LAM DONG PROVINCIAL PEOPLE'S COMMITTEE
DEPARTMENT OF AGRICULTURE AND RURAL DEVELOPMENT

4th Version

VIETNAM DAM REHABILITATION AND SAFETY PROJECT (WB8)

REPORT
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
SUBPROJECT: REPAIR AND UPGRADING OF DA TEH RESERVOIR – MY DUC COMMUNE – DA TEH DISTRICT – LAM DONG PROVINCE

Lam Dong, April 2015

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Prepared by:

Lam Dong, April 2015

APPENDIX

List of Tables

List of Figures

LIST OF ABBREVIATIONS

BOD	Biological Oxygen Demand
CPO	Central Project Office under Ministry of Agriculture and Rural Development (MARD)
CSC	Construction Supervision Consultant
CSEP	Contract for specific Environmental Plan
DARD	Department of Agriculture and Rural Development
DO	Demand of Oxygen
DONRE	Department of Natural Resources & Environment
EIA	Environmental Impact Assessment
ECOP	Environmental Code of Practice
EMDP	Ethnic Minority Development Plan
EMP	Environmental Management Plan
ESMF	Environmental and Social Management Framework
ESU	Environmental Service Unit
GOV	Vietnamese Government
IMC	Irrigation Management Company
IPM	Integrated Pest Management
MARD	Ministry of Agriculture and Rural Development
OP	Operational Policy of World Bank
PEMC	Provincial Environment Management Consultant
PMF	Pest Management Framework
PPC	Provincial People's Council
QCCP	Allowable Code
QCVN	National regulation
RAP	Resettlement Action Plan
REA	Regional Environment Assessment
RPF	Resettlement Policy Framework
TCVN	National regulation on environment
TOR	Terms of Reference
WB	World Bank
WUO	Water Users' Organization

SUMMARY

1. The "Repair and Upgrading of Da Teh 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) assure reservoir safety during operation in adaptation with climate change and in accordance with the increasingly high demand of lowlands area, minimizing the adverse impacts on environment and landscape of reservoir bed and lowlands; (ii) ensure the initial design objective for stably irrigating 2,300 hectares of rice paddy field and crops in the whole year covered by the available irrigation area of My Duc commune and Quang Tri commune, Da Teh district, Lam Dong province; (iii) ensuring domestic water supply with flow rate of 10.000m^3 per day and night, etc.. 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. ***Background:*** Being situated in My Duc commune, Da Teh district, Lam Dong province towards the South of Lam Dong province, Da Teh Reservoir is about 180km and 150km far from Da Lat city and Ho Chi Minh City, respectively. The reservoir is characterized by basin area of 198km^2 and capacity of 29.35x10^6 m^3. Its head works complex and auxiliary works include following items:

a) Earth dam:

- Rehabilitate and expand the am section towards downstream to ensure that the designed section is equal to embankment with compact coefficient of $K \geq 0.97$;
- Reinforce the dam top by 20cm thick M200 concrete;
- Upstream roof: From the elevation of + 146.0m or less, disordered ashlars are dropped (by removing from upstream roof). From the elevation of + 146.0m to the elevation of + 150.0m, 25cm thick hand facing stones are arranged in the filtering macadam layer within M200 reinforced concrete with dimensions of (5x5)m. From elevation of + 150.0m or more, the dam top is reinforced by pre-cast in-situ M200 reinforced concrete with 15cm thickness;
- Repair and complete the dam's downstream roof (constructing irrigation ditch by M150 concrete, sodding for protection purpose, extending and building the downstream attic-type irrigation and drainage rock pile, etc);
- Apply the high pressure drilling to avoid water penetration for dam body and foundation, the total length is 318m (the right shoulder is 110m long whereas the center section is 208m long).

b) Spillway:

Expand and upgrade the overflow weir in the form of door-based weir:

- Elevation of overflow weir: + 150.2m, 24m width, arranged with 3 plain gates (8x1.5)m; steel valve gate operated by electric hoist;
- Recover the water slope and flank and rehabilitate the flanks to the design elevation by M300 reinforced concrete;
- Expand weir's upstream channel;
- Re-repair couplings by PVC combined with asphalt concrete;
- Re-build weir bridge with M200 reinforced concrete with 4m width and load of H18;
- Erect the protection handrails along two sides of flanks and water slope .

c) Water intake:

- Roughly chisel all internal culvert surfaces, clean the surface and plaster 7cm thick steel grid cement mortar;
- Reinforce external valve tower body from the elevation of +157m or less + 150m by roughly chiseling, cleaning and applying 7cm thick steel grid cement mortar;

- Repair the tower building and service bridge;
- Replace new stainless stain valve gate and gate operation machine;
- Reinforce the 250m long channel section behind the gate; rectangular section channel with M200 reinforced concrete structure.

d) Operation house and communication system for management purpose:

- Construct head works operation house with 4th grade house standard and gross area of 150m^2;
- Construct the automatic reservoir water level observation system to facilitate the works management and operation.

e) Managed electric wire line:

Construct the 1.8km long LV wire lines from weir shoulder to flood spillway for management and operation purpose.

f) Managed road:

Reinforce the managing road from the section behind the water intake to flood spillway with specifications of 1.7km length, M200 concrete, 20cm thickness and 3m width.

The Project is design and launched in accordance with the Project's Environmental and Social Management Framework (ESMF) and dam safety framework of WB, ensuring strict adherence to administrative regulations and standards of the Socialist Republic of Vietnam. The impacts incurred during the Project's preparedness and implementation are also ensured to be determined fully and closely managed and supervised by detail plans and periodic reports to the management at all levels.

3. ***Social environmental impacts and mitigation measures:*** The project launch shall offer the great benefits to the local community such as: (i) stabilizing water supply, improving the production conditions and living standards of the local people; (ii) improving dam safety to help the local people in lowlands to feel secured to live and produce; (iii) improving landscape, climate system of the reservoir and micro-climate conditions. However, the project performance shall raise some potential adverse impacts and risks on natural and social environment pertaining: (i) construction and (ii) reservoir operation.
4. The preventative or mitigation measures are detailed in the ESMP.
5. The sub-project site is characterized by residential community, mainly King ethnic (92.7%). No ethnic minority households are affected.
6. When the Sub-project is launched, 1 hectare of public land at the dam shoulder (under the commune's management) shall be temporarily recovered to use as backfilling soil material mine. Within the project site, no graves or temples or any cultural or religious works are affected.
7. The calculation of design consultant unveiled that total excavated soil volume (earth dam, operation house, flood spillway, dam paths and spillway paths) is about 80,000m^3; backfilling soil volume required for the entire works is about 93,000 m^3. All excavated soils shall be reused to embank the dam and paths to the dam and spillway. An estimated 5,000 m^3 of soft soil which is not used and organic removing soil shall be dumped right at the dam bottom to protect the soil dam. The insufficient quantity of backfilling soil shall be taken from soil material mine to use. The Consultant has launched the backfilling soil material mine located at the dam's right shoulder covering an area of 1ha with exploitation reserve of 100,000m^3, at transportation distance of 200m – 1,000m, in which the manual or mechanical exploitation and transportation are favorable. This low hilly side area is managed by the local authority. The compensation for site clearance has been successfully completed since 2009. Other building materials such as stone, sand, rubble stone, gravel, etc., unavailable at the site must be bought from other places:

Stone: At the construction site, stone from Bao Loc stone pit is not used. It is about 70km far from the works;

Sand, rubble stone and gravel: It is exploited at Da Quay River which is about 10km far from the works;

Others: Other materials are taken from center of Da Teh district about 10km far from the works or transported from Ho Chi Minh City (about 150km).

8. Site preparation phase requires to mobilize about 15-20 workers in short tiem (01 month). Number of workers concentrated at site in peak hours is about 150 persons (construction of soil dam, spillway, paths to dam, access road and operation house, etc.) Total 40 machines shall be used to serve for construction such as 110CV bulldozer, excavator, truck, 500l mixer, concrete compactor, electric generator, pumps, etc.

9. Works construction may generate adverse impacts on natural environment (increase in air pollution, water pollution, soil pollution, noise and vibration pollution, etc) and the social environment (traffic jam, affecting social security, etc.) However, such impacts are only local, temporary, small and preventative/minimized by:

Ensuring adherence to the ESMP prepared for the Project;

Consulting the local authority and the local people from project preparation and maintaining during the Project performance;

Closely supervising the Project performance.

10. The Project's ESIA Report aims to prepare the specific action plan to ensure the quality of natural environment and social environment at the Project site. Entire project performance process shall be closely supervised by Project Management Unit (PMU) under Department of Natural Resources and Environment (DONRE), construction supervision consultant, environmental management consultant and local community. The supervision process shall be recorded and reported in public and periodic manner.

11. Impact management and minimization plan during project performance: In order to minimize the potential adverse impacts during the Project performance, the following measures should be taken under the close, continuous and open consultation with the local authority and community:

Assurance of environmental standards must be covered in the terms of the Contract and interpreted with the Contractor.

Full performance of mitigation measures with proper observation and modification in accordance with the practical conditions to obtain the highest mitigation performance.

Close supervision and monitoring of implementation of safety measures to ensure the full and effective performance of mitigation measures in the entire project.

Planning and full performance of Community Consultation Program during the Project life.

12. Responsibilities: Central Project Office (CPO) is responsible for supervising the overall project and implementation progress of the project on: ***"Rehabilitation of Da Teh Dam and Reservoir",*** including implementation of environmental protection measures as recommended in ESMP.

13. Lam Dong Irrigation Investment & Management Center is responsible for preparing the detail bidding invitation information, selecting proper contractor, drafting contracts to ensure successfully perform and closely supervise the Project's ESMP. The Contractor is responsible for launching the Project as scheduled and submitting the periodic detail report to CPO. CPO is responsible for working closely with the local authority to ensure the consultation efficiency and improve the performance of mitigation measures. Lam Dong Province's DONRE is responsible for supervising the implementation of environmental policies as stipulated by Vietnamese Government. After the works is put into operation, operator shall be responsible for periodically maintaining, servicing and testing the works items.

14. Expenditure allocation: ODA and counter-part capital of Vietnamese Government are used with total investment of: **82,695,623,000 VND.**

Cost for ESMP implementation:

ESMP implementation: 551,000,000 VND;

Environmental and Social Surveillance Plan: 342,144,000 VND.

15. ESIA Report comprises of 8 main parts as follows:

Part 1: Introduction
Part 2: Sub-project description
Part 3: Policy, legal and administrative framework
Part 4: Environmental and social-economic characteristic of the project area
Part 5: Environmental and social impacts assessment
Part 6: Alternative analysis
Part 7: Environment and social manageMENT plan (ESMP)
Part 8: Stakeholder consultation and information disclosure

PART 1 INTRODUCTION

The "Rehabilitation of Da Teh 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. Approach and implementation method of ESIA

Environmental and Social Impact Assessment (ESIA) is complied with the law on environmental protection, policy and law of Vietnamese Government and regulations of the World Bank.

❖ **Approach and social impact assessment measures**

The following social impact assessment methods are applied in the report:

Documentation collection method:

It is used to evaluate the social impacts. The consultant has studied following documents:

Valid policies and regulations of the State and Lam Dong province relating to investment in fundamental construction;

Standards and codes on project design;

Project description: Rehabilitation and Upgrading of Da Teh Reservoir, Lam Dong Province.

Special reports:

The topographic and geological surveys and engineering geology at the site;

Documents and figures on natural conditions, socio-economic conditions of My Duc commune and Quang Tri commune, Da Teh district, Lam Dong province;

Figures on surveying and measuring environmental conditions at the Project site;

Basic design description, bill of quantity, cost estimates and drawings, March, 2015;

2013 statistical yearbook of Lam Dong province;

Summary of public consultation of the People's Committee and Committee of the Vietnam Fatherland Front of My Duc commune and Quang Tri commune, Da Teh district, Lam Dong province from 2nd February 2015 to 9th February 2015.

Field survey method: Field survey was conducted at communes of My Duc and Quang Tri. The PoEs interviewed with questionnaire in combination with field observation method and group discussion, in-depth interview wit the local authorities at all levels and representatives for groups of beneficiary households. Such activity helped to collect the overview information about the socio-economic conditions, socio-economic characteristics of the local people/area at the Project site, to be used as the basis to recommend the proper solutions to minimize the direct and indirect adverse impacts of the Project.

Socio-economic survey at household level by quantitative questionnaire: The Consultant interviewed and collected information from some households at hamlet 8, My Duc commune (the head works area). In addition to the questions designed with available options, there were open questions to further collect opinion of the interviewees.

Sociology survey method: It investigated and interviewed the local people surrounding Da Teh Reservoir, leaders of My Duc commune and beneficiary households.

Group discussion method: The Consultant worked with the leaders of My Duc commune to prepare the main group discussion plan. Total 3 group discussions were

available with the participation selected from representatives of households with the criteria: Households affected by sub-project, households with female bread-winner, households with special difficulty (elder, handicaps, family under preferential treatment policy, etc).

Participatory Rural Appraisal (PRA) method: The PRA tools were applied by the Consultant such as crop schedule, map, and demand evaluation to help the community to easily determine the preferential issues to be handled pertaining raising awareness on objectives, potential active and passive impacts of the Project. Participants of PARA included affected households and beneficiary households of the project.

❖ **Approach and Environmental Impact Assessment Method**

Field survey method: Collect and summarize the findings of available studies related to the Project; Collect and process the data on topographic and geological conditions; hydro-meteorological conditions; Socio-economic conditions at the Project site. Such method is applied to establish the natural condition and socio-economic conditions of the Project Site.

Site environmental survey method:

- To conduct site environmental survey by sampling and analyzing the indicators at labs to determine the quality conditions of surface water, underground water and soil quality at the Project site and surroundings.
- To take sample by sampling diagram (Sampling position as described in Appendix 4).
- To collect the air quality from background environment reports released by Lam Dong Province or similar projects within the Project Site in 2014.
- Sample of surface water and underground water quality is taken by water sampling tools in accordance with TCVN 6663-6:2008 (ISO 5667-6:2005). Water sample is treated and stored in accordance with TCVN 6663-14:2000 (ISO 5667-14:1998);
- The concerned soil and water samples are stored and kept at the labs for analysis to ensure the compliance.
- *Quick evaluation method:* To apply pollution coefficients set up by the World Health Organization (WHO) to:
- Evaluate the pollutant load in emission and waste water.
- Develop the mitigation measures for the pollution.
- Estimate load and concentration of pollutants arisen during the Project's construction and operation, then, conduct qualitative and quantitative evaluation on environmental impacts.

Comparison method: To evaluate the impacts by comparing codes and standards on soil, water, noise and air quality and other related environmental standards.

1.2. Consultant

Name of the consultant:	VietVuong Construction, Investment and Consulting JSC
Represented by:	Phung Duc Cau, M.A; Title: Director
Contact address:	No. 9, Duong Thanh, Hoan Kiem, Hanoi.
Telephone:	04.22253288 Fax: 04.22253288

List of main participants during preparing the ESIA Report of the Dam Safety Improvement Project launched in Lam Dong province; sub-project on Da Teh Reservoir as follows:

Table 1-1: List of person in-charge of implementation

No.	Full anme	Major	Expert
1	Nguyen Dang Anh, M.Eng	Hydraulic works	Team leader, experts in hydraulic works
2	Dr. Nguyen Viet Hung	Environmental	Environmental Expert

No.	Full anme	Major	Expert
		Engineering	
3	Ho Thi Huong, M.A	Environmental Science	Environmental Expert
4	Project Manager Quang Thu Nguyet	Environmental Science	Environmental Expert
5	Project Manager Tran Quy Long	Sociology	Sociological expert
6	Project Manager Hoang Thi Hoa	Sociology	Sociological expert
7	Project Manager Duong Linh Phuong	Economics	Economic expert

PART 2 SUB-PROJECT DESCRIPTION

2.1. Overview about sub-project

a) Sub-project on "***Rehabilitation and Upgrading of Da Teh Reservoir***" shall be launched at My Duc commune, Da Teh district, Lam Dong province, about 200km from Da Lat City. The reservoir has been built since 1995 by the State's budget. During operation, the works has been damaged, degraded and disqualified with the irrigation design capacity, raising highly potential risks for the head works and threatening the lowland safety.

b) Objectives of the Sub-Project

Rehabilitating and improving dam safety aim to ensure reservoir safety, adaptive to the climate change;

Ensuring stable irrigation water sources for the traditional agriculture production area and providing water for aquaculture.

c) Project owner:

Project owner: Lam Dong Irrigation Investment & Management Center

Address: No. 51 Hung Vuong Street, Da Lat City, Lam Dong Province

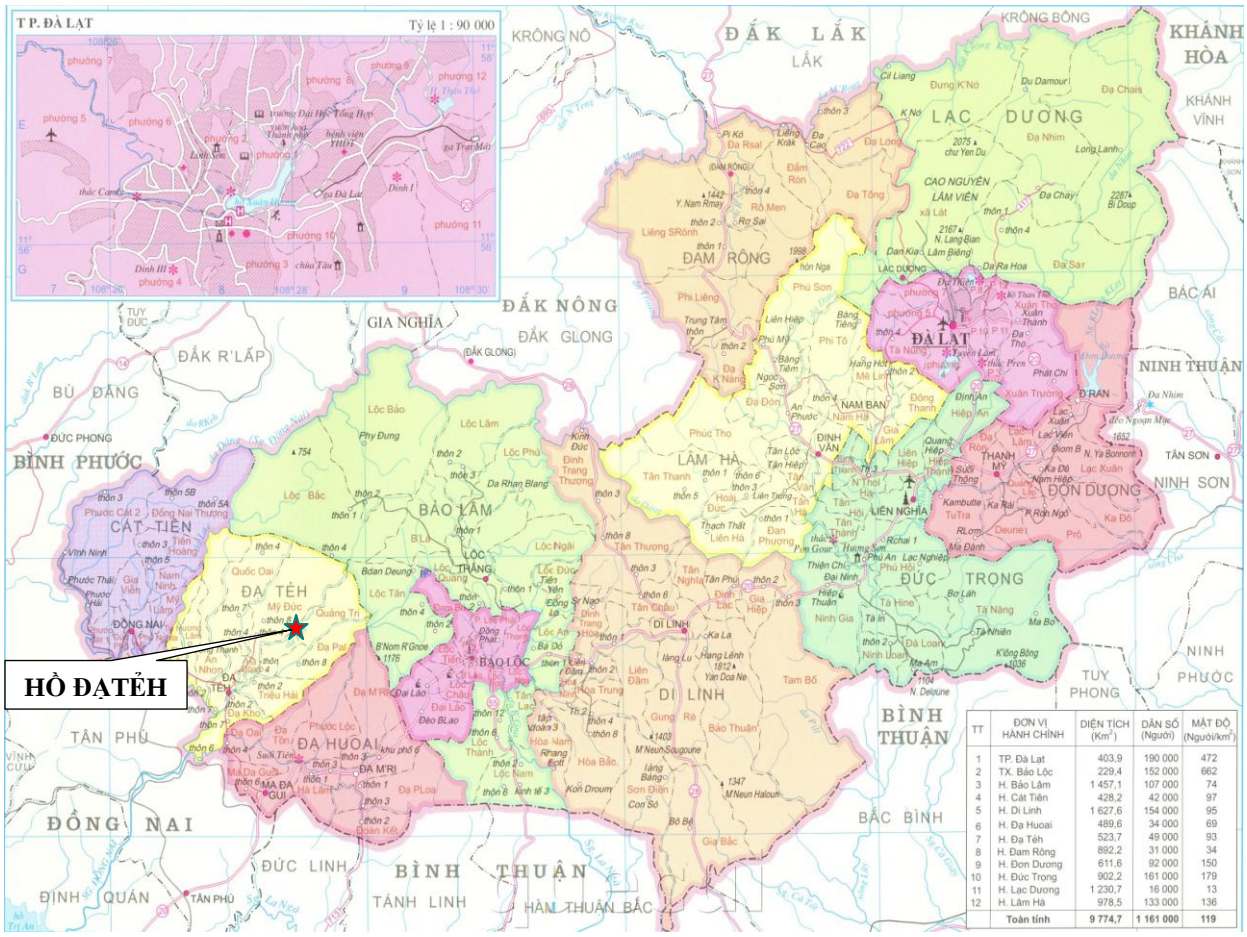
Telephone: 063. 3828369 Fax: 063. 3834739

d) Total investment capital:

Investment capital of sub-project: **82,695,623,000 VND** *(Eight billion six hundred and ninety five million six hundred and twenty three thousand Vietnam dongs)*

e) Project site:

The sub-project is launched at hamlet 8, My Duc commune, Da Teh district, Lam Dong province as illustrated in below map.



TT	ĐƠN VỊ HÀNH CHÍNH	DIỆN TÍCH (Km²)	DÂN SỐ (Người)	MẬT ĐỘ (Người/km²)
1	TP. Đà Lạt	403,9	190 000	472
2	TX. Bảo Lộc	229,4	152 000	662
3	H. Bảo Lâm	1 457,1	107 000	74
4	H. Cát Tiên	428,2	42 000	97
5	H. Di Linh	1 627,6	154 000	95
6	H. Đạ Huoai	489,6	34 000	69
7	H. Đạ Tẻh	523,7	49 000	93
8	H. Đam Rông	892,2	31 000	34
9	H. Đơn Dương	611,6	92 000	150
10	H. Đức Trọng	902,2	161 000	179
11	H. Lạc Dương	1 230,7	16 000	13
12	H. Lâm Hà	978,5	133 000	136
	Toàn tỉnh	9 774,7	1 161 000	119

section is equal to embankment with compact coefficient of K ≥ 0,97;

- Reinforce the dam top by 20cm thick M200 concrete;
- Upstream roof: From the elevation of + 146.0m or less, disordered ashlars are dropped (by removing from upstream roof). From the elevation of + 146.0m to the elevation of + 150.0m, 25cm thick hand facing stones are arranged in the filtering macadam layer within M200 reinforced concrete with dimensions of (5x5)m. From elevation of + 150.0m or more, the dam top is reinforced by pre-cast in-situ M200 reinforced concrete with 15cm thickness;
- Repair and complete the dam's downstream roof (constructing irrigation ditch by M150 concrete, sodding for protection purpose, extending and building the downstream attic-type irrigation and drainage rock pile, etc);

Apply the high pressure drilling to avoid water penetration for dam body and foundation, the total length is 318m (the right shoulder is 110m long whereas the center section is 208m long).

2. Flood spillway:

Expand and upgrade the overflow weir in the form of door-based weir:

- Elevation of overflow weir: + 150.2m, 24m width, arranged with 3 plain gates (8x1.5)m; steel valve gate operated by electric hoist;
- Recover the water slope and flank and rehabilitate the flanks to the design elevation by M300 reinforced concrete;
- Expand weir's upstream channel;
- Re-repair couplings by PVC combined with asphalt concrete;
- Re-build weir bridge with M200 reinforced concrete with 4m width and load of H18;

Erect the protection handrails along two sides of flanks and water slope.

3. Water intake:

Roughly chisel all internal culvert surfaces, clean the surface and plaster 7cm thick steel grid cement mortar;

Reinforce external valve tower body from the elevation of +157m or less + 150m by roughly chiseling, cleaning and applying 7cm thick steel grid cement mortar;
Repair the tower building and service bridge;
Replace new stainless stain valve gate and gate operation machine;
Reinforce the 250m long channel section behind the gate; rectangular section channel with M200 reinforced concrete structure.

4. Operation house and communication system for management purpose:

Construct head works operation house with 4th grade house standards and gross area of 150m^2;
Construct the automatic reservoir water level observation system to facilitate the works management and operation.

5. Managed electric wire line:

Construct the 1.8km long HV wire lines from weir shoulder to flood spillway for management and operation purpose.

6. Managed road:

Reinforce the managing road from the section behind the water intake to flood spillway with specifications of 1.7km length, M200 concrete, 20cm thickness and 3m width.

