from earthworks and traffic	Regular sprinkling of roads with water during dry days Ensure only equipment with properly maintained engines are used.		Contractor under supervision of Project Owner
Increase noise nuisance	Operations of construction equipment and machinery	Avoidance of construction activities at night Hammering, grinding and blasting to be done only during daytime		Contractor under supervision of Project Owner
Impact on the surface water quality	Sediments from quarry and earthmoving activities	Excess embankment materials to be disposed of in the designated landfill which is situated on a naturally depressed area Provision of silt traps around stockpiles of embankment materials Immediate stabilization and/or compaction of exposed/loose soils		Contractor under supervision of Project Owner
Impact on the soil and groundwater quality	Fuel and waste oil spillage	Contractor to implement good housekeeping policy at the sites Contractors fuel storage tank to be placed on a concrete platform and provided with perimeter oil traps Fuel and used oils to be contained in barrels and stored in designated area		Contractor under supervision of Project Owner
Loss of land/land use rights	Recovery of 0.5 hectare of land	Implementation of the RAP/Compensation Plan		Project Owner under DARD supervision
Loss of crops, trees and properties	Recovery of 0.5 hectare of land Acquisition of 1.0 ha temporary easements	Implementation of the RAP/Compensation Plan		Project Owner under DARD supervision
Interruption in irrigation water supply	Repair of the dam embankment and intake	Implement a staggered or modular construction strategy Consultation with farmers on the timing and construction strategy to minimize cropping disruption Provide alternative source of water during construction		Project Owner under DARD supervision
Occupational health	General construction	Compel contractor to practice		Contractor under

Impacts	Activity Causing the Impact	Agreed Mitigation Measure	Est. Cost (VND)	Responsible Org.
and safety issues	activities: operations of heavy equipment	good housekeeping Installation of proper warning signs and notices Require wearing of PPE		DARD supervision
Increased public health and safety risk	General construction activities Contact with migrant workers	Installation of warning signs and notices of off limits. Fencing off of dangerous areas Provision of sanitation facilities including toilets at the site Medical screening of workers		Contractor under Project owner supervision
Chance archaeological/ paleontological finds	Excavation at construction and quarry sites	Adoption and implementation of **Chance Find Procedure (Appendix B7**)		Contractor and Project Owner
Chance encounter of unexploded ordinance, mines	Construction activities in newly opened areas	Immediately secure the area and contact responsible agencies through the PPMU will be responsible for contacting the concerned agencies.		Contractor and Project Owner
Operation Period				
Solid waste and domestic wastewater	Operation of the new dam management house	Adopt and implement house rules and proper waste disposal.		Project Owner
Increased use of pesticides	Intensification of agricultural production in the irrigation service areas	Introduction and/or support by MARD of an Integrated Pest Management program within the area.		MARD
Drowning/accident hazards at the dam	Opening of the dam site and facilities to the public Use of the reservoir and canals for recreation by local residents/children	Provision and maintenance of adequate warning signs, fences and guard rails. Provide a designated recreational area and organize residents to provide regular watchers or lifeguards.		Project Owner

7.2.3. Estimated cost of mitigation measures

Table 7.5: Estimated cost of mitigation measures

TT	Activities	Mitigation measure works	Estimate cost (VND)	Implementing responsibility
	Preparation stage:			
1	Transport of construction waste	- Equipping 10 canvases for the lorries for that have no canvas or replacing for old canvas.	2millions/canvas x 10 canvases = 20millions	Contractor

TT	Activities	Mitigation measure works	Estimate cost (VND)	Implementing responsibility
2	Assembling means and machines	- Make movement plan, assemble equipments reasonably to avoid effect on local people's life		
	Construction stage:			
1	Construction activities	- Non-use of the too old equipments, maintain periodically machines and equipments 6months/time	10millions/time * 1 time/1 year * 2 yrs = 20millions.	Contractor
		- Spraying water periodically on the construction area and along the execution road line	Change by day	
		- Cover canvas for materials storage yards and material transport means	5millions	Contractor
		- Clean up and treat the volume of dogged sandy soil and weathered soil scatters on the ground	20 millions	Contractor
		- At each construction site places 02 dustbins to keep waste from machines; and 02 dustbins keep normal waste	1 million /dustbin x 04 bins x 1 placing point = 4 millions	Contractor
		- Regularly collect and clean scattered materials - Classify solid waste and put rightly to bins as per required - Collect and treat rightly waste as per regulation	Service fee for waste collection and treatment 12millions/year * 2 years = 24 millions	
		- Economical use of water source - Constructing accumulation pit to collect construction wastewater, machines washing water to treat waste matter, colloidal sludge	10 million/1 construction site * 01 site = 10 million.	Contractor
		- Arrange the reasonable working schedule - Equip sufficiently labor safety instruments for workers -Holding the training, capacity building on labor safety and environmental protection before construction. - Organizing periodic medical checkup for workers on the	- Equip labor safety instruments: 10 millions/year * 2 years = 20 millions. - Organize training on labor safety: 30 millions/course *2 courses/year*2 years = 60 millions. . - Arrange periodic medical checkup: 20	Contractor

TT	Activities	Mitigation measure works	Estimate cost (VND)	Implementing responsibility
		construction site	millions/year *2 years = 40 millions.	
		- Make prevention plan of storm, tropical low pressure, whirlwind. - Disseminating the response plan. - Organizing maneuver.		Contractor
2	Production activities of concrete components	- Economical use of water source - Constructing wastewater collection system, accumulation pit for treatment before discharge to environment	Expenses included in construction accumulation pit	Contractor
		- Maintain machines periodically		
	Materials transport activities	-Transport in the regulated time - Carry loading capacity rightly as per regulated and having guarded canvas. Equip more 20 canvases for lorries have no canvases or replacing for too old canvases. - Run follows the speed limit.	02 million/canvas x 20 canvases = 40 millions	Contractor
	Life activities of staffs and workers	Purchase 03 flexible latrines.	30millions/latrine x 2 units = 60millions	Contractor
3		- Equip 03 dustbins to collect rubbish at the tents - Clean up regularly - Contract with environmental sanitation agency of local to transport and treat waste	2millions/dustbin x 03 bins x 01 tent = 6 millions - The transport and rubbish treatment fee 20millions/year *2years = 40 millions	Contractor
4	Repair and return the road lines that have been damaged	- Repair, levelling and improve the damaged, depressed and low quality road lines	80 millions	Contractor
5	Environmental monitoring during construction time	- Take the sample for observation and monitor environment quality at construction site (2 yrs)	448.358.000đ (See the detailed estimation in table 7.7)	Environmental consultant
	Operation stage			

TT	Activities	Mitigation measure works	Estimate cost (VND)	Implementing responsibility
1	Return whole construction area: tent area, dumping ground, soil exploitation area	- Dismounting tents, signs - Gathering, and selling for user. -Assembling and movement of machines, construction equipments. - Fill up and levelling the ground of explosion field.	50millions	Contractor
2	Reservoir and dam operation and maintainance	- Organise to inspect the maintanance regularly and periodically. - Discover and tackle opportunely the encroachment and use canal line out of purpose.	O&M budget	PPMU
3	Traning and incidents prevention	- Arrange the training on coping with unexpectd events with frequency of 1 time/year according to proposed program of Department of Agriculture and Rural Development (DARD).	O&M budget	PPMU
4	Dredge irrigation	- Operate water sluice flexibly; - Observation and monitor to find out the region that get accumulation or erosion state; - Get the periodic canal dredge plan to guarantee water flow and environment	O&M budget	PPMU
5	Operating close and open suice gate	- Regularly monitor the salty level, regional hydrology regime	O&M	PPMU
		- Operate water inlet sluice flexibly and timely		
		Total cost	**948.358.000đ**	

7.3. ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMoP)

7.3.1. ESMP Compliance Monitoring and Audit

The monitoring will focus on compliance with the ESMP. The Project Owner will be required to submit ESMP Implementation Status Report to the MARD CPO through the Provincial DARD, during the start of the construction, midway during construction and at the completion of the construction. The Report shall at the minimum use the ESMP table above with additional column on status, such as follows:

Impacts	Activity Causing the Impact	Agreed Mitigation Measure	Responsible Org.	Status

Depending on the perceived environmental and social risks, the MARD CPO may conduct its own, or may engaged the services of a consultant to undertake site visits, to conduct compliance audit and/or to validate of the Project Owner's ESMP Implementation Status Reports.

7.3.2. Environmental Monitoring

As discussed above, long term impacts on the environmental quality (i.e. air, water and soil quality) at sites are expected to be negligible while short term impacts will be limited to increased particulate mater (mostly construction and traffic dusts), sedimentation of waterways, noise generation and temporary migration of wildlife away from the construction site. These impacts are highly visible and can be mitigated right away upon occurence and hence do not require systematic measurements or sample analyses during construction. Nevertheless, the Provincial DARD and/or MARD CPO may, at the completion of sub-project, conduct environmental measurements and sampling at the sub-project sites and compare these with the results of the baseline measurements undertaken during the conduct of this ESIA.

7.3.3. Environmental and social monitoring cost

Table 7.7. Estimated cost of environmental monitoring

No.	Item	Quantity	Unit price (1000 VNĐ)	Total estimation (1000VNĐ)	Remarks
A	DIRECT COST				
1	Independent environmental specialist: 1 person x 48 days		1,150	55,200	Circular 219/2009/TT - BTC
2	Internal environmental specialist:: 01 person x 24 months		5,400	129,600	Circular 219/2009/TT - BTC
3	Travel cost (8 times)	8	1,500	12,000	
4	Samples transportation (8 times)	8	1,500	12,000	
5	Measurement and analysis (8 times)			132,832	
	Air sample	24	1,354	32,496	
	Surface water sample	16	5,084	81,344	
	Waste water sample	8	2,374	18,992	
6	Report preparation	4	8,000	32,000	

No.	Item	Quantity	Unit price (1000 VNĐ)	Total estimation	Remarks
	Sub-total			373,632	
B	General cost (20%)			74,726	
	Total cost			**448,358**	

7.4. ESMP IMPLEMENTATION ARRANGEMENT

7.4.1. Agencies and Responsibilities

Table 7.9. The role and responsibility in ESMP implementation

Unit	Role and responsibility		
	Pre-construction stage	**Construction stage**	**Operation stage**
CPO	Guiding safety policy staffs of Provincial Project management Board during the preparation period of Inspection report the environmental and social impact assessment. Review and contribute the ideas for report submited by Provincial Project Management Board	Guiding the staffs of Provincial Project Management Unit (PPMU) to carry out the environmental and social management plan during construction time. Supervising progress of the subproject during construction time. Gathering the 6months reports on environment from PPMU	Guiding safety policy staffs of Provincial Project management Board to carry out the environmental and social management plan during the first operation year; Supervising progress of subproject during the first operation year; Gathering the reports on environment from PPMU;
Provincial People's Committee	Guiding safety policy staffs of Provincial Project management Board during the preparation period of Inspection report of the environmental and social impact assessment. Review and contribute the ideas for report submited by Provincial Project Management Board	Project Owner takes the highest responsibility on environmental activities of subproject during the construction time	Project Owner takes the highest responsibility on environmental activities of subproject during the operation time including the implementation ESMP.
Provincial Project Management Board	Hiring consultant and take the general responsibility on preparation ESIA and submit for approval;	Taking the responsibility on implementing ESMP in pre-construction and construction periods;	Taking the responsibility on implementing ESMP in the first operation

Unit	Role and responsibility		
	Pre-construction stage	**Construction stage**	**Operation stage**
	Guarantee the officers must be trained completely in environmental issues;	Guarantee the detail of contract and bidding documents including environmental requirements; Conducting the investigation and supervision environmental issues during construction time; Cordinating Environmental Monitoring Reports to CPO;	year; Conducting the investigation and supervision environmental issues in the first operation year; Assist project owner in giving out environmental requirements in operation procedure and maintenance project;
People's Committee of District	Approving the Environmental Protection Committment (CEPs) of subproject in accordance with legal regulations of Vietnam Government;	Supervising the implementation of ESMP via their internal supervision system;	Supervising the implementation of ESMP via their internal supervision system;
Community Supervision Board (CSBs [1]) and members of community	Participating in activities of consultation, determination and preparation project's works; Having the ability to contribute the ideals to environmental impact reports when these documents are introduced to them;	Participating in environmental supervision activities as per Vietnam laws and attending the training cources.	Participating in environmental supervision activities as per Vietnam laws and attending the training cources.
Execution supervision consultant	Participating in activities of consultation, determination and preparation project's works; Having the ability to contribute the ideals to environmental impact reports when these documents are introduced to them;	Undertaking the training cources on environment for Supervision Consultant staffs Participating in supervising environment accoring to approved ESMP in ESIA report Preparing the monitoring report and submitting to	Participating in supervision activities on construction as per Vietnam laws and attending the training cources.

[1]CSBs, has been established according to Decision 80/2005/QD-TTg dated 18/04/2005 of Prime Minister on promulgating investment supervision regulation of community. Item 8 of Decree 80/2006/NĐ-CP provides for community monitoring chance the conformity, implementation supervision and investment result assessment in commune including environmental impacts.

Unit	Role and responsibility		
	Pre-construction stage	**Construction stage**	**Operation stage**
		PPMU	
Construction Contractor	Participating in activities of consultation, determination and preparation project's works; Having the ability to contribute the ideals to environmental impact reports when these documents are introduced to them;	Preparing the specific report on environmental supervision in the project field to meet the general requirements of the subproject's ESMP; Allocating sufficiently the labor source to meet the obligatory requirements and regulations of ESMP on the field;	Participating in construction activities, supervision as per Vietnam regulations Participating in training cources.

7.4.2. Assessment of existing environmental and social management practice and capacity for dam management

At present, Khe Gang reservoir and canal system are managed by Dai Son agriculture cooperative. The staffs of cooperative are unkownledged on irrigation management in general and reservoir management in particularly. Recently, staffs of cooperative participated in training class about Dam safety for operators under the sponsorship of World Bank, under Vietnam Disaster Management Project – HAZ – WB5.

Head works: There are no reservoir operational procedures, open and close gate and monitoring are mainly based on visual observation and experience. Monitoring, checking and repairing are not performed regularly as prescribed.

Canal system: Water distribution operation in canal system is executive by 01 vice-chairman of the cooperative, and directly contract with irrigation team of the villages. Before each season, the cooperative makes plan to dredge and repair canal. However, due to limited funding, only minor damage was fixed.

7.4.3. Building capacity and improves the knowledge on the environmental and social protection training/coaching programs

To increase the capacity and technique in environmental management for staffs of Subproject Management Board, organizations and relevant individuals, the Subproject Management Board conduct the following training contents:

- Heighten capacity in environmental management and supervision;
- Communication to increase awareness in environmental protection;
- Training on preventing and fighting fire;
- Training on environment regulations and standards;
- Training on environmental health and labour safety measures, environmental safety

- Training on enhancing awareness of dam safety;
- Training on enhancing awareness of infectious disease;
- Training on enhancing awareness of gender equality;
- Training on enhancing awareness of ethnic minority development.

7.5. COMMUNITY DEVELOPMENT NEED ASSESSMENT

The sub-project implementation may arise negative impacts to local community. A community development needs assessment identifies the strengths and resources available in the community to meet the needs as well as potential impacts of sub-project to community development. The needs assessment will be:

To minimize the negative impacts caused by the implementation of the subproject as well as maximizing the positive effects, the Contractor will coordinate with local government to organize consultation meetings with the participation of stakeholders to disseminate information about the subproject, sharing all information on items and activities of the project for the affected people, gather information about the needs and priorities of those affected as well as get information about their response about policies and the proposed activities, to ensure that those affected can be fully informed decisions that directly affect the income and their life. They have the opportunity to participate in activities and decision-making on issues that directly affecting them. A full communications plan will be presented in Appendix B3 of this report.

CHAPTER VIII. STAKEHOLDER CONSULTATION AND INFORMATION DISCLOSURE

8.1. PUBLIC CONSULTATION OBJECTIVES

The objectives of public consultation are:

- To seek agreement of local authority and people on subproject implementation;

- To understand the expectation of local community of the sub-project implementation for better solutions to overcome issues during sub-project implementation;

- Raise awareness for local people, the local governments/ workers in the project areas to understand the potential impacts on the community health during project construction;

- Help people understand how respond to issues relating to public health arisen during the sub-project construction.

- People are informed, and updated the project implementation schedules prevent diseases that may cause harm to the community during the sub-project construction.

8.2. ENVIRONMENTAL IMPACT ASSESSMENT CONSULTANTATION

8.2.1. List of Consultation Conducted

Date	Location	No. of Attendees	Attendees	The content of consultation
17th October 2014	The People's Committee of Ngoc Son commune	22	Commune People's Committee, Fatherland Front Board, Woman association, War Veteran association, Youth Union and the people get benefits from project	- For sharing all information of project. -Survey, observation and interview by questionnaire, deepth interview.
30th March 2015	The People's Committee of Ngoc Son commune	200	Commune People's Committee, Fatherland Front Board, Woman association, War Veteran association, Youth Union and the people get benefits from project	- For sharing all information on project's works and anticipated activities. - Collecting the contribution ideas and the interests in sensitive environmental issues in project area from the local authorities and residents;

8.2.2 Summary of feedbacks received from stakeholders

Mr Hồ Văn Lập – Presedent of commune People's Committee

- The local authority and residents fully concur and desire the project will be implemented in the region.
- During constrution time especially in the material transport process (go through schools) does not scatter soil and rock on the road.
- The security issue, propose project owner coordinates closely with commune People's Committee to manage the workers well during construction period.
- Avoiding material transport and activities causing the noise in the rush hours.

Mr. Nguyễn Văn Chương – Vice Presedent of Commune People's Committee

- The project development process from investment policy to construction is very close. The implementation of ESIA report of project is earnlest also.
- The environment polution causing by project is insignificant.
- Proposing the Project Owner disclose the project information so the commune has responsibility for community supervision

Mr Hồ Hữu Cơ – Cadastral officer

- Agree with the environmental impacts causing by the subproject.
- The materials transport on the road having the covered canvas or not depending on the driver's awareness.
- The project implementation will impact on mentality local people hence proposing the project must be done on schedule.

Mr Nguyễn Ngọc Võ – Leader of village No. 4A

- The local people totally support the development of the subproject in the region.
- The water cutting during the construction of project's works is in pre-harvest period therefore this cutting will not affect to irrgation water supply to rice cultivation.
- The materials transport line go through area of Village No.4ª. Hence, he proposes project owner has adequate measures to minimize dust, noise on the transport road.

Mr Hồ Hữu Nhật – Leader of War Veteran Organization of Village No. 8

The project implementation has great role to environment, ecological condition and social-economic development of Ngoc Son commune in general and to villages at downstream in particular. The local peole desire the project will be quickly approved and be done soon.

Ms Phan Thị Hiền – Village No. 4A

- Khe Gang reservoirs has been constructed more than 20 years ago. The reservoir has been downgraded and damaged thus the irrigation water is not sufficient for 175ha agricultural land of commune. The dam has infiltration phenomenon that damages the life and assets of households at downstream when the flooding reason coming.
- The investment in repair and upgrading of reservoir is aspiration of local people. Desiring the project will be operated soon to guarantee the life and production stability of local residents in the region.

8.2.3. Commitment of project owner

The project Owner totally agrees with the above ideas and requirements of People's Committee, local residents around project area and commits to implement completely and seriously the measures to minimize the adverse environmental and social impacts during the subproject implementation.

8.3. SOCIAL IMPACT ASSESSMENT CONSULTATION

The social impact assessment consultation has been organized in a parellel time with environmental impact assessment consultant.

8.3.1. The consultation attendees include:

- The local authorities
- Fatherland Front Board
- Representatives of organizations (Farmer association, Woman association and Youth Union)
- Representative of the affected households and the households get benefits from project; especially pay attention to women headed households and the number of female attenders

8.3.2. The consultantation's contents are:

- The safety policies on environment and social of the subproject;
- The potential social impacts during the subproject implementation;
- The role and interests of parties including community in participating in implementation, supervision, and support the subproject as well.
- The feedback mechanism from community during the subproject implementation;
- Question and answer the local people's queries for project

8.3.3 Summary of feedbacks received from Stakeholders

In general, The local authorities as well as local residents realize the necessity of project in prevention and mitigation Natural Disaster for the local as well as the benefits on stable irrigation water source, the surface water area for aquaculture has been widened. The plans for implementation have been adopted by local authorities and residents. The project development is conformable to demand and aspiration of local people.

