NGHE AN PROVINCIAL PEOPLE'S COMMITTEE DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT

VIETNAM DAM REHABILITATION AND SAFETY PROJECT (WB8)

REPORT ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) SUBPROJECT: REPAIR AND IMPROVEMENT FOR SAFETY OF KHE SAN RESERVOIR – NGHE AN PROVINCE

Nghe An, 05/2015

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REPRESENTATIVE OF THE PROJECT OWNER

Nghe An, 5/2015

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EXCUTIVE SUMMARY

1. The "Repair and Upgrading of Khe San 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 1,800 people within the immediate downstream of the dam and the protection of 650 ha of agricultural and natural area, and downstream infrastructures particularly community buildings; (iii) to ensure stable water souce for irrigation of 120 ha of rice 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. Khe San reservoir is located in Quynh Thang commune, 80km far from Nghe An city in the south. The reservoir was built in 1980. The catchment area of the reservoir is of 5.2 km^2 , water volume of $1.47 \times 10^6 \text{ m}^3$. The headwork cluster and auxiliary works of the Khe San reservoir consist of following categories:

Dam: It is homogeneous earth dam with the height from 8.0-15m, crest length of 389 m. Crest elevation is at +44.5m; width of 2.6-3.2m;

Spillway: It is an earth and broad-crested free spillway, 23.6m in width.

Water intake: Construction of new water intake to replace the old one was broken. New water intake is F500 steel pipe and is covered by concrete M200. It is located 12m far from the old.

Management and operation route: (i) Route to Khe San from raw pineapple road: current surface of this route is earthen, width is of 1.0-1.5m; It is steep slope and slip in rainy season, difficult to travel.

3. The current state of the dam does not guarantee safety. Over the 36 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 (100m from 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 1,800 people within the immediate downstream of the reservoir, producing rice on 650 ha of land. A provincial road (598) pass through the area and serve as the life-line connecting the north of Nghe An with to the districts (Quynh Luu). 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 Quynh Thang Commune.

5. *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 79.6m² floor area management house, and the rehabilitation and upgrading of the existing management road. Sufficiently detailed plans for the sub-project repair works and their implementation have been prepared and served as the basis for this ESIA.

6. *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.

7. *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 120 ha of rice paddies, vegetables plots and aquaculture ponds, and supple ment 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.

8. A survey of the area indicates that about 1.42 hectare will be permanently used by the subproject and about 1.0 hectare will be temporarily used during construction (The land is owned by the People's Committee of the Quynh Thang Commune). 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 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. 9. The other impacts associated with construction activities include: possible land degradation within the vicinities of the construction and quarry sites due construction spoils, boulders, materials and rubbish; increased concentration of particulate matter (mostly dust); elevated noise; increased sedimentation and turbidity of surface water; traffic disruptions; 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 part of this ESIA to address these impacts. The ESMP requires as 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 the preparation of Emergency Preparedness Plan as Dam Management Unit and 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 project completed, the operation organization will take responsibility of maintenance and periodic inspection project's works.

12. **Budget allocation**: Both ODA fund and Counterpart fund of Vietnam Government are used for sub-project investment. Total budget estimation is: **43,577,164,000** VNĐ. Budget for ESMP implementation including: Implementing ESMP: 626,000,000 VND; Implementing ESMoP: 436,735,000 VND.

PART 1. INTRODUCTION

The "Rehabilitation of Khe San 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

The following methods were used:

1.1.1 Environmental Impacts Assessment Methods

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 4. Samples of soil, water after taking were preserved and delivered to the standardized laboratory of the Institute for Water and Environment 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 San 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 Quynh Thang 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 Quynh Thang 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 Sam reservoir and leaders of Quynh Thang commune, households benefited from the supply of water from the reservoir.

Group Discussion Method: Consultants have been working with the leaders of Quynh Thang 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, demand assessment 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

Joint Venture: Centre for Environment and Development & Institute for Water, and Environment

* Center for Environment and Development

Add: $N^0 122 - Le$ Hong Phong street – Vinh city – Nghe An province

Tel: 038.3560532/038.3838721

✤ Institute for Water, Irrigation and Environment

Add: $N^0 2/165$ –Chua Boc streets – Dong Da district – Hanoi city

Tel: 04.35634809

TT	Name	Experience	Position in ESIA implementing
1	Duong Thi Kim Thu	Planning specialist	Team leader
2	Hoang Thi Hoai Thu	Gender & Social specialist	Member
3	Phi Thi Hang	Resettlement specialist	Member
4	Le Phuc Hiep	Community Development specialist	Member
5	Nguyen Thi Xuan Thuy	Minority specialist	Member
6	Ngo Truc Nha	Ecology specialist	Member
7	Nguyen Nghia Ky	Irrigation specialist	Member
8	Nguyen Dang Bang	Economic specialist	Member
9	Nguyen Quoc Son	Social specialist	Member
10	Bui Thi Ban Mai	Environmental specialist	Member

Table 1.1. List of staff

PART 2. SUB-PROJECT DESCRIPTION

2.1 Overview of sub-project

The Khe San reservoir was built in 1980 with funding assistance from the local Government. In 2001 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. Over the 36 years (1980-2015), 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 slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protective layer of grass graft downstream face has been slipping while the protecting th

2.1.1 Objective of the sub-project

- Securing the lives of 1,800 people, 650ha of land and infrastructure system downstream area of the project;
- Ensure stable and secure long-term for reservoir and dam;
- Stable supply of irrigation water for 120 ha of rice of Quynh Thang commune;
- Supply of drinking water for people and livestock and poultry;
- Contribute to improving people's lives, moisturizing forest fire prevention, regulate the climate and ecology of the region;
- Increased water table service for people living in the area, moisturizing, rehabilitation, environmental, forest fire prevention.

2.1.2 Sub-project owner

Department of Agriculture and Rural Development, Nghe An province.

Address: Nº 129, Le Hong Phong streets, Vinh city, Nghe An provinceRepresentative: Mr Ho Ngoc SyPosition: DirectorTel: 0383.835.993

2.1.3 Location of the sub-project

The work under the sub-project is conducted at Quynh Thang commune, Quynh Luu district, Nghe An Province (with the coordinates: 105056'35" East Longitude, 19026'41" North Latitude) as can be seen in the map below:



Location of sub-project

2.1.4 Total investment budget

Total i	nvestment bud	get for sub-proj	ect:	43,577,164,000 VND
In whi	ch			
_	- ODA: 39.219 billions VND (9		s VND (9	0%)
_	Vietnam:	4.358 billions	VND (10	%)
In whi	ch			
Cost of construction: 29,446,143,000 VND			43,000 VND	
_	- Cost of project management:		5	83,034,000 VND
_	Consaltancy c	cost:	5	,613,539,000 VND
_	Other cost:		4	75,136,000 VND
_	Cost of cleara	nce:	1,	,793,800,000 VND
_	Contingency of	cost:	5	,664,612,000 VND

2.2 The sub-project activities

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

Current status and Volume, Scale of items of the work and construction methods are shown in the following table:

No	Items	Parameters of current status	Parameters after repair
1	Reservoir	Parameters: -Area: 5.2 (km ²) -Voulume: 1.42 (10 ⁶ m ³) -Irrigation area: 120 (ha) of rice	Keep the current status
2 Dam Infilt face istone local prote long place		 <i>Parameters</i>: Homogeneous earth dam; largest dam height of 12m, length of 389m. The dam crest at the elevation of 44,5m; crest width of 2.6-3.2m; dam face coefficient: 2,5 to 3,0. <i>Current status</i>: Infiltration on the dam body. Upstream face is protected by dry stone but the stone had gone out and occurs some local protrusions. Downstream face is protected by grass, bush and through long use (35 years) has eroded many places. Infiltration occurs in some 	Keep the current location of dam, expansion dam face. Specifically as follows: width 5m dam face under current standards. <i>Upstream face</i> : Protection with reinforced concrete and stone. <i>Downstream face</i> : Remove the plant soil layer, Conduct the surface treatments where exposed to the new added earth layer. Apply the embankment with the parameters of the old roof; Reinforce by paved rock in the

Table 2.1. Volumes and scales of the items and construction methods

No	Items	Parameters of current status	Parameters after repair
		locations of dam body.	concrete frame and plant grass.
3	Water intake	 <i>Parameters:</i> D80cm; the upstream threshold elevation of +33.63m and downstream +35.05m <i>Current status:</i> The part of canal which is after water intake is filled, the water often overflows onto bunds and waste 	Build a new water intake from the old 12m towards the right shoulder of dam, steel pipe F500, M200 concrete cover opens with still downstream sewer flow and pressure control valves arranged upstream.
4	Spillway	Parameter: Entrance gate width: 23.6m <i>Current status</i> : Spillway has much deteriorated: Wall stone broken off by several sections, wall downstream erosion; Body overflow overflow is pragmatic, stone structure built of concrete cover	Keep the spillway location, expanding the current width to B=30m, build a wall overflow, digging canals extending downstream to ensure long-term safety when removing the design and test flood flow.
5	Management road	Parameters: Earthen road, length L = 150m, width of the road is 3m. <i>Status:</i> Steep, very slippery and difficult to walk during rainy season.	Designed according to the design standards of rural roads, type B (Concrete road, length $L = 150m$, 6 m foundation width of the road, pavement width of 3.5 m).
6	Management house	No	New house is located downstream from the left bank of the dam approximately 100 m. 1-floor with area of 79.6 m ² .

2.2.2 *The volume of construction works and transportation*

No	Items	Volume	Density	Weight (ton)
1	Excavated soil	37.789 (m ³)	1.450 kg/m^3	54.794
2	Excavated rock	27 (m ³)	1.600 kg/m^3	43

No	Items	Volume	Density	Weight (ton)
3	Filled soil	59.713 (m ³)	1.450 kg/m^3	86.583
4	Concrete	$2.408 ({\rm m}^3)$	2.200 kg/m^3	5.297
5	Formwork	13.839 (m ²)	77 kg/m ²	1.065
6	Steel	59.966 kg	-	59.966
7	Stone	307 (m ³)	1.600 kg/m^3	491
9	Rocks	4.523 (m ³)	1.600 kg/m^3	7.236
10	Sand	493 (m ³)	1.200 kg/m^3	591
11	TS40 fabric filter + bags asphalt load	7.40 (m ²)	2 kg/m^2	15
12	Brick	70 (m ³)	1.500 kg/m^3	105
13	Motar	997 (m ²)	1.800 kg/m^3	1.794

[Source: FS report]



Figure 2.2 Overall project and location of land mines exploited

Items	Location	Quantity (exploring capacity)	Distance to construction site, transport routes
Land mine	4A village, Quynh Thang commune	$30.000 - 50.000 \text{ m}^3$	200-500m
Rock mine	Purchased at Quynh Xuan commune	Ensure sufficient workload.	25km
Landfill	Village 7, Quynh Thang commune.	There is enough capacity to store all types of waste materials	200m
Construction materials supply	Cau Giat town, Quynh Luu district	Ensure sufficient workload.	25km
Regrouping sites of construction materials	On the left side of the dam	Area: 1000m ²	50m

Table 2.3. Estimated transporting stone and construction materials activities

^{2.2.3} The list of worker, machinery, and equipment for construction

Name	Name For use in		Capacity
Excavators	Work and material excavation	1	<=2,3m ³
Excavator bucket	Work and material excavation	2	<=2,3m ³
Foot compactor	Soil and concrete rammer reach the technical requirements	2	9T
Dump Truck	Soil, stone, material transportation	5	10T
Tilting car 5T	Material transportation	5	5T
Tandem drum vibrating roller	Rammer	2	25T
Concrete mixer	Mixing concrete in construction	3	500L
Stick vibrator	Concrete, dam rammer	2	1.5KW
Vibrating plate compactor	Concrete, dam rammer	10	1KW
Jumping Jack Compactor	Concrete, dam rammer	05	
Sprayer	Moisturising structures constructed	01	
Bulldozer (110 CV)	Levelling construction	03 + 01 back up	
Generator	Ensure electric for construction	2	75KW
Water pump	Foundation pumping	2	3/h

*All machinery and equipment are expected to be in a good working conditions as will be required under the contractors contract. [Source: FS report]

2.3 The construction timetable

Construction will be implemented within 10 months.

No	Items	Construction time	Start	End
1	Road for construction, camp, Regrouping sites of construction materials, house management	2	1/2016	2/2016
2	Water intake	3	5/2016	7/2016
3	Earthen dam (upstream and downstream face)	3	3/2016	6/2016
4	Spillway	2	6/2016	8/2016

The major items of construction are implemented in dry season. Therefore, the works related agricultural production is not affected much. In addition, the construction works such as water intake, spillway...require low water level in reservoir, the water should be get by pumping water into the channel in case of need.

PART 3. POLICY FRAME WORK, INSTITUTIONS AND REGULATIONS

Project Repair and improvement for safety of Khe San reservoir, Nghe An province will not affect to ethnic minority. No natural forest, reservation area, wet land and rare and precious animal and plant species in the project area is found. Impacts of the project mainly relate to natural environment due to activities during construction such as earth work, repairing work items, material and waste transportation, etc. and some impacts on social environment due to temporary and permanent land acquisition of 12 households. Policy framework, institution and regulation applied in ESIA of the project include:

3.1 Country environmental and social safeguard policies

a) Policy framework on environmental assessment

Law on environmental protection (2014) has defined the issues relating to strategic environmental assessment, environmental impact assessment and environmental protection commitments for development activities. Development of environmental impact assessment report is carried out simultaneously with the process of setting up an investment project (feasibility study report). Time of making, appraisal and approval of reports are specified in detail in Item 2 of Article no. 13 of Decree no. 21/2011/ND-CP. Environmental screening (type of environmental assessment for the project) is done according to the list of project types in Annex 2 of the Decree no. 18/2015/ND-CP.

<u>Environmental assessment</u>. In Chapter 4 of Decree No. 18/2015/ND-CP dated 14/02/2015, from Article 12 to Article 17 specifies the formulation, evaluation and approval of environmental impact assessment reports and the implementation of projects and measures to protect the environment before the official operation of the project and operational phases of the project. Article 12 of this Decree defines that during the implementation process of environmental impact assessment, project owners must conduct consultation meeting with People's Committees of communes, wards and townships (collectively CPC) where project will be carried out, organizations and communities directly affected by the project; study, receive objective opinions and right proposals of the consulted stakeholders in order to minimize the adverse impact of the project on natural environment, biodiversity and community health . Annex 2 of the Decree states that Environmental Impact Assessment must be done for the project to build reservoirs with the capacity of 100,000m³ and more.

<u>Environmental protection plan</u>. Chapter 5 of Decree No. 18/2015/ND-CP dated 02/14/2015, from Articles 18 and 19 defines the object to develop environmental protection plan is new investment projects. Projects to invest into expanding the scale, increasing the capacity of the production, business and services agencies are not subject to develop environmental impact assessment Report specified in Annex II of this Decree.

According to regulations of GoV, the project "Repair and improvement for safety of Khe San reservoir" will be performed report Environment Impact Assessment.

b) Policy framework for dam safety

Decree No. 72/ND-CP dated 05/07/2007 of GoV on dams safety management in Vietnam has defined construction, management and ensuring safety of the dams. According to this Decree, large dams are dams with height from 15 and or capacity of reservoir from 3 mil. m³ or more; medium dams are dams with height from 10m to 15 m or capacity of reservoir from 1 to 3 mil. m³ and small dams are dams with height from 5 to 10 m or capacity of reservoir from 50,00 to 1 mil. m³. According to this decree, the dam owner should have plan to operate the reservoir, sluices and related works, inspect and monitor dam safety and hydrological conditions, maintain and protect the dam, rescue dam, report dam safety, implement flood protection for downstream areas. All plans must be taken seriously. MARD is responsible for state management of dam safety management in the country. Ministry of Industry and Trade is responsible for State management of hydroelectric dams. PPCs are responsible for State management of reservoirs in the province. PPCs assign DARD to implement this function.

c) Policy framework related to land acquisition and resettlement

Land Law no. 45/2013/QH13 takes effect from 07/01/2014 and the decrees relating to land acquisition, compensation and resettlement applied in Vietnam and the provisions of the cities/provinces constitute the legal framework confirms the right of citizens on the land use rights and assets attached to land, land classification, land use origin, legal nature and legitimacy, classification of compensation and support types, regulations on land acquisition, compensation and resettlement, safety requirements for safety corridors of dam, reservoirs, irrigation works.

3.2 Applicable world bank safeguard policies

The provisions on environmental protection of WB are given in form of operational policies (OPs), which includes 10 policies, from which important policy relating to the environment is OP 4:01 on environmental assessment. Here is a summary of the WB's policy related to the sub-project:

Name	Objectives			
OP 4.01	• Ensure that the proposed project is sustainable and ensure environmentally			
Environmental	and socially.			
assessment	• Provide for the decision makers information about the potential risks of			
	environmental and social issues associated with the project.			
	• Increase transparency and participation of affected people in the decision			
	making process.			

 Table 3.1. Environmental safety policies of the WB related to the project

OP 4.37 Safety	The essential problem for the safety of dams in:			
of Dams	• The projects involve in construction of new dams			
	• The project may be affected by safety factors of operating an existing dam			
	or dams under construction			
	• The other important issues: dam height, reservoir capacity, suitability of			
	safety standards			
OP 4.12	• Avoid or reduce compulsory resettlement and the influence on economic			
Involuntary	activities, including loss of livelihoods			
Resettlement • Provide transparent compensation procedures in the c				
	acquisition process of land and other assets			
	• Provide adequately for people resettled new investment resources and			
	opportunities to benefit from the project (implemented through resettlement			
	plan)			
	• Restore and improve the living conditions of people affected by the project			
	• Compensation for affected people at replacement cost. The resettlement			
	planning and mitigation measures should be taken on the basis of			
	consultation with those affected and by the participatory approach.			

PART 4. BASELINE ENVIRONMENT AND SOCIAL CONDITION IN THE SUBPROJECT AREA

4.1 Natural environment

4.1.1 Geographic location of Khe San dam

As described earlier, the Khe San Dam is located in Quynh Thang 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 ³/₄ 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.

Quynh Thang Commune – Quynh Thang is one of the mountainous communes of Quynh Luu district. The East borders on Nghia Thuan and Nghia Hoi commune (Nghia Dan district); the West borders on Quynh Lam commune, the North borders on Tan Thang commune, the South borders on Quynh Chau commune. The total natural area is 3867ha. There are 24 villages with 7km total length and 3.5km width of commune. The population is 9010 people with 2030 households.

4.1.2 Climate and hydrology

4.1.2.1 Meteorology characteristic

- The Khe San reservoir catchment is located in the north central region, a monsoon tropical area under impacts of trade wind from the South of sub-tropical high pressure area along

the Northeast towards the equator. The area is also under the dominant influence of monsoon in the South East Asia. The climate in the reason is characterized by 2 distinct seasons: absolute low air temperature is observed during January and February when the monthly average temperature is $17 - 18^{\circ}$ C, the monthly temperature range is $8 - 9^{\circ}$ C. The highest annual average temperature is $(38 - 39^{\circ}$ C). The monthly temperature range is $9 - 11^{\circ}$ C which is often observed during August, September and October.

- The air humidity in the region ranges with annual temperature and rainfall. The highest average humidity are observed during February and March and the lowest average humidity are observed during June and July. The monthly average relative humidity is more than 80%.

- The evaporation in the region is high. The annual evaporation is as much as 614.1mm. The evaporation distribution is not even, highest in dry months and lowest in rainy season.

- The studied area has annual average rainfall of 1,560.8 month. Large rains are found during October and November, causing inundation for low land areas.

- Number of sunshine hours: the average sunshine hours is 1520.90 hours; the maximum hours are observed during May, June and July; least sunshine hours are observed during January and average during February and March.

- Wind: the average wind velocity in the project area is observed during annual September, October and November. The average wind speed is 1.7m/s.

4.1.2.2 Hydrological characteristics

Nghe An province has 7 river basins (with separate river mouths). The total length of rivers and stream in the province is 9,828 km, the average river density is 0.7 km/km^2 . The largest river is Ca river (Lam river) originates in Muong Pec district of Xieng Khoang province (Laos PDR) with a length of 532 km (361 km in Nghe An province). The river catchment in Nghe An is 15,346 km². Total annual water volume is 28,109 m³.

Khe San reservoir has a catchment area of $F_{1v}=5.2 \text{ km}^2$, total length of the mainstream is L=4.8 km, total length of branches is $\Sigma l=2.0 \text{ km}$.

The annual design flow $Q_P = 0.069 \text{m}^3/\text{s}$.

The flood flow is $Q_P=88.54$ m³/s, total flood volume is $W_P=1.64.10^6$ m³

4.1.3 Topography

Nghe An province is located in the North East of Truong Son range where the topography is complicated and divided by system of mountains and rivers leaning towards North-West and South-East directions. The highest peak is Pulaileng (at the elevation of 2,711m) in Ky Son district; the lowest land is the delta of Quynh Luu, Dien Chau, Yen Thành with some locations are as low as 0.2 m compared to the mean sea level. The reservoir catchment is approx. 5.20 km² and located in the low to average high mountainous areas. The natural elevations of the region is ranging from 40m to 100m. The beneficiary is located in the medium high mountain

and semi-mountainous area at the elevations of 20 - 30m. The water around the construction area will be drained taking advantage of the sloping shape of the topography.

The field geological survey found that the project area has 8 main formations upwards with predominant characteristics of precipitated sand containing some quartz pebbles and sandstone and cement grey colored and yellow-grey clay schist.

- *Hydrological geology:* the project area of Khe San reservoir has 2 auriferous complexes: one auriferous complex in the unconsolidated deposit and one auriferous complex in cracks of mother stone. Groundwater study in the project area did not see such erosion elements of Calcium and Magnesium. So water here is not concrete erosive and will not affect the repair an upgrading of the reservoir.

- *Physical geological phenomenon:* there are some collapsed points in the reservoir which is caused by the erosion of surface runoff, causing collapsing conditions on both slopes and this issue will affect reservoir sedimentations and in fact, Khe San reservoir is being silt up to some extents.

- *Geotechnical:* soil and sand layers along dams and sluices are evenly distributed and endurable under pressure. The landfill of dam body with 1a layer as the less and medium compacted soil structure that is permeable.

The flood spillway of Khe san dam is built at the mountainous strait on the left of the dam. Soil and sand layers along the flood spillway are evenly distributed; especially mother stone is exposed on the surface which is convenient for the stabilization of spillway foundation.

4.1.4 Geology

4.1.4.1 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 redgrey. It's half-hard structure and medium compactness. It's originated from alluvial (aQ).
- Layer 4: 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 from residue soil (deQ).

- Layer 5: Decayed rock completely to light and medium loam mixed grit and splinter, the rock core incompletely 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 5a: Strong decayed arenaceous rock, brown-grey and brown mixed whitegrey 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 5b: 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.

4.1.4.2 Geology of the Spillway

Layer 4: 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 from soil (deQ).

4.1.5 Water environment

The center for environment and development has coordinated with Labor Environment observation and analysis station to carry out survey, sampling and sample analysis in combination with other collected data to produce following results:

4.1.5.1 Surface water

Quynh Thang commune has 23 small and medium reservoirs supplying water for the entire cultivation lands of the commune, including Khe San reservoir serving the largest irrigation area which makes up more than half of rice cultivation land of the commune (120 ha out of 216 ha of rice). Up to 99% of local farmer are using dug well water and rain water for domestic uses and drinking.

Khe San reservoir with a storage capacity of more than 1 million m³ is an abundant water source for irrigation of 120 ha of cultivation land and domestic water supply as aquaculture for 9 downstream villages in Quynh Thang commune.

No.	Sample code	Location	Coordinate
1	NM1	In the reservoir on the side of flood spillway	N:19 ⁰ 15'50,5" E: 105°33'54,5"
2	NM2	In the reservoir near the intake	N:19 ⁰ 15'43,7'' E: 105°33'57,1''
3	NM3	Canal after the intake	N:19 ⁰ 15'46,7'' E: 105°34'01,8''

Table 4.1. Location of surface water sampling

The diagram of sampling locations for water environment quality analysis in Khe San reservoir is as follows:



Figure 4.1 Diagram of water sampling locations

The measurement and analysis result of water environment quality in the project area showed that the surface water environment quality parameters at the measurement time are within the allowable limit. The surface water quality in the project areas has not been polluted.

Danamatan	Unit	Results			QCVN 08: 2008/BTNMT
Parameter		NM1	NM2	NM3	(A2)
pН	-	6,5	6,6	6,9	6-8,5
Temp	⁰ C	26,3	26,7	26,4	-
BOD ₅	mg/l	4,5	4,5	5,0	6
COD	mg/l	9,8	8,5	9,1	15
DO	mg/l	6,9	5,8	6,6	≥5
TSS	mg/l	25	29	25	30
Amoni	mg/l	0,18	0,12	0,09	0,2
Р	mg/l	0,16	0,14	0,12	0,2
Ν	mg/l	3,3	2,9	2,8	5
As	mg/l	KPH	KPH	KPH	0,05
Hg	mg/l	KPH	KPH	KPH	0,001
Pb	mg/l	KPH	KPH	KPH	0,02
Cd	mg/l	KPH	KPH	KPH	0,005

Table 4.2. Results of surface water analysis

Denometer	I Init	Results			QCVN 08: 2008/BTNMT
Parameter	Umt	NM1	NM2	NM3	(A2)
Coliform	MPN/ 100ml	3.697	4.985	3.108	5000

4.1.5.2 Groundwater

In activities with geological survey, groundwater is contained in soil and stone layers and pebble layers. At present, 99% of Quynh Thang commune population are using groundwater for domestic activities and for drinking. They are using rain water for same purposes.

No.	Sample code	Location	Coordinate
1	NN1	Dug well of Ms. Ho Thi Hong's family beyond the dam foot	N:19 ⁰ 15'47,6" E: 105°34'01,0"
2	NN2	Dug well of Mr. Tran Duc Thuy's family beyond the dam foot	N:19 ⁰ 15'57,6" E: 105 [°] 33'59,6"

 Table 4.3. Locations of ground water sampling

The measurement and analysis result of groundwater environment quality in the project area showed that the groundwater environment quality parameters at the measurement time are within the allowable limit. The groundwater quality in the project areas has not been polluted.