Quantity and scope of works items are described as follows:

Table 2-1: Scope of works items

No.	Parameters	Designation	Unit	Value	
				Present	**After Rehabilitation**
	Design indicators				
1	Works grade			**II**	**II**
2	Basin area	F_{lv}	km^2	198	198
3	Irrigation assurance frequency	P	%	75	**85**
4	Designed flood frequency	P	%	0.5	0.5
5	Check flood frequency	P	%	0.5	0.1
I	**Reservoir**				
1	Designed flood flow rate	Q_{lutk}	m^3/s	1,143.60	1,143.60
2	Check flood flow rate	Q_{lukt}	m^3/s	1,141.10	1,141.10
3	Dead level	MNC	m	144.00	144.00
4	Retention level	MNBT	m	150.20	151.70
5	Designed flood level	$MNGC^{TK}$	m	156.64	**157.38**
6	Check flood level	$MNGC^{KT}$	m	157.60	**158.32**
7	Gross storage capacity	V_{tb}	10^6m^3	24.00	**29.35**
8	Net capacity	V_{hi}	10^6m^3	19.19	**24.13**
9	Inactive storage capacity	V_C	10^6m^3	5.22	**5.22**
10	Reservoir bed area corresponding to dead level	F_C	ha		**162.10**
11	Reservoir bed area corresponding to retention level	F_{MNDBT}	ha		**435.98**
II	**Earth dam**				
1	Dam crest elevation	▼dd	m	158.0	**159.00**
2	Elevation of breakwater	▼tcs	m		**159.80**
3	Maximum dam height (excluding cutoff dike)	Hd	m	27.5	**28.00**
4	Dam length	Ld	m	600	700.00
5	Dam crest width	Bd	m	5	5.00
6	Upstream roof coefficient	m_t		3.0-4.0	3.0-4.0
7	Downstream roof coefficient	M_h		3.0-4.0-5.0	2.5-3.5-4.0
8	Dam type	Chimney-type drainage			
III	**Flood spillway**				
1	Spillway type: Oficerop self-spillway			Wide crest spillway	Wide crest spillway with 3 regulating gates by plain gates
2	Spillway elevation	▼nt	m	151.7	151.7
3	Elevation of water slope	▼dd	m	150.2	150.2
4	Jet nozzle elevation	▼mp	m	146.53	146.53
5	Breadth of overflow weir	Bt	m	18	**3x8=24.0**
6	Breadth of water slope	Bd	m	19.6	19.6
7	Discharge flow rate Qmax 0.5	Q_{max} 0.5%	m^3/s	495.44	595.44
8	Discharge flow rate Qmax	Q_{max}0.1%	m^3/s	572.97	772.97

	0.1				
9	Spillway head corresponding to p% designed	H_{tk}	m	6.64	5.35
10	Spillway head corresponding to p% designed	H_{kt}	m	7.60	6.25
IV	**Water intake**				
1	Intake type	Self-flowing culvert with pressure regulated by valve gate			
2	Gate valve type	Placing 01 plain gate and 01 radial gate			
3	Elevation of culvert threshold	▼cv	m	140	140
4	Culvert length	Lc	m	118.5	118.5
5	Culvert dimensions	(bxh)	m	2x2 and D= 2.000mmm	1.8x1.8 and D= 1.800mmm
6	Designed flow rate	Q_{tk}	m^3/s	5.7	5.7
7	Culvert structure	M200 reinforced concrete		Grouting to reinforce and prevent water penetration for M300- 10cm steel grid concrete mortar	
8	Slope	i	‰		
9	Culvery's downstream channel: Non-reinforced			Request to reinforce a 250m long section by M200 reinforced concrete	

❖ **Quantity of main materials**

Materials are used for the works items such as earth dam, spillway, water intake, access road to dam and spillway and branch line, etc. According to the calculation of design consultant (WHECC), the main material quantity of the works items are shown in the below table:

Table 2-2: Quantity of main materials

No.	Items	Unit	Quantity
1	Macadam of various types	m^3	12,972.83
2	Ashlars (15 x 20 x 25)	pcs	294,117.00
3	Quarry-stone	m^3	7,562.30
4	Course sand	m^3	12,200.53
5	Steel wire	kg	6,362.99
6	Brick of various types	pcs	8,813.00
7	Wood nog	m^3	181.76
8	Tile of various types	pcs	1,565.00
9	Bitumen	kg	50,420.68
10	Roofing iron	m^2	150.00
11	PVC sheets, type KN 92	m^3	857.00
12	Steel section of various type	ton	57.56
13	Round bar	ton	341.38
14	Mortar of various type	m^3	195.00
15	Cement PC40	ton	3,866.00
16	Plastic pipe	m	2,727.00
17	Steel pipe	m	88.5

❖ **List of human resources, construction plants and equipment**

According to the work volume, the design consultant estimates the quantity of main construction equipment as follows:

Table 2-3: List of expected construction plants and equipment

No.	Items	Unit	Status	Quantity	Total

				Used	Reserved	
1	0.7-1.3 ton excavator	pcs	Used	1	0	1
2	10-12 ton dump truck	pcs	Used	6	2	18
3	110CV bulldozer	pcs	Used	1	1	5
4	500l mobile mixer plant	pcs	Used	4	1	9
5	Concrete compactor	pcs	Used	10	2	20
6	250m^3/h water pump	pcs	new	8	1	9
7	10-15 ton tire crane	pcs	Used	1	0	1
9	5m^3 oil tanker	pcs	Used	1	0	1
10	5m^3 water tanker	pcs	Used	1	0	1
11	50KVA generator	pcs	new	4	0	4
14	Metal cutter	pcs	new	1	0	1
15	Metal bending machine	pcs	new	1	0	1
16	Sawing machine	pcs	new	1	0	1

❖ **Raw materials and supplies for the Project**

1. Backfilling materials

In order to satisfy the reserves and quality on backfilling materials for the works, in this phase, the Consultant has launched the backfilling soil material mine located at the dam's right shoulder covering an area of 1ha with exploitation reserve of 100,000m^3, at transportation distance of 200m – 1,000m, in which the manual or mechanical exploitation and transportation are favorable. This low hilly side area is managed by the local authority. The compensation for site clearance has been successfully completed since 2009.

2. Stone

At the construction site, stone from Bao Loc stone pit is not used. It is about 70km far from the works.

3. Sand, rubble stone and gravel

It is exploited at Da Quay River which is about 10km far from the works.

4. Others

Other materials are taken from center of Da Teh district about 10km far from the works or transported from Ho Chi Minh City (about 150km).

2.3. Construction progress

Total expected implementation period of sub-project is 24 months; the expected time for completing the remaining parts as well as the site surface restoration is the last 3 months. The time to avoid rain and storm lasts about 3 months; therefore the direct construction period is 18 months.

PART 3

POLICY FRAMEWORK, REGULATIONS AND RULES

3.1. Applicable National Law and Regulations

❖ **Application of environmental-related legal framework**

- Law on Environmental Protection (2014) No. 55/2014/QH13 on defining issues on strategic environmental assessment, environmental impact assessment and environmental protection commitment for development activities. EIA report is conducted simultaneously with preparation of investment project (feasibility research report);
- The Decree No. 18/2015/ND-CP promulgated on 14th February 2015 on planning environmental protection, strategic environmental assessment, environmental impact assessment and environmental protection plan;
- The Directive No. 26/CT-TTg of the Prime Minister on 25th August 2014 on implementing the Law on Environmental Protection;
- The Circular No. 01/2012/TT-BTNMT dated 16th March 2012 on defining formulation, appraisal and approval, inspection and certification of implementation of detailed environmental protection plans; formulation and registration of simple environmental protection plans;
- The Decree No. 29/2011/ND-CP of the Government dated 18th April 2011 on providing strategic environmental assessment, environmental impact assessment and environmental protection commitment;
- The Circular No. 16/2009/TT-BTNMT of the Ministry of Natural Resources and Environment dated 7th October 2009 on defining national technical regulations on environment, air quality and some hazardous substances in the ambient air;
- The Decision No. 22/2006/QD-BTNMT of the Ministry of Natural Resources and Environment dated 25th December 2006 on the compulsory application of Vietnam's standards about the environment.

❖ **Application of Legislative Framework on land use and recovery in the investment projects**

The Law on Land No. 45/2013/QH13 approved on 29th November 2013 by the National Assembly of the Socialist Republic of Vietnam;

The Decree No. 43/2014/ND-CP dated 15th May 2014 on guiding the implementation of 2013 Law on Land;

The Decree No. 44/2014/ND- CP dated 15th May 2014 on defining land price;

The Decree No. 47/2014/ND-CP dated 15th May 2014 on compensation, support and resettlement upon land recovery by the State;

The Decree No. 37/2014/ND-CP dated 30th June 2014 on detailing the compensation, support and resettlement upon land recovery by the State;

The Circular No. 23/2014/TT-BTNMT of the Government dated 19th May 2014 on stipulating the certificates of land use right, house ownership and other assets on land.

❖ **Legislative Framework on using and managing the construction of investment projects**

The Law on Construction No. 50/2014/QH13 approved on 18th August 2014 by the National Assembly of the Socialist Republic of Vietnam;

The Decree No. 15/2013/ND-CP dated 6th February 2013 on quality management of construction works;

The Decree No. 207/2013/ND-CP issued on 11th December 2013 on amending and supplementing a number of Articles of the Decree No. 48/2010/ND-CP of the Government dated 7th May 2010 on contracts in construction activities;

The Decree No. 12/2009/ND-CP dated 10th February 2009 on managing investment projects on the construction of works.

❖ **Legislative framework on general exploitation of water natural resources, forest protection, cultural heritages and biodiversity**

The Law on Water Resources approved on 21st June 2012 by the National Assembly of the Socialist Republic of Vietnam;
The Decree No. 42/2012/ND-CP of the Government dated 11th May 2012 on management and use of rice-farming land;
The Decree No. 112/2008/ND-CP of the Government dated 20th October 2008 on management, protection and integrated exploitation of resources and environment of hydro-power and irrigation reservoirs;
The Decree No. 120/2008/ND-CP of the Government dated 1st December 2008 on managing river basin;
The Decree No. 72/2007/ND-CP of the Government dated 7th May 2007 on dam safety management;
The Decree No. 149/2004/ND-CP of the Government dated 27th July 2004 on issuing permits for water resource exploration, exploitation and use, or for discharge of wastewater into water sources;
The Law on Cultural Heritage No.28/2001/QH10 approved on 12th July 2001 by the National Assembly of the Socialist Republic of Vietnam. Article 13 – The following acts are strictly prohibited: Appropriating or deviating cultural heritages; Ruining or posing a danger of ruining cultural heritages; Conducting illegal excavations at archaeological sites or illegal construction, encroaching upon the land within historical-cultural relics, famous landscapes and beauty spots; Illegally purchasing, selling, exchanging and transporting vestiges, antiques, national precious objects pertaining to historical-cultural relics, famous landscapes and beauty spots; illegally taking abroad vestiges, antiques and national precious objects;
The Law on Bio-diversity No.28/2008/QH12 approved on 13th January 2008 by the National Assembly of the Socialist Republic of Vietnam. Chapter III- Conservation and Natural Sustainable Bio-diversity Development and Chapter IV- Conservation and Development of Species.

❖ **National policies on dam safety**

The Decree No. 72/ND-CP of the Government dated 7th February 2007 on dam safety management;

The Directive of the Government at the Statement No. 21/CT-TTg dated 14th October 2013 on strengthening management and assuring reservoir safety;

The Circular No. 33/2008/TT-BNN dated 4th February 2008 on guiding a number of Articles in the Decree No. 72/ND-CP;

The Circular No. 34/2010/TT-BCT of the Ministry of Industry and Trade dated 7th October 2010 on defining dam safety management of hydro-power plants.

❖ **Resettlement Policy**

The Legislation of the Socialist Republic of Vietnam (1992) affirms the rights of citizen on using and protecting the house ownership.

The Legislation of the Socialist Republic of Vietnam (2013).

The Law on Land No. 45/2013/QH13 on defining administrative regulations on land in general. The 2013 Law on Land supersedes the previous versions in 1987 and 1993.

The Law on Complaint No. 02/2011/QH11 approved by the National Assembly of the Socialist Republic of Vietnam;

The Decree No. 43/2014/ND-CP dated 15th May 2014 on implementing the Law on Land.

The Decree No. 44/2014/ND-CP dated 15th May 2014 on defining land pricing;

The Decree No. 47/2014/ND-CP dated 15th May 2014 on compensation, support and resettlement upon land recovery by the State;

The Decree No. 75/2012/ND-CP dated 3rd October 2012 on implementing the Law on Complaint.

The Decree No. 38/2013/ND-CP dated 23rd April 2013 on management and use of official development assistance (ODA)

The Decree No. 42/2012/ND-CP of the Government dated 11th May 2012 on management and use of rice-farming land;

The Circular No. 37/2014/TT-BTNMT dated 30th June 2014 on compensation, support and resettlement upon land recovery by the State;

The Decision No. 1956/2009/QD-TTg of the Prime Minister dated 17th November 2009 on approving the Master Strategy on Vocational Training for Rural Workers up to 2020.

The Decree No. 197/2004/ND-CP of the Government dated 3rd December 2004 on compensation, support and resettlement upon land recovery by the State.

The Circular No. 116/2004/TT-BTC of the Government dated 17th December 2004 on guiding the implementation of the Decree No. 197/2004/ND-CP dated 3rd December 2014 on compensation, support and resettlement upon land recovery by the State.

The Decree No. 188/2004/ND-CP of the Government on 16th November 2004 on methods of determining land prices and assorted-land price brackets.

The Circular No. 36/2014/TT-BTNMT dated 30th June 2014 on land pricing method; compilation and adjustment to land price lists; determination of specific land prices and consultancy on land pricing.

The Circular No. 114/2004/TT-BTC dated 16th November 2004 on guiding the implementation of the Decree No. 188/2004/ND-CP;

The Decree No. 17/2006/ND-CP of the Government dated 27th January 2006 on amending and supplementing a number of Articles of the Decree on guiding the implementation of the Law on Land and the Decree No. 187/2004/ND on transforming the State-own companies into joint stock companies.

The Decree No. 84/2007/ND-CP of the Government dated 25th May 2007 on additionally stipulating the grant of land use right certificates, recovery of land, exercise of land use rights, order and procedures for compensation, support and resettlement upon land recovery by the State, and settlement of land related complaints.

The Decree No. 123/2007/ND-CP issued on 27th July 2007 on amending and supplementing a number of Articles of the Decree No. 188/2004/ND-CP dated 16th November 2004 on methods of determining land prices and assorted-land price brackets;
The Decree No. 69/2009/ND-CP of the Government dated 13th August 2009 on additionally stipulating the land use, land price, land recover, compensation, support and resettlement.
The Decision No. 52/2012/QD-TTg of the Prime Minister on 16th November 2012 on employment and vocational training support policies for laborers subject to agricultural land recovery.

❖ **Gender policy**

The Law on 73/2006/QH11 on general equality approved on 29th November 2006 on the National Assembly;
The Directive No. 07/2007/CT-TTg 3/5/2007 of the Government on implementation of Law on Gender Equality;
The Decree No. 70/2008/ND-CP of the Government dated 4th June 2008 on detailing the implementation of a number of Articles of the Law on Gender Equality;
The Decree No. 55/2009/ND-CP of the Government dated 10th June 2009 on sanctioning of administrative violations of gender equality;
The Decree No. 48/2009/ND-CP of the Government dated 19th May 2009 on providing for measures to assure gender equality;
The Circular No. 191/2009/TT-BTC of the Ministry of Finance dated 1st October 2009 on guiding the management and use of budget for gender equality and activities for the advancement of women;
The Circular No. 07/2011/TT-BTP of the Ministry of Justice dated 31st March 2011 on guiding the realization of gender equality in legal aid personnel and activities;
The Decision No. 2351/QD-TTg of the Prime Minister dated 24th December 2010 on approving the 2011-2020 national strategy for gender equality.

❖ **Development policy for ethnic minority community**

The Decree No. 82/2010/ND-CP of the Government dated 20th July 2010 teaching and learning of the language and writing of ethnic minorities in schools.

The Decree No. 60/2008/ND-CP of the Government dated 9th June 2008 on defining functions, duties, authorities and organizational structure of the Committee for Ethnic Minorities.

The Decision No. 06/2007/QD-UBDT of the Committee for Ethnic Minorities dated 12th January 2007 on the strategy of media for the program 135-phase 2.

The Decree No. 70/2001/ND-CP: all asset registration of the family and land use rights must be subscribed with both names of husband and wife

The Decision No. 134/2004/CP of the Prime Minister dated 20th July 2004 on some policies to support residential land, productive land, housing and clean water for poor, disadvantaged ethnic minorities households;

The Decision No. 03/2005/QD-BNN of the Minister of Agriculture and Rural Development dated 7th January 2005 on promulgating the Regulation on exploitation of timber for providing dwelling-house support to poor ethnic minority people meeting with difficulties under the Decision No. 134/2004/QD-TTg of the Prime Minister dated 20th July 2004;

The Decision No. 33/2007/QD-TTg of the Prime Minister dated 5th March 2007 on policies on price and freight subsidy and the scheme on human resource development for ethnic minority areas;

The Decision No. 32/2007của/QD-TTg of the Prime Minister dated 5th March 2007 on providing loans to develop production of extremely disadvantaged ethnic minority households;

The Decision No. 1592/QD-TTg of the Prime Minister dated 12th October 2009 on constant implementation of support policies on production land, residential land and potable water for poor ethnic minority households up to 2010;

The Decision No. 05/2007/QD-UBDT of the Committee for Ethnic Minorities dated 6th September 2007 on recognizing communes of three ethnic minority and mountainous regions according to their development levels

The Circular No. 06 of the Committee for Ethnic Minorities dated 20th September 2007 on guiding support of services, subsistence improvement to improve legislative knowledge in accordance with the Decision No. 112/2007/QD-TTg

❖ **Poverty elimination**

The Decision No. 33/2007/QD-TTg of the Prime Minister dated 20th July 2007 on support policies to improve the legislative knowledge in accordance with the program No. 135, 2nd phase.

The Decision No. 1956/2009/QD-TTg of the Prime Minister dated 17th November 2009 on approving the Master Plan on vocational training for rural laborers by 2020

The Resolution No. 30a/2008/NQ-CP of the Government dated 27th December 2008 on the support program for fast and sustainable poverty reduction in 61 poor districts.

❖ **Vietnam standards and codes on environmental protection**

(i) Water environment:

QCVN 08:2008/BTNMT – National Technical Regulation on Surface Water Quality;
QCVN 09:2008/BTNMT – National Technical Regulation on Underground Water Quality;
QCVN 14:2008/BTNMT – National Technical Regulation on Domestic Waste Water Quality;
QCVN 39:2011/BTNMT – National Technical Regulation on Irrigation Water Quality;

(ii) Air environment:

QCVN 05:2013/ BTNMT – National Technical Regulation on Ambient Air Quality;
QCVN 06:2008/BTNMT – National Technical Regulation on some hazardous substances in the ambient air.

(iii) Soil environment:

QCVN 03 : 2008/BTNMT - National Technical Regulation on Allowable Limit of Heavy Metals in soil;
QCVN 04: 2008/BTNMT – National Technical Regulation on chemical residues in soil and plant protection;
QCVN 43:2012/BTNMT - National Technical Regulation on Sediment Quality.

(iv) Solid waste management:

QCVN 07: 2009/BTNMT - National Technical Regulation on Hazardous Waste Thresholds.

(v) Vibration and noise:

QCVN 26:2010/BTNMT – National Technology Regulation on Noise;
QCVN 27:2010/BTNMT – National Technology Regulation on Vibration.

3.2. World Bank Safeguards policies Triggered

According to WB's safety policies, ESIA report must combine the economic, financial, legislation, social and technical analysis of the Project to ensure the environmental and social issues are properly concerned regarding selection of project, location and decisions related to technological solutions. Five (05) safety policies of WB should be initiated for the Project, including:

Environmental Assessment (OP/BP 4.01)
Object culture source (OP/BP 4.11)
Indigenous person (OP/BP 4.10)
Mandatory Resettlement (OP/BP 4.12)
Dam safety (OP/BP 4.37)

PART 4 ENVIRONMENT AND SOSIO-ECONOMIC CHARACTERISTIC OF THE PROJECT AREA

4.1. Physical conditions

4.1.1. Natural conditions

Lam Dong Province

Lam Dong is one of five provinces in the Central Highlands of Vietnam, and is adjacent to the southern key economic zone. Located on the highest plateau of the Central Highlands of Lam Vien - Di Linh with the altitude of 1,500 m above sea level, Lam Dong is the only province in the Central Highlands having no international borders. Its capital is the Da Lat City, about 300 km to the north of Ho Chi Minh City, and 210 km from the port of Nha Trang 210 km to the west.

The total natural land area of Lam Dong is 977.219,6 ha, making up 3.1% of the country's area and 17.9% of the total area of the Central Highlands. The province has about 255.407 hectares of land for cultural production, in which 200,000 hectares of basaltic land in the plateaus of Di Linh - Bao Loc is suitable for perennial crops. The area for coffee and tea is around 145,000 hectares, the area for vegetables is about 23 783 ha concentrating in Dalat, Don Duong, Luoyang, Duc Trong, Lam Ha.

Da Teh District

Da Teh district is located in the west of Lam Dong province, having an area of 523km^2 and a population of 46,312 people (2014 Statistical Yearbook). The district center is the town of Da Teh, about 45km from Bao Loc town to the west and about 15km from Madaguoil, Da Huoai to the north.

Da Teh district is located on the transition area between the plateau of Di Linh, Bao Loc with the Southeast region, with lower terrain to the west, southwest, from a height of 600m to less than 120 meters in the downstream of Da Nha river, Da Teh . Topography of Da The is divided into two types:

- The heavily dissected high mountainous terrain makes up the relatively large area, distributing in the upstream of Da Te, Da Lay, Da Kho rivers, within the area of the communes of DaPal, Quang Tri, My Duc, Quoc Oai and in a part of the commune of Huong Lam, An Nhon.
- The low mountainous area, which is interspersed with narrow valleys has an average elevation of 200 meters, concentrating in the south and southwest of the district. This terrain is located in the downstream of the abovementioned rivers and forms a relatively flat land in Ha Dong commune, Da Teh town and a part of the My Duc, Quoc Oai, An Nhon, Huong Lam, Da Lay and Da Kho communes.

My Duc Commune

My Duc commune, DaTeh District, Lam Dong province is about 10 km from the district center to the northeast, and about 200km from the city of Lam Dong.

Climate and hydrology

The project area is located on the general background of the tropical monsoon equatorial climate of the south. The climate has special features related to the effects of altitude and topography because of Truong Son windshield.

In the province of Lam Dong there are 4 meteorological stations, namely Cat Tien, Da Lat, Lien Khuong and Bao Loc. According to the zoning map of hydrological climate of the province, the sub-project area is located in Bao Loc and Cat Tien, so data from two stations will be referred to the project.

Some climate characteritics of the project area according to data from the Cat Tien and Bao Loc stations are as follows:

Air temperature

Air temperature directly affects metabolism and dispersion of pollutants in the air. The higher air temperature is, the more rapid the rate of chemical reactions takes place, thereby, leading to a shorter sustained period of pollutants. Moreover, the variation in temperature will affect the spread of dust and gas and the process of heat exchanger of the body and health of workers.

The temperature of the project areas is as follows:

- The annual average air temperature: $24,4^0$C;
- The lowest temperature (December): $22,1^0$C;
- The highest temperature (May): $26,0^0$C;
- Monthly temperature differences (minimum and maximum): $4,1^0$C.

Solar radiation and the number of hours of sunshine

Solar radiation is one of the important factors that directly influence the thermal regime in the region, which will affect the sustainable levels of atmosphere and and the dispersion - change process of pollutants. Solar radiation will directly alter the temperature of objects depending on its ability of reflection and absorption of radiation as surface coatings, paint, surface properties. The amount of solar radiation depends on the number of hours of sunshine. Characteristics of solar radiation in the project area are as follows:

- The amount of radiation reaching 160 kcal/cm^2/year, distributing fairly evenly throughout the year.
- The total amount of radiation on average is about 14L kcal / cm2 / month in the dry months, 19 kcal / cm2 / month in April and May and 18 kcal / cm2 / month in March.