- The construction and upgrade project's works in order to improve dam safety, stabilize life for local people.
- The affected households desire to be provided information and implementation progress of subproject.
- The affected households want to be compensated adequately and manifestly according to the replaceable price for damaged assets and the market price for temporary affected farming products.
- Both male and female participate in local organizations and propose ideas relate to subproject; hence the gender issue has been ensured.
- There is no ethnic minority living in the subproject area. For this result there is no negative impact to ethnic minority.
- Woman merchandising situation does not occur in the subproject area.

The affected people understand positive and negative impacts of the subproject to local; therefore, they get fully unanimity with the subproject development and they hope the subproject will be deployed soon.

8.4. ESIA DISCLOSURE

For effectuating the program on project's information disclosure of Vietnam and according to WB's policy on approaching information, all project information must be announced widely, the detail is as follows:

The Vietnamese ESIA report must be announced at the portal of Nghe An province, People's Committee of Quynh Luu district and keep at People's Committee of Ngoc Son commune for relevant organizations can approach and supervise the ESIA implementation

Besides the Vietnamese and Enligh versions of ESIA report will be sent to Provincial Project Management Board, Centre for Information and Development, Vietnam at 63 Lý Thái Tổ - Hà Nội for announcement.

CONCLUSION, RECOMMENDATION AND COMMITMENT

1. CONCLUSION

The subproject "Repair and upgrading of Khe Gang reservoir under the Project of Reparing and Improvement of Dam safety of Nghe An province (WB8)"has been owned by Nghe An Department of Agriculture and Rural Development and managed byNghe An Agriculture and Rural Development Project Unit. Based on the findings during ESIA and ESMP, the conclusions of the subproject are:

(i) The subproject belongs to Group B in environment as per environmental safety policy of WB;

(ii) The subproject does not locate in the sensitive environment area and it does not commit any "ineligible"criterion of WB;

(iii) This report determines and assesses completely the significant impacts in three stages of the subproject: before, during construction and operation stage and it also indicates measures to minimize the adverse impacts with the consultation of local authorities, affected people and vulnerable groups;

(iv) An Environmental and Social Management Plan (ESMP) and an Environmental and Social Monitoring Plan (ESMoP) have been developed help the authorities to update and monitoring regularly during subproject implementation;

The potential impacts during the subproject pre-construction stage:

During the subproject preparation, the land clearance will be implemented of: (i)the permanent land acquisition of 5,000sqm which is growed the perenrial trees of one household (the land managed by Ngoc Son People Committee) to upgrade management road and build the operation house; and the temporary land acquisition of 10,000sqm which managed by Ngoc Son People Committee to construct the landfill and material storage areas.

The potential impacts during the subproject construction stage:

The upgrading of works includes: dam, auxiliary works, , management road may cause some adverse impacts such as: a) increase the risks for local residents along the road cross 1 and 4A villages due to the increase of material and rubbish transport means; b) The increasing of noise, dust, exhaust fumes and vibration due to the operation of machines, equipments will cause effects to the health of local people and workers along the road if they contact with this pollution source in a long time; c) arising social evils due to the workers are present there such as: theft, gambling, drugs and infectious diseases.

The potential impacts during the operation stage:

During operation stage, the dam can be slided and eroded causing the unsafely for local residents at downstream. In addition, if the water level increases over the downstream of breakdown spillway at rainy season, then it will effect to livelihood of farmers such as: paddy field, fishing ponds and farmhouses.

The measures to minimize adverse impacts in construction stage:

The appropriate measures to minimize adverse impacts of upgrading dam and auxiliary works include: a) Implementing the Resettlement Action Plan; b) Implementing the mitigation measures such as: minimizing dust, exhaust fumes, noise, vibration; reasonable operation of equipments and machines; suitable working schedule to avoid rainy days; apply safety measures and health guarantee at the construction site; c)Reasonable human source management (human source selection, guidelines in health, safety, infectious prevention, community interaction and develop regulations at the tent for workers and having measure to deal with violator; and d) Having good relationship with the local community (coordinate to work with local authority, inform to local people and prioritize to hire the local labor, etc.)

The measures to minimize adverse impacts in operation stage:

The operation management unit of Khe Gang reservoir inspects periodically the safety of reservoir; coordinates closely with Commune People's Committee and local people to report timely the risks related to dam safety and has opportune repair; appoints somebody to monitor regularly and keep watching to ensure rational water regulation in flood season; has plan to inform to local residents on flood discharge plan.

Environmental and social monitoring:

The contractor must prepare ESMP at the construction site, it will be the basis for environmental supervision by appropriate authorities, provincial Project Management Unit and supervision consultant. An environmental monitoring system prepared and approved by WB will be applied for subproject. The supervision consultant regularly supervises and report monthly to provincial Project Management Unit. This will be the independent report with environmental report of province that submit to the Central Project Office (CPO).

2. RECOMMENDATION

Based on the findings in Environmental and Social assessment and Environmental and Social Management Plan (ESMP) in this document, these recommendations can be proposed for subproject:

(i) The mitigation measures mentioned in ESMP will be set up as an independent part in the bid documents. The contractor will split volume of works and estimate total cost for implementing those mitigation measures. This expense is safe cost on environment and social protection and it will be paid when all given measures will be implemented as the contract committed.

(ii) The task of environmental and social monitoring as required in the ESIA report of the construction supervisor will be integrated in the biding package of environmental and social monitoring.

(iii) Based on the Environmental and Social Impact Assessment report, the safety policy consultant and Subproject Management Unit will submit to appropriate authorities and WB for approval. The ESIA of the subproject "Repair and upgrading Khe Gang reservoir, Ngoc Son commune, Quynh Luu district, Nghe An province" approved will be the basis for implementing next steps and ensuring the subproject implementation plan.

3. STATEMENT OF COMMITMENT BY THE SUBPROJECT OWNER

In order to prevent or otherwise minimize the adverse impacts on natural and social environment during the construction and as well as during the operation of the rehabilitated dam, the Department of Agriculture and Rural Development of Nghe An province as the sub-project owner, hereby commits to comply with the requirements of the Law on Environmental Protection of Vietnam and the policies of th World Bank.

Specifically, the sub-project owner commits to:

i. Conform strictly with the environmental criteria and standards (Vietnam National Technical norms and standards) following the current regulations on environmental quality parameters.
ii. Fully implement all the measures identified in the Environmental and Social Management Plan (ESMP), including the Resettlement Action Plan/Compensation Plan (RAP/CP) and other measures necessary to protect water resources and environment.
iii. Take full responsibility with Social Republic of Vietnam in case of infringements with international conventions, non-conformance of Vietnam standards on Environment and when the environmental problems occur.
iv. Strictly conform with regulations on compensation as regards damages due to the sub-project implementation.

_____

Authorized Signature
Department of Agriculture and Rural Development

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26. Maps and survey data and documents.

APPENDIX

APPENDIX A - ENVIRONMENT

Appendix A1- DRAWING OF THE CONSTRUCTION WORKS

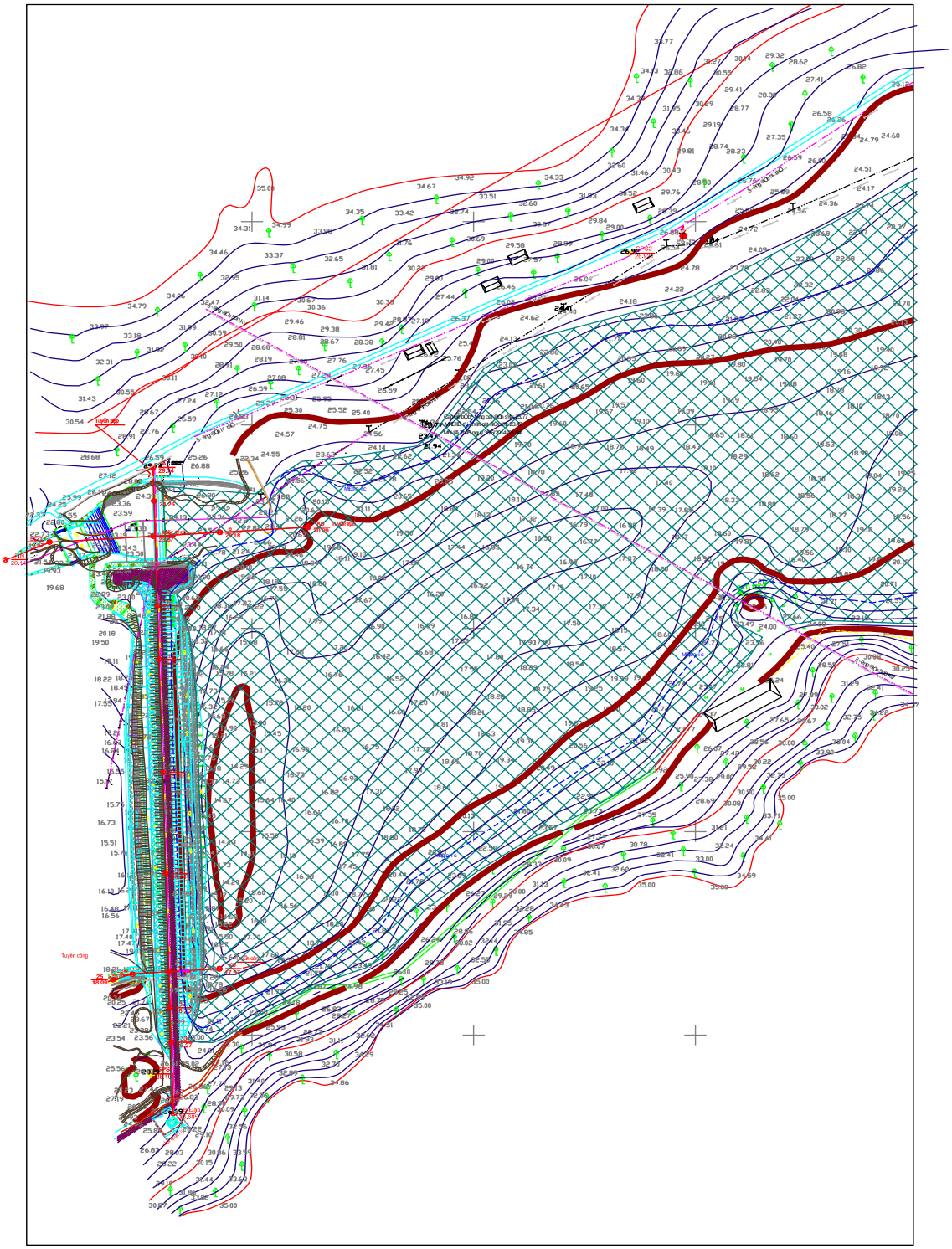


Figure A1.1. General plan of the head works of Khe Gang reservoir

Appendix A2- MAP OF THE SUBPROJECT AREA

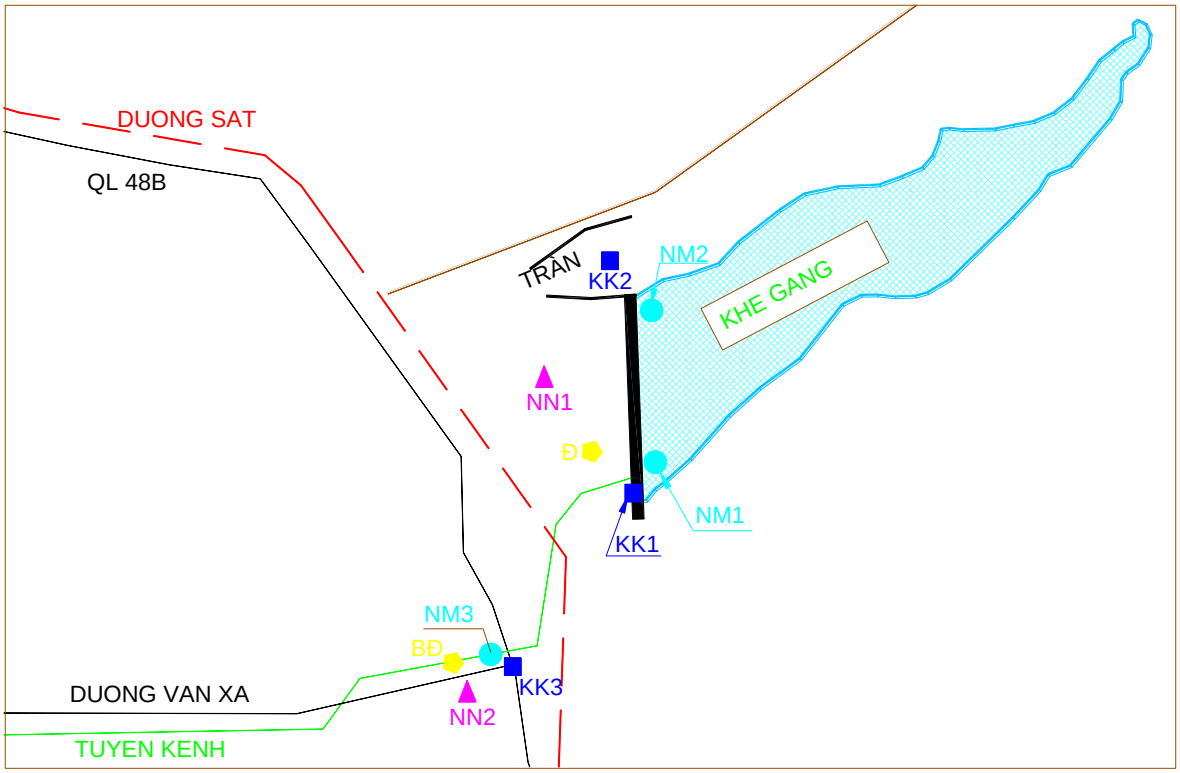


Figure A2.1. Plan of sampling and observation locations of Khe Gang reservoir

Figure A2.2. Map of Khe Gang reservoir location

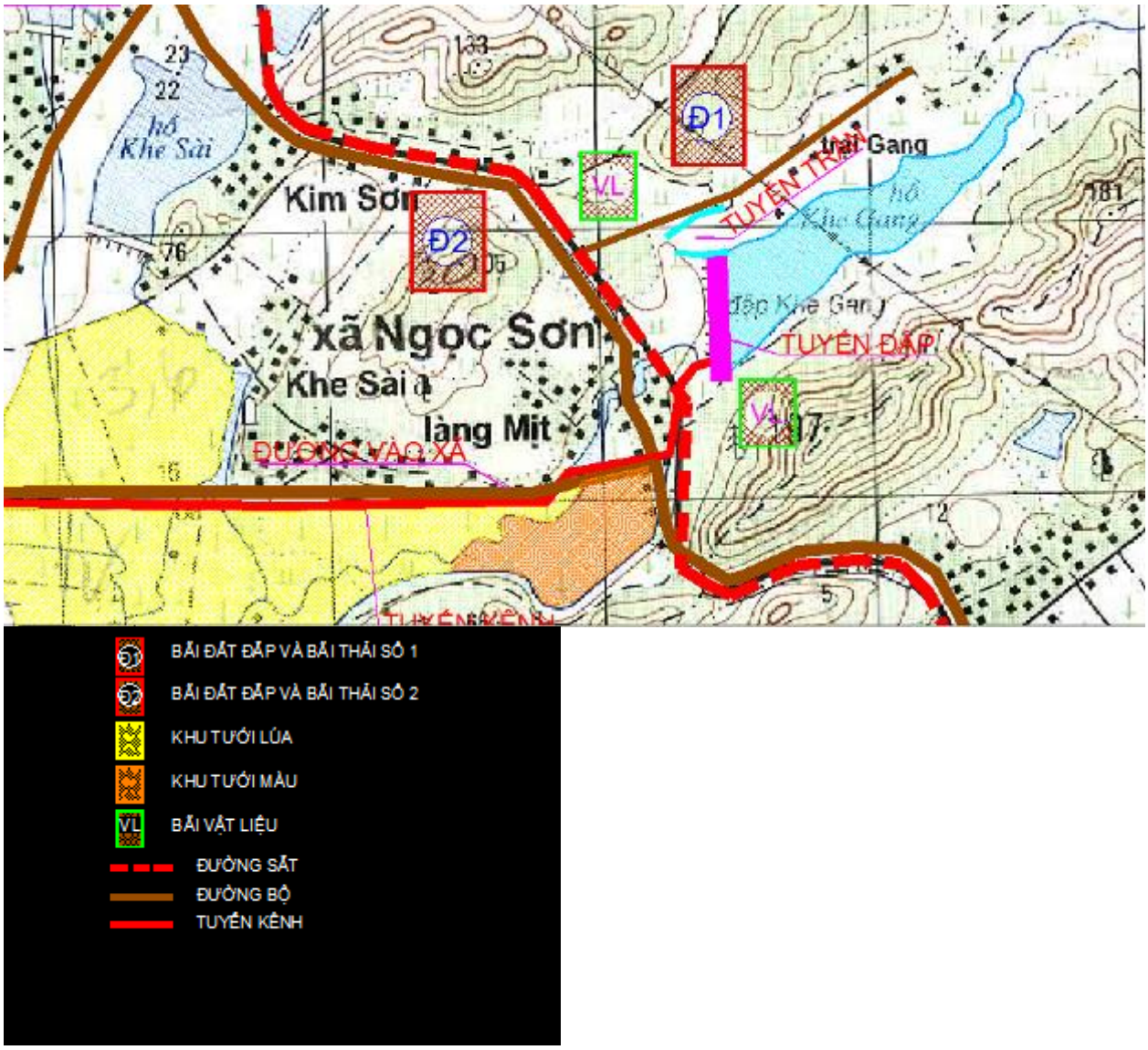


Figure A2.3. Map of borrow pit and disposal area of Khe Gang subproject

Appendix A3- POLICY FRAMEWORK, INSTITUTION AND REGULATION OF GOVERNMENT OF VIETNAM FOR ESIA

Legal framework related to environmental protection

- Law on Environmental Protection 2014, No. 55/2014/QH13 regulating the issues related to Strategic Environmental Impact Assessment and commitment of Environmental protection for development activities. EIA report must be prepared during investment preparation process (feasibility study);
- Decree No. 18/2015/NĐ-CP dated 14/02/2015 regulating plan for environment protection, strategic environmental impact assessment, EIA and planning for environmental protection;
- Direction No.26/CT-TTg dated 25/8/2014 of Prime Minister on implementing the Law on Environmental Protection;
- Circular No.01/2012/TT-BTNMT dated 16/3/2012 of MONRE regulating preparation, approval and monitoring, identifying the implementation of the detailed environmental protection project; preparation and registration of the simple environmental protection project;
- Decree No.29/2011/NĐ-CP dated 18/04/2011 regulating strategic environmental assessment, EIA and environmental protection commitment;
- Circular No.16/2009/TT-BTNMT dated 17/10/2009 of MONRE on Regulation and Technical Standard on environment, air quality and some toxics in the around air;
- Decision No. 22/2006/QĐ-BTNMT dated 25/12/2006 of MONRE on forcing Vietnam National Standards of environment application;
- Decision No.46/2011/QĐ-UBND dated 23/09/2011 of Nghe An Provincial People Committee on the issuing of unit prices for environmental quality analysis of around air, gas emission, inland water, ground water, waste water and coastal water within Nghe An province;
- Decision No.24/2012/QĐ-UBND dated 29/03/2012 of Nghe An Provincial People Committee regulating the normal solid waste management within Nghe An province.

Legal framework related to land use and land acquisition of the investment projects

- Law on Land No.45/2013/QH13 approved by Vietnam National Assembly dated 29/11//2013;
- Decree No. 43/2014/ND-CP dated 15/05/2014guiding the implementation of Law on Land 2013;
- Decree No.44/2014/ND- CP, dated 15/05/2014 regulating the land price;
- Decree No.47/2014/ND-CP, dated 15/05/2014 regulating the compensation, support and resettlement in cases of the land acquisition;
- Decree No.37/2014/ND-CP, dated 30/06/2014 regulating in details about the compensation, support and resettlement in cases of the land acquisition;
- Circular No.23/2014/TT-BTNMT dated 19/5/2014 regulating the Certificate of Land use right, House ownership and other assets attached;

- Decision No. 04/2010/QĐ-UBND dated 19/01/2010 of Nghe An Provincial People Committee regulating the compensation, support and resettlement in cases of the land acquisition within Nghe An province;
- Decision No. 10/2012/QĐ-UBND dated04/02/2012 of Nghe An Provincial People Committee on revising and supplement some Articles of the Decision No. 04/2010/QĐ-UBND dated 19/01/2010 on the compensation, support and resettlement in cases of the land acquisition within Nghe An province;
- Decision No. 91/2012/QĐ-UBND dated21/12/2012 of Nghe An Provincial People Committee issuing the new construction price of house and architecture for compensation, support and resettlement in cases of the land acquisition within Nghe An province;
- Decision No. 27/2013/QĐ-UBND dated15/05/2013 of Nghe An Provincial People Committee issuing the unit price of compensation for crops, tree and moving graves within Nghe An province.