Parameter	T Tre \$4	Resu	QCVN	
	Unit	NN1	NN2	09:2008/BTNMT
pН	-	6,3	6,2	5,5 - 8,5
Turbidity*	NTU	1	2	-
EC	s/m	25	23	-
DO	mg/l	4,7	5,1	-
TSS	mg/l	2,3	3,5	1500
Độ cứng	mg/l	65	58	500
Zn	mg/l	0,45	0,2	3,0
As	mg/l	KPH	KPH	0,05
Hg	mg/l	KPH	KPH	0,001
Pb	mg/l	KPH	KPH	0,01
Cd	mg/l	KPH	KPH	0,005
Coliform	MPN/100ml	KPH	KPH	3

Table 4.4. Results of ground water analysis

4.1.5.3 Factors affecting water environment

In general, water quality in the project area is good as there is no industrial zone or large urban area within the 30 km radius. Main impacting factors on water resources in the project area are:

- Pesticide and chemical fertilizers used in agriculture, yet their impacts is insignificant.
- Domestic waste from households and farm households: so far, there are 20 % of households having septic latrine and 5 livestock farms. Although these farms follow regulations on sewage treatment of livestock waste, this still presents an impact on water quality

 Dust and domestic waste: these sources of pollution present insignificant impacts on water quality due to garbage thrown onto banks of Ban reservoir.

4.1.6 Air environment

Environment of the project area is slightly affected only by dust from agriculture activities and simple means of transport and motorbikes. We can see that the air environment of the project area is good.

No.	Sample code	Location	Coordinate
1	KK1	In the South of the dam	N:19 ⁰ 15'51,4" E: 105 [°] 33'54,5"
2	KK2	In the North of the dam	N:19 ⁰ 15'42,8" E: 105°33'58,3"
3	KK3	Next to the road	N:19 ⁰ 15'47,0" E: 105°34'01,5"
4	KK4	Canals after dam	N:19 ⁰ 15'46,7" E: 105°34'01,8"

Table 4.5. Locations of air sampling

The measurement and analysis result of air environment quality in the project area showed that the air environment quality parameters at the measurement time are within the allowable limit. The air quality in the project areas has not been polluted.

 Table 4.6. Results of physical parameter analysis

Location	Noise	Temperature	Humidity	Wind speed	Vibration *
Location	(dBA)	(⁰ C)	(%)	(m/s)	(dB)
KK1	45	21.4	80	0.5-0.8	27
KK2	46	21.2	77	0.8-0.9	26
KK3	44	19.0	80	0.7-0.9	33
KK4	50	19.0	80	0.8-0.9	33
QCVN 26:2012/					
BTNMT	70	-	-	-	-
(from 6:00 to 21:00)					
QCVN 27:2010/					
BTNMT	-	-	-	-	75
(From 6:00 to 21:00)					

4.1.7 Soil environment

The sampling location in the South of the dam: at the coordinate of N:19⁰15'51,4" &E: $105^{\circ}33'54,5"$ ($\oplus 1$)

The analysis result showed that all analyzed soil sample parameters in the project area showed that the air environment quality parameters at the measurement time are within the allowable limit of Vietnamese specifications QCVN 03: 2008/BTNMT relating to soil environment quality. The soil environment in the project areas has not been polluted.

In sum, the air, surface water and groundwater environments in the project area are relatively good and not polluted by the urbanization and industrial zones. Some locations of water sampling in rivers and canals have Coliform and NH_4^+ contents exceeding allowable limit due to the effects of domestic and livestock waste, yet insignificant. Soils in the area have not been polluted by heavy metals and toxicants.

Parameter	Unit	Result of Đ 1	QCVN 03:2008/BTNMT
Cd	mg/kg	0,016	2
Pb	mg/kg	0,04	70
As	mg/kg	КРН	12
Zn	mg/kg	9	200
Cu	mg/kg	1,7	50

Table 4.7. Results of soil analysis

4.2 Biology environment

4.2.1 *Flora*

The project area does not have rich forest or natural forest; most of them are poor and medium rich forest; main plants are small and medium trees which are scattered distributed with a diameter of 10cm or less; most of these trees have 0.5m or less in diameter.

Regarding planting forest, Quynh Thang commune has mainly trees planted by local people, such as eucalyptus (for timber), Acacia (for timber), pine tree (for resin), and some bushes, grasses and fruit trees as bananas, guava etc....

Like in other areas planting paddy and upland crops, farmers in the project area practise rice intensification for a long time. The rice see pattern is changed by crop and proves to be more suitable to local soil and climate conditions. They are mainly rice varieties producing 0.40÷0.5 tons per ha planted during winter-spring and summer crops. Besides rice, other foodstuff trees are well developed, such as peanut and watermelons, pear etc.

4.2.2 *Fauna*

Forest animal: it is found through surveys that local people no longer see such precious animals in the area as tiger, dear, mountainous goat. Only reptiles (snake), amphibian (frog) and rodents are found (rats, porcupine).

Terrestrial fauna: birds like accentor, sparrow are popular. There are also rats, reptiles (snakes), amphibian (frog), and livestock as buffalo, cow, pig and chicken.

River fish: some species of high values such as turtle, shrimp are still observed sometime. However due to over-exploitation and capture, they almost disappear here. Only small shrimps and fishes are left, such as goby, mud carp etc.

Farmed fishes: local people raised fishes in reservoirs. They are mainly carp, tilapia, mud carp etc.

4.2.3 Sensitive area

There is no environmental protected area or important ecological system in the project area in Quynh Thang commune.

4.3 Economic-Social and cultural environment

4.3.1 Population conditions

It is recorded by Quynh Thang commune in 2013 that the total population of the commune is 8,889 in equivalent of 1,935 households. (Male: 4,000 and female: 4,889). The average family size is 4.6 people. The population density is 215 people per km². The population of labor age is 5,296 (making up nearly 60%), including male: 2,646 and female: 2,650. The labor beyond labor age (<16 and >60): 3,593 (making up more than 40%). The evaluation showed that the labor force in the commune is rather abundant who are mainly high secondary junior graduates; some are trained through vocational schools. They basically meet labor demands of agencies and enterprises in the commune.

- *Labor distribution in different economic sector:* In general, the key livelihood of local people in Quynh Thang commune is agriculture (>66%). The main agriculture production is two rice crops and one upland crop year round.



Figure 4.2 Labor structure in Quynh Thang commune

4.3.2 Socio-economic conditions

Socio-economic conditions in the commune: Quynh Thang commune is a mountainous commune with total natural area of 3.867 ha, covering 24 hamlets. In the past, Quynh Thang is a neglected region with only ethnic minorities living near streams and rivulets. So far, Quynh Thang commune has 24 hamlets (with more than 9,000 people) and 2 agriculture cooperatives of Dong Tam (covering 8 hamlets) and Tien Thanh (covering 13 hamlets). There are 3 hamlets: Dông Xuan, Quynh Long, Trung Tiến (Thai ethnic minority).

The economic growth rate in 2014 is 19.7% with the contribution of 60% from agriculture, forestry and aquaculture; basic construction 9.6% and service 20.6%.

Parameter	Result
Natural area	3,867 ha
Agriculture land	1,096 ha (28.35%)
Population	8,889 people
Raito of ethnic minorities	Kinh: 96.6%; ethnic minorities: 3.4%
Average annual income per capita	VND 17.9 million

 Table 4.8. Summary of basic information on socio-economic conditions

Source: Statistical data of Quynh Thang commune - 2014.

4.3.2.1 Infrastructure:

In general the rural infrastructure of Quynh Thang commune is not developed. There is such main road as Provincial road 598 with total length of 1.5 km across the commune; the road is 6 m wide built on grave aggregate and the roadway is 3.5 m (stretching from hamlet 1 to 6 and 7 of Dong Tam). The commune has inter-commune and commune road with total length of 21.1 km, including 15.2 km as degraded asphalt road. However this road is narrow and fails to meet technical specifications of Ministry of Transport. Inter-village roads are earth roads hindering travelling during rainy season as it becomes slippery and during dry season as it is covered with dust.



Figure 4.3 Main road of Quynh Thang commune

The commune does not have common infrastructure, however all villages have village cultural house where local people convene community meetings. All project related issues are shared and discussed in these meetings.

- *Electricity system*: The electricity supply system basically meet consumption demands of local people. Some locations receive weak electricity supply as they located end of the system during peak hours. The district electricity agency is in charge of this commune. The commune has 6 sub-stations with total capacity of 960 KVA. All of them are in good conditions (100%); new construction is required for 6 sub-stations with total capacity of 720 KVA. The medium voltage cables is 5 km long which is in good conditions (100%); a new 3 km of electricity line should be erected. The low voltage cables is 5 km long with 48.6 km need upgrading (100%.). Total electricity users is 1,772 households; the access to safe electricity supply in the region is 100% of households.

Water use and management of hydraulic works: water from Khe San reservoir is supplied to agriculture (key user) and to aquaculture (some aquatic species). It is surveyed that water in Khe San reservoir has never been depleted since its construction. At present, Khe San reservoir is being managed and operated by Quynh Thang Agriculture cooperative. This cooperative also managed all reservoirs and hydraulic works in the commune.

Safety of the reservoir: Khe San reservoir was built before 1980. After 35 years of operation, the reservoir has been seriously degraded. However no dam failure or unsafe condition has been observed which might have led to operation cease of the reservoir.

4.3.3 Cultural and social condition

Tangible and intangible cultural assets: Quynh Thang commune does not possess archeological area or cultural or historic relics. There are only some pagodas and temples and churches in the commune. None of them is located near the project are within 2km distance or on the transport way of construction materials or waste.

Religions: like other communes, the politic system of Quynh Thang has a full set of society unions as Women union, Youth union, veteran union, farmer union, elderly union, red cross union. Wide participation of women is observed in all these unions. Most of local people in Quynh Thang commune are Buddhists; few are Christians (5% of the commune population).

Health care: Quynh Thang is a commune meeting national standard relating to health care service. The commune clinic station has 1 doctor, 1 under-graduate doctor 2 physicians, 4 nurses and midwife. At present commune clinic station is planned to be a two story building with 10 rooms and a precinct of 4,280 m². The ratio of local people participating in different types of health insurance is 25%. The health care service meets new rural area standards.

Education: the coverage of secondary education: total pupils attending secondary education is 626/626, or 100% as planned. The ratio of pupils passing secondary education and

continuing to high secondary schools or vocations schools is 99- 100% annually. The ratio of rural labors who are trained and provided with vocational certificates (3 month certificate) is 7%. The commune provides 3 levels of education: kindergarten, primary schools and secondary schools. Total pupils in the commune are 1,388; total school area is 36,164 m²; 3/3 schools are of national standard.

4.3.4 Other social services

Gender and role of women: gender related activities in the commune are well implemented. There is no significant gender inequality observed in the commune. Big tasks in the family are often discussed and jointly decided by both women and men. Women often take care of household works. They also actively participate in social activities as movements or propaganda in the commune. Women's participation is observed in social unions and state agencies such as People's Committee, commune clinic station, schools. It is estimated that the ratio of women in social unions and state agencies is 30%.

Labors and employment: the seasonal migration for extra jobs is popular for both men and women, when women tend to work locally and men tend to work in other districts/provinces (mainly in industrial zones in the South or work as exported labors). As a result agriculture labors are mainly old and young people which should be taken into consideration by the project.

Family size: the family size of a female headed family is smaller than a male headed one, however this difference is in-significant (4.59 people vs. 4.91 people) (see below table):

Item	Average family size	Family size (%)			
		1-2 people	3-4 people	5-8 people	>9 people
Total samples	4.6				
Male headed households	4.91	29.7	37.3	32.5	0.5
Female headed households	4.59	28.6	26.9	26.5	18.0

Table 4.9. The average family size

(Source: Surveyed data in January 2015)

Income and poverty: The survey of all 5 income groups in female headed households and male headed households showed that the lowest income group (group 1) the households headed by female are more predominant than those headed by males (15.5% compared to 10.3%). This showed that the financial capacity of female headed households is far as good as those headed by males. Women are the disadvantaged in the project area.

Item	Income group					Total
	Group 1	Group 2	Group 3	Group 4	Group 5	
Male headed households	10.3	2.0	38.2	28.0	21.5	100.0
Female headed households	15.5	5.0	35.5	26.7	17.3	100.0

Table 4.10. Income groups by gender (%)

(Source: Surveyed data in January 2015)

Living standard: local people think that their living standard is average or rather poor due to unfavorable natural conditions for agriculture production. By gender, much more households having female heads are poor than those having male heads (15.5% vs. 10.3%).

Domestic water supply: about 95 % of local people in Quynh Thang commune are using domestic water from drilled/dug wells. Few are using rainwater or buying water (the ratios are respectively 4% and 1%). However, it is surveyed by the Consultant that the construction work of the project will not affect water supply or domestic uses of local people.

- Environment sanitation: domestic wastes of all hamlets are collected at the end of a day and transported to planned dumpsites. In some villages, domestic wastes are collected and treated by the household themselves. In general, the domestic waste are either buried or burnt.

In the project area, up to 66.6% of households have sanitary latrines including 32.4% having septic or semi-septic toilet and 34.2% using two-compartment toilets. Moreover, about 1/5 of households (21%) are using simple latrines (digging holes in gardens or using bridges over ponds) and 2.0% of households having no toilets.

Tourism: it is surveyed that Quynh Thang commune has no site planned for tourism such as relics, sight of interest so local people participating in tourism service is zero.

Fire-fighting: Quynh Thang officially committed to fire prevention and fighting regulations annually in the commune. So far, there has been no significant fire leading to serious damages of people and property.

4.3.5 Ethnic minorities

It is surveyed that there is no ethnic minority household as affected one in the project area.
PART 5. IMPACT ASSESSMENT

5.1 Result of the environment and social impacts screening

Table 5.1. Environmental and social impacts need to be handled

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
1.	Violate historical / cultural regions	No impact	Within a radius of 5 kilometers (from the project area), there is no historical/cultural regions needed to be preserved. Sub-project environmental and social impacts screening
2.	Violate ecosystems (for example: sensitive natural habitat or reserve area, national parks, natural reserve areas).	No impact	Sub-project only renovates the current status, not to expand, does not violate of Natural reserve area Furthermore, within a radius of 20 kilometers from Khe San reservoir, there is no natural reserve area or sensitive natural habitat. Therefore, activities under the sub-project shall not violate the ecosystem.
3.	To cause deformation to the landscape and increase the amount of waste.	Low	 During construction, the sub-project will permanently withdraw some certain areas. Specifically: Sub-projects will permanently affect 4,200m2 of land around Khe San reservoir and temporarily use approximately 10,000m2 of land surrounding the project to build auxiliary areas, and workers' camps. There are 03 households affected. The effect is slight because: i) There are 01 households to be relocated but this problem has been included in the report on Resettlement Action Plan (RAP); ii) Permanently affected land are gardens, alluvial lan, leased land of Communical People's Committee; livelihood of households is not much affected; (See the report on Resettlement Action Plan for more details) Location: Focal area of Khe san reservoir, in Quynh Thang Commune

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
			- Time: Prior to implementation of the project
			• Waste emission: There are three sources of solid waste emitted from construction activities including: type (i) construction wastes such as debris from the surface leveling (plants, animal feces, fences, etc.), cement packs, oil tanks and engine oil, etc.; type (ii) daily wastes from workers' camps on the construction area; and (iii) residually excavated soil. In addition, the sludge from toilets can contain harmful bacteria and is the source of pollution that needs to be handled during the construction.
			- The aforesaid impacts are considered LOW and TEMPORARY due to:
			- With regard to type (i) and type (ii): those are non-hazardous solid wastes, particularly, residual materials (with a total estimated volume of 37,789m3) shall be collected and quickly stockpiled to the disposal site.
			- Wastes in type (ii): In the rush period, there will be about 50 people working on the construction site so the volume of generated waste is not much, approximately 15-30 kg / day (approximately 0.3- 0.5 kg / person / day).
			- The volume of solid waste generated during the construction can be easily managed in accordance with the regulations on solid waste management. Domestic wastes like latrine sludge will be handled in accordance with standard designed by the Ministry of Health, and the amount of sludge can be used for cultivation as a fertilizer for the soil.
			- Location: workers' camps and within 50 meters around the camps of workers
			Duration: 10 months.
4.	To destroy the vegetation layer or to cut down trees.	Low	- The sub-project is mainly based on the status of the former work. Permanent and temporary withdrawal forces to have around 9,000 Acacia and Melaleuca cut down; and is a wasteland along the reservoir under the management of the Communal People's Committee.

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
			There is no valuable vegetational cover demolished by the implementation of sub-projects.
5.	Change in the quality of surface water or flow (eg, increase in turbidity due to wastewater from camps, erosion, and construction waste).	Low	 At the rush period of construction, there may be 50 workers presenting on the site, the amount of generated wastewater is 1,800 liters / day (60 liters/day/person). Domestic wastewater flowing into the water resource shall be the risk to increase the amount of pollutants in the water. About 10 vehicles and machines of all kinds regularly travel on site. Oil spills from construction machines and equipment or water during machine washing may cause pollution and decrease the water quality and aquatic ecosystems. Waste water and oil compounds may be sunk into the soil and will gradually seep into aquifer and contaminate aquifer. In addition, wastewater from toilets of workers' camps in case the measures are not properly applied can also change the quality of water quality in surrounding areas. However, this effect is SLIGHT and TEMPORARY due to: The location of camps - a place to keep grease away from water source (from 2 kilometers) With the amount of waste water is 1,800 liters /day, the average concentration of suspended solids in wastewater after being discharged into streams is very small, can be controlled by the mitigation measures Sub-project will be conducted in the dry season when rainfall is lowest, therefore, the possibility of washed oil, grease or compounds which are washed and swept to downstream is very low.
			containers (ie containers with lids), and the contractor shall collect and dispose hazardous

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
			 waste at right places. + Location: dams, spillways, channels and machinery oil storages in downstream of the dam + Duration: 10 months of construction
6.	Increase the dust volume or contaminants into the air during the construction.	Low	 During repair of dams, spillways, bridges and auxiliary works, some of the activities described below will cause negative impacts such as dust emission, exhaust gas causing bad effects on lives of local residents: The operation of equipment and trucks on the location crossing residential areas of hamlets no. 7 and 9, in Dong Xuan hamlet, Quynh Thang commune. Material and waste transportation for construction via the public soil routes crossing hamlets no. 2, 3, 11, 6, 7, 9. Everyday, there is about 5 trucks (10 tons) travelling on the route during the construction roads (total of 14,138 turns - equivalent to 141,377 tons of excavated soil) The amount of dust and gas can cause respiratory diseases or lung diseases to people (such as sinusitis, asthma, etc) if people directly contact with these polluted sources in a long period. However, this effect is SLIGHT and TEMPORARY due to: i) The construction site of the sub-project (dam and auxiliary works) takes place in rural area where is thinly populated and airy. Dust can easily be diluted in the air and swept by the wind. ii) Location of sub-project (dam and auxiliary works) is mainly in hamlet 4A, in Quynh Thang commune. This is thinly populated area. Only a few families live nearby the

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
			 construction site. iii) The number of vehicles / equipment for construction, especially noisy vehicles/ equipment is not much; about 5 turns of trucks passing residential areas but will not generate a large amount of emissions. Location: Transportation route passing hamlets no. 3, 11, 6, 7, 9 of Quynh Thang commune with a length of about 18 kilometers. Construction site is located in hamlet no. 7, in Quynh Thang commune.
			Duration: 10 months of construction (in 2 dry seasons)
7.	Increasing noise and vibration	Low	Noise can be caused by vehicles transporting materials for construction and construction equipment (excavators, bulldozers, road rollers, compactors) affecting families and schools along segment of the construction route. Every day during the construction, there is about 5 trucks. During the construction and transportation of materials and wastes, noise will be generated and can affect people living along the route on Khe San reservoir. However, these effects are SLIGHT and TEMPORARY due to i) The sub-project area is quite open, airy with lots of plants and crops which can reduce noise. ii) The residential area located near the route and construction works are distributed fairly sparse, with a low population density (215 people / km2).
			iii) The number of equipment / means for construction causing noise is not significant (about 5 trucks / day).Location: The transportation route passing hamlets no. 2, 3, 11, 6, 7, 9 of Quynh Thang commune with a length of about 18 kilometers Construction site is located in hamlet no. 7, of Quynh Thang commune.

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
	impuets on environment.	iever	
			Duration: 10 months of construction (in 2 dry seasons)
8.	Resettling households? If yes, how many households to be resettled?	No impact	Within the scope of sub-project, there is no household whose building land is to be resettled.
9.	Using environmentally and/ or culturally sensitive relocation area.	No impact	There is no household to be relocated. The sub-project only withdraws a certain area for construction.
10.	The risk of disease transmission from workers to local residents (and vice versa).	Low	 The temporary presence of workers living in households or their living in camps and interaction with local residents can cause infectious diseases among workers with local residents and vice versa. During the construction, the use of water which does not meet standards of sanitary for workers in the camps or construction site may also cause gastrointestinal diseases or the spread of insect-transmitted disease (ie, dengue fever, malaria, etc). When immigrated labour are bitten by infected insects (mosquitoes) and then spread to others. Besides, a number of social diseases such as HIV / AIDS, syphilis are also potential to break out. However, these effects are SLIGHT and TEMPORARY due to: a) large terrain and dust easily dispersed in the wind; b) toilets are designed following standards by Ministry of Health; c) controlling the spread of pathogenic insects as well as propagation on how to prevent pathogenic insects from workers; d) The Contractor regularly hold health checks to employees during the recruitment process; e) local government and communal medical stations shall launch propaganda activities when there are signs of infectious disease in the province. Location: Quynh Thang commune Time: The effects will last for a long time of the project implementation; dust and smoke will have strong influence on dry days while insects grow in rainy season.

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
11.	Potential conflicts between workers and local residents (and vice versa).	Low	 During the construction, approximately 20-30 workers from other regions come to live and work on this area (in rush period there can be up to 50 employees). During this time, there may be conflicts between the local residents and immigrated labour due to disagreements on the culture or communication or disputes about employment opportunities. However, these effects are SLIGHT and TEMPORARY due to: i) Under the regulations by the State, the contractors have to report temporary residence, temporary absence to authorities of Quynh Thang commune about all workers who come to live and work on this area during the project implementation; ii) Immigrated workers shall be informed, instructed on communication and provided with contact information of local authorities and residents by the contractors. In addition, contractors also have their own regulations on the staff management. iii) The number of workers (about 30%) will be locally hired to perform simple tasks such as soil excavation, luminescence, and material transportation.
12.	Use of explosives or toxic chemicals	No impact	Explosives or toxic chemicals are not allowed to be used during construction.
13.	Using the site where accidents due to blasting or explosives remaining from the wartime occured	No impact	Based on the results of the public consultation held on January 2015, there is no report within recent 20 years on bombs remained on the area of the sub-project.
14.	Construction may disrupt transportation, roads, or waterway.	Low	Construction may impact travelling, and transportation of the local residents, as well as the risk of accidents: a) increase the risk of accidents due to the increase of means travelling on inter-communal roads and construction area (where activities such as excavation and concentration of construction equipment and waste is located on or next to roads, works, etc) can be dangerous, especially at night when vision is limited; and suspended dust particles reduce the vision; b) the construction of dams and auxiliary works such as management road will limit travelling of people as well as the access to social

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
			infrastructures such as schools, markets, etc.
			However, these effects is SLIGHT and TEMPORARY due to:
			i) The route for construction material transportation within the sub-project and the site for dam construction and management road passing a few sparsely populated areas, so the possibility of traffic accidents is very low;
			ii) The number of vehicles / equipment for route construction with about 5 trucks / day is relatively little.
			iii) A part under the scope of work executed by the contractors is to ensure the health and safety on construction site for individuals and construction area. The risks to the safety of people are not allowed. Thus, the contractors shall take measures to minimize the impacts during the construction.
			iv) The route for construction material transportation does not pass the Communal People's Committee and schools. Hence, the access of people to these locations is not affected.
			Location: Quynh Thang commune
			Duration: 10 months of construction (in dry season)
	Construction may cause any damages to		The process of transporting construction materials or wastes on rural roads can damage the road if these trucks are overcharged and operate in rainy and stormy weather.
15.	existing roads, bridges or other rural Lo	Low	Other works of rural infrastructures such as power cable system, communication cables are not affected by the construction of the sub-project as they are located on the safety corridors of the main roads. The management road does not include works concerning power cables or communication cables. Other social infrastructures (schools, markets, etc) are located far away from the works of the sub-project. Thus, these social infrastructures are not affected

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
			by the construction.
			The above impacts are SLIGHT and TEMPORARY due to:
			i) Most of the works are constructed in the dry season, so the material transportation by trucks has a slight impacts on the quality of the road;
			ii) The quantity of construction materials and the number of vehicles transporting materials is low (about 5 trucks / day).
			Location: Quynh Thang commune
			Duration: 10 months of construction (in one dry season)
16.	Excavation during construction of the sub-project can cause soil erosion.	Low	 Construction of dam roof, building water intakes, exploiting soil from mines (about 500 meters from the management road) can cause erosion to the dam or surrounding areas. However, these effects are SLIGHT and TEMPORARY due to: i) The construction of water intakes is carried out in dry season and surrounding dikes are also built. Thus, during the construction, the potentiality of soil erosion is very low or hardly occurs; ii) The dam roofs are constructed in dry season. The construction sites are located over the water level and the foot is made of cement; so the potentiality of erosion is low. Location: The focal work of Khe San reservoir, soil mine
			Duration: 10 months of construction (in dry season)
17.	Is it necessary for a new temporary and permanent service road to be opened?	No impact	A new service road is not necessary to be opened. Temporarily, the existing routes are capable to transport construction materials and wastes.

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
18.	Separate or dissolve into the habitat of animals and plants?	No impact	 + For the flora and fauna under the reservoir will not be affected since the project does not cause impacts on quality of water or water level. + For terrestrial flora: Surrounding the sub-project and indirectly affected areas, none of them is the habitat of rare plants and animals which need to be preserved.
19.	Long-term effects on quality of the air.	No impact	The sources of air pollution mainly are from dust generated by means of transporting construction materials, wastes, etc, travelling on the roads in Quynh Thang commune. In addition, the air may also be polluted from the construction machines, and transportation means. However, this source of emission is very low and only occurs in certain time. Therefore, there is no long-term impact on quality of air, but some temporary impacts on the air.
20.	The risk of accidents to workers and communities during construction period.	Medium	Construction can face risks of accidents due to machine operation, excavation and filling, levelling or material transportation if workers fail to comply with regulations on safety at work. In addition, the construction can also cause accidents for communities if there is no restriction to the people's access to the construction site. However, these effects are at MEDIUM level and TEMPORARY due to: i) The number of construction machines is not much ii) A lot of items shall be manually constructed such as transporting materials, casting concrete, etc. Thus, risks of accidents will be significantly reduced; iii) The construction activities are mainly conducted in dry season, thus accidents are limited; iv) The construction sites are located far away from residential areas.
21.	Use of hazardous or dangerous materials and creation of hazardous	No impact	Hazardous substances are not used and created within the scope of the sub-project.