Characteristics of sunshine hours are as follows:

- Average annual hours of sunshine: 2.063,0 hours;
- The sunshine hours in the maximum month: 246,0 hours;
- The sunshine hours in the minimum month: 31.8 hours.

Rainfall

The rainfall will also affect air quality. Rain will entrain dust and pollutants in the atmosphere, as well as contaminants in the ground where rainwater runs through. Stormwater quality depends on the quality of the regional atmosphere and environment.

Rainfall in the province of Lam Dong distributed spatially uneven, increases from east to west; from north to south. Annual rainfall in Cat Tien and Bao Loc ranged from 2,500 to 3,500 mm.

The rainfall regime in the project area is as follows:

- Average annual rainfall: 3307.60 mm;
- The rainfall in the maximum month (July): 628.60 mm;
- The rainfall in the minimum month (January): 8.75 mm.

Humidity

Humidity and air temperature are the natural elements directly affecting the metabolism and dispersion of pollutants in the atmosphere, the heat exchange of the body and health of workers.

Summary of humidity in the project area is as follows:

- The average annual humidity in Cat Tien and Bao Loc stations is about 83.1%. Variability of moisture is similar to that of the rainfall. It rains much from June to October and the humidity is about 91.5%. At the end of the rainy season, humidity decreases reaching a minimum of 75.5% in January.
- The lowest humidity in all the months is below 80%.

Wind

Wind is one of the most important factors reflecting the conditions of atmospheric circulation. Located in the tropical monsoon region, the project area has the rotation of the wind direction in two seasons.

Based on the average monthly wind speed and frequency of calm wind, the wind regime can be divided into three periods:

- The period of calm wind: March and April with the average monthly wind speed from 1.1 to 1.3 m / s, the frequency of calm winds is above 50%;
- The period of light wind: January, February, May and October with the average rate of 1.5- 2.1 m / s, the frequency of calm wind of 35-45%;
- The period of strong wind: June, July, August and November, December with the average speed of 2.5m / s, and the frequency of calm wind of 15 to 30%.

Fog

Low temperatures, especially during the night and early morning make water vapor in the air to reach the saturated state so that the project area generally has more fog than the other plains.

The coastal forest with higher level of fog than that of the barren hills. In the valley, because of the wet, cold and wind, the fog persists longer.

Conditions of geographic terrain

The sub-project area is located in My Duc commune, Da Teh district, Lam Dong province, where the dam was built at the location of the narrow terrain belonging to Con O hamlet, My Duc commune.

According to the investment report, the area around the reservoir of Da Teh has the alpine terrain, with the altitude of > 100m, mostly is dense forest and bamboo. Reservoir fits in the valley that stretches from the Northwest to the Southeast. Reservoir terrain is sloping, with some low hills forming beautiful peninsula.

Geological characteristics

a. Geological conditions of the reservoir area:

According to the investment report, the reservoir area is not dehydrated, the loss of water through the bottom is very small.

b. Geological conditions in dam area:

Da Teh dam is a kind of homogeneous earth dam with front yard and the dam body and the front yard are covered with sticky soil, permeability coefficient of the dam body is smaller than that of the dam foundation.

Based on the results of geological survey in 1993 together with the investment report by the Company of Highlands Construction Consulting and Irrigation Limited in 2009, the geological characteristics of the area are as follows:

- Layer A: Mixed rock on the dam surface, the average thickness of 0.4 m;
- Layer 1A: Clay, clay mixed with crushed with the colors of gray, yellow, white brown and gray brown, medium structure in hard plastic state with the average thickness of 0.7 ÷ 1.6 m;
- Layer 1: clay, mixed clay with yellow brown, pink colour, medium structure in hard and soft plastic state with the average thickness of 12 ÷ 14 m;
- Layer 2: Clay in yellow brown and pink brown color in medium soft plastic state with the average thickness of 12 m, distributing in the left body of the damt;
- Layer 2A: mixed sand and laterization gravel, yellow-brown with the average thickness of 3 m, distributing in the right body of the dam;

- Layer 3: clay, loam with grit with the colors of pink-brown, tan, gray-yellow, gray and white, tightly structure, hard plastic state, semi-hard, the average thickness of 1 ÷ 25 m;
- Layer 4: Basalt gray with the colors of yellow, black and gray.

c. Hydrogeological conditions

In accordance with investment report, groundwater in the district under two major complexes:

- Aquifier complex that is porous with Holocene sediments, including: Pebbles, calculus, siltstone, and peat, water layer thickness of 1-25 m, flow of surface water rout is from 0.01 to 6.89 l/s.
- Aquifier complex with fractures of terrigenous sediments, late Jurassic and Cretaceous volcanic late, composite components include: Stone Daxit, Riolit upstairs, sandstone and siltstone downstairs. The weathered surface is sandy loam with 0.5 to 5 m of thickness, the thickness of all complex is about 450 metres, flow of surface water rout is 0,06 to 0,64 l/s.

The quality of groundwater in the project area is as follows:

- Surface groundwater (wells): surface groundwater and closed surface water (implicit pressure, depth of 50mg CaCO3/litre), water levels vary by region and by season: central area of Da Teh district is regulated by Da Teh lake then underground water level is shallow, deep water of the wells from 2-6m, of hills from 15-20m. In the rainy season, the water level of 1-2m above the ground, but in the dry season the water level drops to 5-6m to the ground in the area where erosion is accumulated and to 7-12m in the area where corrasion is accomulated.
- Groundwater in deep level (wells with depths> 20m): In depth of above 20 metres, hardness and alkalinity of underground water are quite high (totality hardness of 1,950mg $CaCO_3$/litre, totality alkalinity of 1,325 mg $CaCO_3$/litre, acidic environment of 0.8 mg oxygen/litre). Thus, if the extraction of groundwater is for water supply to residential areas such as towns and industrial areas, it requires technical measurement.

4.1.2. Water environment

1. Water source:

- Surface water:

Water source supplied for domestic purpose and agricultural production in the project area is now taken from Da Teh Lake through infield irrigation system.

- Underground water:

Results of the survey and geological research in Lam Dong province so far have been performed by The Union of 707 Construction Hydrology - Geology, now is done by Unit of Water Resources Planning and Survey. About tectonic, Lam Dong is "a valley of magmatic activity created" with complicated geological structure, then underground water movement is also complex. Underground water in the province is located in the aquifer vulnerability (Quaternary aquifer, Miocene); the fissured aquifer (Pleistocene, middle Cretaceous, middle Jurassic and geological formations containing little water).

According to the survey results, underground water in the project area is distributed in Quaternary aquifer (abQIV, aQ) and middle Jurassic aquifer (J2ln).

- Quaternary aquifer (QIV, aQ): widely distributed in the river valleys and streams in Da Teh districts, Duc Trong, Nam Cat Tien ... with approximately 350 km^2 area, thickness from 3,1 ÷ 30 m. At Da Teh, an average thickness of about 25 meters. Static water level from 1 ÷ 12 m; average 1,5 ÷ 2,5 m. Water storage capacity is medium, flow from 0,02 ÷ 1,75l/s, popularly from 0,24 ÷ 0,4l/s. permeability coefficient of soil from 0,28 ÷ 0,41m/day. The water level seasonally changes and ranges from 0,3 ÷ 2,6 m.
- Middle Jurassic aquifer (J2ln): widely distributed in the West and North of Da Lat, Da Teh, Duc Trong, Nam Cat Tien and sparse in the northwest, southeast of Bao Loc ... with the area around 3.000km2. Flow in the borehole from 0,21 ÷ 0,83l/s, in the wells

of less than 0,1l/s. The water level seasonally changes, it is 0.89 ÷ 6,64m deeper in dry season than in rainy season.

Table 4-1: Location and coordinates of surface water sample

No.	*Symbol*	*Coordinates*		*Location*
		Latitude	*Longitude*	
1	NM1	$11^0$33’20”	$107^0$32’45”	Da Teh lake, near the flood overflow area, Con O village, My Duc commune, Da Teh District
2	NM2	$11^0$34’00”	$107^0$32’54”	Da Teh lake, near the right of dam, Con O village, My Duc commune, Da Teh District
3	NM3	$11^0$34’02”	$107^0$32’55”	Da Teh lake, Con O village, My Duc commune, Da Teh District
4	NM4	$11^0$33’59”	$107^0$32’57”	Da Teh lake, near the water drain, Con O village, My Duc commune, Da Teh District

Table 4-2: Location and coordinates of underground water sample

No.	*Symbol*	*Coordinates*		*Location*
		Latitude	*Longitude*	
1	NN1	$11^0$32’47”	$107^0$31’06”	Underground water outside the project area, My Duc commune, Da Teh District, household of Le Van Tien
2	NN2	$11^0$34’46”	$107^0$33’33”	Underground water outside the project area, My Duc commune, Da Teh District, household Le Minh Dang
3	NN3	$11^0$33’49”	$107^0$33’51”	Underground water outside the project area, My Duc commune, Da Teh District, household Nguyen Van Ngoc
4	NN4	$11^0$33’58”	$107^0$33’47”	Underground water outside the project area, My Duc commune, Da Teh District, household Pham Huy Vinh

2. Quality of water:

Data source and the following criteria are used to assess water quality:

- Data source: The analysis results of water quality in the project area performed by Khai Nguyen Trading and Technical Services Co., Ltd in February 2015
- Assessment regulations:

- QCVN 08: 2008/BTNMT: National technical regulation on the quality of surface water used for domestic purposes, irrigation and water transport;
- QCVN 02: 2009/BYT: National technical regulation on the quality water used for domestic purposes.

The analysis results of water samples in the project area as in the following table:

Table 4-3: Analysis result of surface water in the project area

No.	*Items*	*Unit*	*NM1*	*NM2*	*NM3*	*NM4*	*QCVN 08: 2008/BTNMT (B1Column)*
1	pH	-	6.28	6.40	6.53	6.22	***5.5 - 9***
2	TSS	mg/l	23	24	30	42	***50***
3	COD	mg/l	12	12	12	13	***30***
4	BOD	mg/l	4	4	4	4	***15***
5	NH_3-N	mg/l	0.31	0.28	0.33	0.30	***0.5***
6	NO_3-N	mg/l	0.058	0.055	0.062	0.066	***10***
7	NO_2-N	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	***0.04***
8	PO_4^{3-}	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	***0.3***
9	Cl^-	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	***600***
10	EC	µS/cm	11.6	11.7	11.6	11.6	**-**
11	TDS	mg/l	10	11	10	10	**-**
12	DO	mg/l	7.01	7.12	7.08	6.92	***≥4***
13	Cu	mg/l	0.08	0.09	0.09	0.08	***0.5***
14	Pb	mg/l	0.008	0.008	0.007	0.008	***0.05***
15	Zn	mg/l	0.06	0.07	0.06	0.06	***1.5***
16	Grease	mg/l	0.07	0.08	0.08	0.09	***0.1***
17	Coliform	MPN/100ml	3.400	3.400	3.500	4.000	***7.500***

Note:

QCVN 08:2008/BTNMT: *National technical regulation on quality of surface water;*

In which:

B1: *Water used for irrigation purposes or other uses which require the same quality of water used for purposes such as type B2*

(-): *No regulation;*

KPHĐ*: Undetectable*

Assessment of surface water quality:

The analysis results of surface water samples in the above table shows the surface water quality in the project area is generally good, meet the criteria for surface water irrigation activities. The analysis criteria are within the permitted limits. These values are lower than standards.

In all samples, the contaminated grease and Coliform items are probaly due to the activity of living and traveling around the lake so water supply for living purposes must be refreshed.

Table 4-4: Analysis result of underground water quality in the project area

No.	*Items*	*Unit*	*NN1*	*NN2*	*NN3*	*NN4*	*QCVN 09: 2008/BTNMT*
1	pH	-	6.08	5.82	6.02	7.28	***5.5 - 8.5***
2	NH_3-N	mg/l	0.22	0.14	0.12	0.48	***0.1***
3	NO_3-N	mg/l	0.052	0.032	0.102	0.056	***15***
4	NO_2-N	mg/l	KPHĐ	0.114	0.284	KPHĐ	***1.0***
5	PO_4^{3-}	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	**-**
6	Fe	mg/l	0.157	0.096	0.113	0.748	***5***
7	Hardness	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	***400***
8	Sulfate	mg/l	15.0	26.3	21.1	160.4	***500***

No.	*Items*	*Unit*	*NN1*	*NN2*	*NN3*	*NN4*	*QCVN 09: 2008/BTNMT*
9	Cl^-	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	***250***
10	TS	mg/l	25	25	18	104	***1.500***
11	Cu	mg/l	0.03	0.06	0.016	0.05	***1***
12	Pb	mg/l	0.002	0.005	0.006	0.006	***0.01***
13	Zn	mg/l	0.014	0.009	0.017	0.011	***3***
14	Hg	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	***0.001***
15	As	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	***0.05***
161.3.	Coliform	MPN/100ml	5	4	3	4	***3***

Note:

QCVN 09:2008/BTNMT: *National technical regulation on quality of underground water;*

(-): *No regulation;*

KPHD*:* *Undetectable*

Assessment of groundwater quality:

Analysis result of groundwater samples in the table above shows most of the indicators monitoring groundwater quality in the project area are within the limit value of QCVN09:2008/BTNMT. However, item NH3-N of all monitoring locations is exceeded standards. This can be explained by the land surrounding the project area is agricultural land. In cultivation process, applied fertilizer such as chemical and organic fertilizers in order to increase productivity has influenced groundwater quality in the project area.

4.1.3. Air environment

The air in the sub-project area generally has no signs of contamination. The economy is mainly agricultural, and the industrial and service sectors are underdeveloped, so that air pollution has not been observed. According to the report of current state of the environment by Lam Dong province in 2014, the value of the parameters controlling air quality such as CO, SO_2, NO_2, dust in Da Teh district as well as in the project area are in accordance with the regulation values (QCVN 05: 2009/BTNMT).

The air quality in the town of Da Teh has signs of contamination (in the area along the provincial road of 721). The values of the parameter controlling air quality, such as CO, SO_2, NO_2, dust are higher than the standards (QCVN 05: 2009/BTNMT). However, that area is not in the project scope.

The air quality in the project area measured by the Environmental Consultancy Unit in February 2015 is shown in the following table:

Table 4-5: Location and coordinates of air quality monitoring

Order	*Code*	*Coordinates*		**Position description and sampling comditions**
		Latitude	***Longitude***	
1	K1	$11^0$33’20”	$107^0$32’45”	Flood overflow, Con O village, My Duc commune, Da Teh District. Sampling conditions: Hot and sunny weather, air humidity of 71,6%, wind speed of 0,7m/s; pressure of 100,1kPa; wind direction of East-North East.
2	K2	$11^0$34’00”	$107^0$32’54”	Earth dam, Con O village, My Duc commune, Da Teh District. Sampling conditions: Hot and sunny weather, air humidity of 70,3%, wind speed of 0,8m/s; pressure of 100,1kPa; wind direction of East – North East.
3	K3	$11^0$33’47”	$107^0$32’56”	Road to earth dam, Con O village, My Duc commune, Da Teh District. Sampling conditions: Hot and sunny weather, air

Order	Code	Coordinates		Position description and sampling comditions
		Latitude	Longitude	
				humidity of 70,3%, wind speed of 0,5m/s; pressure of 100,2kPa; wind direction of East – North East.

Table 4-6: Results of air quality monitoring in the project area

No.	Items	Unit	K1	K2	K3	TC 3733 /2002	QCVN 05:2009	QCVN 26:2010
1	Temperature	^{0}C	29.7	28.8	28.5	32	-	-
2	Humidity	%	71.6	70.3	70.3	80	-	70
3	Vibration	cm/s	0.01	0.013	0.014	1	-	-
4	Temporary noise (Leq)	dBA	41.4	50.7	51.2	85	-	-
5	CO	mg/m^3	1.02	1.11	1.58	40	30	-
6	NO_2	mg/m^3	0.011	0.021	0.025	10	0.2	-
7	SO_2	mg/m^3	0.025	0.019	0.029	10	0.35	-
8	Dust PM_{10} (TSP)	mg/m^3	0.04	0.02	0.09	-	-	-

Note:

TC 3733/2002/QĐ-BYT: *Standards of microclimate and noise in working area;*
QCVN 05:2009/BTNMT: *National Technical Regulations on ambient air quality (average 1 hour)*;
QCVN 26:2010/BTNMT: *National Technical Regulations on noise;*
(-): *No regulations.*

The results of air quality monitoring as the above table shows air environment in the subproject area is not polluted. Most monitoring indicators are within the limits allowed under Vietnam regulations (QCVN 05:2009/BTNMT, QCVN 26: 2010/BTNMT, QCVN 05:2013/BTNMT). At all monitored locations, PM10 dust appears (suspended dust with aerodynamic diameter less than or equal to 10 µm) with the amount of dust in the range of 0,02 ÷ 0,04 mg/m^3. At position K3, total suspended particulates are up to 0.09 mg/m^3 as they are located on the route to the dam where some vihicles participate in transportation leading to increasing of the amount of dust in the air.

Noise in the project area is low, the concentration of pollutants in all samples are low. All values are within the permitted standards for ambient air quality and noise.

Thus, the air quality inside and outside the sub-project area is pretty clean and still relatively fresh.

4.1.4. Soil environment

The project is located in the area of My Duc commune, Quang Tri commune with total natural area is 16.679,10 hecta. The total population of 6.606 people in which about 90 per cent mainly engaged in agricultural production, livestock and small trade business.

The project area has headwater forest plantation, plain around the hills for rice to ensure food for the communes. It also has mountainous regions for forest and rare forest products development.

Because the project is to upgrade, repair, ensure the safety of Da Teh reservoir, the project will not change the area of land use in the region. The project will upgrade a number of items such as dam, flood overflow, water drain ... So environmental consultants will get soil samples inside and outside the project area to assess the current state of soil.

Table 4-7: Location and coordinates of soil sample in the project area

No.	*Symbol*	*Coordinates*		*Location*
		Latitude	*Longitude*	
1	Đ1	$11^0$34’02”	$107^0$32’55”	Hilly soil sample in the right of earth dam in My Duc commune, Da Teh District
2	Đ2	$11^0$34’17”	$107^0$32’56”	Hilly soil sample in the left of earth dam in My Duc commune, Da Teh District
3	Đ3	$11^0$33’47”	$107^0$32’56”	Land sample in downstream of earth dam in My Duc commune, Da Teh District
4	Đ4	$11^0$33’51”	$107^0$32’55”	Land sample in downstream of earth dam in My Duc commune, Da Teh District

Table 4-8: Results of the soil analysis in the project area

No.	*Item*	*Unit*	*Đ1*	*Đ2*	*Đ3*	*Đ4*	*QCVN 03: 2008/BTNMT*
1	pH_{KCl}	-	6.29	6.62	6.08	6.74	-
2	Total soluble salt	%	0.17	0.24	0.33	0.16	
3	Total N	%	0.11	0.09	0.13	0.11	-
4	Total P	%	0.06	0.05	0.08	0.06	-
5	Total copper (Cu)	mg/kg	12.33	12.81	12.17	12.79	100
6	Total lead (Pb)	mg/kg	17.1	17.2	17.5	13.7	300
7	Cadimi (Cd)	mg/kg	KPHĐ	KPHĐ	KPHĐ	KPHĐ	10
8	Zinc (Zn)	mg/kg	34.2	31.6	36.4	33.2	300
9	Asen (As)	mg/kg	0.14	0.13	0.17	0.19	12

Note:

QCVN 03:2008/BTNMT: *National technical regulation on content of heavy metals in soil;*

(-): *No regulation;*

KPHD*:* *Undetectable (content is too small or in the form of traces)*

According to the analysis, results in the table above, the indicators analyzed are within the permissible limits of QCVN 03:008/BTNMT for agricultural land. In conclusion, the quality of land in the project area at the time of observation, measurement is quite good, no signs of contamination by heavy metals.

4.2. Biological environment

The report of fluctuations in land use of Da Teh district in 2014 illustrates the present area of forest land has been allocated to household to manage stably. Newly planted area is exceeded targets.

❖ **The flora**

The vicinity of Da Teh reservoir has some broadleaf trees such as com tree, bodkin, oak, and chestnut... with average volume.

In the agricultural sector, there are some left natural plants and recovered plants after cultivation, such as oak, chestnut... with low quality, many vines and encroached bush.

❖ **The fauna**

Terrestrial flora and fauna in the project area primarily consist of cattle, pigs, chickens... and some species of wild fauna and flora, such as squirrels, rabbits, birds, deer, wild boar, badger, mink, leaning ...

Some kinds of bird (such as shrike, starling, cuckoo, woodpeckers ...) and a small quantity of reptiles are inhabited in the area of upstream.

Besides, there are also some species of insects such as ants, dragonflies, butterflies, beetles living in the forest... Insects in the forest may encounter some amphibians and reptiles such as frogs, toads, lizards, and snakes.

According to a survey in February 2015 of environmental consultancy, there are no rare animals in need of protection inhabiting in the forests of My Duc and Quang Tri commune. There are also no ecological parks or protective areas should be protected in the project area.

After the project is deployed, the potential for tourism in the Lake will be developed and secured, significantly contributes to economic, social development of the communes in or out the project area.

4.3. Socio-economic and cultural characteristics

Population

Pursuant to statistics of Da Teh District Statistical Department, the total population in the project area is 6.606 people, 1.614 households with low population density of about 39,61 people/km2. The population growth rate is 1,15% of average. The population is unevenly distributed; people mainly live in the central of commune which follows the provincial road axis, while sparsely populated in mountainous area.

In the project area, there are two main ethnic groups living, they are the Kinh and the Chau Ma, and other ethnic groups such as Tay, Nung. The Kinh present at all villages in the project area, with 1.472 households, accounting for 91.2%. The Chau Ma only live in group 8, My Duc commune with a total of 134 households, 521 people accounting for 8,3% percentage. The other ethnic groups such as Tay, Nung come from other locations to do business, get marriage with a total of about 8 households, making up 0,05%.

Current status of the population of the commune in the subproject area is presented in the following table:

Table 4-9: Population of cummunes in the project area

No.	*Commune*	*Total population (person)*	*No. of household*	*Male (person)*	*Female (person)*	*Population density (person/km2)*	*Rural (person)*
1	Quang Tri	2,702	609	1,370	1,332	42.97	2,702
2	My Duc	3,904	1,005	1,977	1,927	37.57	3,904
	Total	***6,606***	***1,614***	***3,347***	***3,259***	***39.61***	***6,606***

Source: The 2014 Statistical Yearbook Da Teh District

❖ **Economy - Society**

In accordance with the 2014 statement of economic and social development and Statistical Yearbook Da Teh districts, economic structure of the district in the past years is respectively agriculture - forestry, fishery - services – industry, construction with corresponding output value as follows:

- Agriculture – Forestry and Fishery: 1.111.209 mil VND, making up 46,49%;
- Services: 800.690 mil VND, making up 33,49%;
- Industry and Costruction: 478.512 mil VND, making up 20,02%.