Legal framework related to the use and management of the investment projects

- Law on Construction No.50/2014/QH13 approved by Vietnam National Assembly dated 18/08/2014;
- Decree No. 15/2013/NĐ-CP dated 06/02/2013 on managing the construction quality;
- Decree No. 207/2013/NĐ-CP dated 11/12/2013 on revising and supplement some Articles of Decree No. 48/2010/NĐ-CP dated 07/5/2010 of Government on the contract in construction activities;
- Decree No. 12/2009/ND-CP dated 10/02/2009 on managing the construction and investment projects.

Legal framework related to integrated water resources exploitation and forest protection, cultural heritage and biodiversity

- Law on Water Resources approved by Vietnam National Assembly dated 21/06/2012;
- Decree No.42/2012/NĐ-CP, dated 11/05/2012 of Government on managing and using of rice land;
- Decree No. 112/2008/NĐ-CP dated 20/10/2008 of Government on managing, protecting and integrated exploitation of water resources and environment of the electrical generation and irrigation reservoirs;
- Decree No. 120/2008/NĐ-CP dated 01/12/2008 of Government on River Basin management;
- Decree No. 72/2007/NĐ-CP dated 07/05/2007 of Government on Dam safety management;
- Decree No. 149/2004/NĐ-CP dated 27/07/2004 of Government regulating the licensing of exploration, exploitation and use of water resources and waste water discharge into water resources;
- Law on Culture Heritage No.28/2001/QH10 approved by Vietnam National Assembly dated 12/07/2001. Article 13 - Strictly prohibit the following acts: Appropriating and distorting the cultural heritage; destroying or risk destruction of cultural heritage; Unauthorized excavation of archaeological sites; illegal construction, encroachment of land belonging to historical – cultural and scenic areas;

- Law on Biodiversity No.28/2008/QH12 approved by Vietnam National Assembly dated 13/01/2008. Chapter III- Natural Ecosystem conservation and sustainable development, and Chapter IV- Creature Conservation and Development.

National Policy on Dam safety

- Ordinance No. 32/2001/PL-UBTVQH10 dated 04/4/2001 on exploitation and protection of hydraulic structures;
- Ordinance No. 27/2000/PL-UBTVQH10 dated 24/8/2000 on revising and supplement some Articles of Ordinance No. 9-L/CTN dated 20/3/1993.
- Decree No. 72/NĐ-CP dated 07/02 /2007 on managing Dam safety;
- Government Direction No. 21/CT-TTg dated 14/10/2013 on enhancing the management of reservoir safety;
- Circular No. 33/2008/TT-BNN dated 04/02/2008 on guiding the implementation of some Articles of Decree No. 72/NĐ-CP;
- Circular No. 34/2010/TT-BCT of Ministry of Industry and Trade dated 07/10/2010 regulating safety management of Eclectric Generation Reservoirs.
- Decree No. 143/2003/NĐ-CP dated 28/11/2003 regulating in details of implementation of some Articles of Ordinance No. 32/2001/PL-UBTVQH10 dated 04/4/2001 on exploitation and protection of hydraulic structures;
- Decree No.115/2008/NĐ-CP dated 14/11/2008 on revising and supplement some Articles of Decree No. 143/2003/NĐ-CP.

Resettlement policy

- The Constitution of Vietnam Socialist Republic (1992) confirmed the people rights on house ownership and house ownership protection.
- The Constitution of Vietnam Socialist Republic 2013.
- Law on Land No. 45/2013/QH13 on administration regulations of land in general. Law on Land 2013 instead of the previous Land Laws in 1987 and 1993.
- Law on Complaints No. 02/2011/QH11 approved by Vietnam National Assembly.
- Decree No. 43/2014/ND-CP dated 15/5/2014 on the Land Law enforcement.
- Decree No.44/2014/ND-CP dated 15/5/2014 regulating the Land price assessment.
- Decree No. 47/2014/ND-CP dated 15/5/2014 on compensation and resettlement in cases of land acquisition.
- Decree No. 75/2012/ND-CP dated 03/10/2012 on guiding the implementation of the Law on Complaints.
- Decree No. 38/2013/ND-CP dated 23/4/2013 on managing and use of Official Development Assistant Fund (ODA).
- Decree No. 42/2012/ND-CP dated 11/05/2012 on managing and use of rice land;
- Circular No.37/2014/TT-BTNMT dated 30/6/2014 regulating compensation, support and resettlement in cases of land acquisition.
- Decision No. 1956/2009/QD-TTg dated 17/11/2009 of Prime Minister on approving the Overall Strategy of Career training for rural labour to 2020.
- Decree No. 197/2004/NĐ-CP of Government dated 03/12/2004 on compensation, support and resettlement in cases of land acquisition.

- Circular No.116/2004/TT-BTC dated 17/12/2004 of Government on guiding the implementation of Decree No.197/2004/ND-CP, dated 03/12/2004 on compensation, support and resettlement in cases of land acquisition.
- Decree No.188/2004/NĐ-CP of Government on the methods of determining land price and land price frame for each type of land.
- Circular No.36/2014/TT-BTNMT dated 30/6/2014 regulating the methods of land price assessment, construction and land price adjustment.
- Circular No. 114/2004/TT-BTC, dated 16/11/2004 guiding the implementation of Decree No. 188/2004/NĐ-CP.
- Decree No.17/2006/NĐ-CP of Government dated 27/01/2006 on revising and supplement some Articles of Decree guiding the implementation of Law on Land and Decree No. 187/2004/NĐ on the transformation of state companies into joint stock companies.
- Decree No. 84/2007/NĐ-CP of Government dated 25/05/2007 regulating the supplements of issuing the Land use rights Certificate, procedures of compensation and resettlement in cases of land acquisition.
- Decree No. 123/2007/NĐ-CP, dated 27/7/2007 on revising and supplement some Articles of Decree No.188/2004/NĐ-CP, dated 16/11/2004 on the methods of determining land price and land price frame for each type of land.
- Decree No. 69/2009/NĐ-CP of Government dated 13/08/2009 regulating the additional planning regulations on land use, land price, land acquisition, compensation, support and resettlement.
- Decision No. 52/2012/QĐ-TTg of Government dated 16/11/2012 on support policy of employment and career training for labours who have land acquisition.

Gender policy

- Law on Gender Equality No. 73/2006/QH11 approved by Vietnam National Assembly dated 29/11/2006;
- Direction No. 07/2007/CT-TTg 3/5/2007 of Government on the Law on Gender Equality enforcement;
- Decree No. 70/2008/NĐ-CP dated 4/6/2008 of Government regulating in detail on implementation of on Gender Equality;
- Decree No. 55/2009/NĐ-CP dated 10/6/2009 of Government on administration sanctions of gender equality;
- Decree No. 48/2009/NĐ-CP dated 19/5/2009 of Government on the measures of ensuring gender equality;
- Circular No. 191/2009/TT-BTC dated 1/10/2009of Ministry of Finance guiding the use and management of funds for gender equality and women advancement;
- Circular No. 07/2011/TT-BTP dated 31/3/2011 of Ministry of Justice guiding the gender equality ensure in staff arrangement and legal support activities;
- Decision No. 2351/QĐ-TTg dated 24/12/2010 of Prime Minister approving the National Strategy on Gender Equality for 2011 – 2020 period.

Poverty reduction policy

- Decision No. 33/2007/QD-TTg dated 20/7/2007 of Prime Minister on the support policy to improve knowledge of Law enforcement within 135 program- stage 2.
- Decision No. 1956/2009/QD-TTg, dated 17/11/2009 of Prime Minister approving the Master Plan on career orientation training for rural labours to 2020.
- Resolution No. 30a/2008/NQ-CP of Government dated 27/12/2008 on the support program for rapid and sustainable poverty reduction for 61 poorest districts.

Some legal documents related to sub-project preparation

- Decision No.2439/QĐ.UBND-NN dated 03/6/2014 on the permission of preparing the investment projects on repair and upgrading the reservoirs in Nghe An province namely Khe Gang, Hoc Nghet, Khe San of Quynh Luu district; Xuan Duong of Tan Ky district; La Nga of Thanh Chuong district; Thanh Thuy of Nam Dan district.
- Decision No.571/QĐ.SNN-QLXD dated 09/6/2014 of Department of Agriculture and Rural Development of Nghe An province approving proposal of investment project of repair and upgrading of Khe Gang reservoir, Ngoc Son commune, Quynh Luu district, Nghe An province.

National Regulations and Standards related to environmental protection

(i) Water Environment:
- QCVN 08:2008/BTNMT – National Technical Standard on surface water quality;
- QCVN 09:2008/BTNMT - National Technical Standard on ground water quality;
- QCVN 14:2008/BTNMT - National Technical Standard on domestic waste water.
- QCVN 39/2011/BTNMT - National Technical Standard on water quality for irrigation.

(ii) Air Environment:
- QCVN 05:2013/ BTNMT - National Technical Standard on around air quality;
- QCVN 06:2008/BTNMT – National Technical Standard on some toxics in around air.

(iii) Land Environment
- QCVN 03 : 2008/BTNMT - National Technical Standard on permitted limitation of heavy metals in the soil;
- QCVN 04 : 2008/BTNMT – National Technical Standard on residue of chemical and pesticide in the soil;
- QCVN 43:2012/BTNMT - National Technical Standard on sediment quality.

(iv) Solid waste management:
- QCVN 07: 2009/BTNMT - National Technical Standard on thresholds of hazardous waste.

(v) Vibration and noise:
- QCVN 26:2010/BTNMT – National Technical Standard on the noise;

QCVN 27:2010/BTNMT – National Technical Standard on the vibration.

Appendix A4-ACCOMPLISH SCREENING FORM

The table below assesses the environmental and social issues that are relevant to the World Bank Policies.

Table A4.1. Assessment of World Bank Policy Triggers

Issues	Assessment	Description
Impacts on the Natural Environment		
Loss or degradation of land and water areas where there are native species, and where human activity has not significantly alter the fundamental ecological functions	No Impact	The sub-project only improves the current status without widening and violating to nature reserve, the construction is only in a narrow scope compared with the water surface area of the reservoir. Also, there is no sensitive natural environment in the sub-project construction area.
Loss or degradation of natural habitats such as: important conservation areas, areas protected by traditional local communities (e.g. sacred forest), biodiversity; rare, vulnerable, migratory or endangered species.	No Impact	There is no natural reserve or biodiversity zone within 500-meter radius from the reservoir. The sub-project however will permanently use about 0.5 hectare currently covered with trees (principally Melaleuca and Acacia) and shrubs. I will also temporarily use about 1.0 hectare of the same lands for easements during construction.
Impact on Physical Cultural Resources		
Loss or degradation of the material culture resource, structures, groups of structures, characteristics, natural landscape with importance of archaeology, palaeontology, history, architecture , religion, aesthetic, or other importance of culture.	No Impact	There is not any impact on material culture resource, structures, groups of structures, characteristics or natural landscapes, sites or structure with importance to archaeology, palaeontology, history, architecture , religion, and aesthetics within 2-km radius of the reservoir.
Result to conflict with national laws or international obligations under treaties or international environmental agreements, including the World Heritage Convention of UNESCO or affect famous, scientific and important heritage sites.	No Impact	There are no World Heritage, national heritage or local heritage sites or structures of great scientific or tourism potentials within and around the construction areas. The sub-project will ensure national laws or international obligations under treaties and related environmental agreements are fully complied with.
Impacts on land and related natural resources used by Ethnic Minorities		
May result to impacts on land or traditionally owned territory, or used or customary	No Impact	The sub-project will not use land or territory traditionally owned by ethnic minorities, or

Issues	Assessment	Description
tenure, and where access to natural resources,which is vital for the sustainability of the culture and livelihood of ethnic minorities.		land under customary tenure.
Likely to lead to impact on cultural and spiritual values symbolized for the land and natural resources or impact on management of natural resources and the long-term sustainability of resources affected.	No Impact	The sub-project will not use land or territory traditionally owned by ethnic minorities, or land under customary tenure.
Displacement of Home and/or Livelihood		
Result to the displacement of people or land acquisition, property affecting their lives and difficulty in restoring livelihoods.	No Impact	The sub-project will not use any lands that are owned, occupied or currently used by any private person, family or groups of people. The 1.5 hectares lands to be used by the subproject is Ngoc Son commune's managed land.
Dam Category		
Does the sub-project require construction of a large dam? Dams with height of 15 meters or more, or those with between 10 to 15 meters height but with complex designs, are considered large dams. Regardless of height, dams that impound more than 3 million cubic meters of water is also considered large.	No. The Dam is a small dam.	The dam currently is about 12.5 meters in height with simple design. The maximum reservoir capacity of the dam is _____ cubic meters. The dam is an earth dam with a rock fill on upstream dam face. After rehabilitation, the dam will reach a maximum of 13 meters in height. The reservoir capacity will remain at 3 million cubic meters.
The operation of the sub-project depends on the efficiency of an existing large dam or large dam under construction.	No Impact	Khe Gang reservoir is a small reservoir and independent. There is no dam in the upstream area of the reservoir and the water source originates from a small stream.
Use or purchase of pesticides		
Does the subproject lead to procurement or use of pesticides?	No Impact	The purchase or use of pesticides is not in the procurement plan of the sub-project. However, the improve reliability of the dam will also improve irrigation services to the farms downstream which may lead to increase use of pesticides.

Issues	Assessment	Description
Does subprojects have potential to cause irreversible effect or impact not easy to mitigate? -Lead to loss of regional recharge aquifers, affecting the quality of water storage and water storage areas responsible for providing drinking water to large population centers. -Lead to any impact occurring in relatively long period, affecting to large geographical area or intense impact.	No Impact	The subproject aims to improve the water supply for agriculture. It does not affect to the water quality of any water storage area related to clean water supply for domestic purpose. The construction activities including upgrading, repair of Khe Gang reservoir is considered done in the dry season, the influence of water to benefit area during construction almost did not happen. The reservoir will be repaired to ensure the safety of the people at the downstream dam and provides a stable and effective water contributing to community economic development.

Does the subproject have potential to lead to a wide variety of significant adverse effects?

Many construction sites in various locations are affected, each impactcause loss of habitat, natural resources, land or significant depletion of resources quality.	No Impact	To serve for construction, temporary land use includes: - Land area for construction site: Total area of 1 ha of land is prepared along management route. - The construction and transportation of materials can affect to people living along the route including village no. 1 and 4A. However, this impact is low and temporary. - The subproject construction will take place in the small area. It does not affect to living environment, natural resources, land and natural resources quality decreased significantly.
The significant potential adverse effects capable to expand beyond the construction site or works.	No Impact	The subproject will not causesignificant negative impacts. The construction area is in mountainous area far from residental zone of local people. Dust, emission from material transport can be affected to the villages along the route including village no. 1 and 4A. However, this impact is low and temporary because the construction period is just about 24 months.
The impact across the border (in addition to a small change in the waterway activities are taking place).	No Impact	The scope of subproject is inside Ngoc Son Commune, Quynh Luu District, Nghe An Province. This location is not near the country border. There is no navigation activities inside Khe Gang reservoir.

Issues	Assessment	Description
The need for public road, tunnel, canal, power transmission corridor, new pipeline, or borrowedarea and disposal areas in underdeveloped region.	No Impact	Among subproject activities, management road connecting National Road no. 48B and Khe Gang reservoir will be upgraded, in order to better operation of the system and use in case of incident. This segment is earth road will be upgraded to concrete surface road with length of304.5m, contributing to ensure travel demand of people.
Interrupt the cycle of migration of wildlife, wild animal or grazing animal, nomads or semi-nomads	Yes	Noise from construction activities can be affected to some terrestrial fauras and florasliving surrounding the reservoir. However, there is no rare, vulnerable, migratory or endangered species at risk of extinctionin surrounding the Khe Gang reservoir. The subproject construction can affect to the living area of underwater species. However, this is interrupted and temporary impacts.
The subproject does not have precedent work, does it?		
No precedent at national level?	Yes	There have been many similar projects to be implemented at national and provincial level. Similar projects funded by the World Bank has been implemented at national level in some provinces such as Ha Tinh, Nghe An, and Thanh Hoa, etc.
No precedent at provincial level?	Yes	There are five reservoirs in the Nghe An province has been funded. Similar projects funded by the World Bank has been implemented in some districts such asNghi Loc,Anh Son and Thai Hoa, etc.
Is subproject controversial and likely to attract the attention of NGOs and national or international social organizations?		
Considered as risk and likely to have special controversial aspects	No	There is not any negative point that leads to the attention of civil society organizations, NGOs.
May lead to protests of those who wish to express or prevent construction.	No	Consultation results showed that both the local government and the people fully agreed and supported implementation of the subproject. The subproject will bring greatly efficiency in terms of environment and society to local people.

Table A4.2: Environmental and social impacts need to be handled

	Assess-ment	Description of Impact
The trespass on historical/cultural heritage.	No	There is NO any cultural works, heritage or grave are affected or relocatedin subproject scope area.
The trespass on ecosystem (e.g. natural sensitive living environment or nature reserve,	No	The subproject only improves current dam status without widening and violating to nature reserve. Furthermore, there is no nature reserve or natural sensitive environment in the

	Assess-ment	Description of Impact
natural park, etc.).		distance of 20km from Khe Gang reservoir.
To deform landscape and increase waste.	Low	There are 03 solid waste sources arising from construction activities including: (i) construction waste likes debrises from surface levelling activities (plants, residual, fences, etc.), ciment bags, oil barrels and (ii) domestic waste from tents of workers in construction site and (iii) superfluous excavated soil. In addition, mud waste from latrine can contain harmful bacteriums need to be treated during construction process. The above impact is LOW and TEMPORARY because: - With type (i) and type (iii), the solid waste is unharmful, as for remaining material (with total estimated volume around 11,336 m^3) has been collected and moved fast to the landfill. - For the waste type (ii):In the high-levelled constrution period there are around 20 people working in construction site thus the amount of potential waste is not much, estimating around6–10 kg per day (around 0.3-0.5kg/person/day). - The amount of solid waste arising in construction period can be easily managed as per regulation on solid waste management. The domestic waste like mud of latrine will be treated conform to designed standards of Ministry of Health and the quantity of this mud can be used for planting as a fertilizer for soil. Location:Workers' camp and within 50 m around the camp. Period:24months.
Demolish trees or vegetation cover	Low	Implementation of the subproject is based on the current status of the work, thus, there is no any vegetation cover be demolished or damaged. The permanently land recovers for building operation houseand road must be cut down 500 trees of Melaleucas and Acacias. The residualbare lands nearby reservoir managed by the Commune People's Committee.
Change quality of surface water or flow (e.g., increase water turbidity, wastewater discharged from camp and erosion, and construction waste).	Low	Spilled oil from machinery and construction equipment or water when washing machines can pollute and decline water quality and aquatic ecosystems. Wastewater and oil compounds may be sunk into the ground and over time will gradually seep into aquifers and contaminate aquifers. Besides, wastewater from toilets of worker camps if not applied properly can also influence water quality of nearby. However, this impact is LOW and TEMPORARY because: i. Location of camp, oil storage yard is far from water sources. ii. Construction of the subproject will take place in dry season when rain fall level is the lowest. Thus, the possibility of oil, grease or compounds washed and swept into water source is very little Wastes from petroleum products can easily be stored in a safe place in the standard containers (ie. containers with lids), and the contractor will have to collectand dump waste and hazardous waste damage at right places.
Increase the level of dirt or contaminants in the air during construction process	Low	During repair and upgrading of dam, water intake and auxiliary works, some activities described below will cause negative impacts such as dust, emissions affecting lives of local people: (i) The exploitation of earth fill materials. (ii) The transportation of construction materials (earth fill, cement, sand, gravel, steel, etc) (iii) Transportation of construction waste (soil weathering, surplus construction materials) (iv) The operation of equipment and trucks and use of

	Assess-ment	Description of Impact
		construction machinery It is estimated that there are about 36 trucks transporton roads every day during the construction. The amount of dust and emission can cause respiratory disease or lung diseases to people (such as sinusitis, asthma, etc.) if people, workers directly contact with the pollutant sources for long time. However, this impact is LOW and TEMPORARY because: ● The subproject area is in the valley. Dust that can easily be diluted in the air and blown by wind; ● Construction of the categories in the project (dam and auxillary works) are mainly taken place in the village no. 4A and 5 of Ngoc Son commune. The area is sparsely populated, only a few families living near the construction area. ● The transport road of construction materials and waste to landfillpasses through one village, and residential area is also sparse. This impact is evaluated as very small ● Number of vehicles/construction equipment especially vehicles/equipment causing noise is not much, about 36 trucks passing through residential areas will not generate a large amount of emissions. Location: village no. 4A and 5 of Ngoc Son commune. Period: 24months of contruction stage.
Increase noise/vibration.	Low	Noise can be caused by the transportation of construction materials and construction equipment (excavators, bulldozers, road rollers, compactors) affecting households and schools along the road section for construction. During the construction stage, about 36 turns of trucks/day, 1,075 turns of trucks/month and total is about 25,813 turns of trucks travel on the road. During construction and transportation of material, waste and noise will be generated and can affect to people living along the route including village no. 4A and 5. However, this impact is LOW and TEMPORARY because: ● The subproject area is open space, with lots of plants and crops which may dilute the noise. ● The residential area adjacent to the road and construction works are distributed fairly sparse, with a low population density. ● The number of equipment / facilities construction generating noise is not significantly large. About 36 turns of trucks will travel through the route every day, thus the noise level is not high. Location: village no. 4A and 5 of Ngoc Son commune. Period: 24months of contruction stage.
Resettlement of households? If yes, how many households?	No	The permanently land recovery area (1) is 5,000 m^2 ofperennial tree of 01 household (land managed by the CPC and contracted to households) for building operation housse, construction road combined management and (2) temporary land recovery area is 10,000m2 (land managed by the CPC) for the purpose of construction. The total number of households affected by the subproject is only 01 households (6 people). There are not any households are affected more than 20% of their total agricultural land (or 10% for vulnerable households) and no ethnic minority households affected by the Khe Gang reservoir subproject, Nghe An province.
Use resettlement region being environmental and/or cultural	No	There is not any relocated household. Only the certain area of landis recovered during the construction.