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
	wastes		
22.	Risks for human's safety and health	Low	The construction can cause accidents for communities if there is no restriction on the access to the construction site of people. In addition, wastes during the construction can also cause negative effects on health of local residents if those are not properly treated.
23.	To affect the domestic and production water supply during construction of work items	Low	The upgradation is carried out based on the current status and does not make change to the flow. The water supply for lower stream is not affected as the construction of culverts shall be conducted in dry season (This is the phase of drying and loosing soil on the field. Thus, there is no need to supply water for irrigation). Consequently, the production is not affected. On the other hand, the sub-project shall focus on items in terms of water intakes to shorten the construction time – during this time water supply shall be interrupted. Local residents shall be informed about the schedule of water supply/ water block 2 weeks beforehand since the commencement date so that they can have suitable plan for production. Location: Water intakes under Khe San reservoir Time: In 01 dry season
24.	Increase flooding, sediment transportion in downstream	Low	Khe San is an independent reservoir. Its downstream is the irrigated zones. The construction will require discharging water to the death water level in some certain times. The discharge may cause flooding in some areas of agricultural land. However, those are areas where the drainage system is good, these impacts is considered SLIGHT and TEMPORARY.
25.	Withdrawal (temporary or permanent) of public land (public or private) for construction.	Low	Under the scope of the project, there is 14,200m2 for perennial planting (in which there is 2,000m2 of gardening land and building land owned by Mr. Pham Ngoc Gia's household) to be permanently affected, 10,000m2 public land to be temporarily affected. The affected areas were calculated to be included into the provincial compensation and resettlement action plan.

No.	Does the sub-project cause these impacts on environment?	Impact level	Description of impact
26.	Using land currently occupied or regularly used for production purposes (eg, gardening, farming, grazing, fishing ground, forest).	Low	Within the scope of the project, there is 12,200m2 of agricultural land (reclaimed land) to be permanently affected. The affected areas have been calculated to be included in the provincial compensation plan.
27.	Relocation of individuals, families, or businesses.	No impact	Within the scope of the project, there is no affected household to be relocated or resettled from building land.
28.	Temporary or permanent loss of crops, fruit trees, houses or infrastructures.	No impact	In the project area, only indigo (over 70%), eucalyptus, acacia (9,000 trees) no fruit trees, or crops. Besides, there is no permanent house in the project area.
29.	Mandatory restriction to the access of people in the reserve parks and reserve areas.	No impact	No reserve parks or natural reserve areas or national forests in the project area.
30.	The ethnic minority groups living within or nearby the subproject.	No impact	There is not ethnic minority living in the project area.
31.	Members of ethnic minority groups in the area are likely to be benefited or harmed by the project.	No impact	There is not ethnic minority living in the project area.
32.	Related to construction of a large dam?	No impact	The dam under Khe San reservoir is from 8 to 12 meters high. Thus, it is not the large dam as defined by World Bank.
33.	Depending on water supplied by an existing dam or weir or under- construction-dam?	No impact	Khe San reservoir neither depends on the water supplied by other reservoir nor supplies water for other reservoirs outside the rice field in its lower stream.

5.2 Positive impacts on environment and social of sub-project

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 60ha of seasonal crops. 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.

Expected positive impacts on gender. The project when implemented will have a positive impact on the people in the project area in general and on women in particular. These effects are:

Creating new opportunities for economics, trade and services; creation of jobs to increase income for women, especially poor women during project construction time, temporarily contributing to poverty alleviation in the project communes; and

Providing opportunities to improve the status of women and enhance their participation in community activities through gender action plan.

5.3 Impacts during subproject preparation stage

5.3.1 Activities

- Cutting trees (trees growing on the lower stream and upper stream roof, etc)
- Site clearance, office establishment
- Mobilizing machines, equipment to the construction site

5.3.2 Sources of impact

- *a)* Sources of impacts related to wastes
 - It is estimated that there is about 37,816m3 tons of soil and rock to be demolished by weathering removal of material yard.
 - Cement packs, not-to-used-up construction materials, the solid wastes of workers in offices.
 - Operation of motorized vehicles for leveling: Oil leakage, waste oil from the machines if not being collected and properly disposed at right places, they shall become the causes of water and soil pollution in the area.

- Road opening, land acquisition, construction of auxiliary works, if these activities are not combined with the technical measures, risks of erosion, landslide potentially contribute insignificant impacts to soil.
- Wastes, waste water emited by workers taking part in site clearance.

b) Sources of impacts unrelated to wastes

Those are sources making impacts on physical environment, ecology such as erosion, landslide, erosion of riverbanks, stream banks, lakebanks; siltation of rivers and lakes; making changes in environmental constituents and biodiversity.

5.3.3 Impacts on environment

✤ Impacts on the water:

The demolition of structures made of brick, stone, concrete and transportation of materials such as cement, brick, stone, nylon, decayed wood, as well as solid wastes and wastes, domestic waste water emitted from households if these are not treated properly, they can follow rainwater into the water sources and increase water pollution;

✤ Impacts on the air:

During the preparation, activities are likely to cause air pollution. The agents of air pollution are mostly from vehicles transporting materials and construction equipment. Pollution source is dust generated from these materials, dust generated by the friction between the vehicles and the road surface, gas from construction equipment. The removal of works (dams, spillways) may also generate dust and noise at low level;

Impacts on biology

The clearance including tree cut-down shall damage the residence and settlement, prey seeking of some kinds of birds, the stork, and rodent animals. However, this impact is slight as birds are flying animals; they can travel to seek for new habitat and are not much affected.

The number of trees is not much. Tree cutting down and clearance of vegetation layer take place in a short time. So, the impacts on biology only shortly occur and the sphere of influence is not large.

✤ Impacts on soil:

During site clearance, some existing works such as material yard, site clearance for service road construction, dam system shall be demolished. So, it is obvious that a solid waste amount which may be accompanied by domestic wastes by the workers, and construction machines shall be generated. If these wastes are not well collected and treated, amount of contaminants causing soil pollution will increase;

In accordance with construction plan scheduled and calculated by the consultant, the filled soil shall be utilized from 70% excavated soil, then the residual soil and rocks are around 11,344m3; this amount of soil shall be moved to the disposal site which is 2.5km from the foot of work (see the attached agreement minutes). It is estimated that the capacity of disposal site is approximately 30,000m³.

There is a shortage of about 33.241m^3 of soil which shall be exploited in the mine located nearby the reservoir management road; this is the hill where the eucalyptus is planted and its reserves is from 40,000 m3 to 50,000 m3 (see the attached agreement minutes).

The domestic solid wastes emitted by a worker working on site within a day are 0.3-0.5kg/person/day. During 20 day preparation, with 20 workers often working on site of, then estimated domestic solid wastes is 6-10kg/day, equivalent to about 120-200kg/ whole phase. This amount shall be collected and treated in accordance with regulations.

- There are not much workers, vehicles, machines in this phase. Thus, impacts are insignificant.

- Due to the construction site is not large, within the area of 1.42 hectares, the site clearance, and project preparation can be rapidly conducted; the period of impacts on environment is short.

5.3.4 Impacts on social

a. Impacts of noise on human

Sources of noise generation can be from following activities: tree cutting, demolition of old buildings and transporting wastes to disposal sites. There 02 110CV bulldozers, 03 1.6m3 excavators, 05 automatic 7-10 ton trucks alternately operating on site on various locations. In particular, the noise level at a distance of 1 meter of corresponding device is as follows: the noise from bulldozers is at 77-95 dBA, from excavators is at 72 to 82.5 dBA, and from truck is at 82-94 dBA. As the distance increases to 10 meter, the corresponding noise decreases from 22 to 25%; a decrease of 50 meters, the noise level dropped from 38 to 40%. However, the noise resonance noise by means operating at the same time occurs.

According Vietnamese standard QCVN 26: 2010/BTNMT, the allowed noise at public areas and residential areas is from 50 to 70dBA (from 6:00 to 21:00). Hence, such noise only locally affects within the radius of 50 meters. Accordingly, the objects affected by noise can only be workers working on site; this effect can be controlled by mitigation measures.

b. Impacts on economy and society

All investment projects since deployment, human factor must be considered as the primary concern in order to make appropriate evaluation and to ensure their legitimate rights. So, in the phase of preparation for land acquisition, the mission of environmental impact assessment must clearly specify the negative impacts on living conditions of the human so as to take proper measures for overcoming and mitigation. For this project, at this stage, impacts on socio-economic environment mainly cause to the reservoir area.

Building land: Number of affected households: 01 households, affected area: 2,000 m2

Production land / agricultural land: not affected, number of affected households: 02 households, the affected area: 12,200 m2

Houses / Works / permanent assets: number of affected household: 1 Household, the affected area: 77 m2

Houses / Works / temporary assets: not affected

Affected crops: not affected

Affected trees: Number of effected households: 11 households, affected trees: 9,000 trees (fruit trees of all kinds including dragon, grapefruit, mango)

c. Impacts on life and psychology of local communities

Through surveys and community consultation, sub-project is built on the wish of the local authorities and residents. There is no household to lose land due to the withdrawal by the project. Only 03 households lose their properties on land (9,000 Acacia, indigo, low economic plants; and land is under management of Communal People's Committee). The community is Kinh group. Thus, the land withdrawal for preparation of land acquisition shall not affect cultivation practices much. The only impact of the project during this period is impact on the livelihood and income.

Khe San reservoir is assigned to the aquaculture households every 5 years by the Communal People's Committee allocated 5 year / times. Breeding mainly are carp, tench, mud carp, tilapia, etc. However, to commencement date, the contract is nearly expired. After Khe San reservoir is completed, Communal People's Committee resumes the the bidding. That can affect the life, psychology of the affected people. Due to the withdrawn area is small, these effects are not significant.

d. Impacts on safety of workers taking part in removal work and community

- Risk of electric shock during site clearance can cause fires and explosions, creating smoke, dust, debris dangerous for workers and local residents.

- Fallen material during removal can cause accidents.

-Transportation of bulky materials easily causes accidents during transportation, especially when passing the high traffic density or near schools.

- The process of demolition, site clearance, and foundation excavation may reveal toxic substances previously buried in the project area or hazardous substances in new wastes which may directly affect health workers and residents.

e. Impacts on local traffic, and infrastructures

- During site clearance, vehicle flow in the project area increases affecting the system of local roads. However the amount of transporting trucks in phase of site clearance is not much; so the influence to infrastructures is not much accordingly.

- Due to the numbers of affected households and people are not great, no household shall be relocated. Thus, the impacts on culture and society are very slight.

5.4 Impacts during construction phase

5.4.1 Activities

- Repair water intakes
- Construct and improve the roof of upper stream and lower stream
- Expand and construct spillways
- Repair and construct management road and office

5.4.2 Source of impacts

5.4.2.1 Sources of impacts related to the wastes

- a. Sources generating solid wastes
 - Exploit construction materials such as sand, pepples, gravels, soil, and rocks
 - Domestic wastes of workers taking part in construction on site
- b. Sources generating liquid wastes
 - Water from stone, sand, gravel washing
 - Oil dismissed from machines
 - Domestic waste water of workers taking part in construction on site
- c. Sources generating gas
 - Blasting, excavation, filling and ground leveling
 - Constructing service road, management road
 - Exploiting, transporting and removing materials
 - Mixing concrete and mortar
 - Operation of transporting trucks
 - Operation of construction machines and equipment such as bulldozers, excavators, cranes, drillers, saws, rammers, etc.

5.4.2.2 Sources of impacts unrelated to wastes

Due to the harsh weather such as heavy rains, storms, winds, floods occurring during the construction, soil layers on hill sides, mountain sides in upper stream and focal area are absorbed with water, causing landslides due to the gravity. Since in accordance with the construction method, during ground leveling, the dismissed soil and stone layers on slopes along rivers shall be removed; the amount of sand and soil falling into the river increases, and causing increase in turbidity and directly affect water supply and use of residents living in lower stream.

The understandings of community and workers about domestic waste management are poor. Water used for construction machine and equipment washing can pollute the surface water source, underground water and building land at a high level.

5.4.3 Impacts on environment

5.4.3.1 Impacts on water

* Domestic waste water

Domestic waste water: during construction phase, there are about 20-30 workers on site but they are allocated at the locations of 4 different work items. Domestic waste water is generated from human's personal hygiene such as cooking, eating, drinking, and personal hygiene, etc.

In accordance with Vietnamese construction standard TCXDVN 33:2006 concerning water supply – the pipeline system and the work – designed standard, the average consumed water for a person is 100 liters/ day. Actually, on site, each worker consumes 60 liters/ day at average. So, 30 workers on site, the waste water generated everyday is about 1.44 m3 (the

waste water is equal to 80% of supplied water). Table 5.4 shows the disposal parameters and criteria on amount of wastes generated by workers on site.

No.	Parameters	Disposal criteria (g/person/day)	Amount (kg/day)
1	BOD ₅	45 - 54	2,25 - 2,7
2	COD	72 - 102	3,6 – 5,1
3	Suspended solids	70 - 145	0,35 - 0,75
4	Total nitrogen	6 - 12	0,3 - 0,6
5	Total phosphor	0,8-4,0	0,04 - 0,2
6	Total coliform	$10^6 - 10^8$ MPN/100ml	-

Table 5.2. Amount of disposal in domestic waste water during construction phase

(Source: Report on the current status of urban waste water- Institute of Environmental Science and Technology – Hanoi University of Science and Technology)

During the construction, there is about 432m3 domestic waste water generated by 50 workers working on site. If no proper measures for collection and treatment are taken, waste water may be poured and overflow the surface and absorb into soil and cause soil pollution on construction site and underground water or follow the flow to the rivers then cause pollution. However, these impacts are temporary and uncontinuous.

The domestic waste water flowing into rivers will be the risk increasing the contents of substances included in water causing water pollution.

* Waste water from construction activities

During the construction, agents causing water pollution mostly are oil leaking from equipment, machine repairmen, dust in the air, deposited dust, soil, mud on the construction site. When it rains, those agents shall be washed and flow into surface water source. Then, the quality of water in pools, channels, ditches, and other surface water sources in the area shall be decreased. Rain water which overflows on site shall sweep oil, macadam, rock, mud, soil and rock dust on the surface to the nearby rivers, pools, channels, ditches and increases the turbidity and greasy scum. Overflowing water shall wash soil and stone from material yards and disposal sites and increase the turbidity, cause sedimentation to drainage channels, obstructing the drainage in the area. The construction site of work items is in 2.42 hectare, stretching along the route of main dams and management road. Thus, the source of pollution to surface water needs to be paid attention to and measures for the best mitigation shall be taken.

On areas where the excavation, filling, concrete casting, mortar pumping, etc., are conducted, rain water often sweeps soil, rocks, construction wastes into pools and neighboring channel system, increasing turbidity, water pollution since the alkali from concrete decreases Ph and quality of water.

Calculated for 30 people

Leveling, excavation, filling and disposal sites also cause bad effects to the quality of surface water because of excavated soil and rocks, landslides, especially in rainy season. Nevertheless, this amount shall not focus in one area but scatters on sites of 4 work items.

Besides, activities from the concrete batching plant, alkali production areas, wastes like cement packs, nylon can obstruct the flow, and their decomposition shall pollute the water sources.

Measures to mitigate impacts on water due to construction wastes, land erosion shall be presented in the Chapter 6 of this report.

Construction waste water: Construction waste water from crushing plant, sieving, washing rock, construction material, concrete batching plant, concrete casting yard containing cement, and sand, although the content is less but thick. If they are not handled before discharge, they can cause turbidity and pollution to the water due to alkali from concrete. In accordance with calculation of the consultant, the designed amount of waste water in a day is about 1m3/day, then amount of contaminants during construction (300 days) is as follows:

Contaminants	Norm (mg/l)	Amount of pollution (kg)
COD	625	0,3375
BOD ₅	303	0,1636
SS	6.800	3,672
Lubricant	44	0,2376

Table 5.3. Amount of contaminants in construction waste water

[Source: calculated in accordance with document by Economopoulos, WHO, Geneve 1993]

Leaked oil, oil sludge are discharged from motorized vehicles and machines. Lubricant mostly generates from machine repairmen and maintenance agencies. Amount of lubricant average used for one time of exchange is about 18 liters/once/vehicle. Average time of exchange is 4 times/vehicle/year. With about 10 vehicles, the amount of lubricant discharged during the construction period shall be around 1,080 liters. This source pollutes surface water and underground water in the area (underground water and water in rivers). Therefore, it is necessary to take measures for proper collection and treatment to minimize these impacts.

5.4.3.2 Impacts on the air

* Pollution due to dust

Agents of air pollution during construction mostly are dust. Dust generates from transporting and unloading materials.

During transportation, due to vibration and wind, soil and sand on the trucks and soil and sand on the road shall be swept by the wind, creating dust. Depending on quality of road, method of material unloading and stockpiling, the volume of dust shall be generated accordingly. The concentration of dust shall highly increase in hot weather; the distribution range can be up to 200 meters if it is strongly windy.

Depending on the characteristics of materials and quality of transportation road, we shall calculate the dust generating during this stage for all circumstances.

- Dust generating from transportation of excavated soil

Quantity of excavated soil in this stage is 141,377 tons. It is estimated that the project shall use medium load trucks which can carry 10 tons on a truck. Then, the necessary turns to transport materials is 141,377/10=14,138 turns.

It is assumed that 2 unloaded trucks are equal to 1 loaded truck. Then, total turns of trucks to transport materials are 14,138 + (14,138/2) = 21,207 turns. With construction duration of 12 month, there shall be 1,767 turns of trucks/month. The average distance to transport materials from the supply mine to the site is 0.5 kilometers.

X (m)	3	5	10	15	20	25	Vietnamese standard 05: 2013/BTNMT
$C (mg/m^3)$	1,201	0,524	0,237	0,156	0,116	0,093	0,3

Table 5.4. Concentration a	of dust in the air due to e	excavated soil transportation

(Calculated by the Center of Environment and Development)

Impact Evaluation:

Comparing concentration of generating dust to Vietnamese Standard 05:2013/BTNMT, it can be seen that with the distance less than 5 meters, dust concentration exceeds the allowed standard from 1.3-4 times. However, actually, on site, dust can be wider distributed into the environment as the quality of road can be worse, the wind is strong, and the speed of trucks may be faster in comparison with calculation.

Dust generating during the material transportation shall limit the vision, affect the health of workers and local residents around the construction site. Dust also affects animals, and plants. Dust covers the leaves, reducing the photosynthesis, affects the growth of crops.

- Dust generating from the transportation of steel, iron and other materials

Quantity of iron, steel and other materials during this phase is 74,766 tons and the average transporting distance is 25 kilometers.

Doing the similar calculation as for dust generating from excavated soil transportation, dust concentration generating in this phase is determined as follows:

Table 5.5. Dust	concentration	in the air	due to iron	and steel	transportation

	3	5	10	15	20	25	Vietnamese standard 05:
X (m)							2013/BTNMT
$C (mg/m^3)$	0,635	0,277	0,125	0,082	0,061	0,049	0,3

(Calculated by the Center of Environment and Development)

* Pollution due to gas

- Gas emitted by diesel oil operating vehicles

Gas generated from vehicles contains SO2, CO2, CO, NOx, VOC, etc. The pollutants affecting the air depend on some kinds of construction means, machines, and construction methods. Currently, in Vietnam, there are not much specific standards on gas emission from each construction vehicle. Thus, calculating the amount of gas pollution from mechanized and traffic means is estimated on the basis of factors of pollution load provided by Professor, PhD of Science Mr. Pham Ngoc Dang (The air environment – the Basic theory, dust pollution, hazardous gas pollution, temperature pollution, climate change, noise pollution, potential risks from environment and measures to reduce environmental pollution):

Types of vehicle	Units(U)	TSP (kg/U)	SO ₂ (kg/U)	NO _x (kg/U)	CO (kg/U)	VOC (kg/U)
- Small truck, diesel	1000km	0,2	1,16S	0,7	1	0,15
engine <3,5 tons	Ton of oil	3,5	20S	12	18	2,6
- Big truck, diesel	1000km	4,3	20S	55	28	2,6
engine $3,5 - 16$ tons	Ton of oil	1,6	7,26S	18,2	7,3	5,8
- Very big truck, diesel engine > 16	1000km	1,4	6,6S	16,5	6,6	5,3
tons	Ton of oil	4,3	205	50	20	16

Table 5.6. Factors of air pollution for types of vehicles

(Source: calculated following emitted gas pollution factors by Professor, PhD of Science Mr. Pham Ngoc Dang, The air environment – The basic theory, dust pollution, hazardous gas pollution)

Total turns of trucks for transporting materials is 16,873 turns. The construction duration is 10 months. Average distance of material transportation from the supply mine to the site is 18 kilometers.

Number of kilometers of transportation: 16,873 turns x 18 Km = 303,721Km.

Quantity of diesel oil needed for excavated soil and material transportation during the project construction is estimated to be: 303,721 km x 0.2 liter/km = 60,744 liters.

If we calculate in accordance with conversion factor of diesel oil (0.5%S) from liter into kilogram: 1 liter of diesel oil = 0.85 kg, then 60,744 liters x $085kg = 51,633 kg \approx 51,6$ tons of diesel oil.

From the amount of diesel oil consumed during transporting excavated soil and construction materials, total construction duration is estimated of 10 months, we can estimate amount of gas generating from vehicles transporting materials for construction on project area as follows:

Table 5.7. Calculation sheet on prediction of gas emission generating from transportation

No	Type of gas	Emission (kg/Ton diesel oil)	Emission amount (Kg)	Generating amount (kg/day)
1	TSP	1,6	82,56	0,30
2	SO ₂	7,26S	374,62	1,36
3	NO _x	18,2	939,12	3,41
4	СО	7,3	376,68	1,37
5	VOC	5,8	299,28	1,09

Table 5.8. Concentration of gas estimated to be generated during transportation

No.	Pollutants	Gas concentration (*) (mg/m ³)	QCVN 05:2013/BTNMT 1 hour average (mg/m ³)
1	TSP	0,019	0,3
2	SO ₂	0,085	0,35
3	NO _x	0,213	0,2
4	СО	0,086	30
5	VOC	0,068	-

Note (*): average concentration = load $x10^{6}/(8xV)$.

Through the estimated concentration shown in the aforesaid table and compared to the Vietnamese standard QCVN 05:2013/BTNMT, the concentration of TSP, CO, SO₂ and NO_x estimated to generate during material transportation during the construction period is in the allowed ranges. Particularly, the concentration of VOC is 0.068 mg/m³ and was not specified in the Vietnamese standard QCVN 05: 2013/BTNMT.

* Noise pollution

Noise mostly generates from the excavation and filling by equipment and transportation means. Noise causes bad effects to workers working on site and makes residents around the site uncomfortable. Contacting with high intensity noise in a long time shall decrease the listening capacity, make people tired, stressful, sleepless, and decrease the working efficiency.

No	Types of machines	Noise corresponding to the distance of 1 meter		No	ise cor	responding to the distance			
		Range	average	5m	10m	20m	50m	100m	200m
1	Trucks	82-94	88	74,0	68,0	62,0	54,0	48	42
2	Concrete mixing machine	75-88	81,5	67,5	61,5	55,5	47,5	41,5	35,5
3	Soil digging machine	75-98	86,5	72,5	66,5	60,5	52,5	46,5	40,5
4	Excavator	75-86	80,5	66,5	60,5	54,5	46,5	40,5	34,5
5	Rammer	75-90	82,5	68,5	62,5	56,5	48,5	42,5	36,5
QCVN 26: 2010/BTNMT: 70 dBA (6-21h); 55 dBA (21-6h)									

Table 5.9. Noise from transporting means and construction machines

(Source: Professor, PhD Phạm Ngọc Đăng, Air environment, Publishing house of Science and Techniques, Hanoi – 1997)

Pursuant to the statistics by Ministry of Health and Research Institute Science and Technique for personal protective clothes under Vietnam General Confederation of Labour, noise causes bad effects to most of organs in human body. Impacts of noise on human body at various frequencies shall be shown in following table:

Ranges (dBA)	Impacts to listener
0	Audible threshold
100	Start to change the heartbeats
110	Excite eardrum strongly
120	Strident
130 ÷ 135	Causing mental disease, retch, weakening touch, and muscles
140	Causing hurt and strident, losing mind and mad
145	The maximum limit human can bear the noise
150	If we listen to the noise at this range for a long time, eardrum shall be
	broken
160	It's dangerous for us to listen to the noise at this range for a long time
190	Listening in a short time can cause danger

Table 5.10. Impacts of noise with high intensity to the human health

The noticeable area is construction site. However, in general, noise pollution locally occurs, and mostly directly affects workers working on site. Impacts of noise due to the activities of construction to the neighboring areas are insignificant.

Nevertheless, the results of above calculation shows the maximum radius affected by noise generating from the operation of machines, equipment and means is 50 meters (outside this range, the human is hardly influenced and can live and work during 21 hours). Thus, noise only has influence on workers on site. Besides, due to that the project is located far away from the residential areas (outside the affect radius), the low density of population, and high density of plants, noise shall not affect the local residents.

5.4.3.3 Impacts on soil

* Impacts by waste material disposal

Disposal of waste materials can cause temporary or permanent loss of land.

The temporarily lost land is mainly due to the illegal occupation. This area is used as material yard and temporary disposal site. If the material yard and disposal site exist in a long time can cause insanitary, affect the soil, water since rain water overflows these areas and affects the residents' travelling, traffic means and aesthetics.

On the basis of table 1.3, quantity of excavated soil can be determined as 37,789m3. However, about 70% of this quantity is utilized for construction of work items. The residual part shall be collected to the communal disposal site by the employer and relevant competent units.

* Impacts on domestic solid wastes generated by workers

In rush period, there are 50 workers working at reservoir.