- **Crop:**

Annual rice cultivation area of the district is 7.038 hecta, the average productivity of 47.29 quintals per hecta. Annual rice cultivation area of the 2 communes in the project area is 433 hecta. In addition to the main crops on agricultural land, there are also typical industrial plants of Lam Dong province such as tea, coffee, cashew, durian, etc

Area, productivity and output of some plants in the project area as following:

Table 4-10: Productivity, output of rice in the project area

No.	*Section*	*Autumn – Spring*			*Summer – Autumn*			*Season*		
		Area (ha)	*Productivity (quintal/ha)*	*Output (ton)*	*Area (ha)*	*Productivity (quintal/ha)*	*Output (ton)*	*Area (ha)*	*Productivity (quintal/ha)*	*Output (ton)*
1	Quang Tri commune	33	40,00	132,0	44	43,01	189,2	55	41,20	226,6
2	My Duc commune	88	47,86	421,2	85	48,5	412,3	128	42,15	539,5
	Total	**121**		**553,2**	**129**		**601,5**	**183**		**766,1**

Source: 2014 Statiscal Yearbook of Da Teh District

Table 4-11: Productivity, output ofmain plants in the project area

No.	*Plant*	*Quang Tri commune*			*My Duc commune*		
		Area (ha)	*Productivity (quintal/ha)*	*Output (ton)*	*Area (ha)*	*Productivity (quintal/ha)*	*Output(ton)*
1	Corn	49	66.54	326.05	133	66.33	882.19
2	Sweet potato	5	66.50	33.25	11	64.70	71.17
3	Cassava	64	209.00	1.337.60	178	228.00	4.058.40
4	Vegetables	14		205.00	32		684.00
5	Beans	19		16.00	30		26.00
6	Cane	34.3		2.675.00	3		234.00
7	Cashew	72		39.00	1.152.0		605.00
8	Café	35		49.00	23		33.00
9	Pepper	6,4		17.00	10		27.00
10	Rubber	2		2.99	29		45.35
11	Mulberries	7		97.00	31		457.00

No.	Plant	Quang Tri commune			My Duc commune		
		Area (ha)	Productivity (quintal/ha)	Output (ton)	Area (ha)	Productivity (quintal/ha)	Output(ton)
12	Fruit trees	29		336.00	32		365.00
13	Durian	5.1		33.00	7.7		48.00
	Total	**341.8**			**1,671.7**		

Source: 2014 Statiscal Yearbook of Da Teh District

- **Livestock:**

Over the years, the livestock sector in Da Teh district has developed quite slowly, the value of livestock production continued declining both in the number of livestock, poultry and finished meat production. Buffalo and cow have the slowest rate of growth except goats, pigs and poultry are growing regularly. Number of livestock, poultry communes in the project area is shown in the following table:

Table 4-12: Number of livestock and poultry in the project area

No.	Section	Livestock				Poultry		
		Buffalo	Cow	Goat	Pig	Total	Chicken	Others
1	Quang Tri commune	25	357	0	1,458	20,690	9,420	11,270
2	My Duc commune	43	422	55	1,854	47,040	26,500	20,540
	Total	**68**	**779**	**55**	**3,312**	**67,730**	**35,920**	**31,810**

Source: The 2014 Statistical Yearbook of Da Teh District

- **The use of chemicals in agriculture**

According to survey data of Environmental Consultancy, the annual amount of fertilizer is applied to crops in the project area less than in the plain section. However, the use of chemicals in agriculture is still having affect to soil, water and air. The volume of pesticides and fertilizers used for a crop as following:

- Nitrogen: 153 kg per ha;
- Phosphates: 252 kg per ha;
- Potassium: 80 kg per ha;
- Pesticides: 1 litre per ha.

Due to farming practices, people in the communes often make use of manure and green manure (the easy rotten grass is chopped and then stripped out all fields) leading to the reduction of the use of chemical fertilizers and pesticides.

The pesticides that are commonly used are: Padan, Bassa Ofatoc and Monitor for vegetables. The use of pesticides is in compliance with the guidance of Plant Protection Station - Da Teh district

❖ **Culture - Society**

Healthcare

Every commune in the sub-project area has one clinic with 8 beds, using clean water resource and sufficient medical instruments. Medical equipment has been equipped to meet the need of normal healthcare and medicine delivery. To date, children under 1 year of age in the communes of project area were fully immunized vaccines with a high rate: 96.2% in Quang Tri commune and 83.8% in My Duc commune.

- Malaria: with low rate recently, mainly in the mountainous areas.
- Dengue: does not appear for long time.

Number of Clinics in the sub-project area is stated as table below:

Table 4-13: Number of Clinics in the project area

No.	Section	No. of Clinics	No. of beds	No. Medical staffs				
				Total	Doctors	Physicians	Nurses	Midwives
1	Quang Tri commune	1	8	5	0	2	2	1

No.	Section	No. of Clinics	No. of beds	No. Medical staffs				
				Total	Doctors	Physicians	Nurses	Midwives
2	My Duc commune	1	8	5	1	1	2	1
	Total	**2**	**16**	**10**	**1**	**3**	**4**	**2**

Source: Environmental Conslutancy, February 2015

Education

Communes in the sub-project area only have preschools and elementary schools. Students who are at secondary school and high school level will have to be studying in the neighboring villages and Da Teh town. The district has totally 8 secondary schools (located in 7 communes and towns) and 3 middle schools (located in Ha Dong commune and and Da The town). The number of educational establishments in the subproject area as stated in the table below:

Table 4-14: Education establisments in the project area

a. Preschool education

No.	Section	No. of preschool	No. of class	No. of teacher	No. of pupil
1	Quang Tri commune	1	5	9	104
2	My Duc commune	1	3	4	71
	Total	**2**	**8**	**13**	**175**

b. Primary education

No.	Section	No. of primary school	No. of classroom			No. of class	No. of teacher	No. of pupil
			Total	Permanent	Semi-permanent			
1	Quang Tri commune	1	13	13	0	13	18	197
2	My Duc commune	1	14	3	11	15	21	287
	Total	**2**	**27**	**16**	**11**	**28**	**39**	**484**

Source: 2014 Statiscal Yearbook of Da Teh District

Household income and poverty

As mentioned above, the main income source of people in the subproject area is from agriculture and forestry. Income per capita has reached 14.8 million / person / year. According to the 2014 Statistical Yearbook of Da Teh districts, the poverty rate falls to 8.29% in the district and 11.28% in the project area. Under the leadership of provincial and district leaders, a lot of poor household in the district has come out of poverty in a sustainable manner, but there is still 23 households falling back into poverty, including 1 household of Quang Tri commune. The main reason is the lack of land and water for production. Besides, there is also a number of causes such as social evils, laziness, lack of means of production, low level of education...

Table 4-15: Poor and near-poor households in the project area

No.	Section	The poor		The near-poor		Poverty return	
		No. of household	Percentage (%)	No. of household	Percentage (%)	No. of household	Percentage (%)
1	Quang Tri commune	68	11.18	52	8.55	1	0.16
2	My Duc commune	114	11.34	123	12.24	0	0.00

	Total	***182***	***11.28***	***175***	***10.84***	***1***	***0.06***

Source: 2014 Statiscal Yearbook of Da Teh District

Gender issue in project site

a. Population by gender

In the project area, the average proportion of women composes 50.67% of the population (3.259 women out of 6.606 people), the proportion of men constitues 49.33% (3.347 men out of 6.606 people). Thus, the proportion of women is higher than men.

b. Roles of gender in commuinity activites

According to the survey, women actively participate in the training courses such as agriculture, integrated pest management (IPM) and community healthcare. Besides the usual role in the family, women also play an important role in the production. They assume most of the agricultural work such as sowing, weeding, trans-planting and selling products. Men often take on the job as plowing, irrigating and harvesting. Previously, men often take over plowing, buying seeds and raw materials such as fertilizers, pesticides and borrowing loans but now women are also involved in these activities. If having affect by flooding, the women have to be resposible for a lot of consequences of flooding.

c. Roles of gender in other income-generating activities

In order to increase income for the family, both men and women seek more jobs or participate in income-generating activities other than farming. According to survey of Environmental Consultancy February 2015 in Da The District, there is 2,963 female employees of 4,750 employees working in the individual non-agricultural economic units (communes in the project has 149 female employees). Thus, the number of female workers in the district accounts for 62.38% of the employees working in the individual non-agricultural economic units. See detail in the table below:

Table 4-16: Labors working in the individual non-agricultural economic unit

No.	*Section*	*Total of labor*	*Male*	*Percentage %*	*Female*	*Percentage %*
1	Quang Tri commune	79	62	78.48	17	21.52
2	My Duc commune	190	58	30.53	132	69.47
	Total	**269**	**120**	**44.61**	**149**	**55.39**

Source: 2014 Statiscal Yearbook of Da Teh District

Potable water and sanitation

According to Da Teh Statistical Department, there is about 74.35% of the households in the subproject area has been using clean water so far, the remaining households use water from wells, from natural streams, surface water... In general, water resource is not hygienic. Especially when the flood occurres, most of the wells, latrines and cattle shed are flooded leading to a serious impact on the environment and health of people in the region even though sanitation has been implemented. Therefore, people in the subprojects easily get some kind of diseases such as trachoma, rashes, intestinal, particularly high percentage of gynecology in women.

Percentage of households has used salubrious toilets is about 67.41% and the proportion of households has access to power reached 98.57%. Current use of water and sanitation in rural communes in the subproject area is presented in the table below:

Table 4-17: Status of sanitation in the subproject area

No.	*Section*	*Household using clean water*		*Household using salubrious toilet*		*Household using power*	
		No. of household	*Percentage (%)*	*No. of household*	*Percentage (%)*	*No. of household*	*Percentage (%)*
1	Quang Tri commune	481	79.11	429	70.56	601	98.85
2	My Duc commune	719	71.54	659	65.57	990	98.51
	Total	***1.200***	***74.35***	***1.088***	***67.41***	***1.591***	***98.57***

Source: 2014 Statiscal Yearbook of Da Teh District

5. ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT

5.1. Results of environmental and social impacts screening

5.1.1. Environmental and social impacts screening

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

5.1.2. Ethnic minority screening

There is no need for the preparation of Ethnic Minorities Development Plan (EMDP) as there are no indigenous population or communities of ethnic minorities in the area.

Abbreviated Resettlement Action Plan/Compensation Plan (A-RAP) has been required for ensure safety of the work and prevent incidents, the Sub-project will acquire an amount of land owned by 12 HHs: along the road resulting from expansion of the dam and concreting of roads. Total permanently acquired land is 10,000 m^2. See Appendix A4 for the completed Environmental and Social Screening Form.

- Payment of compensation will be as follows: a) full payment to be made to all affected persons sufficiently before land acquisition;
- Provision of assistance for APs who have to rebuild their houses on newly assigned plots;
- Support for recovering income source;
- Community consultation and public dissemination of compensation policy: (a) APs should be fully informed and consulted about land acquisition, leasing and relocation activities;
- Affected persons should be monitored regarding restoration of productive activities; Now, has produced stable.

Results of survey and proposals:

Agreed to accept the compensation and allocation for investment from day 12/07/2010.

All households now most stable life, some have moved to other places to live.

5.2. Positive impacts on environment and social of sub-project

Da Teh reservoir has brought positive impacts on environment and society in beneficial area of the project as follows:

- Active irrigation for 2,300 ha of rice and vegetable of My Duc and Quang Tri commune
- Creating clean water supply for community in the project area with capacity of 10,000 m^3/ day

5.3. Negative impacts on environment and social

5.3.1. The historical negative impacts and mitigation action

Da Teh reservoir is constructed and put into operation since 1995. According to current status investigation in March, 2015, the dam is penetrated mainly in dam body causing water loss.

Before implementation of the project, Da Teh district of people committee approved compensation cost, resettlement support for rehabilitation and improvement of safety of Da Teh reservoir (Decision no. 428/QĐ-UBND dated 09/7/2010) with specific compensation content as follows:

- Number of affected households is 12 households due to loosing land and livelihood and they are compensated with cost shown in the following table:

NO	Name - Address	Amount (đ)
1	K'Mel	15.808.000
2	Kajep	8.518.400
3	K'Brồi	60.137.400
4	K'Brồi (Duong Hong Phu)	181.366.200
5	K Dung (B)	26.608.000
6	Ka Sang	243.577.000
7	Nguyen Thi Tra	183.154.000
8	Nguyen Van Vinh	4.443.750
9	Phuong Hung Co., Ltd	116.689.200
10	Da Teh centre of irrigation work management and exploitation	41.625.000
11	Dang Thi Hai	41.910.400
12	Do Huu Khanh	53.000.000
	Sum	**976.837.350**

(In words: Nine hundreds seventy six millions eight hundred thirty seven thousands three hundred fifty.

- So by the time of approval of investment projects, the total number of people have been adequately compensated and there is no negative impact due to land loss and compensation.

Up to the present time, the reservoir has not yet faced a major incident, not affect the environment and society.

❖ **Shortcomes**

a) Dam crest

The dam is a part of the operational management route. The dam crest is 600m long, 5m wide and was laid macadam in 2010; however, many sections were peeled off, forming potholes or slope failure, poor road quality. There are no items or elements securing project safety such as lighting, wheel guard, picket or station marker.

Comments:

The dam crest is a part of the operational management route. If it is not reinforced, it will cause difficulties for travel, operational management and rescued. Therefore, the dam crest should be reinforced.

A wheel guard system should be built in order to ensure safety for vehicles and people. Supplement a lighting system for dam supervision and management in rainy and stormy season at night.

Figure 5-1: View of the dam crest from the middle

Figure 5-2: View of the dame crest from the left abutment

b) Upper dam face

The upper dam face is structured by dry and rough stone, which is uneven due to sinking and wave impacts.

Comments:

With current structure and wave impact, the dam face will be eroded, causing danger. It needs urgently reinforcing by such structure as concrete or ashlars stone.

Figure 5-3: Lower dam face

Figure 5-4*:* Upper dam face

c) Lower dam face

The survey shows that in the lower dam face, plants are dense and often have deep roots, which will increase risks of instability, seepage and create conditions for animals to dig cave and termitaries to develop.

In some positions, termitaries or termitary traces on woodlog trunks.

Seepage appears in some positions such as right abutment when water level is high (as reported by dam managers) with clear water and water flow.

The scope of dam body is not marked, so trace of cattle can still be seen on the dam face. The boundary between the project site and the resident area is not fixed, so residents live and farm close to the dam foot. Many positions are hedged by the residents by planting trees, making it difficult for inspection.

On the lower dam face, only water drain along berm can be seen. No drains space for grass growing, horizontal drains and drains gathering water at the dam foot cannot be seen. Trace of water drainage equipment in the dam body and water drainage equipment close to the face cannot be seen.

Figure 5-5: Dense plants on lower dam face

Figure 5-6:Termitary

Comments:

The seepage is stabilized in some positions; however, appropriate lower dam face protection equipment should be supplemented in order to ensure safety. The seepage appears in the flood site when water level in the reservoir is high. Specific survey and careful evaluation are needed in order to recommend appropriate treatment measures.

d) Management road

The road to Da Teh reservoir from provincial road 725 is an aggregate road through Da Teh reservoir with a length of 1.7km. The road to the dam is quite sloped, making it difficult to travel in rainy season.

Comments:

The management road from Da Teh reservoir to Da Teh is a bad pathway, which is difficult for travelling especially in rainy season. Therefore, it needs repairing and upgrading in order to create favorable condition for operation management and rescue in case of incidents.

e) Flood overflow discharge

Flood overflow discharge is arranged about 1,420m away from the dame, stone structure covered with reinforced concrete; joint by water slope and drained by tank. Overflow surface and water slope bottom are covered with good reinforced concrete, the end section is quite sloped.

The wall on overflow site was built of stone a long time ago, water drainage equipment is damaged, forming seepage flows along the wall foot both inside and outside. Some positions are peeled off. The wall is low, making soil and stone on both side flow into the water slope, plants grow alternately the wall structure. On both sides of the wall, many erosion holes appear due to surface flow and seepage flow. Lower derivation is narrow and plants are dense, which limit water drainage.

Comments:

In general, overflow structure is downgraded, solutions to upgrading and reinforcing are needed in order to ensure the water drainage and improve the project stability.

f) Water intake

The water intake is arranged at the right abutment by reinforced concreted. Formally, it is a box culvert with control valve on upper side. The control valve is in quite good condition, the valve gate is not watertight or leak. The wall and water apron bottom and derivation face of the intake are all peeled off.

Comments:

According to outside evaluation, the intake is in quite good condition. However, mechanic part should be repaired in order to ensure the intake is watertight when closed.

g) Management house

According to the inspection of the reservoir actual sate, no management house is arranged to the reservoir. The reservoir operator is using the head office of the factory which is 5km away

for management. A worker living near the contact area is assigned to be in charge of the intake opening and closing.

Comments:

A management house should be built in order to be convenient for managing the reservoir operation regularly. The managent house is not only the regular place for workers to stay but also for keeping project documents, measuring and processing observational data.

5.3.2. Impacts during project preparation stage

5.3.2.1. Activities

Preparing the (construction/ground) plan, yards and huts;

Gathering machines and equipment to the site.

5.3.2.2. Sources of impacts related to the waste

Sources of solid waste:

Bags of cement or construction materials which are not used up, solid wate from construction officials and workers working at the site, etc.

Sources of liquid waste:

Oil and lubricant for machines are disposed;

Oil and lubricant from garages;

Sewage from daily activities of construction workers at the site;

Sewage from the site, huts, concrete mixing plant, construction points.

Sources of waste gas

Gathering vehicles and machines;

Building construction roads and management roads;

Activities of transporting van system.

Sources of impacts unrelated to the waste

Erosion, slip, track and fall of earth, lake foundation's accretion, vatriations of environmental elements and biological diversity.

5.3.2.3. Impacts on social

i) Causing noise to the people

The sources of noise may come from the following activities: chopping down the trees, transporting the waste to the waste land. The noise is also enhanced by the vehicles in operation at the same time.

According to QCVN 26:2010/BTNMT, the noise in public areas and residental areas is allowed from 50 to 70dBA (from 6.00 to 21.00), therefore, the noise only affects locally within a radius of 50 metres. Hence, the objects affected by the noise can only be the workers on the site, this impact ***can be controled*** by the methods to minimize it.

ii) Impacts to the economy – society

In term of the project to upgrade Da Teh reservoir, the impacts to the economic – social environment are mainly seen at the reservoir area.

5.3.2.4. Impacts on environment

Impacts to the water environment: process of grading and bulldosing, preparing ground plan, yard and huts may accelarate water pollution;

Impacts to the atmosphere: All activities during preparing may cause pollution to the atmosphere, the factors causing pollution are mainly from the vehicles transporting construction machines and equipment to the site. Source of pollution is the dust from activities of preparing the ground plan, friction between transporting vehicles and the road surface.

Impacts to the land environment:

This stage has not gathered many workers, vehicles and machines yet, so the level of influence is not remarkable.

Impacts to the biological environment

During the implementation of the project to repair and upgrade the dam, especially the term of upgrading the dam's roof, the floras on the two dam's roofs shall be cleared, the animals living within the dam's area shall be affected.

However, small animals can move to other area: Towards the upper pool of the dam, into the wood or to the miscellaneous gardens of the households or the empty lands with the floras sharing similar characteristics to live. Về phía thượng lưu của đập, trong các cánh rừng hoặc di chuyển đến trong các vườn tạp của hộ dân hoặc các bãi đất trống với hệ thực vật cũng có các đặc điểm tương tự để sinh sống.

5.3.3. Impacts during construction stage

5.3.3.1. Activities

Repairing sewers
Upgrading upper and lower pool's roof
Extending and constructing spillway
Repairing and constructing management road

5.3.3.2. Sources of impacts

Sources of solid waste

Waate from daily activities of construction workers at the site;
Waste from construction materials at the site: dropped and scattered soil and rocks, packaging of cement bags, etc.

Sources of liquid waste

Water to wash rocks, sand and stones;
Disposed oil and lubricant;
Sewage from daily activities of workers at the site;
Spilled rain water.

Sources of waste gas

Excavation and backfill works, grading and bulldosing the ground plan;
Building construction road, management road;
Exploiting, transporting and loading and unloading materials;
Mixing concrete and mortar;
Activities of transporting van system;
Activities of construction machines and equipment like graders and bulldozers, excavators, tamping machines, vans, etc.

Sources of the noise unrelated to the waste

Due to severe weather conditions such as heavy rains, storms, strong wind and floods during construction, layers of soil at the hillsides, mountain flanks at the upper pool and nodal area were penetrated, which led to slipping and tracking because of gravity; Due to construction methods in grading and bulldosing the ground plan, removing the layer of disposed soil and rocks at places with sloping terrain causing the increase of volume of soil and sand downward to irrigation canals, raising the turbidity, affecting directly to the supply and use of water of the people at the lowlands.

The lack of people and workers' awareness in managing the waste from daily activities, water for washing construction machines and equipment which can pollute the surface water, underground water and pollute the soil at a high level.

5.3.3.3. Impacts on social environment

1) Impacts to the economic – social environment

The works after construction will ensure stable irrigation for 2.300 ha cultivated soil, supply water dor daily activities with the capacity of 10.000m^3/day and night, restrict the negative impacts to the environment. However, there also remains some impacts to the economy and society in the project area:

Construction activities like excavating and backfilling for road making, construction yards, workers' huts' areas do not affeact much to the production, but they also affect the supply of irrigation water anf affect agricultural production, etc.

During construction processes, temporary services will be developed accordingly, which will increases the demand for food serving construction workers. However, their demand of food

is not very high so it does not affect the supply – demand balance of the area. The local is completely able to meet the requirements of the work in all aspects.
Construction duration requires the gathering of some workers from other regions, which may cause conflicts between the labour force and local people.
If the soil and stones scattered on the road surface are not collected, they will ruin the landscape and cause dangers to the people and transportation vehicles, as well as increase the risks of transport accidents.
Traffic activity in the main road is basically assured. Besides, traffic density in such roads and population density along the road is relatively scattered. The accident is negligible. Therefore, the operation of trucks to serve for the Project shall not cause significant issue in terms of traffic accidents in the transportation road.
Edit-chị Hằng: If the domestic waste from camps is not well managed, it may cause local non-hygiene such as bad smell, resulting in concentration of epidemic microorganisms such as mosquito, fly, mice, etc, adversely affecting the health of the field workers and the local community, etc.

2) Impacts to the cultural – social environment

When the project is completed, the water source shall be proactive; the agricultural production shall increase. Thus, the demand on increasing crops shall be higher. However, it is required to confront the increased use of chemical fertilizer and pesticide, risk of environmental pollution. The increase in crop yield shall increase pressure on solving post-harvest issues such as processing, storing, organizing to consume products, etc.

a. Impacts to capacities of management and operation of irrigation and drainage system

Once the Project on rehabilitating and improving dam safety is launched, it shall help to consolidate the reservoir; additionally, help Lam Dong province's management agencies to develop the long-term rural development scenarios and strategies, etc.

b. Impacts to the people's health

When the project is launched, the impact on environment shall be available due to material transportation and noise of plants and equipment, etc. A large number of workers moved from other places may bring the epidemics; whereas the different living styles shall break the traditional feature and local regulations. The construction contractor shall consider the health risks such as infectious diseases. The propaganda and close supervision of such work shall be applied.

5.3.3.4. Impacts to the natural environment

1) Impacts to water environment

Source materials, purchased materials of the rock quarries which are available or from exploiting the rock quarries

a. Sewage from daily activities

Sewage from daily activities: During rush stage of construction, there shall be 150 people, but they are allocated at work items. Sewage from daily activities such as personal hygien work of the people in cooking, eating and drinking, personal washing, etc.
According to TCXDVN 33: 2006 for the area of Da The commune – a mountainous commune, the average water volume for daily activities per person is about 60 liters. Therefore, the sewage is counted at about 90% of the water volume for daily activities, then the person will dispose about 54 liters of sewage in a day on the average. For 150 workers/day, the sewage disposed will be 8,100 liters/day, equivalent to 8.1 m^3.
Sewage's elements: Sewage mainly consists of organic substances, suspended solid substances and micro-organism.

Table 5-1: Waste volume in sewage from daily activities during construction stage

NO.	Parameters	Waste target (*g/person/day*)	Waste volume (kg/day)
1	BOD_5	45 - 54	2.25 – 2.7
2	COD	72 - 102	3.6 – 5.1
3	Suspended solid substances	70 - 145	0.35 – 0.75
4	Nitrogen total	6 - 12	0.3 – 0.6
5	Phosphorous total	0.8 – 4.0	0.04 – 0.2
6	Coliform total	$10^6 – 10^8$ MPN/100ml	-

(Source: Report of urban sewage curent situation – Institute of Sciences & Environmental Technology – Hanoi University of Science and Technology)

During construction time, there was about 8.1 m^3 of sewage from daily activities of 150 workers at the site. If this sewage is not collected and processed, it can spill out onto the surface ground and then penetrate into the underground causing pollution to the soil at the site area and underground water or following flows to the rivers and then lead to the pollution.