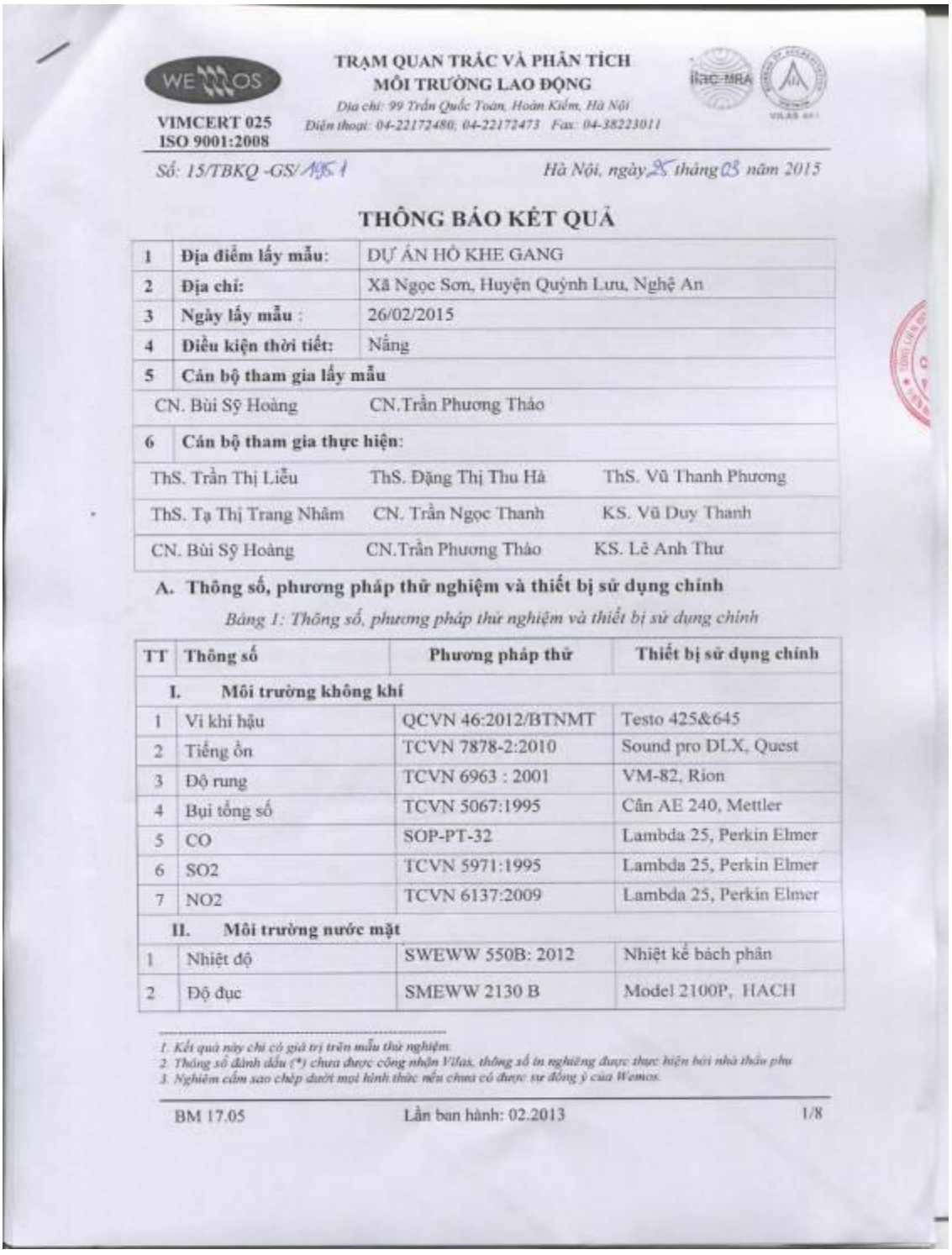
	Assess-ment	Description of Impact
sensitivity.		
The risk of disease infection from human to local people (and vice versa)	Low	- The temporary presence of workers residing in local households or in the camps and their interaction with local people can cause infectious diseases among workers with local people and vice versa. - During construction process, the use of water without sanitary standards met of workers in the camps or at construction site may also cause gastrointestinal disease or the spread of disease transmission via insect (ie. dengue fever, malaria, etc.) when migrant infected workers are bitten by insects (mosquitoes) and then the disease is spreaded to others. Besides, various social diseases such as HIV / AIDS, syphilis also a risk, etc. are also at risk. - However, this impact is LOW and TEMPORARY because: a) Thelarge terrain leads to easily dispersed of dust in the wind; b) The latrine is designed under standards of the Ministry of Health; c) Controlling the spread of thepathogenic insect as well as propagating the prevention ofpathogenic insect for workers; d) The Contractor regularly checks the health for employees in the recruitment process; e) The local government and Center of Health Services will have the propagandic activities when the signs of infectious disease appear in the province. - Location: Ngoc Son commune. - Period : The effects will last during project implementation, the impact of dust will strong on dry days, meanwhile the insects will operate during the rainy season.
Potential to cause conflict between construction workers and local people (and vice versa).	Low	- During construction period, approximately 20 technical workers from other provinces will be living and working locally. During this time, there may be conflict between the local laborsand labors from elsewhere due to disagreements about the culture or communication or disputes on employment opportunities. However, these effects are LOW and TEMPORARY because: i)According to state regulations, the contractor will have to declare temporary residence, temporary absence of all the local workers to live and work during the project implementation to Ngoc Son commune; ii).Migrant workers are disseminated, guided by contractor on how to communicate, notify with local government and people. In addition, contractor shall develop provisions in management of workers iii)A number of workers (30%) will be hired locally to perform simple tasks such as shoveling dirt, cutting trees, portering construction materials. Location: Ngoc Son commune. Period: 24months of contruction stage during dry seasons.
Use explosives and toxic chemicals.	No	Explosives or toxic chemicals will not be used during construction process of the subproject.
Use construction site where the accident happened due to blasting or explosive left over from war period.	No	Subproject will carry out with the existing situation of dam and reservoir where is never occurred mine accident or explosive materials since the Vietnam war.
Construction activities may disrupt transport, roads, or navigation.	Low	- Construction period may impact on local travel, transportation, as well as the risk of accidents:a) increase risk of accidents due to the increase of the means through inter-commune roads and construction sites (where the excavation activities are carried out, and where the construction equipment,

	Assess-ment	Description of Impact
		waste locate on or next to roads, works, etc.). It may danger local people, especially at night when visibility is limited; and suspended dust particles reduces visibility; b) the construction of the dam and auxillary works such as management road will limit the ability of people to travel as well as access to social infrastructure such as schools, markets, etc. However, these effects are LOW and TEMPORARY because: ● The transportation routes of construction materials will pass through the sparsely populated areas. Thus, use of this routes for material transportation will not obstruct traffic much. ● The number of vehicles/equipment for road construction is about 36 turns of trucks per day is negligible. ● A part within the scope of the contractor is to ensure the health and safety on construction sites for individuals and construction site; it is not allowed to have the risk to the safety of people. Therefore, the contractor shall take measures to minimize the impact duringconstruction process. ● The transportation routes of construction materials will not pass through the Commune People's Committee and the schools. Thus, use of this routes for material transportation will not obstruct traffic much. Location: Main dam, management road and road to transport material and waste in Ngoc Son commune Period: 24months of contruction stage.
Construction activities may cause any damage to the local roads, bridges or other rural infrastructure?	Medium	- The construction materials or waste transportation on rural roads can damage the road if the trucks are overloaded and operate much in rainy season. - Other rural infrastructures such as canal system, electric cable system, communication cable system are not affected by the construction of the subproject, because these work lie in the safety corridor of the main roads. There is no electric cable system or communication cable on the management road. The others are also far from construction area of the subproject. Thus, these social infrastructures are not likely to be affected by the construction activities. The impact is LOW and TEMPORARY because: i)The construction is carried out mostly in dry season, thus material transportation vehicles cause low impacts on quality of the road; ii) The volume of construction materials and the number of vehicles transporting materials is small, about 36 turns of truck/day.
Excavation during construction of the subproject can cause soil erosion.	Low	- Dam face and water intake construction may cause erosion on dam body or nearby location. However, this effect is LOW and TEMPORARY because (i) the repairing activities for dam face and water intake will be carried out in the dry season andthe girdle shaped dike will be constructed. The location of construction is located above the water level. It is difficult to cause soil erosion. Location: Khe Gang reservoir, dam face and water intake. Period: 24 months of construction stage (during 2 dry seasons).
Is it needed to create a temporary and permanent service road?	No	- It is no need to develop a temporary and permanent service road, because the current roads are capable to transport construction materials or waste. - Within scope of the subproject, only one management road will be upgraded connecting National Road 48B and Khe Gang reservoir, length of 304.5m.
Divide or disintegrate habitat	No	+ Flora and fauna in the reservoir will not be affected by the

	Assess-ment	Description of Impact
of animals and plants (faunas and floras).		project and will not create an impact on water quality or water. + For terrestrial flora: There is no position as habitat of flora and fauna around the subproject area and area indirectly affected.
Long-term impact on air quality.	No	The sources of air pollution mainly rise from dust caused by the transportation of construction materials, waste transportation, etc. running on the roads in Ngoc Son commune. In addition, the air may be polluted by emission from construction machinery, vehicles. However, it is very few source of emission and it only appears in certain time. Therefore, there is NO long-term impact on air quality but a temporary impact on air environment.
The risk of accidents for workers and communities in the construction stage.	Medium	- Construction process can make risk of accidents due to operating machinery, digging and filling soil or transporting materials in case that the workers do not comply with regulations on occupational safety. In addition, the construction can also cause accidents for communityif the access of people into the construction area is not limited. However, the impact is LOW and TEMPORARY because: i) Number of construction machinery is few; ii) Much activities will be carried out manually such as partnering material, concreting, etc. Thus, risk of accident will be reduced. iii) Construction activities are mostly undertaken in dry season, accident is also reduced. iv) Construction site is far from residential areas. Location: Construction site and along the material and waste transportation routes. Period: 24months of contruction stage (during 2 dry seasons).
Use hazardous or dangerous material and generate hazardous waste	No	There is no need to use hazardous or dangerous material or generate hazardous waste. Only a low amount of oil use for machinery can leak to environment.
Risks to safety and human health.	Low	During construction, there may be accidents for communities in case of unlimited local people accessing the construction area. In addition, the waste during the construction handled not well can also cause negatively affects to the health of the local population.
Affect to water supply and production during construction of work items	Low	Water supply can be affectedduring construction of dam face, spillway, especially water intake. However, the impact is LOW and TEMPORARY because : (i) Construction activities for water intake will be carried out in the dry season andthe girdle shaped dike will be constructed. ii) Water is pumped from the reservoir through the canal to supply water for irrigation as required. Location: Khe Gang reservoir, dam face and water intake. Period: 24 months of construction stage.
Increase flooding, sediment transport in downstream area	Low	Khe Gang reservoir is independent reservoir; its downstream area is irrigated areas. It will need to discharge water in reservoir to death water level at specific times during construction process. The water discharged may cause the localize flooding of agriculture areas. However, the area is supplied with good drainage system, thus this impact is considered as LOW and TEMPORARY.
Loss of land or loss of access to land/resources or livelihood		
Land acquisition (temporary or permanent) of public land (public or private) for construction.	Low	- The area should be recoveredfor construction, including:permanent acquisition of 5,000m^2 of land around the Khe Gang reservoir; and temporary of 10,000m^2 of land surrounding the project area to serve as ground for construction

	Assess-ment	Description of Impact
		and camps. Among permanently acquired land area: 5,000m^2 of forestry land with Melaleuca Acacia and others. This impact is LOW, because: + There is not any households of relocation Location: Ngoc Son commune Period:Preparation stage of the project.
Use land being currently possessed or used regularly for production purposes (eg, gardening, farming, grazing, fishing, forest)	No	Implementation of the subproject will not acquireland for production, gardening and farm, etc. Because the upgraded items are based on the current situation and the enlarged area of safety corridors road/dam. The recovery land areas are mainly theperennial land and bare land nearby the reservoir.
Relocation of personal, family, or business.	No	Implementation of the subproject will not acquire land of any households or affect business operation, because construction activities are carried out around dam area and along the management road. There is no business along the road and next to the dam.
Temporary or permanent loss of crops, fruit trees, house or infrastructure.	No	- The permanently land recovery area (1) is 5,000 m2 of perennial crop land (about 500 Melaleucas, Acacias and others) of 01 household (land managed by the CPC and contracted to households) for building operation house, construction road combined management and (2) temporary land recovery area is 10,000m2 (land managed by the CPC) for the purpose of construction. The total number of households affected by the subproject is only 01 household (6 people). There are not any households are affected more than 20% of their total agricultural land (or 10% for vulnerable households) and no ethnic minority households affected by the Khe Gang reservoir subproject, Nghe An province.
Restrict compulsory access of people into preserved park and conservation area.	No	No preserved park or conservation area locating in subproject area, thus it is not likely impact.
Impact to ethnic minorities		
The ethnic minority groups living within or near the subproject.	No	Kinh people accounts for 100% of population of Ngoc Son commune - subproject area around Khe Gang reservoir. Thus, the project will not affect minority groups locally.
Members of minority groups in the region may be benefited or harmed by the project	No	Kinh people accounts for 100% in population of Ngoc Son commune - subproject area around Khe Gang reservoir. Thus, the project will not affect minority groups locally.
Dam Safety Issues		
Relate to construction of a large dam?	No	Khe Gang reservoir has low dam with height of less than 15m, thus it is not a large dam as defined by WB.
Depend on water level supplied by a dam existing or under construction?	No	Except the water supply for rice paddy fields in downstream, Khe Gang reservoir neither depend on other water reservoirs nor supply water for the other reservoirs.

Appendix A5- RESULTS OF THE ENVIRONMENTAL SAMPLE ANALYSIS



TRẠM QUAN TRẮC VÀ PHÂN TÍCH
MÔI TRƯỜNG LAO ĐỘNG
Địa chỉ: 99 Trần Quốc Toản, Hoàn Kiếm, Hà Nội
Điện thoại: 04-22172480; 04-22172473 Fax: 04-38223011

VIMCERT 025
ISO 9001:2008

Số: 15/TBKQ -GS/ MT-1 *Hà Nội, ngày 25 tháng 03 năm 2015*

THÔNG BÁO KẾT QUẢ

1	**Địa điểm lấy mẫu:**	DỰ ÁN HỒ KHE GANG
2	**Địa chỉ:**	Xã Ngọc Sơn, Huyện Quỳnh Lưu, Nghệ An
3	**Ngày lấy mẫu :**	26/02/2015
4	**Điều kiện thời tiết:**	Nắng
5	**Cán bộ tham gia lấy mẫu**	
CN. Bùi Sỹ Hoàng	CN.Trần Phương Thảo	
6	**Cán bộ tham gia thực hiện:**	
ThS. Trần Thị Liễu	ThS. Đặng Thị Thu Hà	ThS. Vũ Thanh Phương
ThS. Tạ Thị Trang Nhâm	CN. Trần Ngọc Thanh	KS. Vũ Duy Thanh
CN. Bùi Sỹ Hoàng	CN.Trần Phương Thảo	KS. Lê Anh Thư

A. Thông số, phương pháp thử nghiệm và thiết bị sử dụng chính

Bảng 1: Thông số, phương pháp thử nghiệm và thiết bị sử dụng chính

TT	Thông số	Phương pháp thử	Thiết bị sử dụng chính
I.	**Môi trường không khí**		
1	Vi khí hậu	QCVN 46:2012/BTNMT	Testo 425&645
2	Tiếng ồn	TCVN 7878-2:2010	Sound pro DLX, Quest
3	Độ rung	TCVN 6963 : 2001	VM-82, Rion
4	Bụi tổng số	TCVN 5067:1995	Cân AE 240, Mettler
5	CO	SOP-PT-32	Lambda 25, Perkin Elmer
6	SO2	TCVN 5971:1995	Lambda 25, Perkin Elmer
7	NO2	TCVN 6137:2009	Lambda 25, Perkin Elmer
II.	**Môi trường nước mặt**		
1	Nhiệt độ	SWEWW 550B: 2012	Nhiệt kế bách phân
2	Độ đục	SMEWW 2130 B	Model 2100P, HACH

1. Kết quả này chỉ có giá trị trên mẫu thử nghiệm.
2. Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ
3. Nghiêm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

BM 17.05 Lần ban hành: 02.2013 1/8

3	pH	TCVN 6492:2011	Sension 156 của Hach
4	EC	SMEWW 2540 C	Sension 3, Hãng HACH
5	DO	TCVN 7325:2004	Sension™156 của Hach
6	TSS	TCVN 6625:2000	Cân AE 240, Mettler
7	TDS	SMEWW 2540 C	Sension 3, Hãng HACH
8	COD	SWEWW 5220C: 2012	Titritation
9	BOD_5	TCVN 6001-1: 2008	BOD Foc 225 E, Hãng Foc
10	NO_2^-	TCVN 6178: 1996	Lambda 25,Perkinelmer
11	NO_3^-	TCVN 6180: 1996	Lambda 25,Perkinelmer
12	NH_4^+	TCVN 6179-1:1996	Lambda 25,Perkin Elmer
13	PO_4^{3-}	TCVN 6202-2008	Lambda 25,Perkinelmer
14	SO_4^{2-}	TCVN 6200: 1996	Lambda 25,Perkinelmer
15	Cl^-	TCVN 6194:1996	Lambda 25,Perkinelmer
16	Fe	SMEWW 3111B:2012	AAS 400, Perkinelmer
17	As	TCVN 6626:2000	ASS 600, Perkinelmer
18	Pb	TCVN 6193 - 1996	ASS 600, Perkinelmer
19	Cd	TCVN 6197 - 1996	ASS 600, Perkinelmer
20	Coliform	TCVN 6187-2:2009	Memmert INB500
21	Clostridium perfringens	ISO 14189:2013	Memmert INB500
III.	**Môi trường nước dưới đất**		
1	Nhiệt độ	SWEWW 550B: 2012	Nhiệt kế bách phân
2	Độ đục	SMEWW 2130 B	Model 2100P, HACH
3	pH	TCVN 6492:2011	Sension156 của Hach
4	Độ dẫn điện EC	SWEWW 2520B: 2012	Sension 156 của Hach
5	Độ cứng $CaCO_3$	TCVN 6224 - 1996	Titrimetric
6	SS	TCVN 6625:2000	Cân AE 240, Mettler
7	TDS	SMEWW 2540 C	Sension 3, Hãng HACH
8	DO	TCVN 7325:2004	Sension™156 của Hach
9	COD	TCVN 6186:1996	Titritation
10	NO_2^-	TCVN 6178: 1996	Lambda 25,Perkinelmer
11	NO_3^-	TCVN 6180: 1996	Lambda 25,Perkinelmer

1. Kết quả này chỉ có giá trị trên mẫu thử nghiệm.
2. Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ
3. Nghiêm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