In fact, at average, 1 person shall dispose about 0.25kg of wastes per day. So, the amount of wastes during this period is 7.5kg/day in which organic wastes make up 60-70%; other particles including paper, plastic, packs, etc., are 30-40%. Although this amount is not much but its potential biologic decomposition is high, especially on wet and hot weather. On rainy days, rain water shall sweep organic substances into rivers, drainage ditches in the area and causing water surface pollution.

* Impacts from hazardous solid wastes

Hazardous solid wastes in this phase mostly are grease rags, waste oil, light bulbs, broken batteries, etc. The small amount and infrequent hazardous wastes should be stored in the bins with a lid placed in the workers' camps. Every 6 months, functional units shall be contact to handle wastes. The employer will contact Department of Natural Resources and Environment of Nghe An to do registration and to be granted with management license as instructed in Circular No. 12/2011/TT-BTNMT dated 14 April 2011 by the Ministry of Natural Resources and Environment.

5.4.3.4 Impacts on biology

a. Impacts on aquatic ecosystem

The construction on site such as soil excavation, water discharge for construction, etc., makes water in reservoir become turbid, changes the quality of water due to oil leakage.

Illegal occupied land causes loss in habitat, loss in place of egg laying, kills young fish, decreases the photosynthesis of alga. This can destroy or disadvantageously change habitat of fish and other aquatic species, affecting life under the aquatic ecosystem.

5.4.3.5 Impact on terrestrial ecosystem

The cutting of trees, vegetation cover and turning over the surface soil normally cause erosion. However, these impacts shall be reduced by applying measures such as surface paving and treatment, and watering.

Noise from excavation, leveling creates the vibration affecting to the life, biological customs, and moves animals out of the current habitat.

Nevertheless, terrestrial animals and plants as well as aquatic animals in the project area are not much. These impacts are quite apparent but temporarily and shortly occur. Therefore, impacts on ecosystem are insignificant. The construction causes direct or indirect losses on wild animals and plant. This impact is firstly due to disturbance, relocation and resettlement on the earth surface. These impacts mostly occur shortly and only on construction site. The most direct impact on wild animals is the spillway construction and expansion. The influence is assessed as slight.

5.4.4 Impacts on social

a. Impacts on socio-economy

The project will provide the local residents with a lot of benefits, specifically increase in productivity, and agriculture production, increase in number of crops, aquaculture development as the irrigated areas become larger, reduction of risks and natural disasters. The work after being constructed shall ensure the stable irrigation for 120 hectares of rice field and crops in a year of Quynh Thang commune. The project also helps to limit negative effects on environment, landscape on reservoir basin and lower stream; increase the non-agricultural production and business due to the agricultural development, increase the income, improve the life, create more employment opportunities, especially for hired labor such as seasonal labor or long-term labor, decrease free time and contribute to poverty reduction.

These positive effects benefit a crowded part of the weak. Those whose own production land are the subjects directly benefited most by irrigation.

* Increase in proactive irrigation area, smart and climate adaptable agricultural production

To invest, strength, complete and modernize Khe San reservoir shall step by step contribute to the completion of infrastructures, improvement of human's life in rural areas.

* Land withdrawal and it impacts on local residents' economy

Nevertheless, the project also has negative impacts such as withdrawing land of 3 households with total permanently area of 14,200 m2. If measures for mitigation are not taken or improperly taken, for example inappropriate compensation, the absence of supporting policy for livelihood recovery for withdrawn land households, it can lead to that some affected people shall face poverty or reimpoverty. On the other hand, increase in agricultural production such as expanding the area for crops planting and aquaculture shall potentially

cause water pollution due to the increasing demand for fertilizers, pesticides, and industrial foods.

Inside the Khe San reservoir, there is a household successful to hire water surface for aquaculture. The site clearance and acquisition cause noise and affect fish living in cage as the cage is located near the upper stream roof. In addition, during the construction, the withdrawal of water inside the reservoir can affect the quality of water for aquaculture. However, impacts on livelihood of this household is insignificant since the water though is withdrawn to ensure the construction, the remained level stays at 19.4 meters, enough for fish inside the reservoir to live. Surrounding dykes shall be arranged during the construction of dams and spillways and the construction shall not cause turbidity to water inside the reservoir.

Permanent land: permanently occupied area is only included in the expansion of spillway and new management road. Dams are already included in the safety corridor of the work. The area needs to be permanently withdrawn for work construction is 1.42 hectare.

Temporarily occupied land: Temporarily used land is 1 hectare. This area is to serve the construction, including the land for construction; for camp building and site management office, land for material yard.

* Impacts on the social stability of the area

+ Impacts on the social stability of the area

- Activities such as soil excavation and filling, leveling, bulldozing for road construction, construction site, building workers' camps, though do not contribute great influence on production but affects water supply for irrigation and agricultural production. Thus, it is necessary to prepare a proper construction method in which the schedule of harvest time, water irrigation and if required, a mobile pumping station may be designed to temporarily supply water during the construction period.

- The presence of work shall promote temporary businesses opening followed the work. This shall increase the demand for foods in order to serve workers taking part in construction. However, demand for foods of workers is not much; there is no imbalance between demand and supply in the area. The capacity of local resident absolutely meets demands of the work in all aspects.

- The construction requires a great number of labors from other regions. This may lead to conflicts between workers and local residents. Thus, these workers shall follow regulations by law in terms of administrative management and household member management.

+ Impacts on safety of workers and community

- During the transportation, soil and macadam drop on the road. If these materials are not collected and cleaned, it shall be affected in terms of aesthetics and dangers to human and transportation means shall be caused, hence increasing the risk of traffic accidents.

- Beside the main road, the route from national road 48B to Communal People's Committee is now used for material transportation. The traffic on the main route is basically safe. In addition, the traffic density on these routes and population density along these routes are sparse, rate of accidents are low. So, operation of trucks serving the project does not cause

significant impact in terms of traffic accidents on transportation routes. Nevertheless, the Contractor shall take measures to reduce and prevent traffic accidents.

- In accordance with regulations, vehicles are not allowed to carry things over the load capacity (7 tons) and the allowed speed (30km/h) when travelling on inter-communal routes. Overloaded trucks may damage traffic works and cause traffic accidents.

- Domestic wastes from camps if not being properly managed can cause locally insanitary such as generating uncomfortable smell leading to the presence of pathogenic creatures such as fries, mosquitoes, rats, etc., causing bad effects on health of worker and community

b. Impacts on socio-culture

If the project is conducted and operates efficiently in upcoming years such as sufficient water supply for production, the surface of channels is improved, then 1/3 surveyed people scheduled their production plan. This shows that potential impact of the project on production of local residents. The agricultural production shall increase. Thus, the demand of increasing rice crops and crops of project area is great but may face the increase in chemical fertilizers and pesticides causing environmental pollution. On the other hand, increase in rice productivity shall increase the pressure to solve post-harvested problems such as procession, storage, consumption sources to ensure the best benefits for farmers to enjoy the value of rice.

Social impacts of above said increase and transference of economic activities under the condition that water is sufficiently supplied for the production, may bring more employment opportunities, especially for hired labor, decrease the free time, and contribute to reduce poverty. However, the project also contributes negative effects such as land withdrawal and resettlement; livelihood and business are affected due to relocation; conflicts on water using may occur; use of fertilizers and pesticides increases causing risks to health and affects the ethnic minorities. These impacts need to be paid attention to and measures for mitigation shall be considered in implementation phase of the project.

c. Impacts of management and operation of irrigation system

That the Project of Repair and improvement for the safety of dam (DRaSIP) comes into implementation shall contribute to the strengthening the safety of reservoir, and help provincial management units in the project area to establish the scenarios, strategies for long-term rural development in which climate change is included, realizing activities to conduct the national target program to reduce and adapt to climate change; Strategies for irrigation development up to 2020 and vision to 2050; National target on sanitation water supply and rural sanitation up to 2020; Program for socio-economic development in mountainous region up to 2020; National target program on new rural development, etc.

d. Impacts on human's health

The project investment shall mainly affect the environment during the construction due to material transportation and noise of machines and equipment. Besides, when taking part in the construction, workers come from other regions can bring diseases with them and their customs break the traditional characteristic

and local rules. The project management units should consider risks of health such as sexually transmitted diseases and launch propagandizing activities and tightly supervise this works.

In terms of socio-economic aspect, the sub-project shall bring back a lot of positive and long-term impacts. Negative impacts are assessed as insignificant and only occur during the construction period.

5.4.4.1 Impact evaluation in terms of each work item

a. Culvert repair:

- Post-repaired parameter: reinforced structure F500; level of 33,63m;

- Improvement, repair and construction:

- Built new water intakes in replacement of broken intakes. Intakes are made of steel F500, covered with concrete M200, opened and closed by conical valves in the lower stream; affix is assigned to intakes; the block valve arranged in upper stream. Intakes are located in right shoulder of dam and 12 meters from the old intakes.

- Impact evaluation: intakes are constructed in dry season (from May to July). During the construction, the handle shall be filled to regulate the flow through the old ones. Repair and improvement under the sequence: digging foundation for intake construction, moving the quantity to lower stream; clay shall be filled around the intake after finishing casting concrete. Then, the foundation shall be backfilled by materials on site. Only when the new intake is constructed, the old intake shall be demolished. Water intaking is parallel to dam construction.

Intake construction shall affect quality of water inside the reservoir due to the demolition, machinery oil and material dropping from equipment installation.

However, these impacts are considered SLIGHT AND TEMPRARY due to:

i) The construction of water intake is conducted in dry season and surrounding dykes are built if necessary. Thus, influence on supplied water is very low.

ii) Construction duration shall be widely informed to people so that they can be proactive in preparing plan for production and living.

iii) Discharge time shall be suitably decided and avoid the time of irrigation for plants in lower stream.

Location: Khe San reservoir, water intake

Duration: 10 months of construction

b. Improvement of upper stream and lower stream roofs

- Repaired parameter: the length of 289 meters, height of 8-12 meters, the width of 2.6 to 3.2 meters

- Improvement, repair, construction:

+ Remain the location of current dam, expand the surface

Specifically: the surface width of 5 meters under the existing standards.

+ Upper stream roof is protected by reinforced concrete and laving stone

+ Upper stream roof is planted with grass and drainage slots for the roof and the foot.

- Impact evaluation: There are some bushes on upper stream roof. This is the residence of some insects such as mites, crickets, coconut beetles coconut, chinaberry beetles, etc. When conducting the project of upgrading and repair the dam, especially item of upgrading the dam roof, vegetation system on two roofs shall be cleaned up, the animals living within roofs will be affected.

However, small animals can move to other regions, the garden of households or wasteland with flora system shares the similar characteristics to live.

The site clearance, acquisition causing noise shall affect fish living in cages as these cages are located quite near to the upper stream roof. However, due to the small area and the small quantity of plants, impacts from plant clearance are insignificant.

During the construction of roof, the construction of spillway may cause erosion to the dam or neighboring areas. However, this effect is LOW and TEMPORARY due to:

i) The construction of roof is conducted in dry season, the rainfall is small. The possibility of erosion is low or hardly occurs.

ii) Construction sites are located over the water level of reservoir and foot location are built of cement. Thus, soil erosion is very low.

Location: Khe San reservoir, in the lower stream of the dam

Duration: 10 months of construction

c. Expansion and construction for spillway

- Post-repaired parameter: remain the location of spillway, expand the width of current overflowing threshold to B=30 meters, built spillway, dig to open channel regulating water to lower stream to ensure long-term safety when discharge designed and examined flood volume and examine.

- Improvement, repair, construction:

- Expand spillway from 23.6 meter to 30 meters

- Type: Practical spillway, the cross-section is in trapezium shape, the top width of 1.2 meters, the roof 1=1.0, Energy consumption tank is made of natural rocks.

- The width of overflowing threshold: B=30,0 meters, the level of 45,30 meters.

- Structure:

+Entrance gate: the bottom of entrance gate is made of natural soil, wing wall of upper stream is made of concrete M200, the top is from 0.3-0.4 meter wide, the height is from 0-4.05 meters; bottom slab is made of concrete M200, from 0.35 - 0.5 meter thick.

+ Spillway: on the core of old spillway, a M200 concrete layer is casted, outside is covered with reinforced concrete M250, thickness of 20 centimeters. Bordering wall is made of concrete M200, the top is 0.4 meter wide; the height varies from 4.60 to 6.20 meters, the bottom slab of bordering wall is 0.5 meter thick and the height increases from 1.75 to 2.15 meters.

+ Energy consumption tank: The bottom is originally stone and it is not necessary to be strengthened. Wing wall in lower stream is made of concrete M200, the top of wall is 0.4

meter wide; the height decreases from 6.2 meters to 1.6 meter; the bottom slab is 0.5 - 0.3 meter thick; and the width decreases from 2.35 to 1.1 meter.

+ Guiding channel in lower stream: the bottom slab is the formerly original stone, two sides of roof are reinforced by concrete M200, 15 centimeters thick.

- Impact evaluation:

- The construction of dam and spillway is conducted in 10 months. The construction of spillway shall not affect the water intaking for production.

- During the construction, spillway can erode the dam or neighboring areas. However, these impacts are SLIGHT and TEMPORARY due to:

i) The construction of spillway is conducted in dry season, rainfall is low; the potentiality of erosion is very low or hardly occurs.

ii) Construction sites are located over the water level of reservoir or in lower stream of the dam. So, it is difficult to cause soil erosion.

Location: Khe San reservoir, spillway

Duration: 10 months of construction

d. Repair and construction of management road

- Post-repaired parameters: cement concrete road, 145.8 meters long, embankment is 5 meters wide, surface road is 3.5 meter wide.

- Improvement, repair, construction: Management road is repaired and improved by cement concrete. The route still bases on the existing track. However, there is some adjustment made to the ending segment to ensure the slope not to exceed 10%. The service road starts from asphalt road and ends at the beginning point of the dam (milestone A). The road surface is designed in accordance with the design standard for type B rural roads.

- Size: the route is 145.8 meters long, the cross-section is 5 meters wide, in which the embankment is 3.5 meter wide; each roadside is 0.75 meter wide.

+ Drainage ditch is designed with cross-section in trapezium shape; the bottom is 0.3 centimeters wide; 0.3 meter high; the roof m=1.0

- Structure: the upper layer is made of 16 centimeter concrete M200k; the lower layer is made of 15 centimeter macadam; the roadside is filled by 12 centimeter aggregate gradation.

- Impact evaluation: This route shall be used for material transportation during construction of focal works. Materials are transported via this route to reduce traffic capacity for main route. Vegetation along the path of this route is mostly brushes; only some of common timber such as chinaberry and low quality timber are seen.

- The construction of management road does not cause land withdrawal, only affects some plants along the route during the site clearance. Affected plants are perennials (such as acacia, indigo, shrubs, etc) and vegetables of low economic value, not rare plants.

- The construction of management road can affect the travelling, transportation of local residents as well as risks of accidents:

- Increase the risks due to the increase of transportation means on construction area (where activities such as excavation, yard for construction machines, wastes are located over

or nearby the route, the work, etc.) may cause danger, especially at night when the vision is limited.

- To restrict the travelling of local residents as well as the assess to social infrastructures such as schools, markets, etc.

Nevertheless, these impacts are LOW and TEMPORARY due to:

The flow of trucks on site is divided.

- The management route currently is soil road and hardly used by the local residents; mostly is reservoir management road. Thus, possibility to obstruct the traffic is very low.

- A part within the scope of work conducted by the Contractor is to ensure the health and safety on site for all individuals and risks for the safety of people on site are not allowed. Thus, the Contractor is required to take measures to reduce impacts during the construction.

Location: management road passing hamlet 7, in Quynh Thang commune

Duration: 10 months of construction

5.5 Impacts during operation phase

5.5.1 Source of impacts

During this period, source of impacts on environment may be solid and liquid wastes of some people whose the afforesting area in the area larger water level inside the reservoir and people living in beneficial areas. This is a source of impacts on environment; however, the severity of impacts depends on numbers of households and used land area.

- Solid wastes from residential areas and secondary products of agriculture.

- Solid wastes from the use of fertilizers, pesticides during the agricultural cultivation
- Domestic waste water, and industrial waste water
- Change in design of the work

5.5.2 Impacts on environment

a. Impacts on quality of air and regional climate

The repairmen and improvement of reservoir affect the air in different stages with the different affected range. During the preparation and construction periods, the air is polluted mainly due to dust and gas from site clearance, construction of roads, ports, storages, and material transportation, etc. These impacts only occurs in a small range, and cause local pollution and uncontinuous. When the reservoir is completely repaired and put back to the operation (operational phase), impacts of the work shall change some meteorological elements in the area.

The basin of reservoir is typically tropical monsoon climate. The nature of dry continental climate in this area is clearly shown in dry season. The reservoir's re-operation shall contribute to change the regime of microclimate in the area.

Thus, impacts on the air and microclimate in the project area under the phase of management and operation are considered positive, at a relatively great level. In order to define the aforesaid changes in terms of quantity, the meteorological monitoring and study shall be regularly conducted both before and after the construction.

Hence, during the operation phase, the sub-project contributes the stability on water source, ensures the safety for the work and the lower stream of the dam. Negative impacts during the operation phase on the air are nearly zero.

b. Impacts on landscape

Pursuant to the proposal by the consultant, to ensure the safety of reservoir, the spillway shall be expanded by 6.4 meters. After expansion, the width of spillway is 30 meters. With the size after being expanded to 30 meters, when floods occur, the water level inside the reservoir increases lesser compared to the existing spillway. The stability of reservoir shall higher, decreasing potentiality of sudden increase/decrease in water level followed floods, ensuring conditions for development of inshore flora population and creating new landscape for the reservoir.

Landscape of reservoir: after the work is improved and upgraded, the landscape of reservoir becomes clean and spacious (management road is concreted). Nice view combined with convenient traffic shall attract visitors. Tourism shall contribute an increase in the local budget.

Improvement of ecology: the ground for construction, reservoir and the upper stream in flora system, vegetation cover of ecology shall be improved significantly due to being filled with plants, afforesting to recover the ecology after the construction is completed.

c. Impacts on water

The operation of sub-project after being upgraded shall increase the water intaking, and then change the flow speed, alluvium transportation, regulating the current flow. These elements can erode soil and accumulate sediment along the irrigation system. However, this effect is insignificant.

d. Impact on ecosystem

Upper stream forest and forest nearby the reservoir shall be protected and filled with plants. Plants are increasingly grow combined with the silence shall be the positive element attracting more species, especially small and big animals and emigrated birds to come and live there.

The stable and safe operation of the reservoir contributes to the development of forest ecology. Impacts on ecology are considered as medium and the impacting duration is long and continuous during the life under the project.

e. Impacts on sedimentation and erosion

The reservoir is designed and construction ensuring the designed flooding frequency of 1.5% and inspected flooding frequency of 0.5%. The reservoir shall be repaired and upgraded for flood prevention frequency of 0.01%. The result of calculation on flood regulation shows that the spillway under the reservoir needs to be expanded from 5 meters of the current status to 17 meters. The expansion shall increase the possibility of flood discharge. Water level inside the reservoir shall decrease faster compared to the current status. Since the flooding water level quickly decreases, the time of flooding water stagnated in the reservoir decreases, the amount of sedimentation decreases accordingly. Sedimentation of the reservoir shall be slower, and the longevity of the work shall be improved; the cost for river dredge shall reduce. However, expansion of spillway increases the overflowing flow. This may make erosion to lower stream greater than current status.

f. Urgent flood discharge

This shall not affect the irrigation area in the upper stream when the flood occurs. The flow into the stream and directly into the river. This area is high mound, where there is no presence of residents. On the other hand, urgent flood discharge time is the rush period of floods, not production season, there is no impact on crops in lower stream.

g. Risk of water loss inside the reservoir:

Water inside the reservoir absorbs through bank, major dam, or absorbs into underground water, reducing water to be supplied for 120 hectare of rice and crops in dry season. If the loss of water is great, the regulation on water shall be affected, causing lack of water for production and damages on economy. However, after the repair and consolidation of dam, the **water loss** of Khe San is considered insignificant, spillway and water intake are repaired and upgraded to ensure the water absorbance through the dam to be maximum limited.

h. Risk on safety of dam:

Dam failure affects the hydrologic regime of the area very much, affects water, soil, aquatic ecosystem, water supply of irrigation area, affecting agricultural production in lower stream of the work. Particularly, when the dam fails, the lives and properties of 400 households in hamlets 4A, 7, 9, 11 in Quynh Thang commune shall be impacted. The consequence recovery of dam failure is very difficult and takes a long time. Thus, the operation shall be seriously conducted. The proposed measures of mitigation shall be presented in Chapter V of this report.

i. Causes on dam failure:

(i) The constructed maximum flow and water level of floods exceeds the designed flow and water level. (ii) As the quality of materials for dam filling is not good as specified in standards. (iii) During the construction, the design level is not satisfied, when suffering from the may rain floods, water level exceeds the designed water level. (iv) Since construction failed to follow the design. (v) Since incident of discharge gate system: the discharge gate is blocked. (vi) Due to the inaccurate forecast, operational incident of the reservoir is not timely implemented. (vii) Due to the earthquake. These causes shall be overcome to reduce the impacts on the safety of dam and to protect the lower stream

PART 6. MITIGATION OPTIONS

6.1 Mitigation during preparation stage

Table 6.1. Measures to minimize the environmental and social impact of the sub-project in thepreparation phase

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages	
The impact on families that losing agricultural land	Implement the mitigation measures as outlined in the resettlement plan. The clearance and resettlement is the responsibility for the compensation, support and resettlement of the district	It is inevitable that land loss affects negatively to the lives of people. In the current situation, the difference in compensation rates between frame rates of the state and the actual rates, and the inflation impedes the compensation work. However, the compensation and policy support make the lives of the landless households somewhat stable.	
Dust emissions	Equipping sprinkler vehicles, watering the road. Spray water in the leveling area or transport routes	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.	
Noise	Ensure the best operating status for construction machinery and trucks by maintenance works	These mitigation measures are simple, easy to implement, and do not need the complex technology and complex technique. However, there must be a commitment by	
generation	The loud noise activities should conduct over a period of working day	construction contract between buildin contractors and project management uni Noise impacts can only mitigate, not bein able to completely overcome.	
	Solid waste bins	These measures are highly effective,	
Waste generation	Oil waste bins	feasible and easy to implement. It needs the participation in the form of a contract	
	Grease rag bins	between the contractor and the functional units for collection, disposal, and treat oil waste. It should have the consistency between the construction contractors. There should be a strict sanctions and the closely monitoring.	
	Portable toilet		

6.2 Mitigation measures during construction stage

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages
1.Rocks and dropping material deposits the 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, canalsfrom 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 or 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.
3 Water and aquatic	+ Oil should be stored in a safe area, with concrete floors and roof that	The mitigation measures are simple, easy to

Table 6.2. Measures to minimize the environmental and social impact of the sub-project during construction period

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages
environment	avoid rainwater and floodwater;	implement, no complex technology and
pollution from waste, chemicals, effluent or contaminated land	 +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 	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.
4 Irrigation channels and reservoir 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 phase. + 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.	Highly effective, without complex technology or technique, and low budget.
Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages
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	+ Speed up the construction	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. + During the dry season, the trucks should be sprayed water when they pass through the crowded residential areas, schools in the rush hour. + 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 20 PM. 	These mitigation measures are simple, easy to implement, do not need the technology or complex technical. However, there must be a commitment by construction contract between

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages		
	+ Inform the construction plans regularly to communities and local government by phone, speakerphone, text, or on the notice board of the Commune people's committees	building contractors and project management unit. 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 (1 disposal) + 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 oil waste. It should have the consistency between the construction contractors. There should be a strict sanctions and the closely monitored		

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages
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 	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.

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages
	 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; 	These measures are kickly offective feasible
12 The temporary dump materials such as dust, noise 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 technique. These measures shall require the responsibility of construction units as well as the full assessment before starting construction. Therefore, measures to punish and monitor closely should be needed.
13. Impacts generate from land mines, stone and sand such as dust, noise, safety and the soil or water pollution.	 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 	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

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages
	the treatment from competent authorities. Workers need to be equipped	units to ensure that the waste is being handled.
	with protective tools while working in the made ground.	These measures will bring good results if the
	 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. 	construction contractors and workers are aware and educate about environmental protection, and they are tested by the project owner.

6.3 Mitigation measures during operation stage

Potential impacts	Mitigation measures	Effectiveness Advantages / disadvantages
1. Natural disaster caused the insecurity	 + Khe San operational management unit –Khe San irrigation works management periodically checked the safety of the reservoir. + Khe San operational management unit closely coordinates with the CPC 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 	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 government should have an additional statement. 	This measure has the highly feasible. However, the monitoring system should be equipped to support operating officers in the forecast work.

Table 6.3. Measures to minimize the environmental and social impact of the sub-project during operation

PART 7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

7.1 ESMP objective

- 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 measure

7.2.1 Potential impacts and mitigation measures

The potential impacts and mitigation measures are listed in ESMP in table 7.1

Table 7.1.	Environmental	and Social	Management	Plan
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Activity	The sources causing impact and polluted factors	Measures to minimize the adverse impacts	Implementation expenses	Time for implementati on	Implementation organization	Supervision organization
Pre-construc	ction phase					
-Land acquisition and compensati on for land and	Land acquisition, Compensation	Planning and implementing the plans of compensation, support and land acquisition	- The expenditure for compensation, support and land acquisition .	In the land clearance period	The compensation, support and land acquisition Board	Independent supervision consultant on compensation, support and land acquisition

Activity	The sources causing impact and polluted factors	Measures to minimize the adverse impacts	Implementation expenses	Time for implementati on	Implementation organization	Supervision organization
vegetables planted -Land clearance	- Loss vegetation cover by land clearance.	Reclaim/improve the vegetation cover after project finished.	-The contractor's expenses included in construction contract -Expenses for supervision: included in Environmental management plan		The construction contractor complies with regulations on forestry The hired contractor must return space after finishing construction	- PMU supervises innerly as in contract. - Consultant of CPO supervises independently for inspection. - Department of Natural Resources and Environment.
Construction	n phase					
-The transport of rock, soil and building materials -The constructio n of the subproject' s works	Dust, exhaust fumes, noise and vibration from transport activities of building materials and construction machines Overflowed rain-water	 Moist irrigation for construction area and traffic road; Cover tight lorries by canvases; Machines's maintenance, Supervision the air environment quality Clean the space by end of working day Building the rain water collection system Supervise surface water quality 	-The implementation expenses of contractor as in construction contract -Supervision expenses as in Environmental management plan	During the land leveling and construction time	The contractor and the secondary contractor must obey regulations on health and safety of local people as in contract.	- PMU supervises innerly as in contract. - Consultant of CPO supervises independently for inspection. - Department of Natural Resources and Environment.