When the sewage from daily activities flows into the rivers, it will increase the risk of raising the content of subtances in the water which cause water pollution. For example, the sewage into the environment in a day of 8.1m^3 (equivalent to about 29.565m^3/year), ***can be controled*** by minimization methods.

b. Sewage from construction activities

During construction process, the factors causing water pollution are mainly oil and lubricant leaking from equipment, the process of repairing machines, dust in the air, precipitated dust, soil and mud on the site surface. In case of rain, those factors shall be washed out into the surface water. Therefore, it will reduce water quality in the reservoir, canals and channels and other surface water in the area. When the rain water spills out, flows through the site, it will sweep out oil and lubricant, breakstone, chippings, mud and soil, stone dust from the surface down to the nearby reservoir, canals and channels, which increases the turbidity and causes oil and lubricant films. When the rain water spills out, it will wash out rocks and soil from material yard and disposal yard, which leads to the increase of turbidity in the water, causes accretion to draining canals and prevents the discharge of the area. Construction sites of the work items are located along with the main dam route and management road, so attention should be paid to the source of surface water pollution and it is neecessary to apply effective methods to minimize it.

At the area of excavating and backfilling, placing concrete, drilling and spraying grout, etc. the rain water often sweeps out the soil, stones and construction waste into the reservoir and the area of nearby canals and channels, which then increases the turbidity and water pollution due to the alkali from the concrete decreasing the pH index and reducing water quality.

Activities of grading and bulldosing, excavating and backfilling and the area of disposing waste will also cause impacts to the surface water's quality due to the soil and stones from excavation, backfill, slipping and tracking, especially in rainy season. However, this volume will not gather at one point but it will scatter over the work items.

Moreover, the activities from concrete mixing plants, production area with alkali and kinds of waste materials like cement packaging and nylon may obstruct the flows, and when their dicomposition may pollute the water source.

The methods to minimize the impacts to the water environment caused by construction waste and soil erosion shall be stated in part 6 of the report.

- Construction sewage: Construction sewage from station areas of crushing, screening, washing stones and construction materials, concrete mixing plants, areas of concrete placement containing cement and sand with low content but high density. If it is not processed

before draining, it will cause turbidity and pollution to the water source due to the alkali from the concrete. Calculations by the design consultant(s) has shown out that if the sewage is about 1m^3/day, the pollutant volume during the construction process will be as follows:

Table 5-2: Content of pollutant in construction sewage

Pollutant	Content (mg/l)	Pollution volume (kg)
COD	625	0.3375
BOD_5	303	0.1636
SS	6,800	3.672
Oil and lubricant	44	0.2376

[Source: Calculated according to the material by Economopoulos, WHO, Geneve 1993]

- Leaked oil, oil deposits disposed from mechanical vehicles and machines.

Oil and lubricant are mainly from the units of maintaining and repairing machines. The lubricant volume used for each replacement is about 18 liters/once/vehicle on the average, and average number of replacement per year is 3 times/vehicle/year (Real construction time). For about 20 vehicles in operation, the oil and lubricant disposed during construction time will be about 2,160 litres. This is the source of pollution to the surface and underground water sources in the area, thus, it is esential to have proper methods to collect and process to minimize this impact.

c. Overflow rain water

Spilled rain water on the surface sweeps out the soil, sand, oil and lubricant from transportation vehicles, construction machines and equipment and then flows into the water sources and increases the pollution volume. Total area of work construction is 2 ha, the average rainfall per year of the area is 2925.9 mm. However, this is the work to upgrade and repair the reservoir, so the construction time is determined mainly in dry season with the rainfall of 15 - 20% of the total rainfall per year (600 mm). The pollutant volume of spilled rain water in the project area is determined as follows:

Table 5-3: Pollutant content in overflow rain water

NO.	Parameters	Unit content according to WHO (mg/l)	Rain fall (litres)	Total pollutant volume	
				(10^3mg)	(kg)
1	TSS	20	367,540	7355.8	7.355
2	COD	10 - 20	367,540	3675.4 - 7355.8	3.675 – 7.355
3	Total N	0.5-1.5	367,540	1837.7- 5513.1	1.837 – 5.513
4	Total P	0.004-0.03	367,540	1.4 – 11.1	0.14 – 1.11

The rain water which flows through some areas such as: The are of fuel tanks, parking lots, mechanics, additive depots, etc. or the area for waste from daily activities without careful covers may pollute the water with oil and lubricant and organic and chemical impurities. The methods to minimize the impacts by spilled rain water will be presented in part 6.

2) Impacts to the atmosphere

a. Pollution by the dust

The process of transporting kinds of stones and soil generated from activities of excavating and backfilling to the disposal points may be the source of sissipating the dust affecting the people's health living along the construction route. Main elements are dust soil and stone dust and cement dust, no dangerous and harmful dust. Diffusion level of the dust depends on the volume of the soil excavated and backfilled, the delivery of materials and heavy equipment, etc. The scale and the area to be affected are influenced by the wind direction and speed.

The atmosphere pollution emission index due to the activities of bulldosing and backfilling ground plans in construction is presented in the following table:

Table 5-4: The atmosphere pollution emission index due to activities of excavating and backfilling ground plans

NO.	Causes to pollution	Estimated emission index
1	Dust from prcesses of excavating the soil, grading and bulldosing the ground plans is scattered by the wind (sand dust)	1-100 g/m^3
2	Dust from the processes of loading and unloading construction materials (cement, soil, sand, stones, etc.), machines and equipment	0,1-1 g/m^3
3	Exhausted gases from transportation and mechanical construction vehicles containing dust, CO, hydrocarbon, SO_2, NO_x… (vans of 3.5-16 tonnes using DO oil with S = 0.5%)	Dust: 4.3kg/ton of DO; SO_2: 0.1kg/ton of DO NO_x: 55kg/ton of DO; CO: 28kg/ton of DO VOC: 12 kg/ton of DO
4	Vehicles transporting sand and soil scatter on the roads, which brings the dust	0,1-1g/m^3

Source: According to a quick assessment document by WHO

Based on the volume of excavation and backfilling, grading and bulldosing the area of huts and yards serving construction of about 69548.1m^3, we can calculate the volume of suspended dust travelling into the air:

- The volume of the dust created from the processes of excavation and backfill, grading and bulldosing: 69548.1 m^3 x 80 g/m^3 = 5563832.0 g.
- The volume of the dust created from the processes of transporting: 69548.1 m^3x 0,8 g/m^3 = 55638.32 g.

So the primary calculation of the dust volume of the project over a year gives out: (5563832.0 g + 55.638.32 g) = 5619470.32 g/year.

For the real working time on the site is about 300 days/year, the dust volume created on the site every day will be:

5619470.32 (g/year)/300 (days/year) = 18731.57 g/day.

For the entire of construction site with the area of about 5 km^2, the average height of diffusion of about 3 metres, and the average diffusion content in 24 hours of 0.937 g. It can be seen that the number is many times higher than the number in QCVN 05:2009/BTNMT the National technical standard of surrounding atmosphere

Sources of dust

The sources of dust include: activities of grading and bulldosing, excavating and backfilling, transportation activities, etc.

Emission volume: At the areas of soil excavation and backfill, the diffusion level of the dust depends much on the volume of the soil being excavated and backfilled. The dust diffused is calculated based on the index of pollution and the volume of excavating and backfilling the soil. According to guiding materials EIA by the World Bank - WB (Environmental assessment sourcebook, volume II, sectoral guidelines, environment, World Bank, Washington D.C 8/1991), the pollution index is calculated by the following formula:

$$E = kx0{,}0016x\left(U/2{,}2\right)^{1,4} /\left(M/2\right)^{1,3}$$

In which:

E: Pollution index (kg/ton)
k: Grain structure with average value of 0.35
U: Average speed of the wind
M: Average humidity of the material is 20%

From results of calculations, the average pollution index in the area is 0.009778 kg/ton. For the volume of the soil excavated and backfilled of 69548.1 m^3, the dust volume exhausted into the air will be 1401.83 kg. The dust volume created per day on the average is 0.9735 kg/day, equivalent to the dust density per day on the entire construction ground plan of 2 ha with the

diffusion height of 3 metres estimated at: 16225µg/m^3. Compared to the standard QCVN 05:2009/BTNMT the National technical standard of surrounding atmosphere, the emission volume has been 81 times as high as the allowed level at emission point.

Scale: Activities of excavation and backfill of the soil are mainly implemented at the site area.

- Activities of transportation vehicles, construction machines and equipment: these are also the activities creating a remarkable volume of dust.
  - Emission volume: According to some documents both inside and outside the country (Handbook of emision, non industrial and industrial source, Netherlands; Pham Ngoc Dang, The Atmosphere, 1997), usually when completing a distance of 1000 kms kinds of vehivles weighted <3.5 tons, a volume of dust of about 0.2 kg will be generated; kinds of vehicles weighted 3.5 – 16 tons will generate about 0.9 kg. As estimated, at the construction area, the number of vehicles in operation in rush hour is 20 vehicles weighted 3.5 – 16 tons, the average travelling distance is 60 kms/vehicle/day with continuous operation through the day on shifts. Therefore, the maximum dust pollution volume due to material delivery may reach 77.5 g/hour, equivalent to 0.0538g/s with 25845 counts of vehicles running 4 kms then the dust level created as estimated is 378.68 µg/m^3. Compared to QCVN 05: 2009/BTNMT- the National technical standard of surrounding atmosphere, the emission volume has been 1.9 times as high as the allowed level.
  - Scale: These activities are mainly implemented at the construction area, sometimes on the way of transporting materials.
- Apart from the above activities, the activities of grading and bulldosing the ground plans and building the work items, making construction roads, processing materials, etc. are also important sources of dust pollution.

The above forecasted results of calculations have been calculated at the highest emission capacity (under the condition of the highest construction intensity). However, the emission capacity depends not only on the construction volume and intensity at each point of time in the entire construction period but also on the conditions of the temperature, the humidity and the wind in seasons, thus, the dust density causing atmosphere pollution in dry season is higher than that in rainy season, it is much lower in rainy season compared to calculations' results.

Table 5-5: Results from calculations of exhausted dust volume

NO.	Sources of emission	Emission field	Parameter/ emission volume (mg/s)	Density (µg/m^3)	QCVN 05: 2009/BTNMT
1	Excavation and backfill of the soil	Site area	Dust/125.8177	16.255	200 (µg/m^3)
2	Transportation	Site area	Dust/5.38	378.68	

b. Pollution by exhausted gases

** Gases exhausted from kinds of vehicles using diesel oil*

Gases exhausted from the vehicles contain the following kinds of gases: SO_2, CO_2, CO, NO_x, VOC, etc. This sort of pollution cause affecting the atmosphere depends on the quantity of construction vehicles. Types of construction machines and methods. As estimated, there are 15 counts of vehicles moving into and out of the site on the average per day. It is forecasted that the volume for pollutants for the vehicles using diesel oil is as follows:

Table 5-6: Emission index by a transportation vehicle weighted from 3.5 to 16 tons

Target	Index (kg/1000 kms)	Distance (kms)	Duration(minute)	Vehicle counts (in/out)	Emission volume (g/minute)
Dust	0.9	2.5	12	1	0.1875

SO_2	4.15*s	2.5	12	1	0.0085
NO_X	14.4	2.5	12	1	3.0000
CO	2.9	2.5	12	1	0.6042
HC	0.8	2.5	12	1	0.1667

[Source: WHO: Assessment of sources of pollution to the soil, water and the air – Volume 1, Generva, 1993]

Table 5-7: The volume of exhausted gases and dust equivalent to the number of transporting vehicles in thes area

Number of vehicles	Dust (g/minute)	SO2 (g/minute)	Nox (g/minute)	CO (g/minute)	HC (g/minute)
15	2.8125	0.1275	45	9.036	2.5005

For the atmosphere: increasing the content of SO_2, CO, NOx causing air pollution. The results from the above calculations have shown that the impacts at low level can be reduced by minimization methods.

For the people: The area of huts for workers is about 300 metres far from the work items (the area of dam route, etc.), the residential area is in a long distance with low population density. Compared to the largest radius affected by exhausted gases from trnasportation activities during construction period (about 50 metres) the area of workers' huts will not be affected.

Table 5-8: Estimated exhausted gases' density created from transpotrtation process

NO.	Pollutants	Exhausted gases' density (mg/m^3)	QCVN 05:2013/BTNMT Average in 1 hour (mg/m^3)
1	TSP	0.003	0.3
2	SO_2	0.014	0.35
3	NO_x	0.035	0.2
4	CO	0.014	30
5	VOC	0.011	-

Compared the estimated density at the table 5.9 to the standard QCVN 05:2013/BTNMT, the estimated densities of TSP, CO, SO_2 and NO_x created from delivery process during construction period are all within the allowed limits. Particularly, the density of VOC is 0.029 mg/m^3 and not stated in the standard QCVN 05: 2013/BTNMT.

c. Noise poluution

The noise is mainly generated from activities of excavating and backfilling by delivery equipment and vehicles, etc. During processes of repairing anf upgrading the work items, many construction machines and equipment have been in used (table 2.4). The loud noise has bad impacts to the workers working at the site and disturbs the residents living nearby.

According to the standard QCVN 26:2010/BTNMT, the noise in puclic areas and residential areas is: 55 - 70dBA (from 6.00 to 21.00).

Table 5-9: The noise caused by delivery vehicles and construction machines

NO.	Types of machines	Noise level for 1 metre distance		Noise level for a distance					
		Range	Average	5m	10m	20m	50m	100m	200m
1	Van/lorry	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	Digger	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	Compressor	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)									

(Source: Prof. Dr. Pham Ngoc Dang, The atmosphere, Science & Technology Publisher, Hanoi – 1997)

The results from calculations have shown that the noise level has been reducing to the distances to the source points. Within the range of 50 metres, the noise level will be approximately the standard QCVN 26:2010/BTNMT, therefore, within this range, the workers are just allowed to work continuously in 21 hours. However, as calculated, during construction duration, there are about 10 vehicles taking turns, so the posibility of noise resonance is quite high.

According to the statistics by the Ministry of Health and the Research Institute of Science & Technology for Labour Protection by Vietnam General Confederation of Labour, the loud noise affects badly to most of parts in a human body. Daily activites of the machines, equipment and vehicles, etc. causing loud noise will affect the acitities and living habits of species of animals living near the site.

However, the above results from calculations have shown that the largest radius of the noise's impact coming from the operation of machines, equipment and vehicles is 50 metres (beyond this range, the people are less affected and are able to live and act during 21 hours). Hence, impacts by the loud noise just affect the workers on the site. Furthermore, the project is located far from residential area (out of affected radius) and the population density in the area is low with high density of green trees, so the loud noise will not affect the people. This impact ***can be controlled*** by minimization methods in chapter 6.

3) Impacts to the soil environment:

Activities of exploiting construction materials (exploiting mines for backfilling soil) construction activities; activities of delivering and collecting materias, etc. will affect badly to the soil environment, break the structure of the surface, change the fertility of the surface soil layer (at the points where the surface soil layers are taken off). The waste from thw workers' daily activities, the waste from construction activites, oil and lubricant machines and equipment, etc. when being disposed directly into the soil will pollute the soil entirely. Those impacts will harm the vegetable matters, afect somehow to the field ecosystem, if there are no proper soil reversion methods. The area in temporary appropriation to build the supporting items is about 0.2 ha. It is necessary to apply appropriate minimization methoad.

For the number of construction workers of 150 workers/day, the waste volume from daily activites is created at 0.075 ton/day on the average (each person disposes 0.5 kg of waste/day on the average). After 2 years of construction (about 300 days/year), the waste volume created will be 45 tons. Compared to the volume of waste soil and stones, the waste volume of daily activities is not remarkable but the main elements of organic substances having high risks in causing diseases for the people and cattle need to be processed efectively by some methods.

The source of solid waste created from construction process will be collected and moved to processing areas. The scale of the area used to be store solid waste will be calculated particularly in the part of minimization methods (part 6). The appropriation of the soil is just temporary (18 months) and the commune's policy is to plant trees for compensation when the work is completed, so the impacts are considered at low level, and ***can be controlled*** by minimization methods.

There may be harmful waste like clouts containing disposed oil and lubricant, etc.

If these sources are not collected and processed but disposed arbitrarily out to the surrounding, they will be the sources of environmental pollution, soil's quality reduction (the soil will become more coldhardened, the micro-organism will die, and the productivity of the cultivated palnts will be afected), the area's landscape will be broken down. Thus, the Contractor will require the construction agent to implement the methods to collect, to hire authorised agencies to collect and take to processing areas in order to restrict and minimize the bad impacts probably caused by these sources.

Impacts to the biological environment

a. Impacts to the aquatic ecosystem

Construction activities on the site such as excavating the soil, draining the water for construction, etc. resulted in the reservoir's water's turbidity, the water's quality is changed

due to leaking oil and lubricant, etc. The soil and stones occupy living environment and spaces to lay eggs, kill young fish, decrease the photosynthetic capacity of kinds of alga, etc. Those will break and bring about unadvantegeous changes to the living environment of fish and other aquatic species, and affect the life of the aquatic ecosystem.

b. Impacts to the ecosystem on land

The noise from activities of excavating and backfilling will create the vibration affecting the lives, biological habits and romove animals species out of their current living areas.

Nevertheless, the species of plants and animals on land as well as aquatic species in the project construction area are not of high quantities, these impacts are relatively clear but they are just locally and short-term, so the influence level to the ecological environment is not significant. The construction has caused direct or indirect damages to the wild plants and animals. This impact is firstly due to the disturbance, movement and re-allocation on the earth surface. The impacts are mostly short-term and restricted within the construction areas, spilled dam extension. The influence level is considered as unremarkable.s

5.3.4. Impacts during operation period

5.3.4.1. Activities

In operation period main activities related to the project are:

- Operation activities of reservoir: open/close of water intake to supply water for agricultural production and domestic purpose of community in Quang Tri and My Duc communes.
- Agricultural production activities are mainly rice cultivation in an area of 2,300 ha.

5.3.4.2. Sources of impacts

In this phase, environmental impact sources may come from solid and liquid waste of various types generated by some local people who have the plantation forest in the area higher than the reservoir water level and the local people in the beneficiary area. This is one of sources affecting the environmental quality. However, the large or small impacting scale depends on quantity of households and used land area.

- Solid waste from residential area and by-products in agriculture.
- Solid waste from using fertilizer and pesticides in agricultural cultivation.
- Domestic and industrial waste water;
- Change in engineering design

5.3.4.3. Impacts on social environment

During operation period of the project, positive impacts on social impacts bring many benefits for people in beneficial area:

- Supply water for agricultural for more than 2,300 ha
- Supply domestic water for people

5.3.4.4. Impacts on environment

Rehabilitating and upgrading the reservoir shall impact the atmospheric environment in various periods with very various affect levels. At the preparation and execution stage, the atmospheric environment shall be mainly polluted by dust and waste gases that are caused by construction layout preparation, building traffic road, yard, store, transporting materials, etc. These effects shall occur only in a small space and often cause partial and interrupted pollution. When the reservoir is rehabilitated and operated again (operation phase), the work's affects shall cause fluctuations in some meteorological elements in the area.

Thus, effects on the atmospheric environment and microclimate at the project site in the management and operation phase are evaluated to be positive with relatively great level. In order to be able to determine the above-mentioned changes in a quantitative manner, it is required to perform the meteorological monitoring activities as well as regular study both before and after construction.

Thus, in the operation phase, the sub-project shall increase stably in terms of water resource, ensure safety for the work and dam downstream area. There is almost no negative impact on the atmospheric environment in the operation phase.

Impacts to the landscape

Reservoir landscape: After the works are successfully rehabilitated and improved, the reservoir landscape becomes more beautiful and spacious. The nice landscape and convenient transport shall attract the tourists to come and visit. The local budget shall be improved by tourism.

Ecosystem improvement: The construction site, reservoir and upstream of fauna and flora of the ecosystem shall be remarkably improved by planting green trees and forestation to recover ecosystem after the works are completed.

Impacts to the water environment

Sub-project, after upgraded, shall increase water inflow capacity, thereby affect flow rate, packing of sediment, and current flow regime. These could lead to soil erosion and deposition along the irrigation system.

Impacts related to wastewater

The liquid waste emission source includes the domestic sewage from the construction works operators. After the construction works system is upgraded, extra personnel could be provided in order to manage the works. Therefore, there may be the waste emissions from the managerial staff.

Impacts to the ecosystem

Forest in the upstream and forest along the reservoir shall be protected and further planted. The increasingly growing forest trees and peace are the active factors to attract many species, especially small and medium animals and birds to come here to live.

The stable and safe operation of reservoir facilitates the forest ecosystem development. Impacts on ecosystem are evaluated to be average and the impacts are long and continuous in the project life.

Impacts to deposits and erosion

The reservoir is designed and built to ensure the power to protect against designed floods at 1.5% and tested floods at 0.5%. The reservoir will be repaired and upgraded to ensure prevention against floods at 0.01%. the extension of spilling will increase the capacity to drain flood water, the water level in the reservoir will decrease faster compared to current situation. When the flood water in the reservoir decreases rapidly, the time for flood water to stay in the reservoir will decrease, which leads to a reduction of deposits in the reservoir. The slower deposition in the reservoir will improve the lifetime of the work, decrease costs for dreadging the reservoir. However, the extension of spilling to drain flood water may also lead to higher erosion at lower flow after spilling compared to the current situation.

6. MITIGATION MEASURES

6.1. No action alternative

Da Teh Reservoir witnessed the accident of water overspill to dam body. In order to successfully recover such accident, during construction, it is required to:

- Execute works items in accordance with the approved schedule and measures;
- Adhere to the State regulations on constructing dam, reservoir and dam safety;
- Draw water in the reservoir to ensure the safe water levels during construction;
- Prepare the accident preventative measures and mobilize local authority and people to be available to respond in case of accident.