12	NH_4^+	TCVN 6179-1:1996	Lambda 25,Perkin Elmer
13	PO_4^{3-}	TCVN 6202-2008	Lambda 25,Perkinelmer
14	SO_4^{2-}	TCVN 6200 - 1996	Lambda 25,Perkinelmer
15	Cl^-	TCVN 6194:1996	Lambda 25,Perkinelmer
16	Fe	SWEWW 3111B: 2012	AAS 400, Perkin Elmer
17	As	TCVN 6626:2000	ASS 600, Perkinelmer
18	Pb	TCVN 6193 - 1996	ASS 600, Perkinelmer
19	Cd	TCVN 6197 - 1996	ASS 600, Perkinelmer
20	Clostridium perfringens	ISO 14189:2013	Memmert INB500
21	Coliform	TCVN 6187-2:2009	Memmert INB500
22	E.coli	TCVN 6187-1:2009	Memmert INB500
IV.	**Môi trường đất và trầm tích**		
1	pH_{H2O}	TCVN 5979:2007	Sension156 của Hach
2	pH_{KCl}	TCVN 5979:2007	Sension156 của Hach
3	Mùn tổng	Phương pháp Walkley - Black	Titrimetric
4	Thành phần cơ giới	TCVN 5257:1990	Ống hút Robinson
5	N tổng số	TCVN 4051:1985	Titrimetric
6	P tổng số	TCVN 4052:1985	Titrimetric
7	K tổng số	TCVN 4053:1985	Titrimetric
8	N dễ tiêu	TCVN 5255:2009	Titrimetric
9	P dễ tiêu	TCVN 5256:1990	Titrimetric
10	K dễ tiêu	TCVN 5254:1990	Titrimetric
11	Fe	TCVN 8246:2009	AAS 400, Perkinel mer
12	Al^{3+}	TCVN 8246:2009	AAS 400, Perkinel mer
13	Ca	TCVN 4405:1987	Titrimetric
14	Mg	TCVN 4406:1987	Titrimetric
15	As	TCVN 8467:2000	AAS 600, Perkinel mer
16	Cd	TCVN 6649:2000 &TCVN 6496:2009	AAS 400&600, Perkinel mer
17	Pb		
18	Cu		
19	Zn		

1. Kết quả này chỉ có giá trị trên mẫu thử nghiệm.
2. Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ
3. Nghiêm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

B. Kết quả quan trắc môi trường:

I. Không khí xung quanh

1.1. Yếu tố vật lý

Bảng 2: Kết quả quan trắc hiện trường yếu tố vật lý

TT	Vị trí quan trắc	Tiếng ồn (dBA)	Nhiệt độ (^{0}C)	Độ ẩm (%)	Tốc độ gió (m/s)	Độ rung* (dB)
1	Vị trí K1	40,2	17,5	70,8	0,4-0,8	26
2	Vị trí K2	39,7	17,6	72,8	0,7-0,9	28
3	Vị trí K3	55,8	18,0	71,1	0,5-1,2	35
QCVN 26:2012/BTNMT (từ 6 giờ đến 21 giờ)		**70**	-	-	-	-
QCVN 27:2010/BTNMT (từ 6 giờ đến 21 giờ)		-	-	-	-	75

Ghi chú: *+ Tọa độ K1 (N:19^{0}11'03,6" &E: 105^{o}35'44,2"): Phía nam đập*

+ Tọa độ K2 (N:19^{0}11'19,7" &E: 105^{o}35'44,8"): Phía bắc đập

+ Tọa độ K3 (N:19^{0}10'54,2" &E: 105^{o}35'35,3"): Quốc lộ 537A

1.2. Thông số hóa học:

Bảng 3: Kết quả phân tích các thông số hóa học

TT	Vị trí quan trắc	Bụi	SO_2*	NO_2*	CO*
		($\mu g/m^3$)			
1	Vị trí K1	96	55	31	<5.000
2	Vị trí K2	87	52	32	<5.000
3	Vị trí K3	193	69	37	<5.000
QCVN 05:2013/BTNMT		**300**	**250**	**200**	**30.000**

Ghi chú: *+ Tọa độ K1 (N:19^{0}11'03,6" &E: 105^{o}35'44,2"): Phía nam đập*

+ Tọa độ K2 (N:19^{0}11'19,7" &E: 105^{o}35'44,8"): Phía bắc đập

+ Tọa độ K3 (N:19^{0}10'54,2" &E: 105^{o}35'35,3"): Quốc lộ 537A

II. Môi trường nước

2.1. Nước mặt

Bảng 4: Kết quả quan trắc nước mặt

TT	Thông số	Đơn vị	Kết quả			QCVN 08:2008/ BTNMT (B1)
			NM1	NM2	NM3	
1	Nhiệt độ	oC	22,3	21,8	23,7	-
2	Độ đục*	NTU	1,23	1,98	0,85	-
3	pH	-	7,02	7,00	6,98	**5,5-9**

1. Kết quả này chỉ có giá trị trên mẫu thử nghiệm.
2. Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ
3. Nghiêm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

4	*EC*	µS/cm	181,2	154,2	148,3	-
5	*DO*	mg/L	4,53	4,61	5,58	≥4
6	SS	mg/L	27	13	11	50
7	*TDS*	mg/L	115,9	98,7	94,,9	-
8	COD	mg/L	18,5	13,3	12,7	50
9	BOD_5	mg/L	6,5	4,1	3,9	15
10	NO_2	mg/L	<0,01	<0,01	<0,01	0,04
11	NO_3^-	mg/L	2,23	1,98	3,24	10
12	NH_4^+	mg/L	<0,06	<0,06	0,15	0,5
13	PO_4^{3-}	mg/L	<0,05	<0,05	<0,05	0,3
14	SO_4^{2-}	mg/L	<5	<5	<5	-
15	Cl^-*	mg/L	35	27	46	600
16	Fe	mg/L	0,124	0,131	0,152	1,5
17	As	mg/L	<0,0016	<0,0016	<0,0016	0,05
18	Pb	mg/L	<0,0016	<0,0016	<0,0016	0,05
19	Cd	mg/L	0,0010	0,0009	0,0014	0,01
20	Coliform	MPN/100ml	4.600	5.100	3.900	7.500
21	*Clostridium perfringens*	MPN/100ml	KPH	KPH	KPH	-

Ghi chú: *+ Tọa độ NM1 (N:19°11'04,0" &E: 105°35'45,1"): Phía nam đập*

+ Tọa độ NM2 (N:19°11'19,4" &E: 105°35'45,0"): Phía bắc đập

+ Tọa độ NM3 (N:19°10'54,2" &E: 105°35'35,3"): Kênh dẫn nước sau đập

2.2. Nước dưới đất

Bảng 5: Kết quả quan trắc nước dưới đất

TT	Thông số	Đơn vị	Kết quả		QCVN 09:2009/ BTNMT
			NN1	NN2	
1	Nhiệt độ	oC	19,7	20,3	-
2	Độ đục*	NTU	0,21	0,66	-
3	pH	-	5,91	5,98	5,5-8
4	*Độ dẫn điện EC*	µS/cm	134,4	650,0	-
5	Độ cứng $CaCO_3$*	mg/L	70	268	500
6	SS	mg/L	<2	<2	-
7	TDS	mg/L	86,0	416,0	-
8	*DO*	mg/L	2,32	1,98	-
9	COD	mg/L	<0,4	<0,4	4
10	NO_2^-	mg/L	<0,01	<0,01	1,0

1. Kết quả này chỉ có giá trị trên mẫu thử nghiệm.

2. Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ

3. Nghiêm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

TT	Thông số	Đơn vị	Kết quả		QCVN 09:2009/ BTNMT
			NN1	NN2	
11	NO_3^-	mg/L	1,04	1,54	15
12	NH_4^+-N	mg/L	<0,06	<0,06	0,1
13	PO_4^{3-}	mg/L	<0,05	<0,05	-
14	SO_4^{2-}	mg/L	<5	<5	400
15	Cl^-	mg/L	12	17	250
16	Fe	mg/L	<0,035	<0,035	5
17	As	mg/L	<0,0016	<0,0016	0,05
18	Pb	mg/L	<0,0016	<0,0016	0,01
19	Cd	mg/L	0,0010	0,0009	0,005
20	Coliform	MPN/100 ml	KPH	KPH	KPH
21	E.coli	MPN/100 ml	KPH	KPH	KPH
22	*Clostridium perfringens*	MPN/100 ml	KPH	KPH	-

Ghi chú: *+ Tọa độ NN1 (N:19°11'12,1" &E: 105°35'38,1")- Hộ Phạm Thị Luyến*

+ Tọa độ NN2 (N:19°10'54,0" &E: 105°35'35,0")- Hộ Trịnh Xuân Điền

III. Môi trường đất, trầm tích

Bảng 6: Kết quả phân tích đất

TT	Thông số	Đơn vị	Kết quả	QCVN 03:2008/ BTNMT (Đất nông nghiệp)
			MĐ1	
1	pH_{H2O}	-	7,23	-
2	pH_{KCl}	-	7,84	-
3	*Mùn tổng số*	%	1,8	-
4	*N tổng số*	%	0,12	-
5	*P tổng số*	%	0,08	-
6	*K tổng số*	%	0,06	-
7	*N dễ tiêu*	mg/100g	7,2	-
8	*P dễ tiêu*	mg/100g	12,8	-
9	*K dễ tiêu*	mg/100g	11,5	-
10	Thành phần cơ giới			
	Cát (0,5-1mm)	%	16,13	-
	Limon (0,002-0,5mm)	%	29,21	-

1. Kết quả này chỉ có giá trị trên mẫu thử nghiệm.
2. Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ
3. Nghiêm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

	Sét (<0,002mm)	%	54,66	-
11	*Ca*	mg/Kg	225,3	-
12	*Mg*	mg/Kg	182,4	-
13	*As*	mg/Kg	0,53	**12**
14	Cd*	mg/ Kg	<0,89	**2**
15	Cu*	mg/ Kg	8,22	**50**
16	Pb*	mg/ Kg	11,51	**70**

Ghi chú: + Tọa độ MĐ1 (N:19°11'03,9" &E: 105°35'43,3"): Phía nam đập

Bảng 7: Kết quả phân tích trầm tích

TT	Thông số	Đơn vị	Kết quả MTT1	QCVN 43:2012/BTNMT
1	pH_{H2O}	-	5,76	-
2	pH_{KCl}	-	6,41	-
3	*Mùn tổng*	%	9,75	-
4	*Thành phần cơ giới*			-
	Cát (0,5-1mm)	%	7,73	-
	Limon (0,002-0,5mm)	%	62,43	-
	Sét (<0,002mm)	%	28,84	-
5	*N tổng số*	%	0,35	-
6	*P tổng số*	%	0,21	-
7	*K tổng số*	%	1,32	-
8	*N dễ tiêu*	mg/100g	13,76	-
9	*P dễ tiêu*	mg/100g	16,90	-
10	*K dễ tiêu*	mg/100g	22,80	-
11	*Fe*	mg/Kg	114,25	-
12	Al^{3+}	mg/Kg	34,14	-
13	*Ca*	mg/Kg	46,33	-
14	*Mg*	mg/Kg	32,54	-
15	*As*	mg/Kg	0,93	**17,0**
16	Cd*	mg/Kg	<0,89	**3,5**
17	Pb*	mg/ Kg	<0,89	**91,3**

1. Kết quả này chỉ có giá trị trên mẫu thử nghiệm.
2. Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ

18	Cu*	mg/ Kg	8,22	**197**
19	Zn*	mg/ Kg	11,51	**315**

Ghi chú:

Tọa độ MTT1 (N:19^{0}10'54,2" &E: 105^{0}35'35,3"): Mẫu trầm tích kênh dẫn nước

IV. NHẬN XÉT :

Theo số liệu quan trắc và phân tích môi trường nước tại dự án hồ Khe Gang có nhận xét như sau :

1. **Môi trường không khí xung quanh:**

+ *Theo bảng 2:* Tiếng ồn được quan trắc có giá trị nằm trong giới hạn cho phép của quy chuẩn QCVN 26:2010/BTNMT.

+ *Theo bảng 3:* Bụi và các thông số hóa học tại các vị trí được quan trắc có giá trị nằm trong giới hạn cho phép của quy chuẩn QCVN 05:2013/BTNMT.

2. **Môi trường nước**

+ *Theo bảng 4:* Trong mẫu nước mặt, các thông số được quan trắc có giá trị nằm trong giới hạn cho phép của quy chuẩn QCVN 08:2008/BTNMT (B1)

+ *Theo bảng 5:* Trong mẫu nước ngầm, các thông số được quan trắc có giá trị nằm trong giới hạn cho phép của quy chuẩn QCVN 09:2009/BTNMT

3. **Môi trường đất và trầm tích:**

+ *Theo bảng 6:* Các thông số được quan trắc trong các mẫu đất có giá trị nằm trong giới hạn cho phép của quy chuẩn QCVN 03:2008/BTNMT.

+ *Theo bảng 7:* Các thông số được quan trắc trong các mẫu trầm tích có giá trị nằm trong giới hạn cho phép của quy chuẩn QCVN 43:2012/BTNMT.

TRẠM QUAN TRẮC VÀ PHÂN TÍCH MÔI TRƯỜNG LAO ĐỘNG	PHÒNG GIÁM SÁT & PHÂN TÍCH MÔI TRƯỜNG
TRẠM QUAN TRẮC VÀ PHÂN TÍCH MÔI TRƯỜNG LAO ĐỘNG	*Phó Trưởng Phòng*
PHÓ GIÁM ĐỐC	
Ths Vũ Thanh Lương	**ThS. Đặng Thị Thu Hà**

1. Kết quả này chỉ có giá trị trên mẫu thử nghiệm.
2. Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ
3. Nghiêm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

Appendix A6- MINUTES OF THE PUBLIC CONSULTATION MEETING

1. Minutes of the related steakholders meeting

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

BIÊN BẢN CUỘC HỌP THAM VẤN CÁC NGÀNH LIÊN QUAN

1. Tên dự án: **Sửa chữa, nâng cấp hồ chứa nước Khe Gang thuộc dự án sửa chữa, nâng cao an toàn đập tỉnh Nghệ An (WB8).**

1- Tiểu dự án : .....

2- Thời gian họp: .....ngày .....tháng .....năm 2015

3- Địa điểm họp: .....

4- Thành phần cuộc họp

a) Đại diện Sở NN và PTNT .tỉnh Nghệ An

Ông (bà): ..Nguyễn Văn Đệ..... Chức vụ:..Phó giám đốc Sở..

b) Đại diện Sở TN&MT ..tỉnh Nghệ An

Ông (bà): ..Hoàng Danh Đức..... Chức vụ:..Chuyên viên Phòng TĐ & ĐTM.

c) Đại diện Ban Quản lý dự án Ngành NN & PTNT.

Ông (bà): ..Trần Xuân Thăng..... Chức vụ:..Phó trưởng Ban.

d) Đại diện UBND các huyện Quỳnh Lưu

Ông (bà): Nguyễn Xuân Dinh..... Chức vụ:..Trưởng phòng Nông nghiệp

Ông (bà): ..... Chức vụ:.....

Ông (bà): ..... Chức vụ:.....

Ông (bà): ..... Chức vụ:.....

Ông (bà): ..... Chức vụ:.....

e) Đại diện UBND các xã vùng dự án:

.....Xã Ngọc Sơn.....

Ông (bà): ..Nguyễn Văn Thường. Chức vụ:..Phó chủ tịch UBND Xã

Ông (bà): ..... Chức vụ:.....

Ông (bà): ..... Chức vụ:.....

Ông (bà): ..... Chức vụ:.....

Ông (bà): ..... Chức vụ:.....

f) Đại diện đơn vị tư vấn : Trung tâm NCS thường & Phát triển

Ông (bà): ..Hoàng Xuân Trường..... Chức vụ:....Giám đốc.....

Ông (bà): ..... Chức vụ:.....

6. Nội dung cuộc họp

a) Đại diện Ban QLDA, ông: Trần Vĩnh Phăng trình bày nội dung các TDA.

b) Đại diện đoàn tư vấn: ..... giới thiệu các chính sách an toàn môi trường của WB và Chính phủ Việt Nam và xã hội, tiến độ chuẩn bị dự án và các tài liệu chuẩn bị.

7. Các ý kiến thảo luận:

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

a) Về phạm vi ảnh hưởng *(Ghi số xã, huyện, số hộ, số người, diện tích đất tự nhiên trong vùng dự án)*:

Số huyện 01 (Quỳnh Lưu)
Số xã 01 (Ngọc Sơn) Xã Ngọc Sơn có diện tích đất tự nhiên 288,94 km², toàn xã có 9.110 người với 1890 hộ
Thu hồi hồ khe Gang có 7 xóm gồm 4B, 4B, 8, 9, 10, 7, 3 gồm khoảng 100 hộ

b) Về các đối tượng bị ảnh hưởng *(Đất nông nghiệp, đất lâm nghiệp, thủy sản và các loại khác, số hộ bị ảnh hưởng (thu hồi đất, di dân, di chuyển mồ mả...), tỷ lệ người dân tộc thiểu số bị ảnh hưởng, số người được hưởng lợi, tỷ lệ hộ nghèo, di tích lịch sử văn hóa, số mồ mả bị di dời)*:

Diện tích đất thu hồi 1,5 ha bao gồm : 1 ha đất thu hồi tạm thời và 1,5 ha đất thu hồi vĩnh viễn đất thu hồi thuộc đất trồng cây lâu năm của UBND xã Ngọc Sơn
Chỉ có 01 bị ảnh hưởng tài sản trên đất, không phải di chuyển mồ mả hay di dân
Trong vùng dự án không có người dân tộc thiểu số sinh sống hay di tích lịch sử văn hóa, VHG
Trong vùng có khoảng 200 người hưởng lợi phía hạ lưu hồ.

7.2 Về tác động của dự án đến môi trường:

- Tác động tích cực *(hạn chế ngập lụt vùng hạ du, hạn chế các sự cố vỡ đập, tràn, cống, tạo việc làm, tăng thu nhập, tăng diện tích tưới, tăng năng suất cây trồng, NTTS, nâng cao đời sống... vùng được hưởng lợi và đối tượng được hưởng lợi)*:

- Bãi đắm an toàn của đập, nâng cao năng lực xả lũ của tràn, đắm bảo an toàn hồ chứa
- Lấp nước trở ổn định cho 175 ha đất nông nghiệp, đất trồng màu của xã Ngư Lộc
- Trồng bãi an toàn chống lũ cho hạ lưu công trình và góp phần chống cháy rừng

- Tác động tiêu cực *(Tác tiêu cực có thể xảy ra trong quá trình chuẩn bị, thi công và vận hành dự án và những khu vực bị ảnh hưởng, đối tượng bị ảnh hưởng. Các tác động tiêu cực có thể xảy ra như: Ô nhiễm môi trường đất, nước, không khí, sản xuất, thu nhập, mất việc làm, bị ngừng các dịch vụ công cộng...)*:

- Phát sinh tiếng ồn, bụi, nước thải và rác thải sinh hoạt. Tuy nhiên, phạm vi tác động nhỏ, giám thiểu, tạm thời trong thời gian thi công.

7.3- Tác động của dự án đến xã hội:

- Tác động tích cực *(Tạo việc làm, tăng thu nhập, tăng diện tích tưới, tăng năng suất cây trồng, NTTS, nâng cao đời sống...)*

- Diện tích nông nghiệp được đảm bảo nước tưới sản xuất phục vụ ổn định 175 ha
- DA góp phần ổn định đời sống người dân. Kinh tế phát triển, đời sống nhân dân ổn định
- Sẽ có mặt của công trình sẽ thúc đẩy hoạt động dịch vụ như thế phát triển theo công trình

- Tác động tiêu cực ;

- Việc đào đất, lập sau sử làm đường, bãi thi công, khu lán trại sẽ nhiều gây xáo trộn cơ cấu quỹ đất địa phương
- Quá trình thi công đã hội việc tập trung một số lao động thì nơi khác tới có thể gây dung đột giữa lực lượng công nhân có thể gây mất trật tự

7.4- Kiến nghị của các địa phương trong vùng dự án/ có đồng tình với các nội dung của dự án không?

Các ban ngành liên quan và chính quyền, nhân dân địa phương rất đồng tình ủng hộ việc TDA được xây dựng, sửa chữa. Hiệu quả về mặt môi trường, xã hội mà sau khi dự án hoàn thành mang lại cho người dân địa phương rất to lớn.