Activity	The sources causing impact and polluted factors	Measures to minimize the adverse impacts	Implementation expenses	Time for implementati on	Implementation organization	Supervision organization
	Domestic Solid waste	Contract with the local unit for rubbish collection Supervise the waste water environment				
	Construction Solid waste	Solid waste is metal, plastic, wrapping, etc. will be sold as waste;				
Operation pl	hase					
Project's safety	Collapse and break of dam	Supervision whole works	-Supervision expenses: in Environmental management plan	During operation time	Project Management organization	- Consultant of CPO supervises independently for inspection

7.2.2 Estimated cost of mitigation measures

Subproject's stage	Subproject's activities	Environmental and Social Impacts	Measures to minimize the adverse impacts	Implementation expenses	Time of implementation and operation	Implementation responsibility	Supervision responsibility
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pre-	Permanent or temporary land acquisition of living or agriculture land	Loss a part of livelihood opportunity of local residents.	+Compensate for household/landowner according to price frame of Nghe An province and harmonise with WB's policies +Stakeholder and beneficiaries consultation must be done +The tally work of damage complies with regulations, especially must have the participation of direct affected people	Provincial budget	Before implementing subproject. Expected in month	PMU coordinates with Compensation and land clearance committee of Quynh Luu district	PMU and Department of Agriculture and Rural Development People's Committee of Quynh Luu district
construction	Transport of waste	 Increase traffic accident risk. Arising dust, noise on the road. 	 Equip 10 canvases for lorries that have no canvas or replacing for old canvas. Guarantee the means and construction equipments have been maintained in good condition. In sunny season, the material transport means must be spay water on the road when they moving 	2million VND/canvas x 10 canvases = 20million Spraying water: 5 million Speed limitation signs: 4 signs x 1 million/sign = 4	Every day	Execution Unit	Project Owner

Subproject's stage	Subproject's activities	Environmental and Social Impacts	Measures to minimize the adverse impacts	Implementation expenses	Time of implementation and operation	Implementation responsibility	Supervision responsibility
			 through crowded residential area, schools in the rush hours. + Asign speed limitation (15km/h) and guide drivers familiarize and obey. + The contractor will propose execution plans that approved by PMU to reduce the time of land clearance, construction and temporaty storage of material. 	million			
	Assembling means, machines	-Noise, dust waste, space withholding	- Make movement plan, assemble equipments reasonably to avoid effect on local people's life		Project preparation phase	Execution Unit	Project Owner
	Workers reside temporarily in the project area	Causing the disorder in local people's life	 + Register temporary residence for workers + The contractor guides the communication way with local community and authorities for workers + The contractor develops and requires workers to obey rules/regulations when living in the 	Contractor	When workers start living at local communication	Contractor	Supervision consultant

Subproject's stage	Subproject's activities	Environmental and Social Impacts	Measures to minimize the adverse impacts	Implementation expenses	Time of implementation and operation	Implementation responsibility	Supervision responsibility
			local region (no quarrel with the local people, no gambling and theft, etc)				
	Construction activities of project works	Dealing the sig	- Non-use the equipments are too old, maintain periodically machines and equipments 6months/time	15million/ time * 1 time/1 year = 30million.		Construction company	
		Construction ctivities of roject works -Arising construction solid waste, scattered sandy soil, hazardous waste (waste machine oil, greasy clouts) cause environmental pollution, decline bio diversification	- Spraying water periodically on the construction area and along the execution road line	Change by day	Regularly during construction time		Project Owner
Construction			- Cover canvas for materials storage yards and means transport material.	10 million			
period			- clean up and treat the volume of digged sandy soil and weathered soil scatters on the ground	30 million	Doing day by day	Construction company	Project Owner
			- At each construction site places 02 dustbins keep hazardous waste; and 02 dustbins keep normal waste	1 million /dustbin x 04 bins x 1 placing point = 4 million	Purchasing before deploying subproject	Construction company	Project Owner
			- Regularly collect and clean	Service fee for waste collection	Doing day by day	Construction	Project Owner

Subproject's stage	Subproject's activities	Environmental and Social Impacts	Measures to minimize the adverse impacts	Implementation expenses	Time of implementation and operation	Implementation responsibility	Supervision responsibility
			scattered materials - Classify solid waste and put rightly to bins as per required - Collect and treat rightly hazardous waste as per regulation	and treatment 20million/year * 2 years = 40 million.		company	
		Overflowed rain-water, washing water means and materials	 Economical use of water source Constructing accumulation pit to collect construction wastewater, 	10 million/1 construction site * 01 site = 10 million.	Constructing before deploying execution	Construction company	Project Owner
			machines washing water to treat r waste matter, colloidal sludge.		Implementing day by day	Workers in the project site	Project Owner
		- Impact to labor safety, working condition, worker's heath at the construction site.	 Arrange the reasonable working schedule Equip sufficiently labor safety instruments for workers Hold the training, capacity building on labor safety and environmental protection before construction. Organize periodic medical checkup for workers on the construction site 	 Equip labor safety instruments: 20 million/year * 2 years = 40 million. Organize training on labor safety: 30 million/course *2 course/year*2 years = 60 million. Arrange periodic 	Implementing during construction process	Construction company	Project Owner

Subproject's stage	Subproject's activities	Environmental and Social Impacts	Measures to minimize the adverse impacts	Implementation expenses	Time of implementation and operation	Implementation responsibility	Supervision responsibility
		- Environmental problems: natural calamity, rainstorm, oil leakage, combustion, detonation, etc	 Make prevention plan of storm, tropical low pressure, whirlwind. Disseminating the response plan. Organizing maneuver. 	medical checkup: 20 million/year *2 year = 40 million.	Annually	Appropriate authorities	Project Owner
	Production activities of concrete components	- Soil and water pollution by water washing machine equipments.	 Economical use of water source Constructing wastewater collection system, accumulation pit for treatment before discharge to environment 	Same expenses for construction accumulation pit	Building before deploying subproject	Construction company	Project Owner
	components	- Dust, exhaust fumes, noise due to mix and pour concrete	- Maintain machines periodically		Periodically every month	Construction company	Project Owner
	Materials transportation activity	 Air pollution by noise, dust, exhaust fumes of transport means Impact to traffic infrastructure of region Increase risks in traffic accident for people travel 	 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 	02 million/canvas x 20 canvases = 40 millions	Everyday	Construction company	Project Owner

Subproject's stage	Subproject's activities	Environmental and Social Impacts	Measures to minimize the adverse impacts	Implementation expenses	Time of implementation and operation	Implementation responsibility	Supervision responsibility
		on road	for too old canvases. - Run follows the speed limit.				
	Life activities of staffs and workers	- Arising domestic wastewater	Make contract to purchase 03 mobile latrines.	30million/latrine x 2 unit = 60million	Purchasing and installing before deploying subproject	Contract with distribution agency	Project Owner
		- Domestic waste	 Equip 03 dustbins to collect rubbish at the tents Clean up regularly Contract with environmental sanitation agency of local to transport and treat waste 	2million/dustbin x 03 bins x 01 tent = 6 million - The transport and rubbish treatment fee 20million/year *2years = 40 million	Purchasing and make the contract for collecting rubbish before implementing project	Construction company	Project Owner
	Repair and return the road lines that have been damaged	- Protect traffic road line in the project area	- Repair, levelling and improve the damaged, depressed and low quality road lines	80 millions	Doing immediately after finishing construction period	Construction company	Project Owner
	Observation and	- Guarantee environment quality of project region	- Take the sample for observation and monitor environment quality at	66 millions	Implementing during	Agency has sufficient legal	Project Owner

Subproject's stage	Subproject's activities	Environmental and Social Impacts	Measures to minimize the adverse impacts	Implementation expenses	Time of implementation and operation	Implementation responsibility	Supervision responsibility
	supervision environment during construction time	as per permitted standard	construction site (18 months)		construction period periodically 3-6 months/time	status and to be hired by project owner	
	Return whole construction area: tent area, dumping ground, soil exploitation area	- Arising solid waste	 Dismounting tents, signs Gathering, and selling for user. Assembling and movement of machines, construction equipments. Fill up and leveling the ground of explosion field. 	50million	Implement when the construction phase finishes	Construction company	Project Owner
Operation period	Management, operation, maintanance water inlet sluices	- Safety guarantee for residential area, cultivated land, works and infrastructure	 Organise to inspect the maintanance regularly and periodically. Discover and tackle opportunely the encroachment and use canal line out of purpose. 	Subproject's maintanance budget	Annually	PPMU	Project Owner
	Traning, prevention of problem	- Serving inspection mission, discovering opportunely, rescuing when the problem	- 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	Subproject's operation budget			

Subproject's stage	Subproject's activities	Environmental and Social Impacts	Measures to minimize the adverse impacts	Implementation expenses	Time of implementation and operation	Implementation responsibility	Supervision responsibility
		happens	(DARD).				
	Dredge irrigation	- Avoid the accumulation state that pollutes water environment and change hydrology regime due to the narrowed river/canal bed	 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 	Subproject's operation budget			
	Operating close and open suice gate	- Cause the interior field water stagnant that effect to surface water quality	 Regularly monitor the salty level, regional hydrology regime Operate water inlet sluice flexibly and timely 	Subproject's operation budget			
	TOTAL ESTIN	IATED COST		626.000.000đ			

7.3 Environmental and social monitoring plan (ESMoP)

7.3.1 Environmental Monitoring Program

i) Environmental monitoring program in construction period

Table 7.3. Environmental monitoring in construction period

No	Type	Position	Frequency	Norm	Compared
110	Туре	rosition	rrequency	1 VOI III	standard
Ι	Monitorin	g of waste sources ma	nagement		
1	Potential source	Tents of workers Dumping ground	3 months/time	Volume of solid waste The number of latrines, tents and waste water treatment systems Volume of harmful waste Waste's components:	
2	Manage ment measures of potential waste	Construction sites, Tents of workers Dumping ground	3 months/time	Amount of dustbins Receipts of collection and transport services.	
II	Monitorin	g the impacts to natura	al environment		
1	Air	1.The earth damexecutionarea(KK01);2.2.Spillwayconstructionarea	6 months/time 2 times/day in each time	 Condition of micro climate, temperature, moisture, wind speed Noise level LAeq 	NTR 05:2013/BTNMT National Technical norm in surrounding

Tuno	Desition	Frequency	Norm	Compared
туре	rosition	rrequency	NOTIN	standard
	(KK02);		- Indecisive dust	environment
	3. Management road		TSP	quality NTR
	construction area		- Respiratory dust	26:2010/BTNMT
	(KK03)		(PM10)	National
				Technical
				standard on noise.
				NTR
				27:2010/BTNMT
				National
				Technical norm
				on vibration.
	1. Surface water in			NTR
	river bed (NM01)			08:2008/BTNMT:
	2. Surface water in		- pH	National
Surface	water inlet sluice		- DO	Technical norm
Suitace	(NM02)	6 months/time	- TSS	on surface water
water	3. Surface water after		- COD	quality.
	dumping ground		- Coliform	
	(NM03)			
			- Hardness (CaCO3)	NTR
			- TDS, TS	09:2008/BTNMT:
Ground	dumping ground		- Iron (Fe)	National
water	rearwards (NN01)	6 months/time	- NH ⁴⁺ followed N.	Technical norm
			- E.coli	on ground water
				quality
	Type Surface water Ground water	TypePosition(KK02); 3. Management road construction area (KK03)(KK03)I. Surface water in river bed (NM01) 2. Surface water in water inlet sluice (NM02) 3. Surface water after dumping ground (NM03)Ground waterGround water	TypePositionFrequency(KK02); (3. Management road construction area (KK03)	TypePositionFrequencyNorm(KK02); (3. Management road construction area (KK03)- Indecisive dust TSP - Respiratory dust (PM10)1. Surface water in vater inlet sluice (NM02) (3. Surface water after dumping ground (NM03)- PH - DO - TSS - COD - COD - ColiformGround waterdumping ground rearwards (NN01)- Hardness (CaCO3) - TDS, TS - Inon (Fe) - NH*+ followed N. - E.coli

No	Type	Position	Frequency	Norm	Compared
110	Турс	1 USITION	Frequency	NOTIM	standard
		1. Surroundings of			NTR
		dumping ground		- Asen (As)	03:2008/BTNMT:
	Soil	(MĐ 01)		- Cadimi (Cd)	heavy metal limit
4		2. Surroundings of	6 months/time	- Copper (Cu)	in soil.
		the construction		- Lead (Pb)	NTR
		materials storage		- Zinc (Zn)	
		ground (MĐ02)			
5	Landslie,	Spillway	1 time in	Scale of landslide;	
5	erosion	construction	quarter 6	Landslide level	

ii) Environmental monitoring program in operation period

Table 7.4. Environmental monitoring in operation period

No	Туре	Position	Frequency	Norm	Compared standard
				- pH	NTR
				- DO	08:2008/BTN
				- TSS	MT: National
	Surface			- COD	Technical norm
		1. Surface water at		$-BOD_5(20^0C)$	on surface
		water inlet sluice		- NO_3^- (according to N)	water quality.
		(NM04);		- PO_4^{3-} (according to P)	
2	water	2. Surface water at	6 months/time	- As	
		canal 2 (NM05)		- Total lubricant	
				- Coliform	
				- Surplus vegetable	
				protection medicine	
				group Cl	
				- Surplus vegetable	, ,

						protection	medicine	
						group Phosp	horus	
				In	flood			
1	Landslie,	At downstream	of	season		Scale of land	slide;	
4	erosion	spliiway		02 years	after	Landslide lev	vel	
				operation	1			

7.3.2 Social monitoring program

i) Social monitoring program in construction period

Table 7.5. Social monitoring in construction period

No	Туре	Position	Frequency	Norm		
Ι	Monitoring the social impacts					
	Social impact	Commune at downstream	6 months/time	Income, employment, the number of crops, average yield, water supply calendar Reflection and complaint of local residents		
II	Monitorin	g environmental sanita	ation and labor	safety		
1	Environ mental sanitation	Construction sites, Tents of workers Dumping ground Material storage ground	3 months/time	Quantity and condition of latrines Quantity and condition of sanitation instruments First aid box Health activity The number of infectious cases Communication plan on community health		
2	Labor safety	Construction sites, Tents of workers Dumping ground Material storage	3 months/time	Labor safety instruments Safety note The number of accidents		

No	Туре	Position	Frequency	Norm
		ground		

ii) Social monitoring program in operation period

 Table 7.6. Social monitoring in operation period

No	Туре	Position	Frequency	Norm
1	Social impacts	Communes get benefits	6 months/time	Income, employment, the number of crops, average yield, water supply calendar Reflection and complaint of local residents

Map of sampling positions for environment monitoring as presented in Annex 4

7.3.3 Estimated cost for environmental and social monitoring

Table 7.7. Estimated cost for Environmental and social monitoring in Construction period

No	Items	Unit	Amount	Unit price	Cost
110		Cint	imount	(VND)	(VND)
Ι	Monitoring waste source management				10,000,000
1	Arising source	Time	1	5,000,000	5,000,000
2	Measures to manage emission	Time	1	5,000,000	5,000,000
II	Monitoring impacts to natural		19,520,000		
1	Air analysis		1,590,000		
	Microclimate condition: temperature, moisture, wind speed	Sample	1	40,000	40,000
	Noise level LAeq	Sample	1	60,000	60,000
	Suspended dust TSP	Sample	1	65,000	65,000
	Respiratory dust PM10	Sample	1	100,000	100,000
	Total cost of analysis 01 sample	Sample			265,000
	Analysis cost 3 points x 2 samples/day	Sample	6	265,000	1,590,000

No	Items Unit Amount		Amount	Unit price	Cost
110		Cint	mount	(VND)	(VND)
2	Surface water analysis				1,710,000
	pН	Sample	1	30,000	30,000
	Dissolved Oxygen (DO)	Sample	1	60,000	60,000
	Total suspended solid (TSS)	Sample	1	50,000	50,000
	COD	Sample	1	70,000	70,000
	Total lubricant (oils & grease)	Sample	1	300,000	300,000
	Coliform	Sample	1	60,000	60,000
	Cost for analysis 01 sample	Sample			570,000
	Total cost for analysis 3 positions x 1 time	Sample	3	570,000	1,710,000
3	Ground water analysis	I	I		580,000
	рН	Sample	1	30,000	30,000
	Hardness	Sample	1	60,000	60,000
	Total dissolved solid (TDS)	Sample	1	50,000	50,000
	Amoni (NH4+)	Sample	1	60,000	60,000
	Asen (As)	Sample	1	80,000	
	Lead (Pb)	Sample	1	60,000	60,000
	Iron (Fe)	Sample	1	60,000	60,000
	Total Coliform	Sample	1	60,000	60,000
	Cost for analysis 01 sample	Sample			380,000
	Total cost for analysis Iposition x l time	Sample	1	380,000	380,000
4	Soil analysis	I			640,000
	Asen (As)	Sample	1	80,000	80,000
	Cadmi (Cd)	Sample	1	60,000	60,000
	Copper (Cu)	Sample	1	60,000	60,000
	Lead (Pb)	Sample	1	60,000	60,000
_	Zinc (Zn)	Sample	1	60,000	60,000
	Cost for analysis Isample/ 1 position	Sample			320,000
	Total cost for analysis 2 positions x Itime/day	Sample	2	320,000	640,000
5	Monitoring landslide	Time	1	15,000,000	15,000,000

No	Itoms	Unit	Amount	Unit price	Cost
INU	Items	Umt	Amount	(VND)	(VND)
III	Monitoring social impacts	5,000,000			
	Social impact	Time	1	5,000,000	5,000,000
IV	Monitoring environmental san	itation an	d labour s	afety	10,000,000
	Environmental sanitation	Time	1	5,000,000	5,000,000
	Labor safety	Time	1	5,000,000	5,000,000
V	Expenses 3 staffs x 3 days		9	350,000	3,150,000
	Car for sampling analysis				
VI	(fixed price, estimated 5	Time	1	5,000,000	5,000,000
	million 1time)				
VII	Make monitoring report for	Set	1	4,000,000	4,000,000
	each time				
	Total estimated cost for				56 650 000
VIII	monitoring 1 time (plus 1-	Time	1		56,670,000
IX	1 otal estimated monitoring	Time	3	56,490,180	170,010,000
	CENEDAL MANACEMENT				
X	COST: TT*20%		С		34,002,000
XI	Total cost before tax		TC		204,012,000
VII	Tax GTGT: (VAT)= 10% x		VAT		20 401 200
АП	(TC)		VAI		20,401,200
	Cost for environmental				
XIII	monitoring in construction		G		224,413,200
	period				
	Round number				223,413,000

 Table 7.8. Calculation cost of environmental and social monitoring in operation period

No	Estimated cost for items	Unit	Amount	Unit price (VND)	Cost (VND)
Ι	Monitoring impacts to natural	21,150,000			
1	Surface water analysis	6,150,000			
	pH	Sample	1	30,000	30,000

No	Estimated cost for items	Unit	Amount	Unit price	Cost (VND)
NU	Estimated cost for items		Amount	(VND)	
	Dissolved Oxygen (DO)	Sample	1	60,000	60,000
	Total suspended solid (TSS)	Sample	1	50,000	50,000
	COD	Sample	1	70,000	70,000
	BOD ₅ (20°C)	Sample	1	80,000	80,000
	NO_3^- (according to N)	Sample	1	60,000	60,000
	PO_4^{3-} (according to P)	Sample	1	60,000	60,000
	Asen (As)	Sample	1	80,000	80,000
	Total lubricant (oils & grease)	Sample	1	300,000	300,000
	Coliform	Sample	1	60,000	60,000
	Surplus vegetable protection medicine group Cl	Sample	1	600,000	600,000
	Surplus vegetable protection medicine group phosphorus	Sample	1	600,000	600,000
	Cost for analysis 01 sample	Sample			2,050,000
	Total cost for analysis 3 position x 1 time	Sample	3	2,050,000	6,150,000
2	Monitoring landslide	Time	1	15,000,000	15,000,000
II	Monitoring social impacts				5,000,000
	Social impacts	Time	1	5,000,000	5,000,000
III	Expenses 3 staffs x 3 days		9	350,000	3,150,000
IV	Carfortakingsampleanalysis(fixedprice,estimated 5 million 1 time)	Time	1	5,000,000	5,000,000

No	Estimated cost for items	Unit	Amount	Unit price (VND)	Cost (VND)
v	Conducting report for each time	Report	1	4,000,000	4,000,000
VI	Total cost for monitoring 1 time (add I-V)	Time	1		38,300,000
VII	Total cost for monitoring2years (4 times)	Time	4	38,300,000	153,200,000
VIII	GENERAL MANAGEMENT COST: TT*20%		С		30,640,000
IX	Total cost before tax		TC		183,840,000
X	Tax GTGT: (VAT)= 10% x (TC)		VAT		18,384,000
XI	Cost for environmental monitoring in operation period		G		202,224,000
	AROUNDED NUMBER				202,224,000

7.3.4 Eenvironmental management training and capacity building

Table 7.9. The cost of capacity building and training implementation

Co	ontent	Trainees	Quantity	Cost (VND)	Fund
Training on fo	od hygiene,	Workers and	All of	50 people x	To be included
occupational	safety and	technical staff	workers,	200,000 VND	in the investor's
environmental pro	otection	of contractors	staff	/person =	contract with
				10,000,000 VND	stakeholders
	Control of	PPMU staff	3 people	500,000 VND	To be included
Training on	emissions			/person x 3	in the investor's
Environmental	sources			people =	contract with
Management				1,500,000 VND	stakeholders
	Impact	PPMU	3	500,000	To be

Co	ontent	Trainees	Quanti	ity	Cost (V	ND)	I	Fund
	assessment,	staff	people		VNd /pers	on x 3	included	in the
	environment				people	=	investor's	
	al risk				1,500,000	VND	contract	with
	control						stakehold	ers
	Envir	PPMU	8	5	500,000	VND	Тс	be be
	onmental	staff	people	(3	/person	x 8	included	in the
	Monitoring	CSC staff	PPMU s	staff	people	=	investor's	
			and 5 C	CSC	4,000,000	VND	contract	with
			staff)				stakehold	ers
	Raisi	PPMU staff	8	3	500,000	VND	To be in	cluded
	ng	CSC staff	people	(3	/person	x 8	in the inv	estor's
	awareness		PPMU s	staff	people	=	contract	with
	and		and 5 C	CSC	4,000,000	VND	stakehold	ers
	accessing to		staff)					
	the							
	environment							
	al legal							
	system							
	Train	CSC staff	5 people		5 peop	le x	To be in	cluded
	ing and				1,000,000	VND/p	in the inv	estor's
	capacity				erson	=	contract	with
	building for				5,000,000	VND	stakehold	ers
	environment							
	al							
	monitoring							
Training for CSB		CSC staff	2 people	e/ 1	2 peop	le x	To be in	cluded
			commun	e x	1,000,000		in the inv	estor's
			1 comm	une	VND/pers	on =	contract	with
			= 2 peop	ole	2,000,000	VND	stakehold	ers
Total (VN	(Đ)				28,000,00	0		

No	Monitoring content/ Implementing period	Implementing responsibility	Cost (VND)
Ι	Construction period	The agency has sufficient legal status and hired by Project Owner	223,701,000
II	Operation period	PPMU	202,224,000
III	Training, capacity building	PPMU	28,000,000
	Total (I+II+III)		453,637,000

Table 7.10. Summary of total cost for conducting Environmental and Social Monitoring Plan

7.3.5 Monitoring report requirement

The reports will be developed during the time implementing monitoring programs, conducting the collection of reports on impacts or the recommendation from local residents for subproject. The effect assessment of mitigation measures was implemented.

Implementation	Type of report	The content of	Frequency	
rosponsibility		ronort	for submit	Submit to
responsionity		report	the report	
	Report on	Collecting	Within 24	Subproject
	accident/risk	information on	hours since	management
		accident or	having	committee
		unexpected	problem	and
		problems		Execution
Execution				monitoring
contractor				consultation
	Infringement	Provide	Within 01	Subproject
	report	information in	week from the	management
		violation acts	matter	committee
		regulations in	happens	and
		environmental		Execution

 Table 7.11. The types of Environmental and Social monitoring report

Implementation		The content of report	Frequency	
responsibility	Type of report		for submit	Submit to
			the report	
		and social		monitoring
		management		consultation
	Demort	Talza note and	Within 24	Subaraiset
	Report	Take note and	within 24	Subproject
		report to	hours since	management
		appropriate	discovering	committee,
		authorities on	archaeological	Execution
		archaeological	relics, royal	monitoring
		relics, royal	tombs	consultation
		tombs have been		and
		newly discovered		Department
				of Culture,
				Sports and
				Tourism
	Report on the	The report on	Every month	Subproject
	implementation	results of		Management
	of ESMP	implementing		Committee
		measures to		
		minimize adverse		
		environmental		
		and social		
		impacts		
Construction	Report on the	- Assessing	Every month	Subproject
supervision	implementation	implementation		Management
consultant	of measures to	results of		Committee

Implementation		The content of	Frequency	
rosponsibility	Type of report	The content of	for submit	Submit to
responsionity		report	the report	
	minimize	measures to		
	environmental	minimize		
	and social	environmental		
	impacts	and social		
		impacts of		
		construction		
		contractors		
		- Results of		
		solving and		
		overcoming		
		problem and		
		shortcomings		
		from previous		
		report		
	Independent	- The inspection	6 months	Subproject
	monitoring	result of	/time or 3	Management
	report on	construction site	months/time	Committee
	environmental	- Result of		and WB
Independent	and social	Community		
environmental	safety	based supervision		
consultant		- Collecting and		
		classifying the		
		monitoring result		
		of execution		
		monitoring		

Implementation		The content of	Frequency	
responsibility	Type of report	report	for submit the report	Submit to
		consultant - Result of environmental monitoring - Assessing the result of ESMP implementation and the recommendation		
Subproject Management Board	Reportonenvironmentalactivitiesofsubproject	Result of ESMP implementation	6 months/time	CPO and WB

7.4 IMPLEMENTATION ARRANGEMENT ESMP

7.4.1 Agencies and responsibilities

a) Responsibility of subproject owner/Subproject management Board

Take responsibility for performing safeguard policies of subproject, supervising daily activities of subproject and monitor and manage the project construction quality, supervising the conformity with the environmental safety in construction activities of subproject

b) Responsibility of Contractor

Contractor has responsibility for conforming to regulations during construction process as contracted with PPMU.

c) Responsibility of Execution supervision consultant

This unit has been hired by PPMU and will be on behalf of PPMU to supervise and take note everyday about the conformity with environmental and social safety policies of construction contractor.

d) Responsibility of independent supervision consultant on environmental and social safety

Assist PPMU in effect assessment of mitigation measures and propose the adjustment of application environmental and social safeguard policies in necessary case;

Make monthly report on the conformity with environmental and social safeguard policies of contractor and submit to PPMU, this report will be the basis for contractor pay environmental and social protection expenses;

Report to PPMU "detections" during construction time.

e) Responsibility of local authorities and Community

The Community Supervision Board has been established according to "Decision No.80/2005/QĐ-CP dated 18/04/2005 of Prime Minister on investment supervision status of community". Community Supervision Board of commune has right and responsibility for supervision construction activities and negative impacts caused by construction activities, ensure measures to minimize the potential negative impacts must be performed effectively. In case of environmental problems arising that affects to community, they will report to construction site supervision consultant (CSC) and/or PPMU to fill in the information feedback notes on environmental safety.

f) Responsibility of reservoir management and development agency

Take responsibility for maintenance and periodic supervision of project works

g) Responsibility of CPO

Guiding provincial Project management Board to carry out environmental and social management plan of subproject. Supervising progress of subproject during construction time and the first operation year.

h) Responsibility of Department of Natural resources and Environment

Has responsibility to carry out environmental policies as per regulations of Vietnam Government.