6.2. With project implementation alternative

- **Minimizing impacts in preparation phase**

Table 6-1*:* Sub-project's mitigation measures for environmental and social impacts in the project preparation phase

Potential impact	Mitigation measures	Efficiency Advantage/disadvantage
Dust emission	Provide sprinkler to water the road. Spray water at the aggrandizement areas and transportation roads	Such mitigation measures are feasible, simple, workable, suitable with the Contractor's capacity and effective if it is closely supervised and strictly adhered. However, such impact is only minimized without complete recovery.
Noise generation	Maintain and service the best operating condition of construction plants, equipment and trucks	Such mitigation measures are simple and workable without technology or complicated techniques. However, the commitment must be obtained from the construction contractor and PMU as specified in the construction contracts. Noise-originated impact may only minimize without completely recovery.
	Activities causing great noise are conducted within daytime.	
Waste generation	Dustbin for domestic solid waste	Such measures are highly effective, feasible and workable. However, it requires the contractual involvement of contractor and the competent authorities in-charge of waste collection and treatment, special units on waste oil and grease. An agreement between the construction contractors must be reached. Strict sanctions and close supervision measures must be applied.
	Dustbin for waste oil and grease	
	Container of greasy cloth	
	Mobile toilets	

- **Minimizing impacts in construction phase**

Table 6-2: Sub-project's mitigation measures for environmental and social impacts in construction phase

Potential impact	Mitigation measures	Efficiency Advantage/disadvantage
1. Surplus soil, stone and materials scattered and deposited in the reservoir bed or channels during earthworks and material transportation.	+ When construction is initiated, to clean the site before moving to the new route. + To erect the screen at drainage ditches; + To dredge ditches and canals in rainy season (as necessary) when many sediments are found; + To clean and dredge sand, soil and broken brick from means of transportation when it is scattered or dumped to the rice paddy field, channels, etc.	It has high efficiency without complicated technology or technique and it is easy to perform. Such mitigation measures depend on the Project schedule, experience and responsibility of the construction unit. Therefore, the construction unit must commit with the Project Owner from the bid submission process.
2. Soil pollution due to spill or leakage of oil or other chemicals.	+ To store different types of chemicals for construction (engine oil, concrete additives, etc) into containers and boxes suitable with each type of chemicals (clearly numbered) in a safety area with concrete foundation and roofing to avoid rainwater and flood water; + To ensure construction vehicles and equipment are maintained in good condition; + To carefully pack and transport to the qualified storage field for surplus chemicals, gas and petroleum. Non-recyclable waste chemical empty containers must be separately collected and transported to the professional units for treatment.	Such mitigation measure is simple and workable without technology or complicated techniques. However, the contractor must prepare the warehouse and storage field conditions before construction. The professional units must be cooperated to ensure the waste treatment. Such measures shall offer high performance if the construction contractor and workers have the high sense of environmental protection and obtain the inspection from the Project Owner.
3. Pollution of water source and aquatic habitat due to waste, chemicals, effluents or contaminated soil.	+ To store oil in safety area with roofing to avoid rainwater and flood water; + To ensure construction vehicles and equipment are maintained in good condition; + To require to have qualified toilets in the workers' camp under the standards of the Ministry of Health; + To regularly collect and handle scattered soil to protect the water source; + Not to mix chemicals near the water courses; + Not to wash raw material containers or empty containers within the site campus; + Not to pile solid waste from 10m or lower in the water course.	Such mitigation measures are simple and workable without technology or complicated techniques or mobilizing machines. However, the contractor must prepare the warehouse and storage field conditions before construction. The professional units must be cooperated to ensure the waste treatment. Expenditures must be provided to launch such measures. Such measures shall offer high performance if the construction contractor and workers have the high sense of environmental protection and obtain the inspection from the Project Owner.
4. Interrupting the water supply capacity for downstream area or rice paddy field due to reservoir construction.	+ To launch the reservoir construction activities in dry season; + To speed up system repair activity during construction; + To take technical measures such as developing the temporary water channel.	It has high efficiency without complicated technology or technique and it requires low expenses. Such mitigation measures depend on the Project schedule, experience and responsibility of the construction unit. Therefore, the construction contractor's commitment is required during the Project is launched.
5. Dam safety risk.	+ To upgrade the water intake dam in dry season; + To speed up the construction progress.	It has high efficiency without complicated technology or technique and it requires low expenses. Such mitigation measures depend on the

Potential impact	Mitigation measures	Efficiency Advantage/disadvantage
		Project schedule, experience and responsibility of the construction unit. Therefore, the construction contractor's commitment is required during the Project is launched.
6. Air pollution due to dust or other emissions (CO, NOx, SOx, etc).	+ To cover canvas in the building material truck or apply during transportation for construction; + To ensure construction vehicles and equipment are periodically maintained; + To water the material trucks in dry seasons when it trespasses the crowded residential areas, etc., in rush hours; + To regulate speed (guide drivers how to make familiar and comply); + To suggest the construction plans by the Contractor and approved by PMU to minimize the construction period.	Such mitigation measures are feasible, simple, workable, suitable with the Contractor's capacity and effective if it is closely supervised and strictly adhered. However, such impact is only minimized without completely recovery.
7. Noise caused by construction devices.	+ To regularly maintain motor vehicles, equipment, etc. + To avoid conduct the construction activities near residential area at lunch time or after 20h at night; + To regularly notify the residential community and the local authority pertaining construction plan by loudspeaker, document or bulletin of the Communal People's Committee (CPC).	Such mitigation measures are simple and workable without technology or complicated techniques. However, the commitment must be obtained from the construction contractor and the Project Owner as specified in the construction contracts. Noise-originated impact may only minimize without completely recovery.
8. Traffic obstruction, increase in traffic accident risks and decrease in accessibility to social services (school, market, medical station, etc) in the Sub-project site.	+ To install warning sign and lighting at the construction site to control the traffic; + To create temporary path for local people as necessary; + Not to mobilize materials in front of entrance of houses of local people and crowded areas; + To notify the construction plan to the local community.	Such mitigation measures are simple and workable without technology or complicated techniques. However, the commitment must be obtained from the construction contractor and the Project Owner as specified in the construction contracts. Risks and accidents may be completely prevented. However, impact on obstructing traffic and social service accessibility may be minimized not completely recovered.
9. Waste materials generated from construction activities at site and living activities of the field workers.	+ To regularly collect waste from construction area; + To arrange the dustbins at proper positions at the site and the workers' camp; + To install the provisional collection and storage system surrounding the site for hazardous wastes (Oil sludge, grease and others from surplus oil, etc), then contact with the professional units for treatment.	Such measures are highly effective, feasible and workable. However, it requires the contractual involvement of contractor and the competent authorities in-charge of waste collection and treatment and special units on waste oil and grease (hazardous waste). An agreement between the construction contractors must be reached. Strict sanctions and close supervision measures must be applied.
10. Social disorder caused by temporary residing field workers, affecting the routine life of local people.	+ To orient the field workers how to contact with the local community and guide them how to protect the health, environmental hygiene and prevent the infectious diseases; + To orient the field workers how to prevent the infectious diseases such as HIV/AIDs and other social evils such as gambling, prostitution, thief,	Such measures are completely feasible and workable under the management of construction unit. However, efficiency also depends on awareness of field workers and responsibility of construction unit. The community must take part in supervision and discovery of

Potential impact	Mitigation measures	Efficiency Advantage/disadvantage
	etc; + To prohibit the worker to exploit the natural resources of the locality.	violation to penalize. The commitment must be made and entered by and between the construction unit and stakeholders (the Project Owner and local authority).
11. Hazards to the health of field workers and labor safety affecting the project site.	***Safety measure within construction site:*** + To arrange the safety official to launch the safety measures at the site and train how to conduct emergency first aid; + To provide complete personal labor safety equipment for workers (Safety helmet, gloves, belt, etc) and train them how to use such equipment; + To install the labor safety regulation board at site; + To erect fence surrounding the site. ***Reducing risk during transporting building materials:*** + To regulate the limited speed along the transportation route; + To organize regular meeting/notification between the Contractor and the communal officials and local people to notify about construction progress and traffic safety so that the residents may know the risks to prevent; + To restrict material transportation in rainy seasons to avoid overload vehicles against the road's loading capacity; + To timely repair the damaged pavement. To apply the dust mitigation measures as mentioned above.	The aforesaid measures may be completely conducted and released with high efficiency if all above regulations are strictly adhered. However, it remarkably depends on self-awareness and compliance of the workers.
12. Impacts arisen from temporary material storage fields (Dust, noise and impacts on water quality).	+ To store the materials along the road, dam or near the site to avoid traffic jam; + To store materials properly to minimize impacts on vehicles and pedestrians when passing the site; + To erect the fence surrounding the temporary material storage field to prevent the local people and domestic animals from trespassing; + To properly compensate for the affected agricultural products of local people if it is affected by material mobilization activity.	Such measures are highly effective, feasible and workable without complicated technology or techniques. Such measures require the implementation responsibility of construction unit as well as comprehensive evaluations before construction. Therefore, strict sanctions and close supervision measures must be applied.
13. Impact surrounding soil exploitation quarry (Dust, noise, labor safety, soil pollution and water pollution by exploitation activities).	+ To have construction vehicles and equipment periodically maintained; + To strictly manage and keep in separate area for hazardous waste such as engine oil and other chemicals so that the competent authority in-charge of hazardous waste treatment can handle it; + To provide the exploitation area with fence and provide barrier and safeguard station for the entrance to prevent the local people and domestic animals from trespassing; + To dry the soil pit in dry days. + To require the Contractor to select	Such mitigation measures are simple and workable without technology or complicated techniques. However, the contractor must prepare the construction machine and storage field conditions before construction. The professional units must be cooperated to ensure the waste treatment. Such measures shall offer high performance if the construction contractor and workers have the high sense of environmental protection and obtain the inspection from the Project Owner.

Potential impact	Mitigation measures	Efficiency Advantage/disadvantage
	licensed supplier of building materials.	

Minimizing impacts in operation phase

Table 6-3: Sub-project's mitigation measures for environmental and social impacts in operation phase

Potential impact	Mitigation measures	Efficiency Advantage/disadvantage
1.Natural disaster risk causing unsafe for Da Teh Reservoir	+ Operator of Da Teh Reservoir must regularly conduct the periodic check for safety of entire reservoir; + Operator of Da Teh Reservoir must work closely with My Duc Communal People's Committee (CPC) and local people to timely report the dam safety risks to take the proper recovery measures; + At the moment which unsafe is easily available such as storm season, a person should be assigned to monitor and watch on-duty to ensure proper water source regulation; + Regarding flood discharge issue, flood map must be prepared for the downstream area. The local people must be notified before at least 01 day regarding the flood discharge plans (as necessary) so that they can actively prevent and reduce the damages; + ROW of flood discharge must be developed as necessary in accordance with the scenario on spatial impact level forecast caused by dam breakage.	Strictly adhering to such measures shall minimize impacts arisen during construction. Such measures also require the local people to strictly adhere to the principle on hydraulic works ROW under Ordinance on Hydraulic Work Operation.
2. Regulating reservoir and flood discharge in case of great flood, affecting the downstream.	+ Operator and manager must timely and accurately notify the flood discharge so that the local people in the community may actively grasp and respond; + At the moment which unsafe is easily available such as storm season, a person should be assigned to monitor and watch on-duty to ensure proper water source regulation; + The local people and local authority must actively take the natural disaster response plans based on the community.	Such measure is highly feasible. However, in order to make the accurate forecast, additional observation systems should be provided to support the operator.

PART 7 ENVIRONMENTAL, SOCIAL MANAGEMENT PLAN (ESMP) AND MONITORING PLAN (ESMoP)

7.1. Objectives of ESMP

- Ensuring the compliance with regulations, laws, standards and guidance for application at the provincial and National levels;
- Ensuring that there is sufficient resources allocated on the basis of project budget to perform those activities related to ESMP;
- Ensuring that environmental, social risks of the project are managed properly;
- Coping with unforeseeable environmental issues which are not identified in the environmental impact assessment of the project;
- Responding to the process of continuous improvement of environmental action results.

7.2. Mitigation measures

7.2.1. Potentail impacts and mitigation measures

Table 7-1: Environmental, social management plan

Project stage	Project activities	Environmental – social impacts	Mitigation methods
Preparation	Preparation of lay-out, gathering of machines and vehicle.	Noise, dust, exhaust gas.	+ Limiting the speeds, instructing drivers to get acquaintance and to comply; + Preparing plan of moving, gathering facilities and equipment reasonably to avoid causing impact on local people's daily life.
	Workers temporarily reside in the project site (small quantity)	Disorder in local people's life	+ Registering the temporary residence for workers; + Contractor instruct the workers about ways of communication and interaction with the authority and community; + Contractor requests the workers to comply with relevant regulations when they lives in the community such as no argument with local people, no gambling, robber, etc.;
Construction	Construction of work items	Declination of air environment quality due to dust, exhaust gas, noise, vibration	Not using too old equipment, performing regular maintenance of machines, vehicle (every 6 months).
			Regularly watering over the construction area and along the route of construction.
			Covering with canvas in material gathering yards, and over material transporting vehicle.
		Appearance of solid waste, falling soil and sand, hazardous waste	At each site, locating waste baskets, including: 03 baskets for hazardous waste, 03

Project stage	Project activities	Environmental – social impacts	Mitigation methods
		(exhaust machine oil, cloth stained with oil and grease) causing environmental pollution, declination of bio-diversity	baskets for normal waste.
			+ Regularly clearing, collecting falling materials; + Classifying solid wastes, putting in correct baskets; + Gathering, treating hazardous waste according to relevant regulations.
		Overflowing rain water, water for washing vehicle, materials	Constructing silt pit, water gathering system to gather waste water from construction, water for washing vehicle and to treat the sludge.
		Impact on labor safety, working conditions, workers' health at the site.	+ Arranging reasonable working schedule; + Equipping sufficient protective tools for workers; + Training, enhancing the capability of labor safety and environmental protection before construction. + Performing periodical health check-up for workers at the site.
		Environmental incidents: Natural disasters, rains and storms, oil leakage, fire, explosion, etc.	+ Preparing preventive plans in case of storms, tropical low pressure, whirlwind; + Popularizing the plans of coping with, dealing with environmental incidents; + Rehearsing.
	Production of concrete structural elements	Pollution of soil, water due to the water for cleansing equipment, machines.	+ Saving the water; + Constructing the gathering system, silt pit for treatment of waste water before discharging to the environment.
		Dust, exhaust gas, noise due to concrete mixing and pouring	Performing periodical maintenance of machines
	Transportation of materials	+ Air pollution due to noise, dust, exhaust gas of transportation means; + Impact on traffic infrastructure of the area; + Increased risk of traffic accident for	+ Transporting at the specified time; + Ensuring correct capacity, with covering canvas. Equipping more canvas or replacing damaged, downgraded ones; + Complying with permissible maximum speed.

Project stage	Project activities	Environmental – social impacts	Mitigation methods
		those travelling on the road.	
	Daily activities, accommodation of officials, workers	Domestic waste water	Procuring 02 mobile toilets for installing at the site.
		Domestic waste	+ Equipping 03 waste baskets at the site hut area; + Regularly clearing and cleaning; + Contracting with local environmental sanitation unit for transportation and treatment.
	Repair, restoration of damaged routes of transportation	Protection of traffic routes at the project site	Repairing, leveling, improving damaged, depressed or low-quality sections.
	Environmental observation, monitoring during the construction period	Environmental quality of the project site is ensured to meet the permissible standards	Sampling for observation, monitoring of environmental quality during the construction period.
Operation	Restoration of construction area: site hut area, dump area, soil exploitation	Appearance of solid waste	+ Removing, gathering sit huts, signs; + Gathering, moving machines, vehicle for construction; + Burying, leveling for restoring exploitation yards.
	Management, operation, maintenance of culverts, locks	Safety for residential areas, cultivation land, works, and infrastructures is ensure	+ Performing regular inspection, maintenance; + Promptly detecting, dealing with the encroachment, abuse of canal corridor.
	Training, prevention of incidents	For timely inspection, detection, rescue and salvage	Training the response to incidents, once/ year according to the proposed program of Department of Agriculture and Rural Development.
	Closing and opening of culverts	Stagnation of irrigation water, impact on surface water quality	Regularly monitoring the hydrologic mechanism of the area

Project stage	Project activities	Environmental – social impacts	Mitigation methods
	TOTAL ESTIMATED COST		

7.2.2. Costs for impact mitigation activities

Table 7-2: Costs for capacity enhancing activities in environmental management

No.	Activities	Location	Cost (đ)
1	Training for raising awareness on environmental protection	My Duc commune	10.000.000
2	Design domestic wastewater treatment plant	My Duc commune	50.000.000
3	Build domestic solid waste treatment procedure	My Duc commune	50.000.000
	Summary		110.000.000

Table 7-3*:* Cost summary for environment protection activities

No.	Activities	Cost (đ)
1	Cost for environmental quality monitoring	132.144.000
2	Cost for capacity enhancing activities on environmental management	110.000.000
3	Cost for construction of sanitation facilities and solid waste collection	100.000.000
	Summary	**342.144.000**

7.3. Environmental and social monitoring plan (ESMoP)

ESMP drafts the methods of mitigating the impacts, monitoring the institutions to be implemented during the construction and operation of project in order to avoid or to control adverse impacts to the environment, society and actions to be implemented for implementing mitigation methods. ESMP creates a useful connection among the mitigation methods of adverse impacts and ensures the methods will be developed.

ESMP proposes the unit of implementation and monitoring, implementation costs and implementation time for mitigation methods as proposed in Part 6. Summary of ESMP for the project:

Table 7-4: Environmental, social management plan

Project stage	Project activities	Environmental – social impacts	Mitigation methods	Implementation cost	Time of implementation and completion	Implementation unit	Monitoring unit
Preparation	Preparation of lay-out, gathering of machines and vehicle.	Noise, dust, exhaust gas.	+ Limiting the speeds, instructing drivers to get acquaintance and to comply; + Preparing plan of moving, gathering facilities and equipment reasonably to avoid causing impact on local people's daily life.	Signs of speed limit: 4 signs x 0.5 mil./ sign = 2 mil.	Stage of project preparation	Construction unit	Employer
	Workers temporarily reside in the project site (small quantity)	Disorder in local people's life	+ Registering the temporary residence for workers; + Contractor instruct the workers about ways of communication and interaction with the authority and community; + Contractor requests the workers to comply with relevant regulations when they lives in the community such as no argument with local people, no gambling, robber, etc.;	Contractor	When the workers start to reside in the community	Contractor	Supervision consultant
Construction	Construction of work items	Declination of air environment quality due to dust, exhaust gas, noise, vibration	Not using too old equipment, performing regular maintenance of machines, vehicle (every 6 months).	Contractor	Regularly during the construction period	Construction unit	Employer
			Regularly watering over the construction area and along the route of construction.	1 mil./month x 20 months = 40 mil.			
			Covering with canvas in material gathering yards, and over material transporting vehicle.	10 mil.			
		Appearance of solid waste, falling soil and sand, hazardous waste (exhaust machine oil, cloth stained with oil	At each site, locating waste baskets, including: 03 baskets for hazardous waste, 03 baskets for normal waste.	1 mil./waste x 03 baskets x 2 types = 6 mil.	Procuring before project implementation	Construction unit	Employer
			+ Regularly clearing, collecting falling materials; + Classifying solid wastes, putting in correct baskets;	Fee of collection and treatment service: 20 mil./year * 2 year	Every day	Construction unit	Employer

Project stage	Project activities	Environmental – social impacts	Mitigation methods	Implementation cost	Time of implementation and completion	Implementation unit	Monitoring unit
		and grease) causing environmental pollution, declination of bio-diversity	+ Gathering, treating hazardous waste according to relevant regulations.	= 40 mil.			
		Overflowing rain water, water for washing vehicle, materials	Constructing silt pit, water gathering system to gather waste water from construction, water for washing vehicle and to treat the sludge.	30 mil.	Before construction, every day	Construction unit	Employer
		Impact on labor safety, working conditions, workers' health at the site.	+ Arranging reasonable working schedule; + Equipping sufficient protective tools for workers; + Training, enhancing the capability of labor safety and environmental protection before construction. + Performing periodical health check-up for workers at the site.	- Equipping protective tools: 10 mil./year * 2 years = 20 mil. - Training about labor safety 10 mil/time *2 time/year *2 years = 40 mil. - Performing periodical health check-up: 15 mil./year *2 years = 30 mil.	During the construction	Construction unit	Employer
		Environmental incidents: Natural disasters, rains and storms, oil leakage, fire, explosion, etc.	+ Preparing preventive plans in case of storms, tropical low pressure, whirlwind; + Popularizing the plans of coping with, dealing with environmental incidents; + Rehearsing.		Every year	Agencies in charge	Employer
	Production of concrete structural elements	Pollution of soil, water due to the water for cleansing equipment, machines.	+ Saving the water; + Constructing the gathering system, silt pit for treatment of waste water before discharging to the environment.	Included in the cost of construing silt pit, water gathering system in the part of waste water.	Before project implementation	Construction unit	Employer

Project stage	Project activities	Environmental – social impacts	Mitigation methods	Implementation cost	Time of implementation and completion	Implementation unit	Monitoring unit
		Dust, exhaust gas, noise due to concrete mixing and pouring	Performing periodical maintenance of machines		Every month		
	Transportation of materials	+ Air pollution due to noise, dust, exhaust gas of transportation means; + Impact on traffic infrastructure of the area; + Increased risk of traffic accident for those travelling on the road.	+ Transporting at the specified time; + Ensuring correct capacity, with covering canvas. Equipping more canvas or replacing damaged, downgraded ones; + Complying with permissible maximum speed.	Construction unit	Every day	Construction unit	Employer
	Daily activities, accommodation of officials, workers	Domestic waste water	Procuring 02 mobile toilets for installing at the site.	50 mil./toilet x 2 toilets = 100tr	Procuring and installing before project implementation	Contract with distribution unit	Employer
		Domestic waste	+ Equipping 03 waste baskets at the site hut area; + Regularly clearing and cleaning; + Contracting with local environmental sanitation unit for transportation and treatment.	- 1 mil/ basket x 03 baskets = 3 mil.; - Fee of collection service: 20 mil./ 20 months	Procuring and entering into contract of waste collection before project implementation	Construction unit	Employer
	Repair, restoration of damaged routes	Protection of traffic routes at the project site	Repairing, leveling, improving damaged, depressed or low-quality sections.	100 mil.	Right after completion of construction	Construction unit	Employer

Project stage	Project activities	Environmental – social impacts	Mitigation methods	Implementation cost	Time of implementation and completion	Implementation unit	Monitoring unit
	of transportation				stage		
	Environmental observation, monitoring during the construction period	Environmental quality of the project site is ensured to meet the permissible standards	Sampling for observation, monitoring of environmental quality during the construction period.	10 mil./time x 4 times/year x 2 years = 80 mil.	Every 3-6 months during the construction period	Eligible units with sufficient legal status, hired by Employer	Employer
Operation	Restoration of construction area: site hut area, dump area, soil exploitation	Appearance of solid waste	+ Removing, gathering sit huts, signs; + Gathering, moving machines, vehicle for construction; + Burying, leveling for restoring exploitation yards.	50 mil.	After completion of construction period	Construction unit	Employer
	Management, operation, maintenance of culverts, locks	Safety for residential areas, cultivation land, works, and infrastructures is ensure	+ Performing regular inspection, maintenance; + Promptly detecting, dealing with the encroachment, abuse of canal corridor.	Cost of work maintenance	Every year	PPMU	Employer
	Training, prevention of incidents	For timely inspection, detection, rescue and salvage	Training the response to incidents, once/ year according to the proposed program of Department of Agriculture and Rural Development.	Cost of work operation	Every year	PPMU	Employer
	Closing and opening of culverts	Stagnation of irrigation water, impact on surface water quality	Regularly monitoring the hydrologic mechanism of the area	Cost of work operation	Every year	PPMU	Employer
	TOTAL ESTIMATED COST			**551 million**			

7.3.1. Environmental monitoring plan

This part describes the proposed monitoring program to be implemented during performance of sub-project. The program consists of (a) monitoring the compliance with mitigation methods in ESMP; (b) monitoring the environmental quality.

Supervising the compliance

i) Supervision by PPMU

PPMU monitors the contractors' compliance with safety policies during the construction period. PPMU designate Construction supervision consultant (CSC) to perform daily supervision based on the approved ESMP and ESMoP, and cares about the mitigation of potential negative impacts caused by construction activities such as material transportation causing dust, noise and traffic obstruction in the sub-project site; TOR for CSC. PPMU will assign environmental officials and environmental supervision unit (provincial environmental consultant) to monitor and supervise the compliance with safety policies.

ii) Supervision by the Community

Local community supervision board is established under "Decision No. 80/2005/QD-CP dated April 18, 2005 of Prime Minister on Rules of investment supervision of the community". Community supervision board at commune level has the right of and responsibility for supervising construction activities, negative impacts on the environment caused by construction activities to ensure effective implementation of mitigation methods by the contractor. In case there is any environmental issue causing impacts on the community, the board will report to CSC and/or PPMU by filling Forms of reflection about environmental safety information.

Supervision of environmental quality

Table 7-5: Environmental – social supervision during construction period

No.	Index	Position of observation	Method	Frequency	Period	Sample quantity
1	**Program of surface water quality supervision**					
	17	02 samples at Da Teh Reservoir Bed	Methods in current Vietnam Standards on environment	Every 03 months	Construction	2 samples
		01 sample at downstream of soil dam (intake canal)		Every 03 months	Construction	1 sample
2	**Program of underground water quality supervision**					
	16	Residential area at downstream of the dam	Methods in current Vietnam Standards on environment	Every 03 months	Construction	1 sample
3	**Program of air quality supervision**					
	8	Construction work	Methods in current Vietnam Standards on environment	Every 03 months	Construction	2 samples

7.3.2. Social monitoring programme

Internal Monitoring

Implementation of the RAPs will be regularly supervised and monitored by the CPO and PPMUs. The findings and recommendations will be recorded by the PPMUs in quarterly reports on implementation progress of compensation and resettlement to submit to the CPO and the WB for review. Internal monitoring aims to:

a. Ensure payment of compensation to project affected people are provided based on DMS results and replacement costs of affected assets at the market prices at the compensation time.

b. Ensure resettlement activities are conducted according to the compensation policies as per agreed RPF and RAP for each sub-project.
c. Determine if the required transition and livelihood restoration measures are provided on time.
d. Assess if income and livelihood restoration measures have been provided properly for livelihood restoration by AHs and propose remedial measures if objectives of restoring income of households have not been met.
e. Implementation of information disclosure and community consultation
f. Determine if complaint procedures are followed and propose solutions if there are pending issues.
g. Give priority to displaced persons' concerns and needs, specially the poor and vulnerable households.
h. Conformity between relocation and land clearance and construction commencement to ensures that AHs have been provided with compensation, allowance, and relocation satisfactorily before construction commencement.