7.5- Kiến nghị của các ngành liên quan:

8- Kết luận:

Chính quyền địa phương và các ban ngành liên quan thống nhất đồng ý trong việc nâng cao, sửa chữa công trình hồ chứa nước Thọ Giang để tăng hiệu quả phòng chống lũ, bảo vệ dân cư, cung cấp ổn định nước tưới cho sản xuất. Tuy nhiên chủ đầu tư cần thực hiện tốt các biện pháp bảo vệ môi trường, xã hội.

Chủ trì hội nghị	Thư ký hội nghị
Sở Nông nghiệp & PTNT	Sở TN&MT
NGUYỄN VĂN ĐỆ	Hoàng Danh Định
Ban Quản lý dự án	Trung tâm Môi trường và Phát triển
Trần Vinh Thắng	Hoàng Xuân Tường
UBND Huyện ..Quỳnh Lưu	UBND xã ..Quỳnh Tân....
Nguyễn Xuân Đức	Nguyễn Văn Chương

2. Ngoc Son commune recommendation

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

Dự án: Sửa chữa, nâng cấp hồ chứa nước Khe Gang thuộc dự án sửa chữa, nâng cao an toàn đập tỉnh Nghệ An (WB8)

Ý KIẾN THAM VẤN CẤP XÃ VÀ CỘNG ĐỒNG TRONG VÙNG DỰ ÁN

Ngọc Sơn, ngày tháng năm 2015

Sau khi nghe Ban Quản lý dự án trình bày tóm tắt nội dung, các hạng mục của TDA và tư vấn trình bày về các tác động của dự án đến môi trường và các biện pháp giảm thiểu, UBND xã có ý kiến như sau:

1. Về sự đồng thuận của địa phương đối với dự án:
Chính quyền và nhân dân địa phương rất đồng tình, mong muốn tiểu dự án được thực hiện trên địa bàn.

2. Về phạm vi ảnh hưởng của dự án và các đối tượng bị ảnh hưởng:
- Về phạm vi ảnh hưởng: Việc thi công TDA chỉ ảnh hưởng tới các xóm 1, 4A do có tuyến đường vận chuyển nguyên vật liệu thi công
- Khu tưới hạ lưu hồ không bị ảnh hưởng tới việc lấy nước do 1 số hạng mục quan trọng được thi công trong thời gian giáp vụ.
- Về các đối tượng bị ảnh hưởng: Việc thu hồi đất cho TDA chỉ ảnh hưởng tới 01 hộ dân do mất tài sản trên đất. Toàn bộ diện tích đất thu hồi của UBND xã
- Các hộ dân trong khu tưới không ảnh hưởng tới việc lấy nước trong quá trình thi công.

3. Về những tác động của Dự án đến môi trường tự nhiên và kinh tế - xã hội:
3.1. Tác động tích cực:
- Nâng cao năng lực xả lũ của tràn, bảo đảm an toàn đập, bảo vệ đời sống sinh hoạt và sản xuất của nhân dân phía hạ lưu
- Cấp nước tưới ổn định cho 175 ha đất nông nghiệp xã Ngọc Sơn.
3.2. Tác động tiêu cực
Sự phát sinh tiếng ồn, bụi, nước thải và rác thải thi công, tăng mật độ giao thông trên tuyến đường vận chuyển nguyên vật liệu.
4. Các sự cố môi trường từ sau khi xây dựng công trình và đưa vào sử dụng:

1

Bảng: Thống kê các sự cố phát sinh từ khi XD công trình

TT	Sự cố phát sinh	Năm	Khu vực BAH	Mức độ AH đến MT, XH	Các biện pháp khắc phục/ kết quả khắc phục
1	Lũ dâng cao	2005	Mái thượng lưu, mái hạ lưu, hạ lưu hồ	Gây ngập úng. Thiệt hại về tài sản	Kè đá thềm ở mái thượng lưu
2	Hạn hán	2008	Hộ dân khu tưới	- Thiếu nước sản xuất	- Đặt bơm trữ tiếp nước từ hồ qua đập

5. Kiến nghị các biện pháp giảm thiểu tác động môi trường của Dự án:

- Đồng tình với các biện pháp giảm thiểu do chủ đầu tư đưa ra trong quá trình thực hiện.
- Đề nghị chủ đầu tư và đơn vị thi công thực hiện nghiêm túc các biện pháp giảm thiểu đưa ra.

6. Kiến nghị đối với chủ dự án:

- Thực hiện TDA đúng tiến độ, đảm bảo cho việc sản xuất của người dân được ổn định.
- Thực hiện chính sách đền bù, chi trả bồi thường giải phóng mặt bằng nghiêm túc, kịp thời.

UBND XÃ...Ngư Sơn......

KT Chủ tịch

PHÓ CHỦ TỊCH

Nguyễn Văn Chương

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

Quỳnh Lưu, ngày 10 tháng 2 năm 2015

BIÊN BẢN LÀM VIỆC

***(V/v Điều tra khảo sát hiện trạng tài sản bị ảnh hưởng tại xã** Ngọc Sơn)*

Hôm nay, ngày 10 tháng 2 năm 2015, tại trụ sở UBND xã Ngọc Sơn,
huyện Quỳnh Lưu, Tỉnh Nghệ An. Chúng tôi gồm:

A. ***Đại diện UBND xã*** Ngọc Sơn

Ông (bà) Hồ Văn Lập — Chức vụ: chủ tịch xã
Ông (bà) Trần Văn Thấy — Chức vụ: đại diện hộ dân
Ông (bà)..... — Chức vụ:.....

và

B. ***Đại diện*** ..... (gọi tắt là Tư vấn):

Ông (bà) Nguyễn Văn Ninh — Chức vụ: Tư vấn môi trường
Ông (bà) Dương Thị Kim Thư — Chức vụ:.....
Ông (bà)..... — Chức vụ:.....

Cùng tiến hành họp và thống nhất một số công việc như sau:

1. Tư vấn thông báo cho UBND xã về phạm vi bị ảnh hưởng và ranh giải toả dự kiến của Dự án Sửa chữa, nâng cấp hồ chứa nước Khe Goang trên địa bàn xã.
2. UBND xã cung cấp cho tư vấn danh sách các hộ bị ảnh hưởng bởi Dự án.
3. UBND xã xác nhận tư vấn đã tiến hành khảo sát điều tra tài sản hiện trạng của 20 hộ bị ảnh hưởng bởi dự án trên địa bàn xã (có danh sách kèm theo)

Ghi chú:

Dự án Sửa chữa nâng cấp hồ chứa nước Khe Goang được thực hiện sẽ có tác động đến một số đất đai như đất giao, một số tuyến vỉa sẽ có thu hồi một số diện tích đất của hộ dân, chủ yếu của người dân.
Xây dựng có người dân đồng tình ủng hộ giao đất.
Tại cuộc họp nhất mong muốn dự án được triển khai.

Xác nhận của UBND xã
CHỦ TỊCH
Hồ Văn Lập

Đại diện tư vấn
Dương Thị Kim Thư

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự Do - Hạnh phúc

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Ngọc Sơn, Ngày 10 tháng 8 năm 2015

DỰ ÁN ....Sửa chữa nâng cấp Hồ chứa nước Khe Gang Thượng....
dự án Sửa chữa nâng cao an toàn đập tỉnh Nghệ An (WB8).....

BIÊN BẢN HỌP THAM VẤN CỘNG ĐỒNG VỀ ĐÁNH GIÁ MÔI TRƯỜNG, TÁI ĐỊNH CƯ VÀ PHÁT TRIỂN DÂN TỘC THIỂU SỐ

Tiểu dự án:...Sửa chữa nâng cấp Hồ chứa nước Khe Gang
Xã..Ngọc Sơn....., huyện..Quỳnh Lưu..tỉnh .Nghệ An

I. Thành phần tham dự

- Ông/Bà....Hồ Văn Liệp.....Chức vụ .....Chủ tịch xã.....
- Ông/Bà.....Chức vụ .....
- Ông/Bà..Trần Viết Thuỳ.....Chức vụ .....P. GĐ Dự.....
- Ông/Bà..Nguyễn Quang Minh.....Chức vụ ....Trưởng thôn.....
- Ông/Bà..Dương Thị Kiều Thu.....Chức vụ ..Chuyên gia.....
- Ông/Bà..... Chức vụ .....
- Đại diện những người bị ảnh hưởng: .....người (*chi tiết xem danh sách đính kèm*)

II. Nội dung tham vấn

Chuyên gia môi trường trình bày những tác động môi trường bao gồm tác động lên môi trường tự nhiên và xã hội của khu vực dự án và những biện pháp giảm thiểu các tác động tiêu cực.

Chuyên gia tái định cư trình bày về những tác động khi thu hồi đất và các tài sản trên đất, những chính sách của Chính phủ nước Cộng hoà xã hội chủ nghĩa Việt Nam và địa phương, chính sách của dự án trong vấn đề bồi thường thiệt hại khi Nhà nước thu hồi đất đai và các tài sản trên đất.

Chuyên gia về cộng đồng, dân tộc thiểu số trình bày về Khung chính sách dân tộc thiểu số của dự án, các tác động xã hội trong quá trình thực hiện dự án. Giới thiệu với cộng đồng về những chính sách của Chính phủ nước Cộng hoà xã hội chủ nghĩa Việt Nam và địa phương về dân tộc thiểu số.

III. Ý kiến thảo luận

III.1 Về các tác động môi trường tiêu cực và biện pháp giảm thiểu

có một số tác động môi trường như bụi, xe cần tưới nước nên đường bị bụi
Khi xây dựng này dự sẽ có tác động đến các giai đoạn
- Giải phóng mặt bằng
- Thi công dự án
- Vận hành
- Tất cả đều có biện pháp giảm thiểu
- Khu nước thải thu đổ ra, và thông đáy
- Tất cả đều ảnh được dự giá là tạm thời và ngắn chỉ trong giai đoạn xây dựng

III.2 Về các vấn đề thu hồi đất và các tài sản trên đất và các chính sách

dự án không ảnh hưởng tới thu hồi đất của người dân
- Ảnh hưởng đất rất ít đây nhìn bởi các người dân đều thống nhất. Nếu đất dự án thu hồi của ai thì đều sẵn sàng giao đất.
- Tất cả đồng nhất tán thành dự án.

III.3 Về các vấn đề về dân tộc thiểu số

Không có dân dân tộc thiểu số

2

IV. Kết luận

ủng hộ dự án

- 100% số người tham dự đều đồng nhất và ủng hộ dự án được triển khai tại xã
- Tất cả đều sẵn sàng được tham gia dự án
- tất cả đều sẵn sàng giao đất khi dự án cần
- Cuộc họp kết thúc lúc 10h 30' cùng ngày UBND xã Nghĩa Lâm

Đại diện Chủ đầu tư	Đại diện cộng đồng	Đại diện tư vấn	Đại diện UBND xã
BAN QUẢN LÝ DỰ ÁN NGÀNH NÔNG NGHIỆP ... NÔNG THÔN ... TỈNH NGHỆ AN			CHỦ TỊCH
Trần Vinh Thắng			Hồ Văn Lập

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

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...Ngọc Sơn..., *Ngày 9...tháng 2...năm 2015*

BIÊN BẢN XÁC NHẬN BÃI KHAI THÁC VẬT LIỆU ĐẤT ĐẮP

Công trình: ...Sửa chữa nâng cấp hồ chứa nước Khe Gang...............

Xã:....Ngọc Sơn, huyện Quỳnh Lưu, tỉnh Nghệ An..........................

Hôm nay, ngày ....tháng......năm 2015, tại Xã Ngọc Sơn.......... Quỳnh Lưu, Nghệ An chúng tôi gồm:

I. Đại diện đơn vị lập báo cáo ĐTM:..

- Ông/Bà...Chức vụ ....
- Ông/Bà...Chức vụ ....

II. Đại diện địa phương:....UBND xã Ngọc Sơn..........................

- Ông/Bà....Hồ Văn Lập.......................Chức vụ ....CTịch xã............
- Ông/Bà...Chức vụ ....

Cùng xác nhận vị trí bãi khai thác vật liệu cho công trình tại hiện trường như sau:

Vị trí: ....Thuộc Eo Đén, Hốc Lừng xóm 7, xã Ngọc Sơn.....................

Tình trạng sở hữu:

...Cả hai khu vực đều thuộc đất của UBND xã quản lý........................

Trữ lượng: ....bãi 1 = 1,8 ha (Eo Đén)....bãi 2 = 2,8 ha (Hốc Lừng)....

Cự li vận chuyển: ..bãi 1 → chân công trình = 1km....bãi 2 → chân ctrình = 0,5km

Mô tả môi trường xung quanh bãi khai thác:

......Cả 2 bãi là cây bụi và cây cỏ dại...

.....Môi trường khí thoáng đãng...

....

Chủ sở hữu đồng ý cho khai thác vật liệu đất xây dựng dự án

Biên bản được thông qua, các bên nhất trí kí tên./.

Xác nhận của địa phương	Đại diện chủ mỏ đất	Đơn vị lập báo cáo ĐTM
CHỦ TỊCH Hồ Văn Lập	Đại diện chủ đầu tư	

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

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Ngọc Sơn, Ngày 8 tháng 2 năm 2015

BIÊN BẢN XÁC NHẬN VỊ TRÍ ĐỔ THẢI

Công trình: Sửa chữa, nâng cấp Hồ chứa nước Khe Gang

Xã Ngọc Sơn, huyện Quỳnh Lưu, tỉnh Nghệ An

Hôm nay, ngày .....tháng.....năm 2015, tại Xã Ngọc Sơn, Quỳnh Lưu

chúng tôi gồm:

I. Đại diện đơn vị lập báo cáo ĐTM:.....

- Ông/Bà: Nguyễn Quang Ninh ..... Chức vụ: Chuyên gia
- Ông/Bà: Dương Thị Kim Thư ..... Chức vụ: Chuyên gia

II. Đại diện địa phương:.....

- Ông/Bà: Hồ Văn Lập ..... Chức vụ: Chủ tịch xã
- Ông/Bà: Trần Văn Khánh ..... Chức vụ: Đại diện hộ dân

Cùng xác nhận vị trí đổ đất thải công trình tại hiện trường như sau:

Vị trí: Tại Eo Đém xã Học Kủy thôn 7 xã Ngọc Sơn

Tình trạng sở hữu:

Do UBND xã quản lý

Trữ lượng: 1,2 ha xã 2,8 ha

Cự li vận chuyển: bãi 1 = 1 km, bãi 2 = 0,5 km

Mô tả môi trường xung quanh bãi đổ thải:

Cả hai bãi đều có cây cỏ lau

Cả 2 bãi đều không có nhà dân

Yêu cầu đơn vị thi công khi đổ đất phải lần lượt, gọn gàng, khi đổ xong phải san gạt cho bằng phẳng.

Biên bản được thông qua, các bên nhất trí kí tên./.

Xác nhận của UBND	Đại diện gia đình	Đơn vị lập báo cáo ĐTM
CHỦ TỊCH		
Hồ Văn Lập	TRẦN VĂN KHÁNH	

Đại diện chủ đầu tư

BAN QUẢN LÝ DỰ ÁN NÔNG NGHIỆP VÀ PTNT TỈNH NGHỆ AN

Trần Vĩnh Thắng

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

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...Ngọc Sơn..., Ngày...7..tháng...2...năm 2015

BIÊN BẢN XÁC NHẬN VỊ TRÍ LÁN TRẠI

Công trình: ...Sửa chữa nâng cấp hồ chứa nước Khe Gang...

Xã...Ngọc Sơn, huyện Quỳnh Lưu, Nghệ An...

Hôm nay, ngày ....tháng......năm 2015, tại Xã ...Ngọc Sơn, Quỳnh Lưu, Nghệ An

chúng tôi gồm:

I. Đại diện đơn vị lập báo cáo ĐTM: ...

- Ông/Bà...Nguyễn Quang Ninh............Chức vụ ...Chuyên gia...............
- Ông/Bà...Chức vụ ....

II. Đại diện địa phương: ...

- Ông/Bà...Hồ Văn Lập......................Chức vụ ...Chủ tịch xã.................
- Ông/Bà...Chức vụ ....

Cùng xác nhận vị trí xây dựng lán trại thi công cho công nhân tại hiện trường như sau:

Vị trí: ...tại khu bãi đất trống gần vị trí đập cách 50 m...............

Tình trạng sở hữu:

.........Khu đất bãi do UBND xã Ngọc Sơn quản lý.........................

Diện tích: .....500 m²...

Mô tả môi trường xung quanh vị trí xây dựng lán trại:

.......Bãi đất trống chỉ có 1 số cây ở bụi...

....

....

Yêu cầu đơn vị thi công sau khi hoàn thành công trình hoàn trả lại hiện trạng cho khu đất mượn tạm để xây dựng lán trại thi công.

Biên bản được thông qua, các bên nhất trí kí tên./.

Xác nhận của địa phương	Đại diện chủ đầu tư	Đơn vị lập báo cáo ĐTM
CHỦ TỊCH		
Hồ Văn Lập	Trần Vĩnh Thắng	

có một số tác động môi trường như bụi, xe Cán tưới nước hằng đường bị bụi

Khi Sửa chữa này cũng sẽ có tác động đối các giai đoạn

- Giải phóng mặt bằng
- Thi công dự án
- Vận hành

- Tại cả đều có biện pháp giảm thiểu
- Khu nước thải thu gom cả, và thông đồng
- Tất cả đều ảnh được đ/giá là tạm thời và ngắn chỉ trong giai đoạn xây dựng

III.2 Về các vấn đề thu hồi đất và các tài sản trên đất và các chính sách

dự án không ảnh hưởng tới thu hồi đất của người dân

- Ảnh hưởng đất rất ít thống nhất bởi các người dân đều thống nhất. Nếu đất dự án thu hồi của ai thì đều sẵn sàng giao đất.
- Tất cả thống nhất tán thành dự án.

III.3 Về các vấn đề về dân tộc thiểu số

Không có dân dân tộc thiểu số

2

IV. Kết luận

ủng hộ dự án

- 100% số người tham dự đều thống nhất và mong muốn dự án được triển khai sớm
- Tất cả đều sẵn sàng được tham gia dự án
- tất cả đều sẵn sàng giao đất khi dự án cần
- Cuộc họp kết thúc lúc 10h. 30' tại UBND xã Ngọc Sơn

Đại diện Chủ đầu tư	Đại diện cộng đồng	Đại diện tư vấn	Đại diện UBND xã
BAN QUẢN LÝ DỰ ÁN NGÀNH NÔNG NGHIỆP PTNT NÔNG THÔN – SỞ NÔNG NGHIỆP – TỈNH NGHỆ AN			CHỦ TỊCH
Trần Vĩnh Thắng			Hồ Văn Lập

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

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...Ngọc Sơn..., Ngày..9...tháng..2...năm 2015

BIÊN BẢN XÁC NHẬN BÃI KHAI THÁC VẬT LIỆU ĐẤT ĐẮP

Công trình: ...Sửa chữa nâng cấp hồ chứa nước Khe Gang..............

Xã:....Ngọc Sơn, huyện Quỳnh Lưu, tỉnh Nghệ An..........................

Hôm nay, ngày ....tháng......năm 2015, tại Xã Ngọc Sơn.........

Quỳnh Lưu, Nghệ An chúng tôi gồm:

I. Đại diện đơn vị lập báo cáo ĐTM:..

- Ông/Bà..Chức vụ ....
- Ông/Bà..Chức vụ ....

II. Đại diện địa phương:....UBND xã Ngọc Sơn.......................................

- Ông/Bà.....Hồ Văn Lập......................Chức vụ .....Chủ tịch xã.............
- Ông/Bà..Chức vụ ....

Cùng xác nhận vị trí bãi khai thác vật liệu cho công trình tại hiện trường như sau:

Vị trí: ....Thuộc Eo Đén, Hục Lùng xóm 7, xã Ngọc Sơn.......................

Tình trạng sở hữu:

..Cả hai khu vực đều thuộc đất của UBND xã quản lý.........................

Trữ lượng: ....bãi 1 = 1,3 ha (Eo Đén)....bãi 2 = 2,8 ha (Hục Lùng)...

Cự li vận chuyển: ..bãi 1 → chân công trình = 1km.....bãi 2 → chân ct = 0,5km

Mô tả môi trường xung quanh bãi khai thác:

......Cả 2 bãi là cây bụi và cây cỏ dại...

.....Môi trường khí thoáng đãng..

....

Chủ sở hữu đồng ý cho khai thác vật liệu đất xây dựng dự án

Biên bản được thông qua, các bên nhất trí kí tên./.