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

Currently, Khe San reservoir is under management of Reservoir's Management Board. However, staff in the Board are responsible for only management and operation of the work as well as detection of incidents. Environmental and social practice has not been carried out properly.

There are activities of the people can make harmful to the work such as grazing pountries on the dam slope or cultivating within safety corridor of the work. Much plants growing on the dam face slope, especially large trees, will facilitate animals burrowing, living; decayed roots leaving pores, affecting infiltration safety of the dam, increasing the risk of dam destabilization and hindering visibility when checking.

To ensure safety of the work after upgrading and improvement, it needs to enhance awareness of people and capacity of staff in resesservoir management board of environmental and social management practice for the dam.

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 conducts the following training contents:

Heighten capacity in environmental management and supervision;

Communication to increase awareness in environmental protection;

Training in preventing and fighting fire

Training in environment regulations and standards

Training in environmental health and labor safety measures, environmental safety

Training to increasing awareness in dam safety

Training to increasing awareness in infectious disease

Training to increasing awareness in gender equality

Training to increasing awareness in 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 learn more about what your group or community needs are;
- To become aware of possible needs;
- To make sure any actions you eventually take or join in are in line with needs that are expressed by the community.

PART 8. STAKEHOLDERS CONSULTATION

8.1 Public consultation objectives

Public consultation for Project is required in the ESMP completion process. Community involvement and consultation has been carried out to:

- Provide useful information, the better understanding on subproject, potential impacts and possible improvements for the project;
- Allow the controversial issues appear at initial stage;
- Create opportunities to solve problems early;
- Help to develop transparent procedures to implement proposed project, and to create responsibility and local ownership in project implementation process.
- Operation Policies WB (OP 4.01) on environmental impact assessment requires that affected groups and non-governmental organizations and local notification are informed;

The participation was activated in the project preparation process under certain conditions and is often recommended as part of the implementation

8.2 Environtmental impact assessment consultation

8.2.1 Consultation process

i) Consultantation attenders:

- Commune People's Committee
- Fatherland Front Board
- Organizations (Farmer association, Woman association and Youth Union)
- Leaders of hamlet
- The affected household in project area
- ii) The consultantation's contents
 - Introducing the contents and main components of subproject, project budget
 - The consultant presents potential impacts of subproject to environment and society,
 - The consultant presents environmental and social management plan includes: the mitigation measures and implementation schedule
 - Consulting environmental problems and historical environmental and social impacts
 - Stakeholders discuss the measures to minimize the environmental and social impacts
 - Commune People's Committee and Fatherland Front Board have written ideas

iii) Consultantation measures

Arrange the meeting with the above participant includes: local authorities, local organizations, affected people. To create condition for the local people express their opinions,

aspirations, the consultation meeting to be held expansively and under questionnaire in status and consequence of happened natural calamity phenomenon in there having expression aspiration and requirement of interviewed organization or individual with subproject.

Participated commune	Location	Time	The number of participated people	Nmber of female
Quynh Thang	Quynh Thang cooperative	10h dated 02/03/2015	50	22

iv) Consultation results

The ideas from local authorities

The subproject receives many ideas from Commune People's Committee and Fatherland Front Board in subproject area. In general, the ideas from local authorities can be summarised as follows:

The People's committee of Quynh Luu district and Commune People's Committee and Fatherland Front Board of communes totally support the development of subprojec. Proposing PPMU coordinates with consultant unit to organize times for disseminating information relating to subproject, propagandize for the local to understand the purpose as well as the benefits of subproject. When the subproject is commissioning, the production and life condition of the local people will be improved;

The local will create all favourable conditions and maximum support for subproject, especially with land acquisition issue during land clearance and construction subproject's main works periods;

The People's committee of Quynh Luu district and Commune People's Committee and Fatherland Front Board of communes also agree with the issues relate to environmental and social impacts as presented in the report. Most impacts of subproject are positive impacts, they will make given impacts to environment and life activities of the local residents in the project area;

Agree with the measures to minimize environmental pollution as presented in the report;

Propose with project owner to apply appropriate regulations with committment to minimize the adverse impacts as well as environmental quality management and supervision;

Commune People's Committee and Fatherland Front Board of commune are ready for cooperation to respond to potential issues during project implementation.

The ideas from local residents

Besides the support ideas from households, the local people also give out many ideas and requirements to develop subproject. These ideas have been summaried as follows:

The local community agrees with the impacts causing by subproject during the project construction, also they require the contractor executes must be guaranteed quality and time progress;
Propose with appropriate authorities quickly approve for subproject can be done soon;

To minimize the impacts to the life of community during construction time, the subproject's works must be done quickly and to be fished one by one before changing to the other items;

Require the contractor and project owner listen attentively the feedback from community to have corressponding reform. The ideas from community must be sent to organizations, Community supervision board, Commune People's Committee, PPMU and relevant organizations;

Require the contractor must do committment rightly to minimize the adverse impacts as per presents in Environmental and Social management and Monitoring plan;

The irrigation canal systems had been downgraded with phenomena of water leakage and accumulation hence results in the bad water conveyance. The water shortage happens mainly with high paddy fields meanwhile the water in reservoir is not deficient by the loss of water on the canal system. The locals desire the supproject supports for the improvement and dredge the irrigation canal system from Khe San reservoir to ensure irrigation water;

The local people are worried about the widening of aquaculture activity on Khe San reservoir after it has been upgrading and improvement that causes the decline of water quality in reservoir, water source pollution risk, epidemic diseases when using water supplies to fishing ponds.

Request PPMU applies measures and regulation on penalizing or terminating unilaterally with contractor, supervision unit if they do not obey adequate safety measures and timely propose environmental protection measures.

8.2.2 Commitment of project owner

Project Owner acquires contribution ideas and has timely adjustment in design documents and simultaneously commits doing well the measures to mitigate negative impacts by subproject's activities.

8.3 Social impact assessment consultation

i) The consultation attendent:

- Commune People's committee
- The affeced housesholds

ii) The consultation's content

- Introducing the content, main works of subproject, source of capital for implementation;
- The consultant presents the policies in interests of the effected people, complaint mechanism and solution, compensation policy for each type of land, architectural works and plants, farm produce
- The consultant presents impacts forecast of subproject to resettlement, gender;

 The stakeholders discuss policies in interests and compensation to the effects on land, works, architecture, plants and farm produce.

iii) Consultation method

Immediately starting project preparation, local authorities leadership at all levels of Quynh Thang commune, Quynh Luu district, Nghe An province have been reported about the subproject, the targets and proposed activities of project. The affected households had been invited to consultation meeting was held in commune office to discuss the related contents.

iv) Consultation result

During the consultation process, there are a lot of ideas of stakeholders have been discussed broadly and freely as concluded as follows:

- The affeced land area by subproject mainly is farmland.
- The land acquisition of Nghe An subproject is very few since the upgrading and repair based in the former line; therefore the adverse impacts can be minimized and land acquisition scale is insignificant.
- 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 project area is Quynh Thang commune. For this result there is no negative impact to ethnic minority.
- Woman merchandising situation does not occur in the project area.
- The affected people understand positive and negative impacts of subproject to local; therefore, they get fully unanimity with the project development and they hope the subproject will be deployed soon.

8.4 ESIA disclosure

According to WB's policy on approaching information, all draft documents of subproject (ESMP; ESMoP, EIA, EMP, ECOPs, etc.) must be announced widely at the local, websites of WB and these documents must be displayed at the easy view positions, succinct and easily understandable edit.

CONCLUSION, RECOMMENDATION AND COMMITMENT

1. CONCLUSION

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

The subproject does not locate in sensitive position with environment and it does not commit any criterion "ineligible" of WB;

This report determines and assesses completely the significant impacts in 03 phases: before, during construction and operation phase and it also indicates measures to minimize the adverse impacts with the consultation of local authorities, affected people and vulnerable people group;

The Environmental and Social Management Plan (ESMP) and The Environmental and Social Monitoring Plan (ESMoP) to supervise the impacts have been developed to help the authorities make decision and they update regularly in process of subproject;

The subproject upgrading and safety guarantee of Khe San reservoir, Nghe An province has been owned by Department of Agriculture and Rural Development and managed by Water resources development and management Board of Nghe An province. The project construction can cause the potential positive and negative impacts during project implementation:

The potential impacts during the project preparation period

During the project preparation, the land clearance cause permanent effect to $14,200 \text{ m}^2$ land surrounding Khe San reservoir area and using temporarily 10,000 m² land to construct auxiliary area and works serve for construction.

The potential impacts during the subproject's construction

The upgrading of works includes: dam, auxiliary works, irrigation canal, management road can cause some adverse impacts such as: a) increase the risks for local residents along the road due to the increase of material and rubbish transport means; b) The increase 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; d) Soil, rock, canal construction materials can be scattered on the flow, paddy field of local farmers,....

The potential impacts during the subproject's operation

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

The measures to minimize adverse impacts in constrution period

The appropriate measures to minimize adverse impacts of upgrading dam and auxiliary works include: a) Implementing Resettlement action plan; b) Implementing 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 (choice human source, guidelines in health, safety, infectious prevention, community interaction and develop regulations at the tents for workers and have measure to deal with violator; and d) communicate well with the local community (coordinate to work with local authority, inform to local people and prioritize to hire the local labor,....)

The measures to minimize adverse impacts in operation period

The operation management unit of Khe San reservoir supervises periodically the safety of reservoir; coordinates closely with Commune People's Committee and local people to report timely risks relates to dam safety and has opportune repair; appoints somebody monitors regularly and keeps watch to ensure rational water regulation in flood season; has plan to inform to local residents on flood discharge plan

Environmental and social monitoring

The winner of bid must prepare ESMP at the construction site, it will be the basis for environmental supervision by appropriate authorities, provincial Project Management Board and supervision consultant. An environmental monitoring system has been prepared and approved by WB will be applied for subproject. The supervision consultant regularly supervises and report to provincial Project Management Board every month. This report will be independent with environmental report of province that submit to Central Projects Organization (CPO).

2. RECOMMENDATION

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

The mitigation measures mentioned in ESMP will be setted up as an indeficient part in the bid documents. The constructor will split volume of works and estimate total cost for implementing those mitigation measures. This expense is safe cost on environment and it will be paid when all measures will be performed well as committed of Constructor.

Based on the Environmental and Social Impact Assessment, safety policy consultant and Subproject management Board petition appropriate authorities and WB for approval ESIA of the subproject upgrading and safety guarantee of Khe San reservoir project, Nghe An province to be the basis for deploying next steps and guarantee subproject schedule./.

3. COMMITMENT OF PROJECT OWNER

All ideas of community has been recorded by Project Owner. The Project Owner commit to apply all mitigation measures that proposed by consultant experts in Chapter 6 of this report. Project Onwer undertakes to apply strong measures such as penalty measure to contractor if the contractor does not perform measures to minimize adverse impacts.

The subproject owner committed:

- 1. To conform strictly and guarantee environmental parameters in accordance with Vietnam standards (National technical norms/Vietnam standards) follows current regulations on environmental quality parameters.
- 2. Perform all measures to project water source and environment among the measure to minimize adverse impacts as stated in ESIA and ESMP reports.
- 3. Project Owner undertakes to take full legal responsibility with Social republic of Vietnam in case of infinging upon international Convention, Vietnam standards on Environment and when occurrence the environmental problem.
- 4. Project Owner commits to strictly conform with legal regulations on compensation, surmounting environmental risks in case of the environmental risks occur due to the subproject development.

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16. Council People Committee of Nghe An province, Decision No.111/2014/QĐ-UBND December 30th, 2014 on public soils price from 01/01/2015 to 31/12/2019 in region of Quynh Luu district.

17. Council People Committee of Nghe An province, Decision No. 04/2010/QĐ-UBND in 19/01/2010 on compensation, supporting and resettlement while recoverd land by State in region of Nghe An province.

18. Institute for Water and Environment (2015) Resettlenment action planning report(RAP) of sub-project Strengthening Khe San reservoir security, Nghe An province;

19. Institute for Water and Environment (2015) Social impact assessment report of sub-project Strengthening Khe San reservoir security, Nghe An province;

20. Institute for Water and Environment (2015) Dam security report of sub-project Strengthening Khe San reservoir security, Nghe An province;

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23. WB - Social security policies(updated 2013), Hanoi

24. WB Vietnam, research on State mechanisms on voluntary land recorvery and transfer in Vietnam – Approach method, land assessment and complaint settlement of citizen.

25. Maps and survey data and documents.

APPENDICES APPENDIX A – ENVIRONMENT Appendix A1- DRAWING OF THE MAIN WORKS



Appendix A2 - TYPES OF MAP

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Map of subproject location

Appendix A3 - POLICY FRAMEWORK, INSTITUTION AND REGULATION

A. Legal framework related to environmental protection

- 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 around air;
- Decision No. 22/2006/QĐ-BTNMT dated 25/12/2006 of MONRE on forcing Vietnam National Standards of environment application.
- B. Legal framework related to land use and land aquicsion of the investment projects
 - Law on Land No. 45/2013/QH13 approved by Vietnam National Assembly dated 29/11//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 recovered;
 - Decree No. 37/2014/ND-CP, dated 30/06/2014 regulating in details about the compensation, support and resettlement in cases of the land recovered;
 - Circular No. 23/2014/TT-BTNMT dated 19/5/2014 regulating the Certificate of Land use right, House ownership and other assets attached.

C. 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 exploitations 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.

D. National Policy on Dam safety

- 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 Electric Generation Reservoirs.

E. 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 recovered.
- 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 recovered.
- 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 recovered.
- 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 recovered.
- 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 recovered.
- 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 recovery, 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 labors who have land recovered.
- F. 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 1/10/2009 of Ministry of Finance guiding the use and management of 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.

G. Policy for Ethnic Minority community development

- Decree No. 82/2010/ND-CP dated 20/7/2010 of Government on teaching and learning the ethnic language in the schools.
- Decree No. 60/2008/NĐ-CP dated 9/6/2008 of Government regulating the functions, tasks, responsibilities and organization structures of Ethnic Committee.
- Decision No. 06/2007/QD-UBDT dated 12/1/2007 of Ethnic Committee approving Communication Strategy for 135 Program – phase 2.
- Decree No. 70/2001/ND-CP: all registration documents of family assets and land use rights must be filled the names of both husband and wife.
- Decision No. 134/2004/CP dated 20/7/2004 of Government on policy of supporting productive land, residential land, house and domestic water for the poor and difficult ethnic households.
- Decision No. 03/2005/QĐ-BNN dated 07/01/2005 of Minister of MARD regulation the wood exploitation to support house construction of the poor and difficult ethnic households in line with Decision No. 134/QĐ-TTg dated 20/7/2004 of Government.
- Decision No. 33/2007/QĐ-TTg, dated 05/3/2007 of Government on the support policy on immigration and sedentarization for ethnic minorities;
- Decision No. 32/2007/QĐ-TTg dated 05/3/2007 of Government on the loans for production development of especial difficult ethnic households.
- Decision No. 1592/QĐ-TTg dated 12/10/2009 of Government on continuing implementation of some policies to support productive land, residential land, house and domestic water for the poor and difficult ethnic households.

- Decision No. 05/2007/QD-UBDT dated 06/9/2007 of Ethnic Committee approving three Ethnic Minority regions and mountainous region based on the development situation.
- Circular No. 06 dated 20/9/2007 of Ethnic Committee guiding the support services for livelihood improvement of local people, technical assistant to improve knowledge on Law enforcement in line with Decision No. 112/2007/QD-TTg.

H. 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- phase 2.
- Decision No. 1956/2009/QD-TTg, dated 17/11/2009 of Prime Minister approving the Master Plan on career orientation training for rural labors 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 / QD-UBND-NN dated 03/06/2014 of Nghe An Province of allows up investment project to repair and upgrade reservoirs: Khe San, Hoc Nghet, Khe Gang - Quynh Luu; Xuan Duong, Tan Ky; La Nga, Thanh Chuong; Thanh Thuy, Nam Dan district, Nghe An province;
- Decision No. 557/QĐ.SNN-QLXD dated 09/06/2014 approving bidding plan for bidding package: Consulting on dam safety inspection for reservoirs of Nghe An province aiming to review reservoir safety (including Khe San reservoir)

I. 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.

J. 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.557/QĐ.SNN-QLXD dated 05/06/2014 of Department of Agriculture and Rural Development of Nghe An province approving proposal of investment project of repair and upgrading of Khe San reservoir, Quynh Thang commune, Quynh Luu district, Nghe An province.

Screening questions	Yes	No	Description of impact					
1. Does the subproject have potential to cause significant adverse impacts on natural environment or important natural environment?								
- Causing loss or degradation to land and water areas where (i) there are native species, and (ii) human's activities have not caused any significantly changes on the fundamental ecological functions of the project area.		х	Sub-project withdraws land of 03 households and Communal People's Committee with area of 14,200 m2 for construction, repairmen, upgradation of dam, spillway and management-operation road. Affected plants include acacia, low quality timber, trunk diameter less than 5cm. The subproject does not affect native species.					
- Causing loss or degradation to important natural habitat as reseve areas, areas protected by traditional local communities (eg, sacred forests), biodiversity; rare, vulnerable, migratory, or endangered species.		x	 The repairmen and upgradation are only conducted around the focal area including available spillways, dams, culverts and management road. All of the above said works are located in hamlet no. 7, Quynh Thang commune, Quynh Luu district. This is the agricultural area and there is no areas with sensitive environment, such as preserved areas, protected areas by traditionally local communities. The areas withdrawn for the construction of 14,200m2 is the land around the Khe San reservoir and management road construction; In addition, the auxiliary areas temporarily occupied for the aim of disposal sites, material yard, workers' camps, the construction site are arranged on a total area of about 1 hectare in hamlet no. 4A and hamlet no. 7 in Quynh Thang commune. These mostly are wastelands, exploited land and shrubs, grass, not the areas sensitive of environment. 					
2. Does the subproject have the potential to cause significant adverse impact	s on pl	hysica	al cultural resources?					
Causing loss or degradation to the tangible cultural resources, architectural objects, groups of architectural objects, characteristics, natural landscapes which are important of archaeology, palaeontology, history, architect,		Х	The project scope does not include the tangible cultural resources, architectural objects, groups of architectural objects, characteristics, natural landscapes which are important of archaeology, palaeontology, history,					

Appendix A4 - ENVIRONMENTAL AND SOCIAL IMPACTS SCREENING

Screening questions	Yes	No	Description of impact
religion, aesthetics, or other cultural importance.			architect, religion, aesthetics, or other cultural importance in Quynh Thang commune. The nearest residential area is 200 meters from the work of hamlet 7, Quynh Thang commune.
Possibly lead to conflict with national law or international obligations under relevant treaties and agreements concerning international environment, including the World Heritage Convention of UNESCO or affect heritages beneficial for famous and important scientific tourism.		x	Khe San reservoir was built in 1980. The regional report on discovery of relics, and scientific assets is not available. The project is implemented completely following the framework of national legislation and international obligations under relevant treaties and agreements on international environment.
3. Is sub-project potential to cause significant adverse impacts on land and re	levant	natur	al resources due to being used by ethnic minorities
Possibly to cause impacts on land or territory which are traditionally owned, or customarily used or occupied, and areas where the access to natural resources is extremely vital for the sustainability of the culture and livelihood of ethnic minorities. Potentially impact cultural and spiritual values symbolizing for those areas and natural resources or impact the management of natural resources and the long-term sustainability of affected resources.		x	 As stated above, Hamlet 7 in Quynh Thang commune where items are upgraded and repaired under the scope of sub-projects is an agricultural area, the population is completely Kinh group. There are no land and relevant natural resources used by ethnic minorities. The withdrawn areas (permanently - 14,200 m2, temporarily - 10,000 m2) are wasteland and reclamed land for perennial planting, gardening land (permanent withdrawal) and public land (temporary withdrawal), and does not suffer the opposition by the people during the consultation, information disclosure. Among the affected households, no household is ethnic minority. Being the subject to enjoy priority policy of the state, the approaches of the affected household be relocated and resettled), and other infrastructures are not affected. The project does not use the lands or territories which are traditionally owned, or customarily used or occupied.
4. Is sub-project potential to cause significant adverse impacts on relocated	popula	tion?	

Screening questions	Yes	No	Description of impact
Leading to the relocation of people or land and asset withdrawal, affecting their lives and difficulties in livelihood recovery.		x	The withdrawal of gardening land, wasteland, land for perennial planting of 03 households (in which there was 01 household owned by Mr. Pham Ngoc Gia, whose 2000m2 of building land was withdrawn and was already granted with land use rights certificate) with a total area of 14,200m2 affecting the cultivation of fruit trees and vegetable in his garden to improve his daily life, and resulting in perennial planting of other households. However, 03 affected households have got their major income from agriculture; cultivating tool is agricultural land which is not affected. Therefore, the impact from the loss of land to the people is slight and temporary. Besides, the withdrawal of 2,000m2 from Mr. Pham Ngoc Gia's household has been considered and included in the report on resettlement action plan (RAP). The affected households, whose building land is to be relocated, shall be resettled nearby residential areas to ensure that living conditions and livelihoods is not different from the past. The result from consultation shows relocated households also had their own plans for resettlement and did not suffer from difficulties in livelihood recovery.
5. Is it necessary for a large dam to be constructed under the scope of the sub	-projeo	ct?	
Is that necessary for a large dam to be constructed under the sub-project's scope? - 10 meters heigh or above - 10 to 15 meters high, with complex design - Less than 10 meters high, but expected to become the largest dam during the operation phase of the sub-projects?		X	The height of Khe San reservoir is from 8 to 12 meters. Within the sub- project's scope, only repairmen and upgradation shall be conducted, but not to construct a large dam. A report on dam safety for the sub-project of repairmen and improvement for the safety of Khe San reservoir was made, ensuring the principles on safety for dam by the Government of Vietnam as well as policies by the World Bank.
Does the operation of the sub-project depend on the efficiency of:		Х	Sub-project is to improve the capacity and ensure the safety of the dam and

Screening questions	Yes	No	Description of impact
- Existing or under construction dam			the people living in downstream.
- Power stations or water supply system taking water directly from the reservoir by a large dam or controlled by an under construction dam.			During repairmen, upgradation, some items of dam, reservoir shall be reparied to improve their efficiency.
- Diversion dam or hydraulic structures downstream from an existing dam or an under construction dam, where every incidents occurable to dam in riverhead can cause tremendous harms or damages to the architecture and irrigation projects or works of water supply funded by the World Bank, are the projects dependent on the capacity and performance of a existing large dam or an under-construction-dam to supply water and could not work if the dam is broken.			Dam is constructed based on the current state only, does not increase the capacity or the irrigated area after being invested.
6. Whether the sub-project leads to presticide purchase or use?			
Does the formula of products falls into classes IA and IB as classified by World Health Organization, or is there any products with formula classified into type II?		x	There is no activity under the sub-project related to presticide purchase or use.
7. Is sub-projects potential to cause irreversible impacts or not easy to mitigate	ted im	pacts	?
Leading 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.		х	The construction and upgrading of items under the sub-project only concentrate on the focal area of Khe San reservoir, on a very small temporarily occupied area, will not impact on the quality of storage water and water storage areas. Land temporarily used for the construction includes the ground for construction, camp, site management office, the material stockpile in the total area of about 1 hectare located along the management route on the wasterland.

Screening questions	Yes	No	Description of impact
			for more than 90%, the nearest residential area is 200 meters from the construction site. Thus, the project is not likely to affect water storage to be suppied for residents' demand of drinking water
Leading to any impact that affected period is relatively long, affacted a large area or the impacts are great.		x	The activities from construction and repairmen of Khe San reservoir do not take so long (about 10 months) and mainly conducted in the dry season, so the impact of irrigation water for 120 hectares of production land during this period is insignificant. The repaired reservoir will ensure the safety of the people behind the dam, at the same time provide a stable, effective water supply and gradually contribute to community economic development.
8. Is the sub-project potential to lead to a wide variety of significant adverse			
Many construction site in different locations are affected; each impact causes the loss of habitat, natural resources, land or significant depletion to quality of resources.		X	 The construction area of the sub-project is not large. The influence on habitat, natural resources and soil is not significant. Construction area: 0.1 hectare Tent area: 0.05 hectare Land mine: the reserve of 40,000-50,000m3 The disposal site: Located in the hamlet no. 7, Quynh Thang commune is a wasteland, low-lying terrain with disposal reserves of about 40,000m3 Area of material yard: 0.1 hectare (70% of waste materials will be used for levelling, so the needed area is very small. Besides, when the work is completed, this area will be reconstituted and the actual status of land use shall be returned as its original status.