Detail indicator of internal monitoring in below table.

Table 7-6: Internal monitoring indicators

Type of monitoring	**Basis for indicators**
Budget and time	• Have the personnel for compensation and resettlement implementation been arranged sufficiently as per plans? • Have resettlement activities been carried out as per agreed plans? • Have budgets for resettlement been allocated for resettlement executing agencies timely and adequately? • Have the resettlement executing agencies received budgets as per plans? • Has compensation been paid as per RAP? • Has the social preparation stage been implemented as per plans? • Has land been acquired and handed over timely for construction?
Delivery of AH's entitlements	• Have all AHs received their entitlements fully for quantities and types of damages as stipulated in the matrix of entitlements? • Have the AHs received their payments on time? • Have the AHs with temporary lose of land been compensated for? • Have all AHs been provided with transportation, transfer, and livelihood and livelihood restoration allowances as per plans? • Have resettlement houses/ land been assigned? Has the legal land use right been granted to AHs? • How many AHs having been granted with land use right? • Have supporting measures been implemented as per plans for the receiving communities? • Can AHs access to schools, medical care services, socio-cultural places and activities?
	• Have livelihood and livelihood restoration activities been implemented as per agreed the RPF and RAPs? For example, numbers of AHs that have been provided with vocational training and jobs, small-scale credits, income-supporting activities? • Have affected business been granted with their entitlements, regardless of being registered or not?

Consultation, Grievance, and Special Issues	• Has community consultation been carried out as plans? Have brochures of project information and entitlements of compensation and resettlement been delivered? • How many AHs know about their entitlements? How many AHs receive such entitlements? • Do AHs know about and use grievance mechanism as set up in the RPF? What are the outcomes? • Numbers of grievances and types of grievances (by genders, vulnerable groups)? • Numbers of settled grievances (by genders, vulnerable groups)? • Levels of awareness of resettlement procedures • Levels of satisfaction on resettlement procedures • Levels of awareness on entitlements
	• Levels of satisfaction on entitlements • Levels of awareness on grievance mechanism • Levels of satisfaction on grievance mechanism

External Monitoring

Compensation and resettlement implementation for a sub-project with a full RAP must be subject to external monitoring by an independent qualified consultant selected by CPO. The independent monitoring consultant should be recruited under regulations of recruiting the Consultant by the WB with a terms of reference that specify frequency of monitoring, methods of monitoring, monitoring indicators, and reporting requirements. Monitoring reports will be submitted to the CPO, the MARD and the WB after finishing site monitoring.

Independent monitoring of RAP implementation will be based on desk review and field visits, meetings with relevant agencies, local officials, and AHs. Separate meetings with women and vulnerable households will be held. The main objective of external monitoring is to provide an independent periodic review and assessment of (i) achievement of resettlement objectives; (ii) changes in living standards and livelihoods; (iii) restoration and/or improvement of the economic and social base of the affected people; (iv) effectiveness and sustainability of entitlements; and (v) the need for further mitigation measures. Monitoring and evaluation indicators are presented in Table 5.

The external monitoring will address specific issues as follows:

a) Public consultation and awareness of resettlement policy and entitlements of AHs;
b) DMS of affected assets and compensation payment as per policies in approved RAPs;
c) Coordination of resettlement activities with construction schedules;
d) Land acquisition and transfer procedures;
e) Construction/rebuilding of replacement houses and structures on residual land or to new relocation sites;
f) Level of satisfaction of AHs with the provisions and implementation of the RAPs;
g) Grievance redress mechanism (documentation, process, resolution);
h) Effectiveness and sustainability of entitlements and income rehabilitation measures for AHs;
i) Gender impacts and strategy;
j) Capacity of AHs to restore/re-establish livelihoods and living standards. Special attention provided or to be provided to severely affected and vulnerable households;
k) Resettlement impacts caused during construction activities;
l) Participation of AHs in RAP planning, updating and implementation;
m) Institutional capacity, internal monitoring and reporting; and
n) Channelling of government funds for compensation payment and allowances for severely AHs or displaced AHs

.Detail indicator of internal monitoring in below table

Table 7-7: External monitoring indicators

Type of monitoring	Basis for indicators
Some basic information of AHs	• Locations • The average size of households, the average age range, the average education attainment • Genders of the AH's heads • Ethnicity • Levels of access to health and education services, utilities, and other social services. • Types of houses • Types of land and legal status of land use • Types of occupations and jobs • Sources and levels of incomes
Restoration of living standards	• Have depreciation, fees or transaction fees been included in compensation amounts for houses for AHs? • Have main environmental, cultural, and social conditions of AHs been restored? • Have lives of AHs, particularly of the displaced people and the vulnerable group, been stable?
Livelihood restoration	• Have compensation amounts been sufficient for replacement of lost assets? • Has compensation land been enough according to suitable standards? • Have transportation and subsistence allowances been enough? • Have business allowances been enough to re-establish enterprises and production? • Have vulnerable groups are provided with chances of incomes? Are such chances been effective and sustainable? • Do new jobs restore pre-project income levels and living standards?
Levels of AH's Satisfaction	• Have AHs agreed with compensation prices? • To what extent do AHs know about resettlement procedures, their rights and entitlements? • Do they know whether their entitlements are provided or not? • To what extent do AHs self-evaluate their restored living standards and livelihoods? • To what extent do AHs know about grievance and grievance redress procedures? • Have their grievances been received, settled timely and satisfactorily as per the mechanism in the RPF?
Efficiency of resettlement planning	• Have AHs and their assets been measured precisely? • Have illegal or legal land user been assisted? • Have implementation time and compensation budgets been sufficient to meet resettlement objectives? • Have entitlements been satisfactory? • Have vulnerably groups been assisted for?
Other impacts	• Are there any unexpected environmental impacts? • Are there any unexpected impacts on jobs or incomes? • If any, how have such issues been resolved?

7.3.3. Estimated cost for Environmental and social monitoring

Table 7-8: Cost estimation for environmental supervision

No.	Content	Unit	Q'ty	Unit price (VND)	Amount (VND)
1	Observation of air quality: 2 positions x 4 times/ year x 2 years = 16 samples	Sample	16	966,000	15,456,000
2	Observation of surface water quality: 3 positions x 4 times/ year x 2 years = 24 samples	Sample	24	1,894,000	45,456,000
3	Observation of underground water quality: 2 positions x 4 times/ year x 2 years = 16 samples	Sample	16	1,952,000	31,232,000
4	Annual report on environmental supervision (4 quarter reports x 2 years + 2 annual reports = 10 reports)	Report	10	3,000,000	30,000,000
5	Report on environmental supervision (Summary report)	Report	1	10,000,000	10,000,000
	Total:				**132,144,000**

Cost break-down of analyzing air and water samples(According Circular No. 08/2014/TT-BTC dated January 15, 2014 of Ministry of Finance) is shown in below tables:

Table 7-9: Indexes of air quality observation

No.	Index	Unit	Unit price
1	Temperature	^0C	56,000
2	Humidity	%	56,000
3	Dust PM10	$\mu g/m^3$	140,000
4	CO	$\mu g/m^3$	140,000
5	NO_2	$\mu g/m^3$	140,000
6	SO_2	$\mu g/m^3$	140,000
7	Vibration	dB	70,000
8	Noise	dBA	224,000
	Total:		**966,000**

Table 7-10: Location, coordinates of observing air quality

Code	*Coordinates*		**Location**
	Latitude	***Longitude***	
K1	$11^0$33'20"	$107^0$32'45"	Flood spillway, Con O Village, My Duc Commune, Da Teh District
K2	$11^0$34'00"	$107^0$32'54"	Soil dam, Con O Village, My Duc Commune, Da Teh District
K3	$11^0$33'47"	$107^0$32'56"	Approach to soil dam, Con O Village, My Duc Commune, Da Teh District

Table 7-11: Indexes of analyzing surface water quality

No.	**Index**	**Unit**	**Unit price**
1	pH	-	56,000
2	Turbidity	NTU	80,000
3	Conductivity	mS/m	80,000
4	SS	mg/l	80,000
5	DO	mg/l	104,000
6	COD	mg/l	120,000
7	BOD_5	mg/l	200,000
8	NH_4^+ (according to N)	mg/l	98,000
9	NO_2^- (according to N)	mg/l	100,000
10	NO_3^- (according to N)	mg/l	140,000
11	PO_4^{3-}	mg/l	84,000
12	Cyanide	mg/l	120,000
13	Copper (Cu)	mg/l	130,000
14	Zinc (Zn)	mg/l	130,000
15	Lead (Pb)	mg/l	130,000
16	Cadmium (Cd)	mg/l	130,000
17	Coliform	MPN/100ml	112,000
	Total:		**1,894,000**

Table 7-12: Location, coordinates of sampling surface water

Code	*Coordinates*		**Sampling location**
	Latitude	***Longitude***	
M1	$11^0$33'20"	$107^0$32'45"	Water of Da Teh Reservoir, near the flood spillway, Con O Village, My Duc Commune, Da Teh District
M2	$11^0$34'00"	$107^0$32'54"	Water of Da Teh Reservoir, near the right dam abutment, Con O Village, My Duc Commune, Da Teh District
M3	$11^0$34'02"	$107^0$32'55"	Water of Da Teh Reservoir, Con O Village, My Duc Commune, Da Teh District
M4	$11^0$33'59"	$107^0$32'57"	Water of Da Teh Reservoir, near the intake culvert, Con O Village, My Duc Commune, Da Teh District

Table 7-13: Indexes of analyzing underground water quality

No.	Index	Unit	Unit price
1	pH	-	56,000
2	Hardness	mg/l	80,000
3	Total Suspended Solids (TSS)	mg/l	80,000
4	DO	mg/l	104,000
5	NH_4^+	mg/l	98,000
6	NO_2^- N	mg/l	100,000
7	NO_3^- N	mg/l	140,000
8	Cl^-	mg/l	120,000
9	Zn	mg/l	130,000
10	Pb	mg/l	130,000
11	Hg	mg/l	180,000
12	As	mg/l	150,000
13	Fe	mg/l	180,000
14	Mn	mg/l	180,000
15	Ecoli	MPN/100ml	112,000
16	Coliform	MPN/100ml	112,000
	Total:		**1,952,000**

Table 7-14: Location, coordinates of sampling underground water

Code	***Coordinates***		***Location***
	Latitude	***Longitude***	
N1	$11^0$32’47”	$107^0$31’06”	Underground water out of the project site, My Duc Commune, Da Teh District
N2	$11^0$34’46”	$107^0$33’33”	Underground water out of the project site, My Duc Commune, Da Teh District
N3	$11^0$33’49”	$107^0$33’51”	Underground water out of the project site, My Duc Commune, Da Teh District
N4	$11^0$33’58”	$107^0$33’47”	Underground water out of the project site, My Duc Commune, Da Teh District

7.3.4. Monitoring report requirement

The reports are prepared during implementation of monitoring programs, collection of reports on impacts or suggestions of local people about the project. Evaluating the efficiency of implemented mitigation methods.

Table 7-15: Types of environmental, social monitoring report

Implementation unit	Type of report	Content of report	Submission frequency	Submission to
Construction contractor	Report on accidents/ incidents	Collecting information on unexpected accidents or incidents	Within 24 hours after the incident	PMU and CSC
	Report on violations	Providing information on violations against the regulations on	Within 1 week after the incident	PMU and CSC

Implementation unit	Type of report	Content of report	Submission frequency	Submission to
		environmental, social management		
	Report on relic discovery	Recording and reporting to competent authority about archaeological relics, royal tombs, etc. to be discovered	Within 24 hours after discovering the archaeological relics, royal tombs	PMU and CSC and Department of Culture, Sports and Tourism
	Report on implementation of ESMP	Reporting the results of implementing mitigation methods	Every month	PMU
Construction supervision consultant	Report on implementing methods of mitigating environmental, social impacts	- Evaluating the results of implementing mitigation methods by construction contractors - Results of solving, recovering incidents and methods of overcoming the shortcomings in previous reports	Every month	PMU
Independent environmental consultant	Report on independent supervision of environmental, social safety	- Results of checking the construction site - Results of supervision based on the community - Summarizing monitoring results of construction supervision consultant - Results of environmental supervision - Evaluating implementation results of ESMP and suggestions	Every 06 months or 03 months	PMU and WB
PMU	Report on environmental activities of sub-project	Implementation results of ESMP	Every 6 months	CPO and WB

7.4. ESMP Implementation Arrangement

7.4.1. Agencies and responsibilities

a) Responsibility of Sub-project owner/ PMU

Organizing the implementation of safety policies, monitoring the daily activities of the Sub-project, monitoring and managing the quality of construction works, supervising the compliance with environmental safety in construction activities.

b) Responsibility of Construction contractor

Complying with relevant regulations while performing the responsibilities under the contract with PPMU.

c) Responsibility of Construction supervision consultant

Hired by PPMU, on behalf of PPMU, monitoring and recording every day about the compliance with environmental, social safety policies of Construction contractor.

d) Responsibility of Independent monitoring consultant of environmental, social safety

- Supporting PPMU in evaluating efficiency of mitigation methods and proposing to adjust the implementation of environmental, social safety policies if necessary;
- Making monthly report on compliance with environmental, social safety policies of the contractor and submit to PPMU; this report is the basis for contractor to make payment of environmental and social protection cost;
- Reporting to PPMU the "discoveries" during the construction.

e) Responsibilities of local authority and community

Local community supervision board is established under "Decision No. 80/2005/QD-CP dated April 18, 2005 of Prime Minister on Rules of investment supervision of the community". Community supervision board at commune level has the right of and responsibility for supervising construction activities, negative impacts on the environment caused by construction activities to ensure effective implementation of mitigation methods by the contractor. In case there is any environmental issue causing impacts on the community, the board will report to CSC and/or PPMU by filling Forms of reflection about environmental safety information.

f) Responsibilities of reservoir management and exploitation agency

Maintaining and regularly inspecting work items.

g) Responsibilities of CPO

Guiding PMU about the implementation of environmental, social management plan. Supervising the progress during the construction and the first year of operation.

h) Responsibilities of Department of Natural Resources and Environment/ Division of Natural Resources and Environment

Supervising the implementation of environmental policies as stipulated by Vietnam Government.

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

Da Teh irrigation system is directly managed, exploited and protected by centre of Lam Dong irrigation work management, exploitation.

Management and exploitation team of Da Teh irrigation work has 5 people, all of them are technically trained: 2 engineers from Water Resource University, 1 engineer from National University of Civil Engineering, 2 engineers from Water Resource Vocational School. Organizational structure includes one team leader and 2 technical staffs. Office of management and exploitation team of Da Teh irrigation work is far from headwork 5 km.

Operation procedure of the reservoir is submitted to Lam Dong irrigation work management and exploitation centre for approval however until now it is not yet approved. Content of this procedure is still based on parameters of current status of the work as well as on old regulations, standards that are not suitable with current regulations. When Da Teh reservoir is rehabilitated and improved, this procedure is necessary to be updated with the newest parameters about the reservoir as well as requirements on frequency and hydrological

parameters. About the procedure, it is must be approved by Lam Dong province of people committee before used.

Comments:

After the approval of technical design and detailed engineering design, it is necessary to establish and approve operation procedure of the reservoir persuant to the newest parameters of the work and update current regulations.

Reservoir safety work:

In reservoir safety work, preparation plan is ready for emergency case is very important. Currently, the work has not yet plan for this work. Management and exploitation team of Da Teh irrigation work has made annual flood prevention plan. In which it is mentioned in detailed:

Dam unsafety situations that can occur

Human resource preparation work

Preparation of materials, prevention materials

Collaboration work with authorities

Information, report work

These flood prevention plans are mainly based on experience and available guideline manual. However, each work has

However, each works has a specific characteristics of the affected areas as well as the role of work items in the cause of dam safety incidents that is not yet considered. So emergency plan should be based on impact zone, based on the ability of dam break and flood discharge that causes flooding in downstream through the dam break calculations and flood maps.

Field observations showed that management unit not yet arrange the supplies and equipment needed for these plans. The materials needed for flood prevention for the work or provision for the problems with the reservoir is sacks, sand, rock ... are not yet prepared.

Comment:

After the rehabilitation and improvement project is approved, the project owner and management unit need to make EPP.

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

To enhance the capability and technique of environmental management for staffs of PMU, relevant organizations and individuals, PMU performs the following training activities:

- Enhancing the capability of environmental management and monitoring;
- Popularizing to raise awareness of environmental protection;
- Training about fire prevention and fighting
- Training about environmental regulations and standards
- Training about environmental health and methods of labor safety, environmental safety
- Training, raising awareness about dam safety
- Training, raising awareness about prevention of infectious diseases
- Training, raising awareness about gender equality
- Training, raising awareness about development of minority ethnic groups

7.5. Community development need assessment

Life quality of beneficial community is increased day by day duee to more stable conditions of water supply for domestic and produciton.

Raising awareness of beneficiaries as well as water using organizations in the project area.

8. STAKEHOLDER CONSULTATION AND AND INFORMATION DISCLOSURE

8.1. Public consultation objectives

- To provide the necessary information, to better understand the project, the impacts of project implementation, and possible mitigation measures for the project;
- To clarify the issues discussed in the first phase of the project;
- To notice the benefits achieved when the project is implemented;
- To support funding for the project, pointing out the responsibility and consciousness of the parties, beneficiaries in the project area during project implementation;
- In a certain time to prepare the project, community involvement is a part of the implementation, the project requires voluntary, it is advised to have advice step on environmental – social issues.

8.2. Social impact assessment consultation

i) Objects of consultation:

- Communal People's Committee
- Affected households

ii) Contents of consultation:

- Introduce contents, main items of Sub-project, implementation capital source;
- Consult and present policy on interests off affected people, mechanism of complaint and complain settlement; compensation policy for each type of land, buildings, architectures, trees and crops
- Consult and present forecasted impacts of sub-project on gender;
- Community discusses on policies on benefits and compensation for impacts on land, buildings, architectures, trees and crops

iii) Methods of consultation

In the early stage of Project preparation, local authorities and leaders of different authority levels in My Duc commune and Quang Tri commune, Da Teh district, Lam Dong province are informed of the Project, objectives and proposed activities of the Project. Affected residents are invited to the consultation meeting held at the communes and discuss related contents.

iv) Results of consultation

During consultation, many opinions proposed by people attending the consultation meeting are discussed widely and freely that can be summarized as follows:

- Da Teh reservoir sub-project occupies very little land because the upgrade and repair are performed on the existing route; therefore negative impacts can be minimized and recovery scope of the project is negligible.
- The construction and upgrade of works are implemented to improve dam safety effectiveness and stabilize local residents' living.
- Both men and women are allowed to participate in organizations, unions in locality and propose opinions relating to the Project, so gender issue is guaranteed.
- Affected people understood positive impacts and benefits from the project, therefore, they fully agreed with the implementation of Project and expect that the Project will be implemented soon.

8.3. Environmental impact assessment consultation

The consultation process

i) Objects of consultation:

- Communal People's Committee
- Vietnamese Fatherland Front
- Unions (Farmers Union, Women Union, Youth Union)

- Head of villages / hamlets
- The households affected in the project area.

ii) Contents of consultation

- Introduce contents, main items of Sub-project, implementation capital source
- Consult and present forecasted impacts of Sub-project on environment and society,
- Consult and present social and environmental management plan including: mitigation measures and implementation plan
- Consult on environmental and social problems and impacts that happened in history
- Discuss among community about measures to minimize social and environmental impacts
- Communal People's Committee and Communal Fatherland Front give written opinions

iii) Methods of consultation

Organize meetings with components as stated above including: local authorities, local unions, affected residents. In order to create conditions for residents to express their opinions and expectations, consultations are held openly in form of questionnaire sheet about situation, consequences of some natural disasters occurred which presents aspirations and requirements of units or people interviewed about the project.

iv) Results of consultation

Participating commune	**Location**	**Time**	**Number of people**	**Number of women**
My Duc	Cultural House Hamlet 8, My Duc commune	08:30 February 03, 2015	30	22
Quang Tri	Cultural House Quang Tri commune	14:00 February 04, 2015	30	6

Opinion from local authorities:

The project has received many opinions from Communal Fatherland Front and Communal People's Committee in project area. Opinions of local authorities are summarized as follows:

- People's Committee of Da Teh district, People's Committee and Fatherland Front of communes fully support the implementation of the project. They recommend PPMU coordinating with other units to consults and organize information dissemination activities related to the Project, to help people understand purposes and benefits of the Project. When the Project is completed, production and living condition of local residents will be improved and guaranteed;
- Locality will create favorable conditions with maximum support for the Project, especially on the issues of land acquisition project for site clearance and Works item construction;
- People's Committee of Da Teh district, People's Committee and Fatherland Front of communes agree with issues relating to environmental-social impacts presented in reports. The impacts of the Project are mainly positive. However, during the Project performance, especially in the construction phase of works items, it will create certain impacts on environmental activities and life of residents in the construction area;
- Agree with measures to reduce environment pollution presented in the report;
- Recommend investors to comply with regulations and commitment on reducing negative impacts caused by Project implementation, as well as monitoring environment's quality;
- People's Committee of commune and Communal Fatherland Front are willing to cooperate to deal with problems arising during project performance.

Opinions from local residents

Besides supporting opinions from households, people also give a lot of opinions and requirements for project implementation. These opinions are summarized as follows:

- Local communities agree with impacts caused by the project during construction and require Contractor to ensure quality and progress of construction;
- Request competent authorities to quickly approve and allow sub-project to be quickly implemented;
- In order to minimize impacts on community living during project construction, works items of the project must be quickly implemented and partially completed before turning to the next section;
- Request contractor and employer to consider feedback from the community to make modifications accordingly. Opinions from community must be sent to the unions, community monitoring unit, Communal People's Committee, PPMU and relevant units;
- Request contractor to comply with commitments on reducing negative impacts caused by Project implementation, as well as monitoring quality of environment and society;
- The existing canal system has been degraded with the occurrence of leakage, deposition resulting in poor hydraulic conductivity. Water shortage primarily occurs in high fields, while there is no phenomenon of water shortage in reservoir due to loss of water in canal before being led to he fields. Residents expect that the project may support the renovation and dredging of the canal system from Da Teh reservoir to ensure irrigation;
- Residents concern that the expansion of aquaculture activities on surface of Da Teh reservoir after upgraded and repaired will reduce quality of water in the reservoir, causing the risks of water pollution, diseases in water when supplying water for fishponds of people in commune benefited from the project.
- Request PPMU to apply and implement measures and regulations on sanctions or even unilaterally terminate the contract with contractor, environment monitoring unit if they do not comply with full safety measures and timely propose measures to protect the environment.

Commitment of investor

The sub-project employer receive feedback for timely adjustment in the design dossier an commit to well implement measures to minimize negative impacts on environment caused by operations of sub-project.

8.4. ESMP discosure

Pursuant to the policy of the World Bank on information access, all of the draft texts of the subproject (ESMP; ESMoP, EIA, EMP, ECOPs ...) must be widely publicized in the local community, at the website WB, these documents are exhibited at the positions easily observed, briefly edited and easy to understand.