Xác nhận của địa phương	Đại diện chủ mỏ đất	Đơn vị lập báo cáo ĐTM
CHỦ TỊCH (đã ký, đóng dấu) Hồ Văn Lập	Đại diện chủ đầu tư (đã ký, đóng dấu: BAN QUẢN LÝ DỰ ÁN NGÀNH NÔNG NGHIỆP VÀ PTNT - TỈNH NGHỆ AN)	(đã ký)

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

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Ngọc Sơn, Ngày 8 tháng 2 năm 2015

BIÊN BẢN XÁC NHẬN VỊ TRÍ ĐỔ THẢI

Công trình: Sửa chữa, nâng cấp Hồ chứa nước Khe Gang

Xã Ngọc Sơn, huyện Quỳnh Lưu, tỉnh Nghệ An

Hôm nay, ngày .....tháng.....năm 2015, tại Xã Ngọc Sơn, Quỳnh Lưu

chúng tôi gồm:

I. Đại diện đơn vị lập báo cáo ĐTM:

- Ông/Bà: Nguyễn Quang Ninh Chức vụ: Chuyên gia
- Ông/Bà: Đường Thị Kim Thủ Chức vụ: Chuyên gia

II. Đại diện địa phương:

- Ông/Bà: Hồ Văn Lập Chức vụ: Chủ tịch xã
- Ông/Bà: Trần Văn Khánh Chức vụ: Đại diện hộ dân

Cùng xác nhận vị trí đổ đất thải công trình tại hiện trường như sau:

Vị trí: Tại Eo Đén xã Học Kỳ thôn 1 xã Ngọc Sơn

Tình trạng sở hữu:

Do UBND xã quản lý

Trữ lượng: 1,2 ha xã 2,8 ha

Cự li vận chuyển: bãi 1 = 1 km, bãi 2 = 0,5 km

Mô tả môi trường xung quanh bãi đổ thải:

Cả hai bãi đều rất cằn cỗi

Cả 2 bãi đều thuộc đất nhà dân

Yêu cầu đơn vị thi công khi đổ đất phải lần lượt, gọn gàng, khi đổ xong phải san gạt cho bằng phẳng.

Biên bản được thông qua, các bên nhất trí kí tên./.

Xác nhận của UBND	Đại diện gia đình	Đơn vị lập báo cáo ĐTM
CHỦ TỊCH		
Hồ Văn Lập	TRẦN VĂN KHÁNH	

Đại diện chủ đầu tư

BAN QUẢN LÝ DỰ ÁN NÔNG NGHIỆP VÀ NÔNG THÔN TỈNH NGHỆ AN

Trần Vĩnh Thắng

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM

Độc lập - Tự do - Hạnh phúc

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... Ngọc Sơn..., Ngày ...7...tháng ...2...năm 2015

BIÊN BẢN XÁC NHẬN VỊ TRÍ LÁN TRẠI

Công trình: *Sửa chữa nâng cấp tiểu chứa nước thủy lợi*

Xã *Ngọc Sơn, huyện Quỳnh Lưu, Nghệ An*

Hôm nay, ngày .....tháng.....năm 2015, tại Xã *Ngọc Sơn, Quỳnh Lưu, Nghệ An*

chúng tôi gồm:

I. Đại diện đơn vị lập báo cáo ĐTM: .....

- Ông/Bà: *Nguyễn Quang Ninh* Chức vụ: *Chuyên gia*
- Ông/Bà..... Chức vụ .....

II. Đại diện địa phương: .....

- Ông/Bà: *Hồ Văn Lập* Chức vụ: *Chủ tịch xã*
- Ông/Bà..... Chức vụ .....

Cùng xác nhận vị trí xây dựng lán trại thi công cho công nhân tại hiện trường như sau:

Vị trí: *tại khu đất thuộc gần vị trí đập cách 50 m*

Tình trạng sở hữu:

khu đất thuộc UBND xã Ngọc Sơn quản lý

Diện tích: *500 m²*

Mô tả môi trường xung quanh vị trí xây dựng lán trại:

khu đất thuộc chỉ có 1 số cây ở khu

.....

.....

Yêu cầu đơn vị thi công sau khi hoàn thành công trình hoàn trả lại hiện trạng cho khu đất mượn tạm để xây dựng lán trại thi công.

Biên bản được thông qua, các bên nhất trí kí tên./.

Xác nhận của địa phương	**Đại diện chủ đầu tư**	**Đơn vị lập báo cáo ĐTM**
CHỦ TỊCH	BAN QUẢN LÝ DỰ ÁN NÔNG NGHIỆP VÀ PTNT TỈNH NGHỆ AN	
Hồ Văn Lập	*Trần Vinh Thắng*	

Appendix A7- PICTURES OF CURRENT STATUS OF SUBPROJECT AREA

	
HIỆN TRẠNG ĐẬP	HIỆN TRẠNG HỒ
	
HIỆN TRẠNG MẶT ĐẬP	SẠT LỞ MÁI HẠ LƯU ĐẬP
	
VỊ TRÍ THẤM THÂN ĐẬP	HIỆN TRẠNG ĐƯỜNG QUẢN LÝ

	
HIỆN TRẠNG CỐNG LẤY NƯỚC	VỊ TRÍ TẬP KẾT VẬT LIỆU, LÁN TRẠI…
	
HỌP THAM VẤN CỘNG ĐỒNG	THAM VẤN CỘNG ĐỒNG
	
PHỎNG VẤN HỘ DÂN BỊ ẢNH HƯỞNG	

APPENDIX B - SOCIAL

Appendix B1- METHODOLOGICAL NOTE

1. Objectives and tasks of Study

The main objective of Social Impact Assessment is to provide an integrated framework for the social analysis in accordance with the World Bank's processes and activities. Because there are many social variables that may potentially affect the operation and success of the Project, the SA has focused on investigating and assessing the issues related to construction activities and operation of the Project. The decision on determination of important issues and how to resolve them have been done by the consultations with stakeholders as well as utilization of different methods to collect information and analyze data. The SA has been implemented through a Socio-economic Survey (SES) at the HHs level.

In this context, the SES has been designed to (i) provide baseline data on household and assessment of the impacts of resettlement; (ii) ensure that the rights of persons affected by proposals are satisfactory, suitable and can be used for the monitoring of resettlement. Quantitative and qualitative methods have been used to collect socio-economic information of households. At a minimum level, the SES has collected information from a sample size of 189 (10%) households, who were identified as beneficiaries of the Project, regardless of gender and ethnicity. Scale of collected data includes socio-economy information of heads of households (name, sex, age, livelihood or occupation, income, education, and ethnicity) and household members (number, livelihood or occupation, children and school-age children, and literacy, regardless of gender; living conditions (access to water supply, sanitation, and energy for cooking and lighting, ownership of durable goods, and access to services and basic structures); The use of the land of affected households; The social and potential impacts of the project to local people.

2. Methodology for assessment

There are many methods and techniques used in the assessment, the Consultant has applied the following methods to collect and evaluate information:

(i) *Document review*: The review and analysis of documents related to the Project will provide basic information of the Project and help to explain reasons for existing changes or non-existence. On the other hand, it also helps identify gaps in data need to be collected and evaluated further. The supply sources of documentation may come from the Povincial Project Managment Unit (PPMU), Department of Agriculture & Rural Development (District), Provincial Natural Resources and Environment Division (district), Provincial Statistical Office of Quynh Luu district, and Ngoc Son Commune - affected and benefited from the Khe Gang subproject.

(ii) *Random sample survey*: to collect information from a large number of affected people through the questionnaire interview with specific questions served for statistical analysis. The survey results will provide the basis for other evaluation studies as they help collect important data about the implementation issues or specific indicators from a sample.

This method requires a sampling strategy (shown as below) to evaluate criteria before and after the existence of the Project.

(iii) *In-depth interviews and group discussions*: to collect general information, point of views on a particular issue or clarify an issue an issue from a small group of selected people as representatives of different viewpoints and various APs (the poor, ethnic minorities, severely affected persons, ...). Group discussion is a good method to collect the opinions of changes, assessment of quality of services provided and identify fields to be improved.

(iv) *Direct observation*: help timely obtain information and usefully complement to the data collected, better understand the context in which the information is collected and explain the survey results.

3. Research sample

Based on the basic design, the Consultant in cooperation with PPMU staffs and cadastral officials of project communes make a list of households affected by the Project in each commune. On the basis of the list of AHs provided by the locality, the Consultant selects randomly at a rate of at least 10% of the total number of households affected and not affected by the Project (including 100% of the households ten to relatively required the relocation) to be interviewed by questionnaire. Samples are selected to ensure gender ratio and ethnic minorities. The in-depth interviews and focus group discussions are selected from the survey and from those who provide key information at the provincial, district, communal levels and local people. Each discussion group consists of 6-8 people, 2 of which are female.

At the subproject of repair and upgrading of Khe Gang, Ngoc Son commune, Quynh Luu district of Nghe An province, the Consultant has carried out the following quantitative studies:

- In-depth interview: 1 leader of the PPMU
- In-depth interview: 1 leader of CPC
- In-depth interview: 1 Woman Union staff, 1 Fatherland Front staff, 1 Farmer Association staff
- Hold 04 group discussions with 56 representatives from affected households of Ngoc Son commune.

4. Organization and implementation of research

The Consultant has established a research team consisting of six key experts (including a team leader) and the fieldwork experts. The experts have collected the documents from CPO and Design Consultant related to the project for the purpose of studying. Besides, the questionnaire, provided by state consultant, are also used for the socio-economic survey at household level, guiding group discussions, in-depth interviews and forms which are used to gather secondary information at the provincial, district and communal levels.

5. Tools for information collection

Household Questionnaire: is designed consisting of nine parts: Part 1 - General information about households and households' members with the main indicator, namely age, gender, marital status, education, occupation and income; Part 2 – Properties of HHs; Part 3 – Income

and Criteria; Part 4 – Access to social services; Part 5 - Production activities, including the activities of agriculture, forestry and fishery, business / service, handicrafts; Section 6 –Some issues related to the project; Part 7 - Knowledge of infectious diseases, sexually transmitted infections and HIV / AIDS; Part 8 - Gender.

In-depth interviews and focus group discussions: Focusing on the issues of (i) rural infrastructure in surveyed localities, (ii) the impact of climate change on production and life and adaptability of local people, (iii) status of land use and its trends, (iv) access to clean water and sanitation in rural areas, (v) community awareness about the impacts of the use of chemicals in the production to the natural environment and natural habitats, and (vi) potential positive and negative effects of the Project to the people and mitigation measures.

Forms: have been designed to collect secondary information and data in provincies, districts and communes, including the key information and data about the natural land and land use planning of each locality, population and labor, ethnicity and support programs for ethnic minorities, socio-economic indicators (average GDP, GDP per capita, poverty rate, percentage of households using clean water and toilets, number of hospitals and clinics, educational situation), areas affected by drought and floods every year, average rice yield, volume of fishing and aquaculture, irrigation systems and rural transportation.

Appendix B2- PUBLIC HEALTH MANAGEMENT PLAN

1.Purposes:

- Better control adverse impacts and risks to public health in the subproject construction period.
- Proactively prevent diseases that arise in the subproject construction period while respond effectively with diseases.
- Enhance communication, education and health for the people, local authorities about the potential risk of diseases in the subproject construction period.

2. Contents of the Public Health Managment PLan

2.1. Control of the subproject construction locations

To protect human health and the environment, the construction area will be strictly controlled in order to reduce the entering of local people. Before the commencement of construction activities, the contractors shall take measures to maintain the security and control the entry at the construction site. The contractors will localize the construction areas; put flags on trees, shrubs and fix landmarks within the construction area to avoid any impacts, and the boundary to restrict the entry. The hazards of the construction areas include excavated and filled land, and machinery, therefore, only the construction workers will be allowed to enter. This information will be announced at the meeting and regularly repeated on the communal loudspeaker system.

2.2. Prevention of construction waste dump to outside

The construction waste should be collected and transported to the landfill area as identified prior to the construction. Waste transporting vehicles must be shielded to avoid spillage affecting the environment and the activities of local people leading to the community health problems.

2.3. Outbreak and spread of diseases prevention

- Prevent the kinds of diseases, especially infectious diseases have been ever appearedin the project area;
- Prevent the risks of spread of infectious disease or affecting community health from immigrant workers, and vice versa.

2.4. Prevention of personal injuries

- Workers directly involved in the construction must be equipped with protective clothing, masks, gloves, hard hats, cotton earplugs, etc. complying the current regulations on occupational safety. The dissemination of knowledge on hygiene, occupational safety for all workers should be taken.
- Control the entry of local workers entering the construction areas as mentioned in section 2.1.

2.5. Responding to the emergencies

Provide contact information: Contractors and localities should provide address and

telephone contact to local people in case of emergency. The road direction to the nearest medical facility should be provided.

Problems may occur during the sub-project construction include: car or construction machinery accidents, fire or environmental accidents (oil spill caused by malfunctioning machinery, broken waste tank of workers, ...).

In case of incidents, related people must immediately contact the address provided above. In case of accident, victims should be provided with first aids before he is taken to medical facility. In case of fire or other environmental incidents, it is necessary to localize the incidents and contact the relevant authorities for proper solutions.

In the event of natural disasters, such as earthquakes, floods, or other dangerous weather conditions, the contractors will cease all work activities and evacuate the workers to safety areas. The working areas will be shielded to keep out of chemicals, and machineries and vehicles should be tightened to avoid impacts to the community.

3. Location:

The planning and management of public health will be performed in Ngoc Son Commune and construction areas of Khe Gang sub-project.

4. Implementation period: Before and after the subproject construction period.

5. Methods of management and supervision

a. Management and supervision indicators:

- Number of labor accidents caused by the subproject construction;
- Number of traffic accidents caused by means of transports served for the sub-project construction.
- Number of times/ number of workers are ill, especially infectious diseases;
- Availability of the medicine boxes in camps;
- Number of employees are guided / trained on issues related to community health;
- Documentation guiding the first aid/ responding to the epidemic, accident used by contractors and deliver to workers.

b. Management methods

- Contractors will assign his work commander or a worker to take in charge of occupational safety and health for workers to monitor and support related issues.
- Contractors shall coordinate with the communal health centers, village health officials to timely update the disease situation in the localities or health problems of workers that may spread out.
- Contractors shall coordinate with local authorities, health centers to inform on issues related to the safety of people in the site construction or along construction materials/ waste transport road.
- The CPC / medical station should actively inspect the hygiene, safety at construction sites and workers' camps.
- The Contractor shall coordinate with CPC/ medical station to agree on a coordination mechanism in case of accidents or disease outbreak.

6. Management, monitoring and implementation agency

i) **Nghe An Agriculture and Rural sector Project Management Unit (PMU)**: The PMU will be responsible for overall monitoring of all project activities, including media planning, public health consultation. The issues related to the public health are also reflected in the Grievance Redress of the Project.

ii) **Communal authorities**: Communal authorities are responsible for all matters arising in the commune in general. Communal authorities will assign the Community Monitoring Committee to monitor the communication activities, the local consultation.

iii) **Communal Health Centers**: the CHC will manage, monitor, provide initial aid, report the public health problems in the commune. Therefore, the issues relating to public health will also be monitored, controlled and supported for these units.

iv) **Contractors**: The commander of the work will act on behalf of the contractors to collaborate with local governments to implement the communication activities, and consultations relating to the community health and workers.

7. Funding for the implementation

For contractors: Funding of contractors is included in the civil contract.
For health centers: There are no funding for these activities because it is the responsibility of the medical units to manage the public health.

Appendix B3- COMMUNICATION PLAN, HEALTH CONSULTATION WITH COMMUNITY PARTICIPATION

1. **Purposes:**
   a) Raise awareness for local people, the local governments/ workers in the project areas to understand the potential impacts on the community health during project construction;
   b) Help people understand how respond to issues relating to public health arisen during the sub-project construction.
   c) People are informed, and updated the project implementation schedules prevent diseases that may cause harm to the community during the sub-project construction.

2. **Subjects of communication, consultation**
   - People in the communes, especially in the project areas and villages/ villages where vehicles transporting construction materials travel.
   - Medical staffs in communes and villages;
   - Local authorities, officials of villages/ villages
   - Workers and officials of the construction sites
   - For the community, the participation of both men and women should be encouraged
3. **Contents of communication, community health consultation**
   - Kinds of diseases, especially infectious diseases are regularly found at the project sites;
   - Risks of spread of infectious disease or affecting community health from immigrant workers, and vice versa.
   - Risks of impacts to the public health due to noise, dust arising from the automotive, construction machineries; and from the waste dumps or wastes from worker camps;
   - Risks of accidents for people at the subproject construction site;
   - Risks of accidents to the community when the number of trucks transporting construction materials increase;
   - Risks of dam safety for farmers at the downstream.
   - Reporting mechanism, problems sharing related to the outbreak of epidemics or other safety issues to the people in the community.

4. **Time: Before and after the subproject implementation process.**

Approximately 1 month before the construction, the contractors will coordinate with local authorities to inform the community construction schedules as well as potential impacts related to public health.

5. **Locations:**

In project communes, priority is given to the sub-project construction areas.

6. **Methods of communication, consultation**

Communication activities, consultations are taken through the following main methods:

i) *Communication through communal loudspeakers*. Currently, Ngoc Son commune has a loudspeaker system in all villages. Most of the other media activities to the community is done through this method. Therefore, loudspeakers will be used to inform the people in the commune issues relating to public health arisen during the sub-project construction.

ii) *Community Meeting / Public Consultation*: This form will be implemented with the participation of workers in the rural communes of the Project; people in Ngoc Son where the sub-project is constructed and households along the road transporting of construction materials or disposal areas.

iii) *Communications integrated into activities of mass organizations or authorities:* the authorities often hold meetings with communal officials and the mass organizations in the village each month, therefore, the content of communications can integrated into these activities.

7. Implementers:

a. Before the project is implemented:

The Safeguard Policy Consultant will perform the communications, public consultation on safety policy issues in general, including public health.

b. During the project implementation:

The PMU, the Contractors will collaborate with local authorities and CHCs under construction and implementation of communication activities according to the aforementioned methods.

8. Implementation monitoring

The communication and community consultation plan relates to the participation and monitoring of the following units:

i) **Nghe An Provincial Project Management Unit:** The PPMU will be responsible for overall monitoring of all project activities, including communication, public health consultation plan. The issues related to the public health are also reflected in the Grievance Redress of the Project.

ii) **Communal authorities**: Communal authorities are responsible for all matters arising in the commune in general. Communal authorities will assign the Community Monitoring Committee to monitor the communication activities, the local consultation.

iii) **Communal Health Centers**: the CHC will manage, monitor, provide initial aid, and report the public health problems in the commune. Therefore, the issues relating to public health will also be monitored, controlled and supported for these units.

iv) **Contractors**: The commander of the work will act on behalf of the contractors to collaborate with local governments to implement communication activities, and consultations relating to the community health and workers.

9. Implementation fund

The fund will be carried out mainly in the construction and construction preparation periods. Funding is shown the in following table:

No.	Activities	Unit price (VND)	Time	Amount
1	Public consultation before construction	500.000	1	500.000
2	Consultation / community meetings during construction. Expected quarterly	500.000	4	2000.000
3	Loudspeakers of the communes. Estimated 2 times/ month x 12 months	100.000	24	2.400.000
	Total			**4.900.000**

Appendix B4- GENDER ACTION PLAN

From the above analyses of gender, a gender action plan is needed to facilitate the full participation of women in the project construction stage, providing new opportunities for women to boost their income, without increased burden on their lives, and contributing to the enhancement of women's role and status in the project area. The objectives of this plan include:

(i) The local contractors will employ at least 30% of female workers in maintenance, construction and repair works;
(ii) For a similar type of work, female workers should be paid as much as male workers;
(iii) Safety conditions must be equal to both men and women;
(iv) The local contractors will not use child labor;
(v) The use of local labors is encouraged and the establishment of labor camps will be avoided;
(vi) The Women's Group and Union will be consulted about the design of subprojects;
(vii) Training on gender mainstreaming will be provided for national, provincial and local authorities (i.e. PMUs, and other stakeholders);
(viii) Training and capacity building is provided for women to engage in public decision-making and sub-projects in a way that makes the most sense (i.e. training in participation, negotiation skills, marketing skills, mathematics and literacy);
(ix) The involvement of women in project study tours is ensured.
(x) The agricultural extension services aimed at women are designed and delivered to women;
(xi) The awareness enhancement campaign on HIV/AIDS will be launched before the start of civil works. PMU is responsible for monitoring and reporting of GAP key performance indicators, including the participation of women, target works and trainings, and HIV prevention campaigns;
(xii) At least one woman shall be involved in the Supervision Board of a commune (about 1/3 of the members).