Screening questions	Yes	No	Description of impact
			- The construction takes place in a narrow area. There is no impact on the habitat, natural resources, land or significant depletion on quality of natural resources.
The significant and potential adverse effects are able to expand to the construction site or construction works.		x	 The construction only uses 1 route from the main road to access the Commual People's Committeehe to the top of dam. Dust generating and distrubuting outside the site may occur, but only in a narrow range. Besides, the construction is executed in rural area and plentiful of trees. So, smoke and dust are easily diluted. Combining with mitigation measures taken by the contractor, this impact can be entirely possible controlled.
The impact beyond the border (in addition to a small change in the ongoing waterway activity).		X	Sub-projects are implemented entirely in the territory of Vietnam and does not impact across borders.
The necessity to built a service roads, tunnels, canals, power transmission corridors, new pipelines, or borrowed and disposed areas in the undeveloped region.		x	 There is an item of management road upgradation from asphalt road (Provincial Road 598) to the pool area for the purpose of a better operation system and use in case of incidents. Beginning point of the route starts from the main road passing the Communal People's Committee (Provincial Road 598) to the reservoir approximately 150 meters. This route will be used as temporary road during the dam construction. The materials shall be transported via this route. Currently, it is a soil road, after upgrading it becomes a concrete road with the length of 145,8 meters, lowering the slope ensures people's travelling. Vegetation along the road is mostly bushes, only some common trees such as chinaberry, low quality timber. Those contribute low economic value, not rare plants.

Screening questions	Yes	No	Description of impact
Interrupting the immigration cycle of wild creatures, herds of animals, or raisers, nomads or semi-nomads		X	 Sub-projects is conducted in hamlet no. 7 in Quynh Thang commune, Quynh Luu district where is densely populated. Wild animals have not been seen here. There are only animals such as buffalo, cows, etc., grazed by the households. The implementation of sub-project does not interrupt the immigration cycle of animals. There is no nomads or semi-nomads in the project area.
9. Is the subproject not a precedent?			
National precedent is not available?		х	A lot of similar projects have been executed
Provincial precedent is not available?		x	There are three reservoirs in Nghe An province funded. Similar projects funded by the World Bank have been implemented in Nghi Loc District, Anh Son, Thai Hoa town.
10. Being a controversial sub-project and likely to attract the attention of NG	Os and	d natio	onally and internationally social organizations?
Being considered as risk and potentially containing specially controversial aspect		Х	Being a sub-project of repairmen, the work came into a long-term operation, under the management of specific units and subjects to be served are clear. Therefore, there is no possibility for the especially controversial aspect.
Likely lead to protests by people those want to show-off themselves or stop construction.		x	Consultation results showed that both the government and people agree and support the sub-project 100%



Appendix A5 - DIAGRAM OF SAMPLING AND MONITORING ENVIRONMENT

Apependix A6 - RESULT OF ENVIRONMENT SAMPLE ANALYSIS



ISO 9001:2008

TRẠM QUAN TRẮC VÀ PHÂN TÍCH MÔI TRƯỜNG LẠO ĐỘNG

Địa chỉ: 99 Trần Quốc Toàn, Hoàn Kiếm, Hà Nội Diện thoại: 04-22172480; 04-22172473 Fax: 04-38223011



Số: 15/TBKQ -GS/ 1952

Hà Nội, ngày 25 tháng 65 năm 2015

THÔNG BÁO KẾT QUẢ

1	Địa điểm lấy mẫu:	: DỰ ÁN HỎ KHE SÂN					
2	Địa chỉ:	Xã Quỷnh Thắng, Huyện Quỷnh Lưu, Nghệ An					
3	Ngày lấy mẫu :	27/02/2015					
4	Điều kiện thời tiết:	Nắng	Nắng				
5	Cán bộ tham gia lấy	mẫu					
C	N. Bùi Sỹ Hoàng	CN.Trần Phương Thảo					
6	Cán bộ tham gia thự	c hiện:					
T	S. Trần Thị Liễu	ThS. Đặng Thị Thu Hà	ThS. Vũ Thanh Phương				
TI	S. Tạ Thị Trang Nhâm	CN. Trần Ngọc Thanh	KS. Vũ Duy Thanh				
C	N. Bùi Sỹ Hoàng	CN.Trần Phương Thảo KS. Lê Anh Thư					

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

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

TT	Thông số	Phương pháp thử	Thiết bị sử dụng chính
1	. Môi trường ki	hông 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	со	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
1	II. Môi trường n	ước mặt	
1	Nhiệt độ	SWEWW 550B: 2012	Nhiệt kế bách phân
2	Độ đục	SMEWW 2130 B	Model 2100P, HACH
4	Dộ đục	SMEW W 2130 B	Model 2100P, HACH

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

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3	pH	TCVN 6492:2011	Sension 156 của Hach
4	EC	SMEWW 2540 C	Sension 3, Hãng HACH
5	DO	TCVN 7325:2004	Sension TM 156 của Hach
5	TSS	TCVN 6625:2000	Cân AE 240, Mettler
7	TDS	SMEWW 2540 C	Sension 3, Hãng HACH
8	COD	SWEWW 5220C: 2012	Titritation
)	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	NH4*	TCVN 6179-1:1996	Lambda 25,Perkin Elmer
13	PO ₄ ³⁻	TCVN 6202-2008	Lambda 25,Perkinelmer
14	SO4 ²⁻	TCVN 6200: 1996	Lambda 25,Perkinelmer
15	Cľ	TCVN 6194:1996	Lambda 25,Perkinelmer
16	Fe	SMEWW 3111B:2012	AAS 400, Perkinelmer
17	As	TCVN 6626:2000	ASS 600, Perkinelmer
18	РЬ	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
1	III. Môi trường nước du	rới đất	
1	Nhiệt độ	SWEWW 550B: 2012	Nhiệt kế bách phân
2	Độ đục	SMEWW 2130 B	Model 2100P, HACH
3	pН	TCVN 6492:2011	Sension156 của Hach
4	Độ dẫn điện EC	SWEWW 2520B: 2012	Sension 156 của Hach
5	Độ cứng CaCO3	TCVN 6224 - 1996	Titrimetric
5	SS	TCVN 6625:2000	Cân AE 240, Mettler
7	TDS	SMEWW 2540 C	Sension 3, Hãng HACH
8	DO	TCVN 7325:2004	Sension TM 156 của Hach
9	COD	TCVN 6186:1996	Titritation
10	NO ₂	TCVN 6178: 1996	Lambda 25,Perkinelmer
11	NO.	TCVN 6180: 1996	Lambda 25 Perkinelmer

Ket quả này chỉ có gia trị trên màu thứ nghiệm.
 Thông số đánh dấu (*) chưa được công nhận Vilas, thông số in nghiệng được thực hiện bởi nhà thấu phụ
 Nghiệm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

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12	NH4 ⁺	TCVN 6179-1:1996	Lambda 25,Perkin Elmer
13	PO4 ³⁻	TCVN 6202-2008	Lambda 25,Perkinelmer
14	SO4 2-	TCVN 6200 - 1996	Lambda 25,Perkinelmer
15	cr	TCVN 6194:1996	Lambda 25,Perkinelmer
16	Fe	SWEWW 3111B: 2012	AAS 400, Perkin Elmer
17	As	TCVN 6626:2000	ASS 600, Perkinelmer
18	РЬ	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 t 	rầm tích	
1	pH _{H2O}	TCVN 5979:2007	Sension156 của Hach
2	pH _{KCI}	TCVN 5979:2007	Sension156 của Hach
3	Mùn tổng	Phương pháp Walkley - Black	Titrimetric
4	Thành phần cơ giới	TCVN 5257:1990	Ông hút Robinson
5 1	N tổng số	TCVN 4051:1985	Titrimetric
6 1	P tổng số	TCVN 4052:1985	Titrimetric
7 1	K tổng số	TCVN 4053:1985	Titrimetric
8 1	N dễ tiêu	TCVN 5255:2009	Titrimetric
9 1	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 1	Mg	TCVN 4406:1987	Titrimetric
15	As	TCVN 8467:2000	AAS 600, Perkinel mer
16	Cd		
17 1	РЬ	TCVN 6649:2000	AAS 400&600, Perkinel
18 (Cu	&TCVN 6496:2009	mer
19 2	Zn		1 20 120

Kết quả này chỉ có giả trị trên mẫu thứ nghiệm.
 Thông số dành dầu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ
 Nghiêm cẩm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

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- 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 (°C)	Độ ẩm (%)	Tốc độ gió (m/s)	Độ rung (dB)
1 Vị trí K1		42,2	18,8	68,1	0,9-1,7	35
2 Vi trí K2		44,6	18,6	66,5	0,6-1,0	40
3	Vj tri K3	47,3	18,9	66,1	0,5-0,8	47
4	Vị trí K4	50,3	18,3	73,5	0,7-1,5	43
QC (1	VN 26:2012/BTNMT từ 6 giờ đến 21 giờ)	70	-	-	-	-
QC (t	VN 27:2010/BTNMT từ 6 giờ đến 21 giờ)	-	-	-		75

Ghi chú: + Tọa độ K1 (N:19⁰15'51,4" &E: 105°33'54,5") : Phía nam đập

+ Toa độ K2 (N:19º15'42,8" &E: 105°33'58,3") : Phía bắc đập

- + Tọa độ K3 (N:19º15'47,0" &E: 105º34'01,5") : Khu vực giáp đường
- + Tọa độ K4 (N:19º15'46,7" &E: 105°34'01,8") : Kênh dẫn nước sau dập

1.2. Thông số hóa học:

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

-	Vị trí quan trắc	Bụi	SO2	NO2	CO.
11		$(\mu g/m^3)$			
1	Vi tri K1	103	60	33	<5.000
2	Vị trí K2	116	58	30	<5.000
3	Vi trí K3	172	63	35	<5.000
4	Vj trí K4	153	62	33	<5.000
	OCVN 05-2013/RTNMT	300	250	200	30.000

Ghi chú: + Tọa độ K1 (N:19º15'51,4" &E: 105º33'54,5") : Phía nam đập

+ Tọa độ K2 (N:19º15'42,8" &E: 105º33'58,3") : Phía bắc đập

+ Tọa độ K3 (N:19º15'47,0" &E: 105º34'01,5") : Khu vực giáp đường

+ Tọa độ K4 (N:19º15'46,7" &E: 105º34'01,8") : Kênh dẫn nước sau dập

II. Môi trường nước

2.1. Nước mặt

Bảng 4: Kết quả quan trắc mước mặt

ruong so			arer qua		OCVN 08-2008/
and the second	Don vi	NM1	NM2	NM3	QC 111 00.2000/
ết quả này chỉ có gia hông số đánh dấu (*, ghiêm cấm sao chép	i trị trên mẫu thứ ng) chựa được công nh dưới mọi hình thức	hiệm. án Vilas, thông nếu chưa có đư	số in nghiêng á ợc sự đồng ý củ	lược thực hiện a Wemas	bới nhà thầu phụ
M 17.05	Là	n ban hành: (02.2013		4/8
	ất quả này chỉ có giả công số đánh dầu (* chiếm cẩm sao chếp M 17.05	ất quả này chỉ có giả trị trên mẫu thử ng cóng số đánh dấu (*) chưa được công nh chiếm cẩm sao chếp dưới mọi hình thức M 17.05 Lầ	lt quả này chỉ có giả trị trên mẫu thứ nghiệm. cóng số đánh dầu (*) chura được công nhận Vilas, thông chiếm cẩm sao chép dưới mọi hình thức nếu chưa cố đư M 17.05 Lần ban hành: (h quả này chỉ có giả trị trên mẫu thừ nghiệm. công số đánh dầu (*) chưa được công nhân Vilas, thông số in nghiêng ở chiếm cẩm sao chếp dưới mọi hình thức nếu chưa có được sự đồng ý củ M 17.05 Lần ban hành: 02.2013	h quả này chỉ có giả trị trên mẫu thừ nghiệm. công số đánh dầu (*) chưa được công nhận Vilas, thông số in nghiêng được thực hiện chiếm cẩm sao chếp dưới mọi hình thức nếu chưa cố được sự đồng ý của Wemos. M 17.05 Lần ban hành: 02.2013

				No. of Street		· BTNMT (B1)
1	Nhiệt độ	oC	21,2	22,7	24,3	-
2	Độ đục"	NTU	1,54	2,16	1,08	1000
3	pH	-	6,92	6,99	6,95	5,5-9
4	EC	μS/cm	135,0	143,8	152,8	-
5	DO	mg/L	4,23	4,36	5,01	≥4
6	SS	mg/L	24	34	37	50
7	TDS	mg/L	86,4	92,0	97,8	
8	COD	mg/L	11,3	17,5	12,3	50
9	BOD ₅	mg/L	3,8	5,2	3,8	15
10	NO ₂	mg/L	<0,01	<0,01	<0,01	0,04
11	NO3	mg/L	2,98	3,13	4,06	10
12	NH4 ⁺	mg/L	<0,06	<0,06	0,07	0,5
13	PO43-	mg/L	<0,05	<0,05	<0,05	0,3
14	SO42-	mg/L	<5	<5	<5	-
15	CI.,	mg/L	25	29	36	600
16	Fe	mg/L	0,107	0,091	0,118	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	<0,0008	0,0010	0,0012	0,01
20	Coliform	MPN/100ml	6.400	5.900	7.300	7.500
21	Clostridium perfringens	MPN/100ml	KPH	KPH	KPH	-

+ Toa độ NMI (N:19⁰15'50,5" &E: 105°33'54,5") : Phía nam đập Ghi chú:

+ Tọa độ NM2 (N:19015'43,7" &E: 105'33'57,1") : Phía bắc đập

+ Tọa độ NM3 (N:19º15'46,7" &E: 105°34'01,8") : Kênh dẫn nước sau dập

2.2. Nước dưới đất

N	merely.	2010/02/02			100000	1. 64	46.
Bang S:	Ket	qua	quan	trac	nuoc	aum	aal

TT	Thomas	Demod	Kết	quå	OCVN 09:2009/
11	I nong so	Dou vi	NN1	NN2	BTNMT
1	Nhiệt độ	oC	20,7	21,8	-
2	Độ đục"	NTU	0,82	0,60	
3	pH	1	6,30	6,22	5,5-8
4	Độ dẫn điện EC	µS/cm	225,1	43,3	
5	Độ cứng CaCO3*	mg/L	62	18	500

Kết quả này chỉ có giả trị trên mẫu thủ nghiệm.
 Thông số đánh dấu (*) chua được công nhận Vilas, thông số in nghiệng được thực hiện bởi nhà thầu phụ
 Nghiệm cẩm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

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TT	Thông số	Denvil	Kết	quả	QCVN 09:2009/ BTNMT
		Thong so Don vi	NN1	NN2	
6	SS	mg/L	<2	<2	1
7	TDS	mg/L	141,4	27,7	
8	DO	mg/L	2,08	1,75	-
9	COD	mg/L	<0,4	<0,4	4
10	NO2	mg/L	<0,01	<0,01	1,0
11	NO ₃ °	mg/L	1,13	0,84	15
12	NH4 ⁺ -N	mg/L	<0,06	<0,06	0,1
13	PO4 ³⁻	mg/L	<0,05	<0,05	-
14	SO42-	mg/L	<5	<5	400
15	Cl	mg/L	23	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	<0,0008	<0,0008	0,005
20	Coliform	MPN/100 ml	KPH	KPH	КРН
21	E.coli	MPN/100 ml	KPH	KPH	КРН
22	Clostridium perfringens	MPN/100 ml	KPH	КРН	-

+ Tọa độ NN1 (N:19º15'47,6" &E: 105°34'01,0")-Hộ Hỗ Thị Hồng Ghi chú: + Tọa độ NN2 (N:19015'57,6" &E: 105033'59,6")- Hộ Trần Đức Thủy

III. Môi trường đất,

Bàng 6: Kết quả phân tích đất

TT	Thông số	Dura	Kết quả	QCVN 03:2008/ BTNMT (Đất nông nghiệp)	
		Dou vi	MĐ1		
1	pH _{H2O}	-	7,13	-	
2	pH _{KCl}	-	7,54	-	
3	Mun tổng số	%	1,6	-	
4	N tổng số	%	0,11		
5	P tổng số	%	0,07		
6	K tổng số	%	0,05	-	
7	N dễ tiêu	mg/100g	6,3	-	
8	P dễ tiêu	mg/100g	10,8	-	

Kết quả này chỉ có giả trị trên mẫu thứ nghiệm.
 Thông số dánh dấu (*) chưa được công nhận Vilas, thông số in nghiệng được thực hiện bởi nhà thầu phụ
 Nghiệm cấm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

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9	K dễ tiêu	mg/100g	11,3	
	Thành phần cơ giới			
10	Cát (0,5-1mm)	%	18,43	-
10	Limon (0,002-0,5mm)	%	31,10	-
	Sét (<0,002mm)	%	50,47	-
11	Ca	mg/Kg	173,2	-
12	Mg	mg/Kg	113,1	17
13	As	mg/Kg	0,72	12
14	Cd*	mg/ Kg	<0,89	2
15	Cu*	mg/ Kg	14,18	50
16	Pb	mg/Kg	9.24	70

+ Toa độ MĐI (N:19915'51,4" &E: 105°33'54,5") : Phía nam đập Ghi chú: Bàng 7: Kết quả phân tích trầm tích

тт	Thông số	Demail	Kết quả	QCVN
		Don vi	MTT1	43:2012/BTNMT
1	рН _{н20}	-	6,23	+
2	рНксі	-	6,81	-
3	Mun tổng	%	8,54	-
	Thành phần cơ giới	1		-
A	Cát (0,5-1mm)	%	10,34	
-	Limon (0,002-0,5mm)	%	53,68	-
	Sét (<0,002mm)	%	35,98	-
5	N tổng số	%	0,31	-
6	P tổng số	%	0,18	-
7	K tổng số	%	1,14	-
8	N dễ tiêu	mg/100g	11,63	-
9	P dễ tiêu	mg/100g	13,83	
10	K dễ tiêu	mg/100g	19,04	-
11	Fe	mg/Kg	102,15	-
12	Al ³⁺	mg/Kg	28,41	
13	Ca	mg/Kg	41,32	-

Kết quả này chỉ có giả trị trên mẫu thừ nghiệm.
 Kết quả này chỉ có giả trị trên mẫu thừ nghiệm.
 Thông số đánh dầu (*) chua được công nhận Vilas, thông số in nghiêng được thực hiện bởi nhà thầu phụ
 Nghiêm cầm sao chép dưới mọi hình thức nếu chưa có được sự đồng ý của Wemos.

BM 17.05

Lần ban hành: 02.2013

14	Mg	mg/Kg	22,43	·. ·
15	As	mg/Kg	0,99	17,0
16	Cď	mg/Kg	<0,89	3,5
17	Pb*	mg/ Kg	<0,89	91,3
18	Cu	mg/ Kg	6,24	197
19	Zn*	mg/ Kg	10,12	315

Ghi chú:

Tọa độ MTT1 (N:19⁰15'46,7" &E: 105°34'01,8"): 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 Sân 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 ngằm, các thông số được quan trắc có giả trị nằm trong giới hạn cho phép của quy chuẩn QCVN 09:2009/BTNMT

3. Môi trường đất và trầm tích:

+ Theo bàng 6: Các thông số được quan trắc trong các mẫu đất có giả 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

QUAN TRAC V PHÂN TÍCH MỘI TRUNG LAO ĐỔNG GIÁM ĐỐC Lucong

PHÒNG GIÁM SÁT & N TICH MOT TREONG ThS. Đặng Thị Thu Hà

Ths. Vũ lohanh 300 I. Kết quả này chỉ có giá trị trên mẫu thừ nghiệm

Thống số đánh dấu (*) chưa được công nhận Vilas, thống số in nghiêng được thực hiện bởi nhà thấu phụ
 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

Appendix A7 - MINUTES OF STAKEHOLDERS METTING

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

BIÊN BẢN HỘI NGHỊ THAM VÁN CỘNG ĐÒNG XÃ QUÌNH THẮNG VỀ BÁO CÁO ĐÁNH GIÁ TÁC ĐỘNG MÔI TRƯỜNG

Tiểu dự án "Sửa chữa, nâng cấp hồ chứa nước Khe Sân, xã Quỳnh Thắng, huyện Quỳnh Lưu"

I. Thời gian: Ngày tháng năm 2015
II. Địa điểm: UBND xã Quỳnh Thắng, huyện Quỳ Lưu, tỉnh Nghệ An.
III. Các thành phần tham dự:

1. Đại diện Chủ đầu tư: Ban QLDA ngành NN và PTNT tỉnh Nghệ An

Ông: Trần Vĩnh Thắng Ông: Phan Doãn Hòa Chức vụ: Phó giám đốc Chức vụ: Kỹ thuật

2. Đại diện tư vấn môi trường: Trung tâm Môi trường và Phát triển

Chức vụ: Giám đốc
Chức vụ: Đội trưởng
Chức vụ: Chuyên gia môi trường
Chức vụ:
- Chức vụ:

3. Đại diện Ủy ban nhân dân xã: Quỳnh Thắng

ồng: Trần Thị Thương	Chức vụ: Phó Chủ tịch		
ồng: Nguyễn Văn Điền	Chức vụ: Bí thư Đảng ủy		

4. Đại diện cộng đồng xã:

Xóm trưởng các xóm hưởng lợi từ dự án

Tổng cộng số người tham gia hội nghị: 20 người.

Chủ trì Hội nghị:

Bà: Trần Thị Thương

Chức vụ: Phó Chủ tịch

Thư ký:

(

Bà: Nguyễn Thị Chung

Chức vụ: Cán bộ hỗ trợ

1

IV. Nội dung Hội nghị:

 Chủ đầu tư giới thiệu mục tiêu, ý nghĩa của buổi tham vấn cộng đồng về ảnh hưởng của dự án tới môi trường, xã hội kinh tế khu vực dự án.

Chủ đầu tư giới thiệu các hạng mục đầu tư và hoạt động của dự án.

 Cσ quan tư vấn trình bảy các tác động môi trường tiềm tàng trong giai đoạn thi công xây dựng, giai đoạn vận hành dự án và các biện pháp giảm thiểu.

 Thảo luận các vấn đề về dự án, các tác động môi trường của dự án và các biện pháp giảm thiểu.

V. Ý kiến của đại diện chính quyền địa phương và cộng đồng

1. Bà Trần Thị Thương – Phó Chủ tịch UBND

Quy trình thực hiện dự án từ chủ trương đầu tư đến khi thi công rất chặt chẽ.
 Việc thực hiện báo cáo đánh giá tác động môi trường của dự án này là nghiêm túc.

Các vấn đề về ô nhiễm môi trường do dự án gây là có nhưng không đáng kể

 Trước khi thi công đề nghi chủ đầu tư công khai thông tin để xã có trách nhiệm giám sát cộng đồng.

- Thông báo trước lịch thi công ít nhất là 02 tuần.

 Sửa chữa những đoạn đường hư hỏng do xe vận chuyển của dự án gây ra trên địa bản.

Nhất trí thực hiện dự án trên địa bàn của địa phương.

Ông Nguyễn Văn Điền – Bí thư đảng ủy

- Đập khe Sân đã được xây dựng từ lâu, qua quá trình vận hành sử dụng đến nay đã xuống cấp nghiêm trọng, mức nước chứa không đảm bảo dung tích phục vụ cho sản xuất. Mái hạ lưu đã xuống cấp, lượng nước rò rỉ trong hồ xảy ra thường xuyên. Vì vậy chủ trương đầu tư sửa chữa đập là hoàn toàn đúng đắn, đáp ứng được nhu cầu nguyện vọng của nhân dân.

 Khu vực đập cách xa khu dân cư nên tiếng ồn, bụi trên công trường ít ảnh hưởng đến đời sống nhân dân.

Đẩy nhanh tiến độ, đảm bảo đủ nước tưới cho người dân vào vụ sản xuất.

3. Ông Nguyễn Văn Nam - Cán bộ Nông nghiệp

 Quá trình thi công đặc biệt là quá trình vận chuyển không để đất đá rơi vãi trên đường.

 Vấn đề an ninh, đề nghị chủ đầu tư phối hợp chặt chẽ với UBND xã để quản lý tốt đội ngũ công nhân làm việc trên công trường.

 Tránh vận chuyển nguyên vật liệu và các hoạt động gây tiếng ồn trong giờ cao điểm.

- Tiến hành phun nước tưới ẩm những đoạn đường dễ phát sinh bụi vào ngày nắng nóng, khô hanh.

2

Kết luận :

6.30-7

Đồng tinh dự án được thực hiện trên địa bản xã.

Nhất trí với các đánh giá tác động mỗi trường, với các biện pháp giảm thiểu tác động môi trường của báo cáo đánh giá tác động môi trường.

Bổ sung các ý kiến góp ý trong hội nghị.

Địa phương cam kết phối hợp thực hiện các biện pháp giảm thiểu.

Đề nghị cơ quan thẩm quyền phê duyệt báo cáo đánh giá môi trường và phê duyệt Dự án.