The Project's Gender Action Plan

Achievements	Tasks and Indicators	People in charge	Period
Achievement 1: Improvement of dam safety and irrigating conditions.	The contractors shall prioritize unskilled labor (through subcontracting); at least 30% of the total labor force is local unskilled ones; Among this 30% local labor, female workers shall be prioritized; Male and female labor will receive the same wages for the same type of work; The Contractors shall not employ children; Those locals wish to work for the project shall register at their villages/villages. Then, these registrations shall be provided by the Head of the villages and	PMU/Project Coordinator shall ensure the record of these terms in the Contract; the list of registered labor shall be submitted by communal officials the Contractor; Communal officials shall ensure the achievement of the targeted objectives. The communal women group shall ensure the involvement of local	During construction stage

Achievements	Tasks and Indicators	People in charge	Period
	communes to the Contractors for selection in favour of poor and vulnerable households.	female workers in the Project.	
Achievement 2: Enhancement of people's capacity to make advantages of the Project	At least 30% of women shall participate in agricultural extension courses.	Staff of Provincial PMU, District staff, Communal staff.	During construction stage
Achievement 3: Enhancement of awareness on potential social evils of vulnerable objects, especially women and ethnic minorities	Programs on HIV/AIDS and human trafficking. Programs on community-based risk mitigation. Information about risk mitigation will be transferred to the communes and villages affected by the Project using the participatory approach with a focus on the poor and vulnerable households (e.g. ethnic groups, households headed by women, households with elderly and disabled people). The documents and information should be appropriate in terms of language, culture and gender, and especially translated into ethnic languages in the region; Women's Union, the representative of Centre for HIV/AIDS prevention and communal staff shall give training to communicators in each commune/village in the project area. The programs will be implemented at the communes and villages by two communicators (village chief and one member of the Women's Union). The program will be implemented in the villages and on market-days through distribution of project/program materials and use of loudspeakers	The Provincial and Communal Women's Union shall organize and host the program (training and preparation of materials) in collaboration with the district/communal health center. The Village's Women's Union shallpopularize and communicate information. The district/communal Health Centers shall support the communal Women's Union. Project coordinator shall provide local and international gender experts and specialists on Ethnic Minorities. Gender experts and specialists on EM shall review existing materials and supplement the required ones for the Program.	Monthly, before and during construction stage
	Program on risk mitigation during project construction	PMU The Contractor	During construction

Achievements	Tasks and Indicators	People in charge	Period
	stage: PMU and the contractor will coordinate closely with the health services in communes and districts to implement programs on awareness enhancement and education on disease prevention, diagnosis and treatment for laborers. All programs and documents are built with integration of gender issues, including vulnerability and needs of men and women. The Contractor shall: Implement awareness enhancement programs workers and communities, including education and communication on HIV infection and preventive measures. Provide free consulting services and encourage employees to do HIV tests so that they all know about their health status. Support the access to health services and encourage HIV-infected patients to admit their status; Provide medical equipment (free condoms) for workers in the camps;	Local Health Centre Communal staff The Women's Union shall perform general coordination for better HIV prevention.	stage.
Project Management	Guidelines on Gender and Development and Education shall be provided for PMU staff, local agencies and Contractors. All capacity enhancement activities shall include the involvement of women and ethnic minorities.	- Project implementation consultant - PPMU	During design and initial implementation stages

Appendix B5- GRIEVANCE REDRESS MECHANISM

1. Complaints relating to any matter of the Project will be settled through negotiations aimed at achieving consensus. The complaint will pass through three stages before it can be filed to the court. The Enforcement Body will incur all administrative and legal fees relating to complaint handling.

2. The complaints relating to the Project shall be settled in compliance with Article 138 of the Land Law 2003; Article 28 of the Law on Complaints; Article 63 and 64 of Decree No.84/2007/ND-CP; Clause 2 of Article 40 of Decree No.69/2009 and regulations on complaints in Decree No.75/2012/ND-CP dated 20/11/2012. According to Clause 2 in Article 138 of the Land Law 2003 and 2013:

3. In case of complaints against administrative decisions and administrative actions on land management first settled by the Chairman of the People's Committees of districts, towns and cities under the province, without contentment of the complainant, the complaints can be filed to the People's Court or appealed to the Chairman of the People's Committees of provinces and centrally-run cities. In case of appeal to the Chairman of the People's Committees of provinces and cities under central authority, the decision of the Chairman of the People's Committees of provinces and cities under central authority is the final one.

4. In case of complaints against administrative decisions and administrative actions on land management first will be settled by the Chairman of the People's Committees of districts, towns and cities under the province, without contentment of the complainant, the complaints can be filed to the People's Court.

5. The time limit for complaints against administrative decisions and administrative actions on Land Management is thirty (30) days after the date of receipt of the administrative decision or being informed of that administrative decision. Within 45 days from the date of receipt of the first complaint resolution decision, the complainant, if disagree, can make an appeal to the state authority or the People's Court.

6. In terms of complaint settlement, in Law on Complaints, Article 14: Rights and obligations of the person competent to settle first-time complaints:
The person competent to settle first-time complaints should:

iii. Ask the complainant, relevant agencies, organizations and individuals to provide information, documents and evidence within 07 days of the request as a basis for complaint settlement;
iv. Determine to employ or cancel the emergency measures as defined in Article 35 of this Law.

7. The person competent to settle first-time complains should perform the following obligations:

(i) To receive the complaint and issue a notice in writing to the complainant, agencies, organizations, or individuals entitled to appeal and the state inspection agencies at the same level of acceptance of resolving complaints against administrative decisions and actions;
(ii) To settle the complaints against administrative decisions and actions if required by the complainant;

(iii) To open a dialogue with the complainant and agencies, organizations and individuals concerned;
(iv) To decide complaint settlement and be responsible before the law for settlement results. In case of complaints from authorized agencies, organizations and individuals, the results shall be notified to agencies, organizations and individuals in accordance with law;
(v) To provide information, documents and evidence relating to the complaint for the complainant when they are required by the complainant for second-time settlement or appeal to the People's Court.
(vi) To compensate for first-time settlement and damages due to administrative decisions and actions in accordance with regulations on the State responsibilities.
(vii) The person competent to settle first-time complaints should perform their rights and obligations as stipulated by Law.

8. In terms of announcement of complaint settlement decision: In Article 12 of Decree No.75/2012/ND-CP dated October 3rd, 2012 of the Government detailing the implementation of some articles of the Law on Complaint.

9. Within 15 days from the date of decision of complaint settlement, the person competent to settle the complaint for the second time shall announce the complaint settlement decision by one of the forms specified in Clause 2 in Article 41 of the Law on Complaints.

10. In case of announcement at a meeting, the attendees of the meeting must include: the person issuing the complaint settlement decision, the complainant or their representatives, the person subject to complaint and agencies, organizations and individuals concerned. Before conducting a public meeting, the person competent to settle complaints must send a notice to agencies, organizations and individuals involved 3 days in advance.

11. The announcement of complaint settlement decision shall be made on the mass media (television, radio, printed and electronic newspaper). If the agency of the person competent to settle complaints has their own portal or website, the complaint settlement decision should be made public on this portal or website. The minimum number of announcement is 02 times on radio, television, and printed publications. The period of announcement on electronic publications, portals or websites should be at least 15 days from the date of notification.

12. In case of notice at the office or the Reception Room of agencies and organizations competent to settle complaints, the period for the notice of complaint settlement decision to be posted up is at least 15 days.

13. The procedure for complaint settlement consists of 4 stages as below:

14. The first stage in the Communal People's Committee: Households affected can file their complaints to any member of the CPC, possibly through the village chief or directly to the CPC in writing. The mission of the CPC officials or village chief is informing the entire CPC the complaint. Then, the CPC will hold a private meeting with the households affected and sign the complaint decision within 10 days. The CPC secretary shall be responsible for compiling and filing documentation of all complaints handled by the CPC. The duration of first-time settlement of complaints shall not exceed 30 days from the date of signing the complaint decision; for complicated cases, this period could be extended but not exceed 45 days from the date of receipt of the complaint. In remote regions difficult for travelling, the time limit for complaint settlement is no more than 45 days from the date of acceptance; for complicated cases, this period could be extended but not exceed 60 days from the date of

acceptance (according to Article 28, Law No.02/2011/QH13 dated 11/11/2011). If the complaint is not resolved for the first time or the complainant is not content with the settlement results from the date of receipt of the first-time settlement decision, they have the right to file the complaint for second time to the People's Court or the District People's Committee.

15. The second stage in the District People's Committee: According to Article 63 of the Decree No.84/2007/ND-CP of the Government, the procedure for complaint settlement against administrative decisions and actions of the Chairman of the District People's Committee is: (i) Within ninety (90) days from the date of issuance of administrative decisions and actions by the Chairman of DPC regarding land management stipulated in Article 162 of Decree No.181/2004/ND-CP that people of relevant rights and obligations disagree with, complaints can be filed to the DPC; (ii) the Chairman of the DPC shall settle the complaint within the period of 30 days from the date of signing complaint decision. In remote areas difficult for travelling, the duration for settlement is no more than 45 days from the date of acceptance; for complicated cases, this period shall be expended but not exceed 60 days from the date of acceptance; (iii) The settlement decision of the Chairman of the DPC shall be publicly available and sent to the complainant and other people of relevant rights and obligations; (iv)Within forty-five (45) days from the date of receipt of the settlement decision of the Chairman of the DPC that the complainant does not agree with, the appeal can be filed to the People's Court or the provincial People's Committee. The time limit for appeal may be longer, but not more than 60 days from the date of receipt of the decision for complex cases. In remote areas difficult for travelling, this period is no more than 60 days from the date of acceptance, and no more than 70 days for complicated cases (according to Article 37, Law on Complaints No.2/2011/QH13 dated 11/11/2011); (v) The body accepting the complaint shall record this in the Complaint Settlement Logbook.

16. The third stage in the Provincial People's Committee: The procedure for complaint settlement against administrative decisions and actions of the Chairman of the Provincial People's Committee is (i) Within thirty (30) days (or 45 days for complicated cases) or within 45 days for remote areas (or 60 days for the complicated cases) from the date of issuance of administrative decisions and actions by the Chairman of the PPC regarding land management stipulated in Article 162 of Decree No.181/2004/ND-CP that people of relevant rights and obligations disagree with, the complaint can be filed to the PPC; (ii) The Chairman of the PPC shall settle the complaint within the time limit stipulated in Law on Complaints; (iii) The complaint settlement decision of the PPC shall be publically available and sent to the complainant and other people of relevant rights and obligations; (iv) Within forty-five (45) days from the date of receipt of the settlement decision from the Chairman of the PPC that the complainant does not agree with, the appeal may be filed to the People's Court. The time limit for appeal may be longer but not more than 60 days from the date of acceptance for complicated cases. In remote areas difficult for travelling, this period shall not exceed 60 days from the date of acceptance, and 70 days for complicated cases; (v) the body accepting the complaint shall record this in the Complaint Settlement Diary.

17. The final stage, the arbitration by the Court: Within forty-five (45) days from the date of receipt of the settlement decision by the Chairman of the PPC that the complainant is not satisfied with, an appeal shall be filed to the People's Court (according to Article 64 of Decree No.84.2007/ND-CP). During the processing time, the land acquisition decision is still implemented. If the state authority handling the complaint concludes that the land acquisition is unlawful, the state agency issuing land acquisition decision shall cancel their decision and make compensation for damages (if any) caused by land acquisition decision. If the land

acquisition is considered as lawful, the person being acquired land shall abide by the decision. Within 30 days from the trial date, the Council on Resettlement and Compensation shall pay the affected households the amount specified by the Court. If the land acquisition is concluded as legal by the Court, the person with acquired land shall comply with the decision (according to Article 54 of Decree No.84/2007/ND-CP).

Appendix B6- DESCRIPTION THE PREPARATION ACTIVITIES INCLUDING ORGANIZATION, INSTITUTION, MONITORING and assessment activities

Table B6.1: ESMP implementation arrangement

Organization	Role and responsibility		
	Subproject's preparation	Subproject's construction	Subproject's operation
CPO	Guiding the policy safety staffs of Project Management Board of province during the period for preparing Environmental and Social Impact Monitoring Report Review and contribute the ideas for report submitted by Provincial Project Management Board	Guiding the staffs of provincial Project Management Board in performing Environmental management plan during the construction period; Supervising the progress of project during construction stage; Assembling 6months report on environment from provincial Project Management Board;	Guiding the policy safety staffs of Provincial Project Management Board in Environmental management plan in the first operation year; Supervising the progress of project during the first operation year; Assembling Reports on environment from Provincial Project Management Board;
Provincial People's Committee	n/a	Project Owner has highest responsibility on environmental activities during construction time;	Project Owner has highest responsibility on environmental activities in term of the performance of ESMP during operation period ,
Provincial Project Management Board	Hiring consultant and take the general responsibility on preparation ESIA and submit for approval; Guarantee the officers must be trained completely in environmental issues;	Taking the responsibility on implementing ESMP in pre-construction and construction periods; Guarantee the detail of contract and bidding documents including environmental requirements; Conducting the investigation and supervision environmental issues during	Taking the responsibility on implementing ESMP in the first operation year; Conducting the investigation and supervision environmental issues in the first operation year; Assist project owner in giving out environmental requirements in

Organization	Role and responsibility		
	Subproject's preparation	**Subproject's construction**	**Subproject's operation**
		construction time; Coordinating Environmental Monitoring Report to CPO;	**operation procedure and maintenance project;**
District People's Committee	**Approve Environmental protection Commitment (CEPs) of subproject in accordance with legal regulations of Vietnam Government;**	**Supervising the implementation of ESMP via their internal supervision system;**	**Supervising the implementation of ESMP via their internal supervision system;**
Community Supervision Board and the other members of local community (CSBs 2)	**Participating in consultation activities and determination, preparation for subproject; Ability to contribute the ideas to environmental assessment document when it has been introduced to them;**	**Participating in environmental supervision activities according to the laws of Vietnam and joint in training courses.**	**Participating in environmental supervision activities according to the laws of Vietnam and joint in training courses.**
Construction Supervision Consultant	**n/a**	**Undertaking training courses on environment for Supervision consultant staffs Participating in environment supervision according to approved ESMP in ESIA Preparing monitoring report and submit to Provincial Project management Board**	**n/a**

[2] CSBs, has been established according to Decision 80/2005/QD-TTg dated 18/04/2005 of Prime Minister on promulgating investment supervision regulation of community. Item 8 of Decree 80/2006/NĐ-CP provides for community monitoring chance the conformity, implementation supervision and investment result assessment in commune including environmental impacts.

Organization	Role and responsibility		
	Subproject's preparation	**Subproject's construction**	**Subproject's operation**
Construction Contractor	**n/a**	**Preparing the detailed plan on environment monitoring on the field to meet ESMP requirements of subproject; Apportion sources sufficiently to meet compulsory requirements and regulations of ESMP on the field;**	**n/a**

Table B6.2: Environmental Supervision Plan

Mitigation measures	Parameters	Location	Method	Frequency	Responsibility	Expenses
Pre-construction period						
Implementing Resettlement Action plan	**The number of affected households has been compensated Complaint arising relating to compensation and benefit**	**Affected area**	**Observation**	**Monthly or having the complaint from affected households**	**Provincial Project Management Board**	**A part of RAP expenses**
Construction period						
1.1. Control water quality	**Turbidity Measuring the volume of oil, odor and other waste water. Rubbish on the flow**	**Khe Gang reservoir and other flow near construction site**	**Observation, interview**	**Weekly after heavy rain or when having the feedback of local people**	**Contractor**	**Involved in contract**
1.2 Minimizing dust arising	**The number of concentrated dust**	**At the nearest residential area and Construction area**	**Survey, interview**	**Monthly or when having the feedback of local people**	**Contractor**	**Involved in execution contract**
1.3 Minimizing noise arising	**Noise level**	**- At the nearest residential area (Village 1) Construction area**	**Survey, interview**	**Monthly or when having the feedback of local people**	**Contractor**	**Involved in execution contract**
1.4 Traffic safety	**The number of accident and accident reason The slow traffic time that affected by construction**	**- The road near residential area**	**Survey**	**Weekly or when having the feedback of local people**	**The local road management agency**	**Involved in execution contract Local budget**
1.5. Solid waste management	**Clean level of tents The volume of rubbish**	**Worker's tent**	**Observe**	**Monthly or when having the feedback of local people**	**Contractor**	**Involved in construction contract**
1.6 Asset management	**Complaint of local people relating to construction**	**Worker's tent The residential area**	**Survey, interview**	**Weekly**	**Contractor**	**Involved in construction**

Mitigation measures	Parameters	Location	Method	Frequency	Responsibility	Expenses
	activities of workers	**near construction site/tents**				**contract**
1.7. The health and safety of local residents	**The number of labor accident at construction site The number of work postponed due to accident or disease**	**Construction site; Construction site near residential area (Village 1 and Village 3, where having material transport lorries go through)**	**Observe and interview**	**Monthly**	**Contractor**	**Involved in construction contract**
1.8. Construction rubbish management	**The volume of dug soil The volume of reused dug soil The volume of dug soil has been moved to dumping yard The amount of material and other waste from construction site Rubbish from worker's tents**	**Construction site Worker's tent Dumping yard**	**Survey or interview**	**Monthly or when having the feedback of local people**	**Contractor**	**Involved in construction contract**
Operation period						
2.1 Risks on dam	**The leakage points of dam The number of dam break/overflow**	**Whole dam**	**Observe and interview**	**6 months/time**	**Operation management unit**	**State's budget**
2.2 Landslide in flood season	**Number of landslide places Frequency of landslide**	**Whole dam**	**Observe and interview**	**Monthly or when having the feedback of local people**	**Operation management unit**	**State's budget**

Table B6.3: Monitoring and Reporting system

Project's Stage	Type of report	Frequency	Responsibility	Agency receives report

Project's Stage	Type of report	Frequency	Responsibility	Agency receives report
Execution	**Report on implementing ESMP presents environmental activities on the field complies rightly with ESMP and supervision results**	**Monthly**	**Construction contractor**	
	Report on ESMP implementation of Construction Supervision Consultant present clearly activities comply rightly with ESMP and supervision results. The report includes (i) the main impacts during construction period (ii) propose the measures to minimize adverse impacts (iii) Assessment the result of performance measures to minimize adverse impacts to environment and social of construction contractor (iv) The results of problem solving and measure to overcome shortcomings from last report; (v) Proposing activities for minimizing environmental for the next construction period	**Monthly**	**Construction Supervision Consultant**	**Project Management Board**
	Report on environmental activities of subproject present clearly activities comply rightly with ESMP and supervision result	**6 months/time**	**Provincial Project Management Board**	**CPO and WB**
	The subproject's environmental report presents all environmental activities and conformity to ESMP	**When the subproject finished**	**CPO**	**WB / MONRE**
	Independent monitoring report on Environmental and Social Safety states the following contents: (i) Supervision result of construction scene; (ii) Community based Supervision result; (iii) Synthesis supervision results of execution supervision consultant; (iv) Result of environment monitoring and (v) Assessment results implementing ESMP and recommendation.	**6 months/time or 3 months/time**	**Independent Environmental Consultant**	**Subproject Management Board and WB**
Operation	**Implementation report ESMP: Present clearly activities conform to commitment on ESMP of subproject during operation time**	**6 months/time in the first 02**	**People's Committee of Yen Son**	**CPO and WB**

Project's Stage	Type of report	Frequency	Responsibility	Agency receives report
		operation years	**district**	

Appendix B7- CHANCE FIND PROCEDURE

This Chance Find Procedure shall be provided to the Contractor as part of the contract documents. A copy shall also be kept by the sub-project contract manager/administrator.

If the Contractor discovers archaeological sites, historical sites, remains and objects, including graveyards and/or individual graves during excavation or construction, the contractor will carry out the following steps:

1. Stop the construction activities in the area of the chance find

2. Delineate the discovered site or area

3. Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the National Culture Administration take over

4. Notify the supervisory Project Environmental Officer and Project Engineer who in turn will notify the responsible local authorities and the Culture Department of Province immediately (within 24 hours or less)

5. Responsible local authorities and the Culture Department of Province would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by the archaeologists of National Culture Administration. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values

6. Decisions on how to handle the finding shall be taken by the responsible authorities and Culture Department of Province. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage

7. Implementation for the authority decision concerning the management of the finding shall be communicated in writing by relevant local authorities

8. Construction work could resume only after permission is given from the responsible local authorities or Culture Department of Province concerning safeguard of the heritage.

9. Implementation for the authority decision making to the management of the finding will be communicated in writing by relevant local authorities

Adopted as part of Sub-project safeguards:

by: _____

Date:_____

PMU Manager/Subproject Manager