Trần Vĩnh Thẳng

BAN DOANTE BAN

HNG

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

BIÊN BẢN CUỘC HỌP THAM VÁN CÁC NGÀNH LIÊN QUAN

1- Tên dự án: Sửa chữa, nâng cấp hồ chứa	nước Khe Sân thuộc dự án sửa chữa.
nâng cao an toàn đập tỉnh Nghệ An (WB8)	
2- Tiểu dự án:	
3- Thời gian họp:ngàythángn	ăm 2015
4- Địa điểm họp:	
5- Thành phần cuộc họp	
a) Đại diện Sở NN và PTNT . Tingh. Nơ bệ A	r.
Ông (bà): Nouvers Vars the	Chire yu the Day the
b) Đại diện Sở TN&MT thiếk. Nghệ. An	chuc va.x.aquabac
Ong (63): thang lanh Anh.	Chirc vu: Chuyen Via
c) Đại diện Ban Quản lý dự án. Ngunh. Nasa Na ku	22 va Plat Tices New the. Able A.
Ông (bà): Ertin Vink Encine	Chức vụ: Pho Gian Đố
d) Đại diện UBND các huyệnQuyĩnh. lu	h
Ông (bà): Nguyto. Xuan Ding	Chic vy: Tuidro Chara NoneNahidr
Ông (bà):	Chức vu:
Ông (bà):	Chức vu:
e) Đại diện UBND các xã vùng dự án:Quym	B. Thing
Ông (bà): th. Dien Thing	Chire vu: Pho. Chil. tick
Ông (bà):	Chức vụ:
f) Đại diện đơn vị tư vấn: Tưưng Toun MG. T	Ulda And Triled
Ong (ba): Moung Xuoun Thildron	Chức vụ: (prain
Ông (bà):	Chức vụ:
Nội dung cuộc họp	
a) Đại diện Ban QLDA, ông:	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:	

1

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

a) Về phạm vi ảnh hưởng (Ghi số xã, hưyện, số hộ, số người, điện tích đất tự nhiên trong vùng hình hưởng. tếx. Xã, luyinh Thượng. Vối sĩ' hà bị củah hưởng. In Ann hệ giảng. The vojily

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, đi dân, di chuyển mồ mà...), 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 mà bị di dời):

Marg thu chil dis thing at di tich lich Sit .a.MiD. day mare day to thang. sinh huiring hilly

7.2 Về tác động của dự án đến môi trường:

Nang sao as toas cho to to to tink this che 120 hr tat sin xeret Nong Nyhiep ta to vieng coo do sa'z che ngriß dan ving di du

- Tắc 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 tảc động tiêu cực có thể xảy ra như: Ô nhiễm môi trường đất, nước, không khi, sản xuất, thu nhập, mất việc làm, bị ngừng các dịch vụ công cộng...):

Tush the cong du ous ...Qua. Ata: 10 Aucis Actiona. th. non Ridde theu ...unde .. Mat. millo tai ctory nau thi die des di van hart da -Unior Se. 40

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 trang, nâng cao đời sông ...) Cn. cao da: Sam Miscia .. NONCI. COLO ... an. than day in dan yen toin nnbdi Tác động Quit 10.000 at tu Tion the an

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

2
* than toan no bot tei soi ise di in this hier tris otia ban tia phildig. 7.5- Kiến nghị của các ngành liên quan: they toan affect the iser there hier du dis 8- Kết luận: Cal manh lies quan ia Chush quyen .dia with this high did de dui their til on tion thei thile hop di dis DE nohi ngilo dan or tinh san xuat Chủ trì hội nghị Thư ký hội nghị Nông aghiệp & PTNT Sở TN&MT SÓ NÔNG NGHI Horng Downh Dirks A NOUYÊN VĂN ĐỆ an Quản lý dự án Trung tâm Môi trường và Phát triển DU AN NGHANH UNG TA HO! THUONG AT TREN BND xa ... Quyry ... Thay Vinh Chẳng UBND Huyện . Quyre, Lita Appage, xure, Ding 3

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

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

Ý KIÉN THAM VÂN CẦP XÃ VÀ CỘNG ĐỒNG TRONG VÙNG DỰ ÁN Quỹc, hòn 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:

 Về sự đồng thuận của địa phương đối với dự án: . Ana Philing bean trave whit the No. viec dri an drive the trees Về phạm vi ảnh hưởng của dự án và các đối tượng bị ảnh hưởng: - Vè phạm vi ảnh hưởng: tha. Nuc..., thi con ... và ... Ore. ... hypo ... Luga. ... Kuy - Về các đối tượng bị ảnh hưởng: ... Cong ... Nap... Jam. Nec. .. trên ... crig. . Aning Va squiri doin bril trig der tuger Silving Vab chunger Về những tác động của Dự án đến môi trường tự nhiên và kinh tế - xã hội: 3.1. Tác động tích cực: . Dut an thin han hat Si ung aup wice in tub do 120 ba tit SONN Va Quyich Thing 19. de di di til ... the ship warg as . Ary ... cuci whan dan ... a Quyes ... thang ... 3.2. Tác động tiêu cực ... Nong. que trel. thin cogy de do de be toe dig ber one tudog. thing the with part, chief thai see the vic he an

Các sự cố môi trường từ sau khi xây dựng công trình và đưa vào sử dụng:

1

TT	Sự cố phát sinh	Năm	Khu vực BAH	Mức độ AH đến MT, XH	Các biện pháp khắc phục/ kết quả khắc phục
			21 21		1
			1		63

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

5. Kiến nghị các biện pháp giảm thiểu tác động môi trường của Dự án: Don si kin trig hai this hip vin chil guyén dia Philing NOW che be rig which the ong triving Chat. 1 6. Kiến nghị đối với chủ dự án: reflice the Chui tri thi huis Phap gicun The C. Mills cal neu Thin m tac Sin Jach thai this hip bi an UBND XÃ Quynh ... Haro hủ tịch

ỦY BAN NHÂN DÂN XÃ <u>QUÌNH THÁ</u>NG

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Số: 13 /UBND

V/v: Tổ chức tham vấn cộng đồng báo cáo Đánh giá tác động môi trường của dự án "Sữa chữa, nâng cấp hồ chứa nước Khe Sân, xã Quỳnh Thắng, huyện Quỳnh Lưu".

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

Quỳnh Thắng, ngày 26 tháng 3 năm 2015

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Kính gửi: - Sở Nông nghiệp và PTNT tỉnh Nghệ An; Ban QLDA ngành NN&PTNT.

UBND xã Quỳnh Thắng nhận được Công văn số 869/BQLDA ngày 06 tháng 10 năm 2014 của Ban QLDA ngành Nông nghiệp và PTNT tỉnh Nghệ An về việc tổ chức tham vấn cộng đồng báo cáo Đánh giá tác động môi trường của dự án "Sữa chữa, năng cấp hồ chứa nước Khe Sân, xã Quỳnh Thắng, huyện Quỳnh Lưu".

Sau khi xem xét tải liệu và tổ chức các hội nghi tham vấn cộng đồng về Báo cáo đánh giá tác động môi trường của dự án, Ủy ban nhân dấn xã Quỳnh Thắng có ý kiến như sau:

 Hoàn toàn nhất trí với việc xây dựng dự án và mong dự án sớm thực hiện và đưa vào sử dụng.

 Việc xây dựng dự án có ý nghĩa quan trọng trong việc cung cấp nước cho sản xuất nông nghiệp của người dân xã Quỳnh Thắng.

Các giải pháp và biện pháp giảm thiểu các tác động xấu của Dự án đến môi trường tự nhiên và kinh tế - xã hội được trình bày trong Báo cáo đánh giá tác động môi trường có ý nghĩa thực tế và mang tính khả thi cao. UBND xã Quỳnh Thắng đồng ý với các biện pháp, giải pháp đã đề xuất.

 Trong quá trình thi công dự án chủ đầu tư phải thực hiện các biện pháp giảm thiểu tác động tới môi trường. Tưới ẩm tuyến đường vận chuyển nguyên vật liệu vào các ngày nắng nóng, khô hành với tần suất 3 lần/ngày.

 Quá trình vận hành dự án đơn vị quản lý phải tiến hành giám sát chất lượng công trình để tránh các sự cố như vỡ đập...

Đơn vị vận hành quản lý phải vận hành công trình đúng quy trình.

Trên đây là ý kiến của UBND xã Quỳnh Thắng gửi Sở Nông nghiệp và PTNT, Ban QLDA ngành NN&PTNT để tổng hợp và xử lý./.

Nơi nhận:

Như kính gửi;
Lưu: VT.



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

Quộnh Thống, Ngày......tháng......năm 2015

DƯ ẢN: Sửa chữa, năng cấp hỗ chứa nước Khe Sân, xã Quỳnh Thắng,

huyện Quỳnh Lưu tinh Nghệ An

BIÊN BẢN HỌP THAM VÁN CỌNG ĐÔNG VÈ ĐẢNH GIẢ MÔI TRƯỜNG, TẢI ĐỊNH CƯ VÀ PHÁT TRIÊN DẦN TỘC THIỀU SỐ

Tiểu dự án: Sửa chữa năng cấp hỗ chứa nước Khe Sân Xã Quỳnh Thắng, huyện Quỳnh Lau tỉnh Nghệ An

Thành phần tham dự

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- Ong Ba Obi Thi Hang Choo vy Di tran
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- Đại diện những người bị ảnh hưởng:người (chi thứ xon đanh sách đình kém)

II. Nội dung tham vấn

Chuyên gia mỗi trường trình bảy những tác động mỗi trường bao gồm tác động lên môi trường tự nhiên và xã hội củn khu vực dự án và những biện pháp giảm thiểu các tác động tiểu cực.

Chuyển gia tái định cư trình bày về những tác động khi thư bối đất và các tài sản trên dất, 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 để bởi thường thiệt bại khi Nhã nước thu hồi đất đại và các tài sản trên đất.

Chuyên gia về cộng đồng, dân tộc thiều số trình bày về Khung chính sách dân tộc thiều 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 mũi trường tiêu cực và biện pháp giảm thiểu

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CONG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM Đặc lập - Tự do - Hạnh phúc BIÊN BẦN XÁC NHẬN VỊ TRÍ LẦN TRẠI Cong trinh: Sen check very on he deer with the Son xa Sugah Brong Buyen Buyen Juin, tak alghe An Hom nay, ngày tháng...... năm 2015, tại Xã ... Bryerts May Beyerte deite chúng tôi gồm: Dại diện đơn vị lập bảo cáo DTM3 TVao. I. Ono Ba phe Ki Harry Chin vy TV train Ong Ba Darg thi HA Case volt sti hig Dei difn dia pharmen U. b. M. D. xn Cary ah Thing 11. Ong Ba Kar Van Tien Chie vy dich row Onersa phan Van Cuty Cherry Can be phase the Cùng xác nhận vị trí xây dựng lân trại thi công cho công nhân tại hiện trường như sau: VI the give star any tel call they of a Tinh trang sở hữu: USAD sea guera da Mô tả môi trưởng xung quanh vị tri xủy dựng lần trại: h. but diel trog Yêu cầu đơn vị thi công sau khi hoin thành công trình hoàn trà lại hiện trạng cho khu đất mượn tạm để xủy dựng lân trại thi công. Biên bản được thông qua, các bên shất trí kỉ tên./. Đơn vị lập bảo củo DTM, TVA Xác nhận của địa phương Dei dife chi dau tu BAN THATY Hord phi thi King DJ AN HEA 4 TIEN Trần Vinh Thắng

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CÔNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM Đặc lập - Tự Đo - Hạnh phác

DANH SẮCH NHỮNG ĐẠI BIỂU THAM DỰ CUỘC HỌP

THAM VĂN CỘNG ĐÔNG VỀ ĐÀNH GIẢ MÔI TRƯỜNG, TẢI ĐỊNH CƯ VÀ PHẢT TRIÊN DẦN TỘC THIỀU SÔ.

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Appendix A8- PICTURES OF CURRENT STATUS OF SUBPROJECT AREA Appendix 8.1: CURRENT STATUS OF SUBPROJECT AREA





CURRENT STATUS OF SPILLWAY





CURRENT STATUS OF DAM





CURRENT STATUS OF WATER INTAKE





CURRENT STATUS OF SLOPE SURFACE



CURRENT STATUS OF ROAD MANAGEMENT





CURRENT STATUS OF LEAKING





CURRENT STATUS OF LANDFILL



Appendix 8.2: PICTURE OF STAKEHOLDER MEETING

Work with Khe San reservoir management unit and president of the Quynh Thanh commune



Community consultation meeting in Quynh Thang commune



Household affected interview

APPENDIX B – SOCIAL

Appendix B1: METHODOLOGICAL NOTE

The purpose of this social assessment (SA), conducted in an integral manner with environmental assessment for this subproject, is two-fold. First, it examined the potential impacts of the subproject –positive and adverse impact –on the basis of planned project activities. Second, its findings inform the design of measures addressing identified potential adverse impact and proposing community development activities that are relevant to the project development goal. For identified adverse impact that could not be avoided, consultation with local people, governmental agencies, project stakeholders, etc., were carried out to ensure affected peoples will be appropriately compensated for, and supported in a manner that their socioeconomic activities will be promptly and fully restored to the preproject level, at least, and that their livelihoods will not be worsen off, in the long run, as a result of the subproject.

As part of the social assessment, where ethnic minority (EM) peoples are present in the subproject area –as confirmed by the EM screening (as per Bank's OP 4.10), consultation with them were carried out in a free, prior, and informed manner, to confirm if there is broad community support from affected EM peoples for the subproject implementation. EM screening was conducted as per Bank's OP 4.10, and was done the scope and coverage of the social assessment vis-à-vis the environmental assessment (OP 4.01). A gender analysis was also done as part of the SA to understand underlying gender dimensions (from project impact perspective) to enable gender mainstreaming to promote gender equality, and enhance further the development effectiveness of the subproject, and the project as a whole. Depending on the magnitude of the identified potential project impact, and the project development objective, a gender action plan and gender monitoring plan were prepared (please see these plans in the Appendix 9 of this ESIA).

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

A total of 360 of respondents participated in the SA exercise for this subproject, of which 310 people participated in the households survey (quantitative), and 50 people participate in focus groups discussions, community meetings, key informant interview (qualitative).

In Section 5, we will present the findings of the SA (positive and positive impact), including the result of the gender analysis. In section 4, we will present briefly the SA results, along with the recommendations on the basis of the SA findings. A gender action plan and gender monitoring plan are presented at Appendix 9 of this ESIA, and the public health intervention plan and public consultation and communication plan were presented at Appendix 7 and 8, respectively).

Appendix B2: PUBLIC HEALTH INTERVENTION PLAN

1. Purposes:

- Better control of contractor, local government to risks relating to public health during subproject construction period;
- Enhance awareness of local people, government, workers in subproject area to understand potential impacts on health during subproject construction period;
- People understand how to make feedback on issues relating to health arising during subproject construction period;
- Local people are informed, updated construction schedule so that they can make plan to prevent disease may endanger community during subproject construction period.

2. Subjects of management

- Risk factors relating to diseases in construction site, workers' camp, disposal site and in community;
- Risk factors affecting the problem of unsafe work, in traffic, especially on transportation road;
- Workers' camp, especially the toilets and cooking area of workers;
- The compliance of workers in ensuring safety and prevention of disease;
- The sensitive sites / sources of wastes arising disease

3. Issues need to be managed

- What kind of diseases, especially common infectious diseases in project area;
- The risk of transmission of infectious disease or risk affecting community health workers due to workers from elsewhere staying in locality;
- The risk of affecting public health due to noise, dust arising from the automotive, construction machinery; and from the disposal or wastes from worker camps
- Risk of accident risk for people at the project construction site
- The risk of accident to the community when the number of trucks transporting construction materials increases
- The risk of dam safety for farmers downstream.
- Reporting mechanism to make feedback on the problems related to the outbreak of epidemics or safety problems for people in the community.

4. Implementation period:

Before and after the subproject construction period.

About 1 month before construction phase, contractors will cooperate with local authority to inform construction plan as well as potential negative impacts relating to public health.

5. Location:

- Workers' camp; Disposal site;
- Work site; In Quynh Thang commune.

6. 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.

7. Management, monitoring and implementation units

a. Nghe An Project Management Unit:

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.

b. 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.

c. 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.

d. 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.

8. Funding for the implementation

For contractors: Funding of contractors is included in the civil contract.

<u>For health centers</u>: There are no funding for these activities because it is the responsibility of the medical units to manage the public health.

Appendix B3: PUBLIC CONSULTATION, PARTICIPATION AND COMMUNICATION STRATEGY

1. Purposes:

- 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.

2. Subjects of communication, consultation

- People in the communes, especially in the project areas and villages/ hamlets where vehicles transporting construction materials travel.
- Medical staffs in communes and villages;
- Local authorities, officials of villages/ hamlets
- 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

- Content of main categories of the subproject, fund for investment;
- Expected effectiveness of the subproject
- Subproject implementation arrangement in locality: information about project owner, construction contractor, monitoring will be done;
- Schedule, plan for construction of main work items;
- Potential impacts to environment and society and local people during construction stage;
- Participatory regime of local people, community monitoring procedure, grievances mechanism

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:

- Communication through communal loudspeakers. Currently, Quynh Thang 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.
- Community Meeting / Public Consultation: This form will be implemented with the participation of workers in the rural communes of the Project; people in Quynh Thang where the sub-project is constructed and households along the road transporting of construction materials or disposal areas.
- 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:

- Before the project is implemented:
- The Safeguard Policies Consultant will perform the communications, public consultation on safeguard policies issues in general, including public health.
- 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:

- 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.
- 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.
- 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:

Activities	Frequency	Quantity	Price unit	Estimate	Fund source
Announcement on loud speaker about construction activities	Once per week during construction stage	1 time x 78 weeks = 78 times	30.000 VND/1 time	2.340.000 VND	In contract of project owner with stakeholders
Large scale consultation meeting with representative of communal, district authority, and HHs related to construction of the project	Once per 3 months 3 during construction stage	6 times in 18 months	500.000 VND/1 meeting	3.000.000 VND	In contract of project owner with stakeholders
Stick on information board in CPC	Once per 2 weeks during construction stage	39 times during construction stage	50.000 VND/1 informatio n board	1.950.000 VNĐ 7.290.000	In contract of project owner with stakeholders
Total				VND	

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:

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

Achievements	Tasks and Indicators	People in charge	Period
Achievement	The contractors shall prioritize	PMU/Project	During
1:	unskilled labor (through	Coordinator shall	construction
Improvement	subcontracting); at least 30% of the	ensure the record of	stage
of dam safety	total labor force is local unskilled	these terms in the	
and irrigating	ones;	Contract; the list of	
conditions.	Among this 30% local labor, female	registered labor	
	workers shall be prioritized; Male	shall be submitted	
	and female labor will receive the	by communal	
	same wages for the same type of	officials the	

The Project's	Gender	Action	Plan
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Achievements	Tasks and Indicators	People in charge	Period
	work;	Contractor;	
	The Contractors shall not employ	Communal officials	
	children;	shall ensure the	
	Those locals wish to work for the	achievement of the	
	project shall register at their	targeted objectives.	
	villages/hamlets. Then, these	The communal	
	registrations shall be provided by	women group shall	
	the Head of the villages and	ensure the	
	communes to the Contractors for	involvement of local	
	selection in favour of poor and	female workers in	
	vulnerable households.	the Project.	
Achievement	At least 30% of women shall	Staff of Provincial	During
2:	participate in agricultural extension	PMU,	construction
Enhancement	courses.	District staff,	stage
of people's		Communal staff.	
capacity to			
make			
advantages of			
the Project			
Achievement	Programs on HIV/AIDS and human	The Provincial and	Monthly,
3:	trafficking.	Communal	before and
Enhancement	Programs on community-based risk	Women's Union	during
of awareness	mitigation.	shall organize and	construction
on potential	Information about risk mitigation	host the program	stage
social evils of	will be transferred to the communes	(training and	
vulnerable	and villages affected by the Project	preparation of	
objects,	using the participatory approach	materials) in	
especially	with a focus on the poor and	collaboration with	
women and	vulnerable households (e.g. ethnic	the	
ethnic	groups, households headed by	district/communal	
minorities	women, households with elderly	health center.	
	and disabled people).	The	
	The documents and information	Village's Women's	
	should be appropriate in terms of	Union shall	
	language, culture and gender, and	popularize and	
	especially translated into ethnic	communicate	
	languages in the region;	information.	
	Women's Union, the	The	
	representative of Centre for	district/communal	

Achievements	Tasks and Indicators	People in charge	Period
	HIV/AIDS prevention and	Health Centers shall	
	communal staff shall give training	support the	
	to communicators in each	communal	
	commune/village in the project	Women's Union.	
	area.	Project coordinator	
	-The programs will be implemented	shall provide local	
	at the communes and villages by	and international	
	two communicators (village chief	gender experts and	
	and one member of the Women's	specialists on Ethnic	
	Union).	Minorities.	
	-The program will be implemented	Gender experts and	
	in the villages and on market-days	specialists on EM	
	through distribution of	shall review existing	
	project/program materials and use	materials and	
	of loudspeakers	supplement the	
		required ones for the	
		Program.	
	Program on risk mitigation during	PMU	During
	project construction stage:	The Contractor	construction
	PMU and the contractor will	Local Health Centre	stage.
	coordinate closely with the health	Communal staff	
	services in communes and districts	The Women's	
	to implement programs on	Union shall perform	
	awareness enhancement and	general coordination	
	education on disease prevention,	for better HIV	
	diagnosis and treatment for	prevention.	
	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		

Achievements	Tasks and Indicators	People in charge	Period
	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;		
Project	Guidelines on Gender and	Project	During design
Management	Development and Education shall	implementation	and initial
	be provided for PMU staff, local	consultant PPMU	implementation
	agencies and Contractors.		stages
	All capacity enhancement activities		
	shall include the involvement of		
	women and ethnic minorities.		

Appendix B5- GRIEVANCE REDRESS MECHANISM

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

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

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.

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.

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

In terms of grievance redress, 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:
- Ask the complainant, relevant agencies, organizations and individuals to provide information, documents and evidence within 07 days of the request as a basis for grievance redress;
- Determine to employ or cancel the emergency measures as defined in Article 35 of this Law;
- The person competent to settle first-time complains should perform the following obligations:
- To receive the complaint and issue a notice in writing to the complainant, agencies, organizations, or individuals entitled to appeal and the state inspection agencies at the same level of acceptance of resolving complaints against administrative decisions and actions;

 To settle the complaints against administrative decisions and actions if required by the complainant;

To open a dialogue with the complainant and agencies, organizations and individuals concerned;

To decide grievance redress and be responsible before the law for settlement results. In case of complaints from authorized agencies, organizations and individuals, the results shall be notified to agencies, organizations and individuals in accordance with law;

To provide information, documents and evidence relating to the complaint for the complainant when they are required by the complainant for second-time settlement or appeal to the People's Court.

To compensate for first-time settlement and damages due to administrative decisions and actions in accordance with regulations on the State responsibilities.

The person competent to settle first-time complaints should perform their rights and obligations as stipulated by Law.

In terms of announcement of grievance redress 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.

- Within 15 days from the date of decision of grievance redress, the person competent to settle the complaint for the second time shall announce the grievance redress decision by one of the forms specified in Clause 2 in Article 41 of the Law on Complaints.
- In case of announcement at a meeting, the attendees of the meeting must include: the person issuing the grievance redress 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.
- The announcement of grievance redress 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 grievance redress 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.
- 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 grievance redress decision to be posted up is at least 15 days.

The procedure for grievance redress consists of 4 stages as below:

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 grievance redress 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.

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 grievance redress 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 Grievance redress Logbook.

The third stage in the Provincial People's Committee: The procedure for grievance redress 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 grievance redress 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 Grievance redress Diary.

The final phase, 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 - INFORMATION DISCLOSURE, ACCOUNTABILITY & MONITORING Table B6.1: Arrangement implementing EMP

	Role and responsibility				
Organization	Subproject's preparation	Subproject's construction	Subproject's operation		
СРО	Guiding the safeguard policies 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 phase; Assembling 6months report on environment from provincial Project Management Board;	Guiding the safeguard policies 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 EMP during operation period ,		
Provincial Project Management Board	Hiringconsultantandtakethe $general$ responsibilityonpreparationESIAandsubmit for approval;GuaranteetheGuaranteetheofficersmustbetrainedcompletelyin	Taking the responsibility on implementing (EMP) in pre-construction and construction periods; Guarantee the detail of contract and bidding documents including environmental	Takingtheresponsibilityonimplementing (EMP) inthe first operation year;Conductingtheinvestigationandsupervisionenvironmental issues in		

		Role and responsibility	Ŷ
Organization	Subproject's preparation	Subproject's construction	Subproject's operation
	environmental issues;	requirements; Conducting the investigation and supervision environmental issues during construction time; Coordinating Environmental Monitoring Report to CPO;	the first operation year; Assist project owner in giving out environmental requirements in 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 EMP via their internal supervision system;	SupervisingtheimplementationofEMP via their internalsupervision system;
Community Supervision Board and the other members of local community (CSBs ¹)	Participatinginconsultation activities anddetermination,preparationforsubproject;Abilitytocontribute the ideas toenvironmental assessmentdocument when it hasbeen 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	n/a	Undertaking training courses on environment	n/a

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.

	Role and responsibility				
Organization	Subproject's preparation	Subproject's construction	Subproject's operation		
Consultant		for Supervision consultant staffs Participating in environment supervision according to approved ESMP in ESIA Preparing monitoring report and submit to Provincial Project management Board			
Construction Contractor	n/a	Preparing the detailed plan on environment monitoring on the field to meet EMP requirements of subproject; Apportion sources sufficiently to meet compulsory requirements and regulations of EMP on the field;	n/a		

Mitigation measures	Parameters	Location	Method	Frequency	Responsibilit y	Expenses
Pre-construct	ion period					
Implementin g Resettlement Action plan	The number of affected households has been compensated Compl aint 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 San 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 (Hamlet 1) Cons truction 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 (Hamlet 1) Cons truction area	Survey, interview	Monthly or when having the feedback of local people	Contractor	Involved in execution contract

Table B6.2: Environmental Supervision Plan

Mitigation	Parameters	Location	Method	Frequency	Responsibilit	Expenses
measures					У	-
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 Loc al 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 constructio n contract
1.6 Asset management	Complaint of local people relating to construction activities of workers	Worker's tent The residential area near construction site/tents	Survey, interview	Weekly	Contractor	Involved in constructio n 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	Cons truction site; Cons truction site near residential area (Hamlet 1 and Hamlet 3, where having material transport	Observe and interview	Monthly	Contractor	Involved in constructio n contract
Mitigation measures	Parameters	Location	Method	Frequency	Responsibilit y	Expenses
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		lorries go through)				
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	Constructio n site Worker's tent Dumping yard	Survey or interview	Monthly or when having the feedback of local people	Contractor	Involved in constructio n contract
Operat	ion period					
2.1 Risks on dam	The leakage points of dam The number of dam break/overflo w	Whole dam	Observe and interview	6 months/tim e	Operation management unit	State's budget
2.2 Landslide in flood season	Number of landslide places Freque ncy of landslide	Whole dam	Observe and interview	Monthly or when having the feedback of local people	Operation management unit	State's budget

Project's Phase	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	СРО	WB / MONRE
	Independent monitoring report on Environmental and Social Safety states the following contents: (i) Supervision result of	6 months/time or 3	Independent Environmental Consultant	Subproject Management Board and

Project's Phase	Type of report	Frequency	Responsibility	Agency receives report
	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.	months/time		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 operation years	People's Committee of Quynh Luu district	CPO and WB