CONCLUSIONS, RECOMMENDATIONS AND COMMITMENTS

1. Conclusions

(i) The sub-project belongs to group B on environment according to environmental safety policy of WB;

(ii) The sub-project is not located in the environmental sensitive areas and does not violate any "inappropriate" criteria of WB;

(iii) The report identified and assessed full significant impacts in 3 phases: before construction, during construction, operation and propose mitigation measures, in consultation with authorities and affected people including vulnerable groups;

(iv) An environmental social management plan (ESMP) and an environmental social monitoring plan (ESMoP) for monitoring impacts were established to help authorities at all level make decisions and regularly update the sub-project implementation;

(v) The sub-project of upgrading and ensuring safety for Da Teh reservoir in Lam Dong province employed by Department of Agriculture and Rural Development of Lam Dong province and managed by Lam Dong Irrigation Investment Management and Exploitation Center. The construction can cause positive and negative potential impacts on construction phases of the project:

Potential impacts in the preparation phase

In the preparation phase of construction, site clearance work temporarily affect 1 hectare hilly land on the right shoulder of the dam to make pits for building dam.

The main potential impacts in the construction phase

The upgrade of sub-project's items includes dam, ancillary works, management road may cause some negative impacts as follows: a) increase risk for people along the route due to increase of vehicles transporting materials and waste; b) increase level of noise, dust, emissions and vibration due to operating machines, equipment that may affect health off residents and workers along the route if they expose to the pollution source for a long time; c) generate social evils due to the presence of workers such as theft, gambling, drugs and infectious diseases; d) soil, canal construction materials may fall into flows, rice fields of residents, etc.

Potential impacts in operation phase

During operation, dams may be eroded and unsafe for people in downstream area. Besides, in the downstream area of incident spillway, in flood season, water level rising through incident spillway may affect livelihood sources including rice, fishponds, farms of residents in this region.

Mitigation measures during construction phase

Suitable measures to minimize impacts for upgrading dam and ancillary works includes: a) implement resettlement plan; b) implement measures to minimize impacts such as dust, emissions, noise, vibration; operate equipment and machines properly; make appropriate working schedule avoiding rainy days; perform safety health measures in construction site); c) manage personnel reasonably (personnel selection, guidance on health and safety, prevention of infectious diseases, community interaction, establishing regulations in construction camp for workers and taking punishment measures for offenders); and d) have a good relationship with local community (cooperate with authorities, notify residents, prioritize to hire local employees, etc.)

Mitigation measures in the operation phase

Performance management unit of Da Teh reservoir periodically check the safety of the reservoir; closely coordinate with Communal People's Committee and local people to timely report the risks related to dam safety for timely remedial measures; appoint personnel to regularly monitor to ensure reasonable during rainy season; plan to inform residents of flood discharge plans.

Monitor environment - society

The winning unit have to prepare ESMP at construction site which is the basic for environment monitoring work implemented by competent authorities, Provincial Project Management Units and Construction Supervision Consultant An environment monitoring system approved by WB will be applied in the sub-project implementation. Construction Supervision Consultants regularly monitor and prepare monthly reports to submit to Provincial Project Management Units. These reports are independent with environmental compliance report of the province and will be submitted to Central Project Management Units.

2. Recommendations

Based on findings of the environmental assessment and Environmental Social Management Plan (ESMP) stated in this document, following recommendations can be proposed for the sub-project:

(i) The mitigation measures mentioned in ESMP will be established as an indispensable part of Construction Bidding Document. Contractor will account workload and offer total cost for implementation of mitigation measures above. The cost is considered safety and environment cost which will be paid when committed mitigation measures are effectively performed by Contractor.

(ii) Based on environmental impact report, Consultation on safety policy and Lam Dong Irrigation investment and exploitation management center recommend competent authorities and World Bank to approve Environmental Social impact assessment of the sub-project of upgrading and ensuring safety of Da Teh reservoir in Lam Dong province to serve as basic for implementing the next steps, ensuring progress of sub-project implementation./.

3. Commitments of employer

All public opinions were recorded by Employer. Employer committed to implement mitigation measures proposed by consultants in Chapter 6 of the report. Employer of the project committed to implement strong measures: punitive measures are applied to contractor if the contractor failed to take measures tominimize negative impacts.

The Employer of the project committed to:

1. Strictly comply with and ensure that environmental parameters is in accordance with Vietnam National Standards (Vietnam National Technical Regulations/ Vietnam National Standards) under applicable regulations on quality parameters of the environment.

2. Perform all methods of protecting water resource and environment in measures to minimize negative impacts mentioned in ESIA report and ESMP.

3. Employer of the project committed that he shall be fully responsible before the law of Socialist Republic of Vietnam if he violates international conventions, Vietnam Regulations on environment or in case of occurrence of environmental incidents.

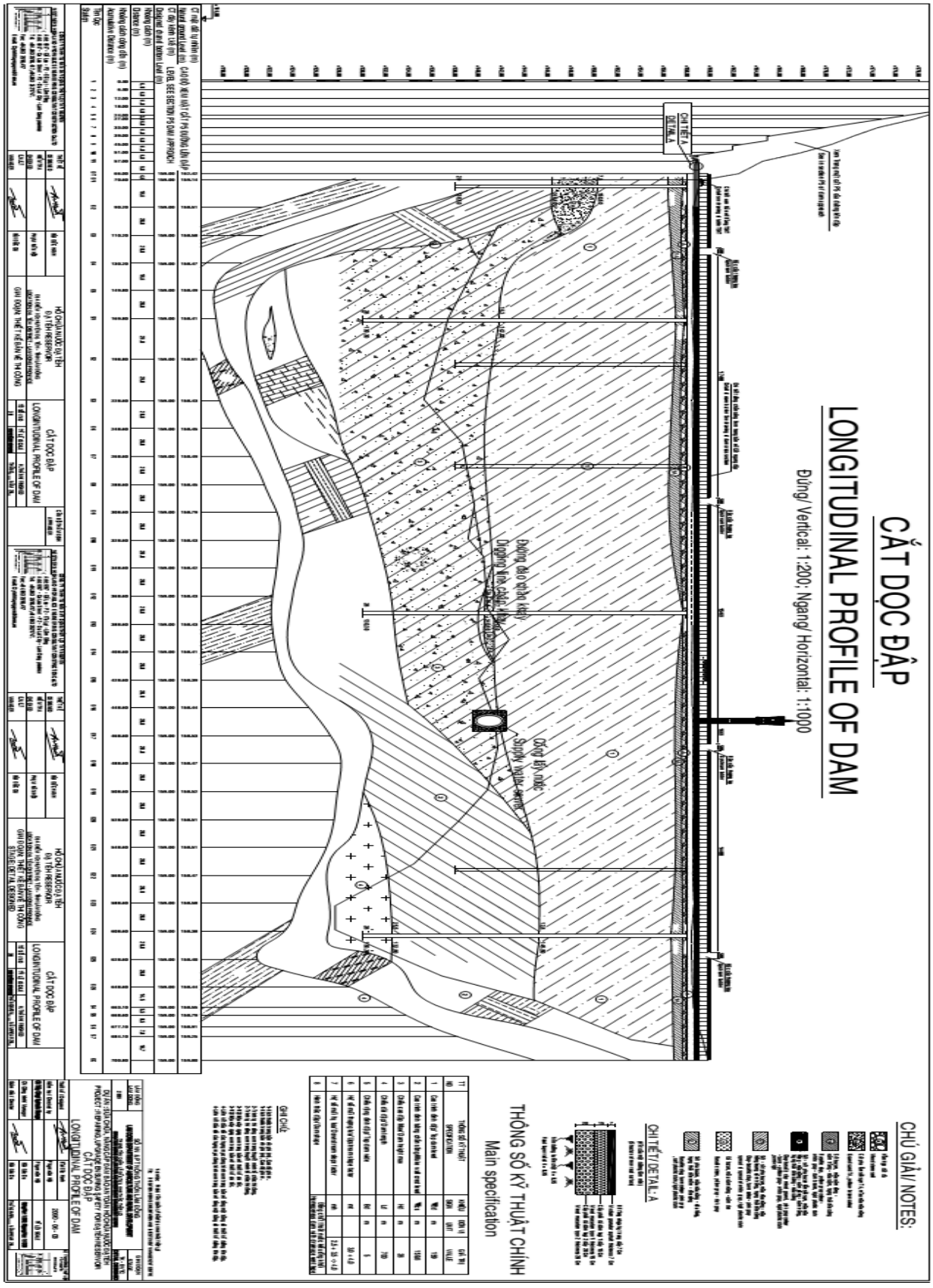
4. Employer of the project committed to strictly perform under regulations of law on compensation and problem solving in case environmental incidents and risks occur due to project implementation.

REFERENCES

1. FS report on sub-project of Upgrading and ensuring safety of Da Teh reservoir in Lam Dong province;
2. Dam safety report on sub-project of Upgrading and ensuring safety of Da Teh 2 reservoir in Lam Dong province;
3. Report on socio-economic situation of My Duc commune, Da Teh district, Lam Dong province in 2014;
4. Results of analyzing ground environment samples in area of on sub-project of Upgrading and ensuring safety of Da Teh reservoir in Lam Dong province;
5. Types of map:
   - Map of project area
   - Map of land use planning of land use in project area.

APPENDIX A – **Environment**

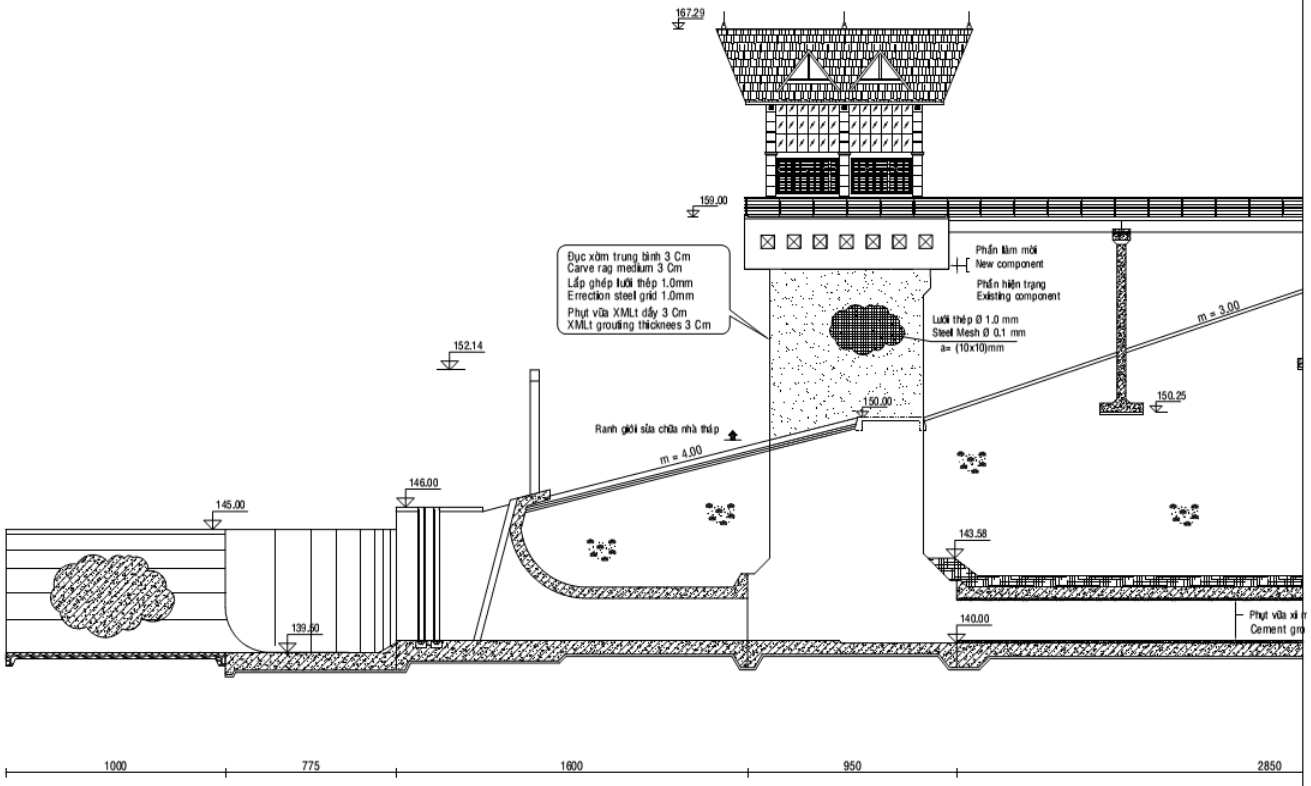
Appendix A1: Drawing of the mainworks

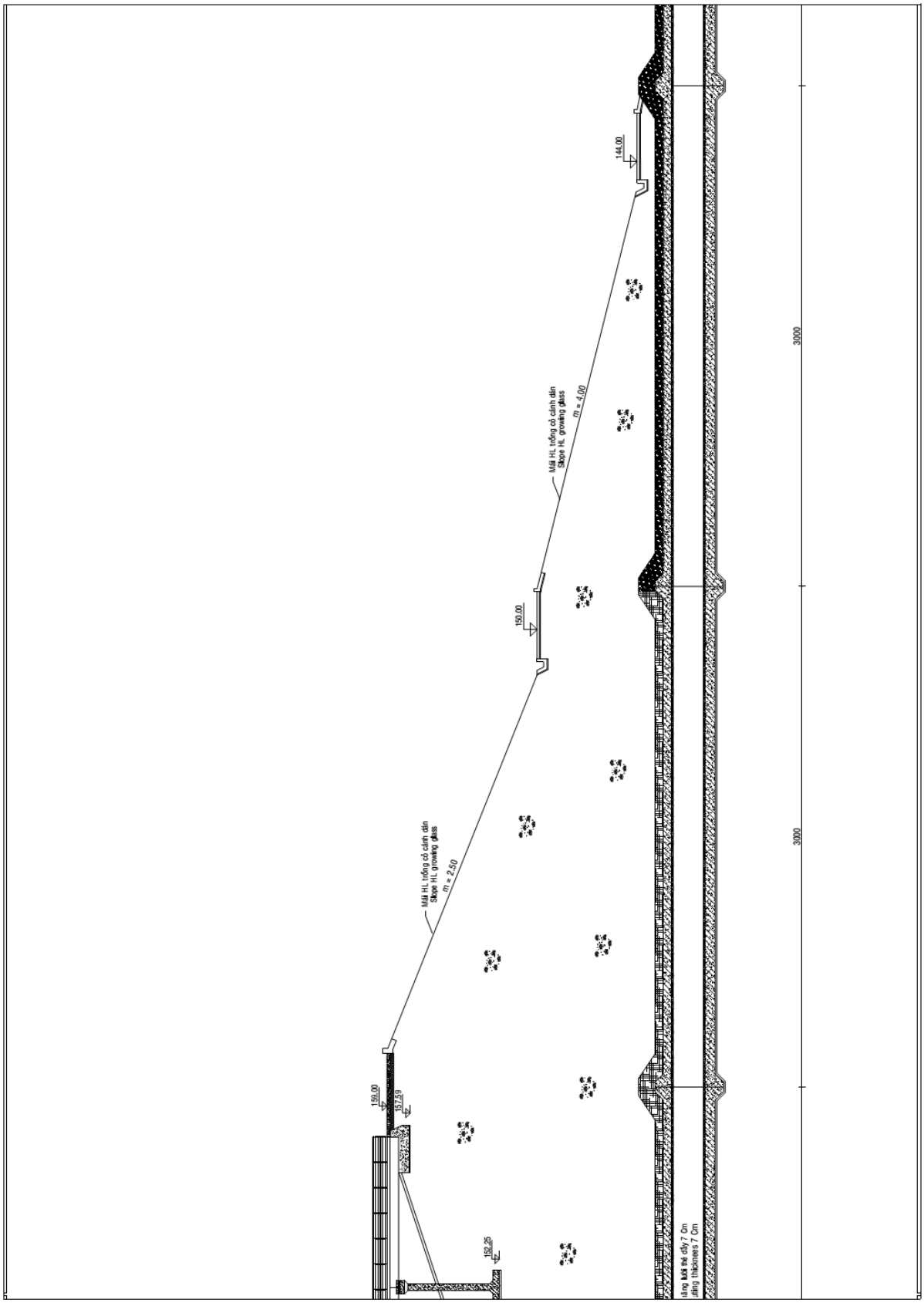


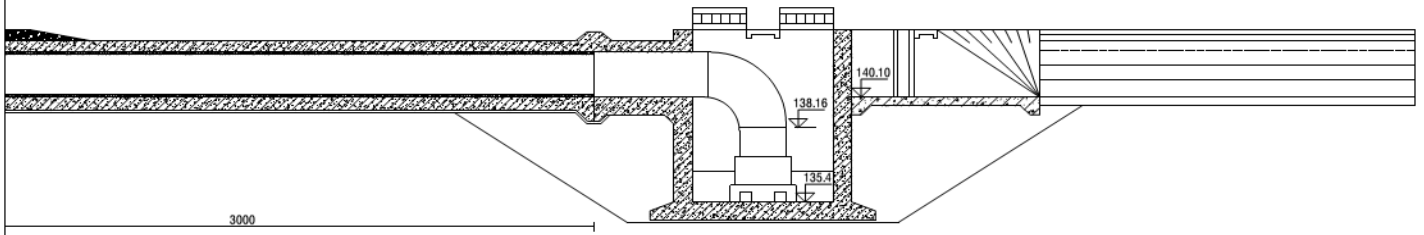
CẮT DỌC CỐNG LẤY NƯỚC ĐÃ HOÀN THIỆN

LONGITUDINAL PROFILE COMPLETED SUPPLY WATER CULVERT

TL/ SCALE:1/200

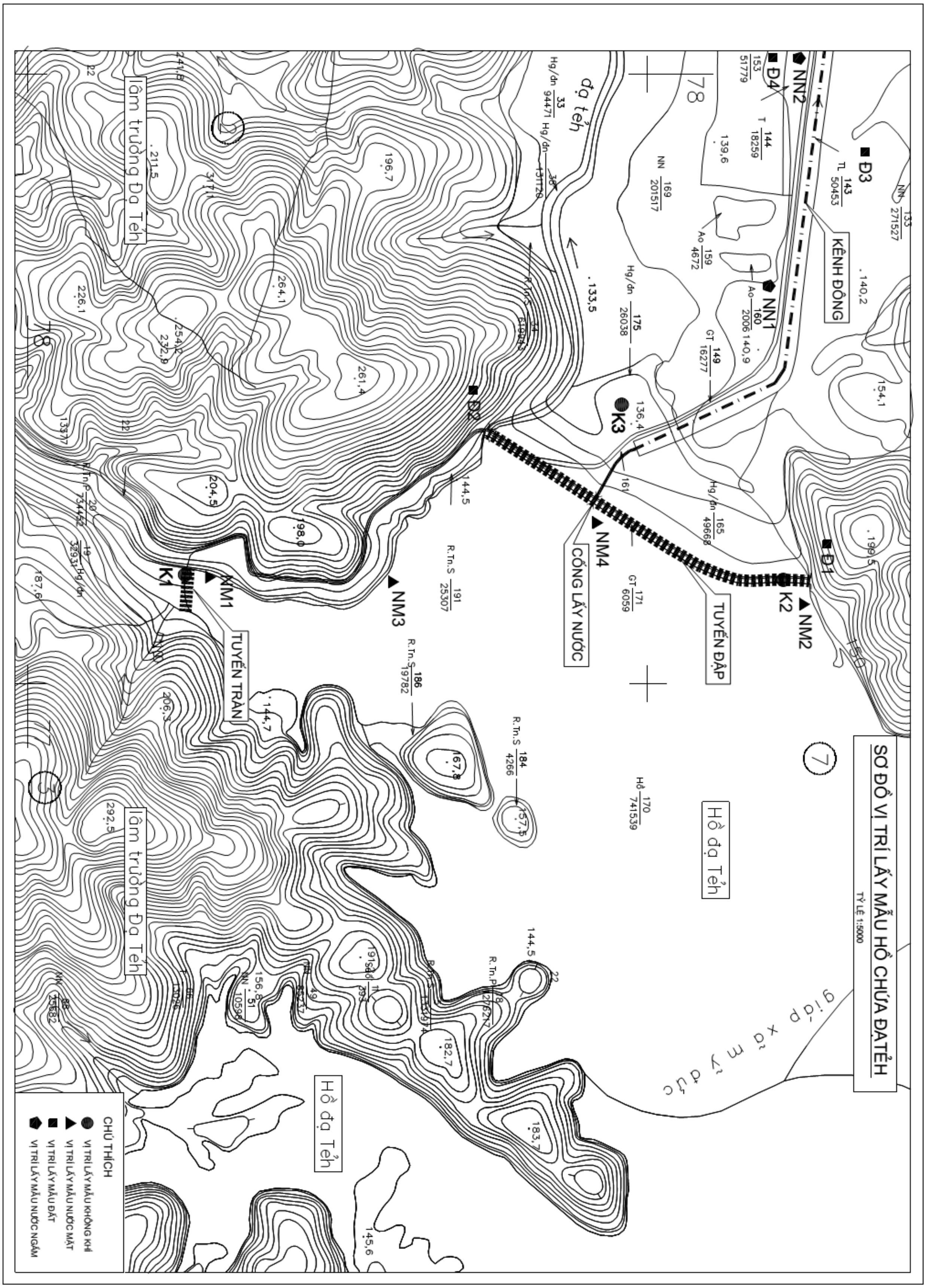



144.00
150.00
159.00
157.29
152.25
Mái HL trồng cỏ cánh dán
Slope HL growing grass
m = 4.00
Mái HL trồng cỏ cánh dán
Slope HL growing grass
m = 2.50
3000
3000



CÔNG TY TNHH TV XÂY DỰNG THỦY LỢI TÂY NGUYÊN WesternHighland Hydraulics Engineering Consultant Construction Co., Ltd 69/7 Cô Ba- P2 - Đà Lạt - Lâm Đồng Tel +84.0633.521.747,+84.0633.901988 Fax +84.0633.510.417 EMail: Ctytnhhtaynguyendl@vnn.vn	THIẾT KẾ DESIGNED BY		BÙI ĐỨC DANH	**HỒ CHỨA NƯỚC ĐẠ TẺH** **ĐẠ TẺH RESERVOIR** ĐỊA ĐIỂM XD: HUYỆN ĐẠ TẺH - TỈNH LÂM ĐỒNG LOCATION: ĐẠ TẺH DISTRICT - LAM DONG PROVINCE	**CẮT DỌC CỐNG ĐÃ HOÀN THIỆN** **LONGITUDINAL PROFILE COMPLETED CULVERT**	CÁN BỘ THẨM ĐỊNH APPRAISER
	KIỂM TRA CHECKED BY		PHẠM VĂN HỘI			
	C.N.C.T MANAGER		BÙI ĐỨC DU	**GIAI ĐOẠN: THIẾT KẾ BẢN VẼ THI CÔNG** **STAGE: DETAIL DESIGNED**	TỜ SỐ / NO TỶ LỆ /SCALE H.THÀNH/ FINISHED XEM B.VẼ/SEE DRAWING THÁNG/MON..... NĂM/YEAR 20...	

SƠ ĐỒ CÔNG TRÌNH PHỤ TRỢ DỰ ÁN HỒ CHỨA ĐẠTẺH
TỶ LỆ 1:5000
KÊNH ĐÔNG
CỐNG LẤY NƯỚC
TUYẾN ĐẬP
TUYẾN TRÀN
Hồ dạ Tẻh
Hồ dạ Tẻh
Hồ dạ Tẻh
lâm trường Đa Tẻh
lâm trường Đa Tẻh
giáp xã mỹ đức
CHÚ THÍCH
NHÀ CHỈ HUY CÔNG TRƯỜNG
NHÀ Ở CỦA CÔNG NHÂN
BÃI CHỨA XE THI CÔNG
BÃI CHỨA VẬT LIỆU
KHO CHỨA VẬT TƯ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TỶ LỆ 1:5000
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VỊ TRÍ LẤY MẪU NƯỚC MẶT
VỊ TRÍ LẤY MẪU ĐẤT
VỊ TRÍ LẤY MẪU NƯỚC NGẦM
KÊNH ĐÔNG
CỐNG LẤY NƯỚC
TUYẾN ĐẬP
TUYẾN TRÀN
Hồ đạ Tẻh
lâm trường Đạ Tẻh
đạ tẻh
giáp xã mỹ đức
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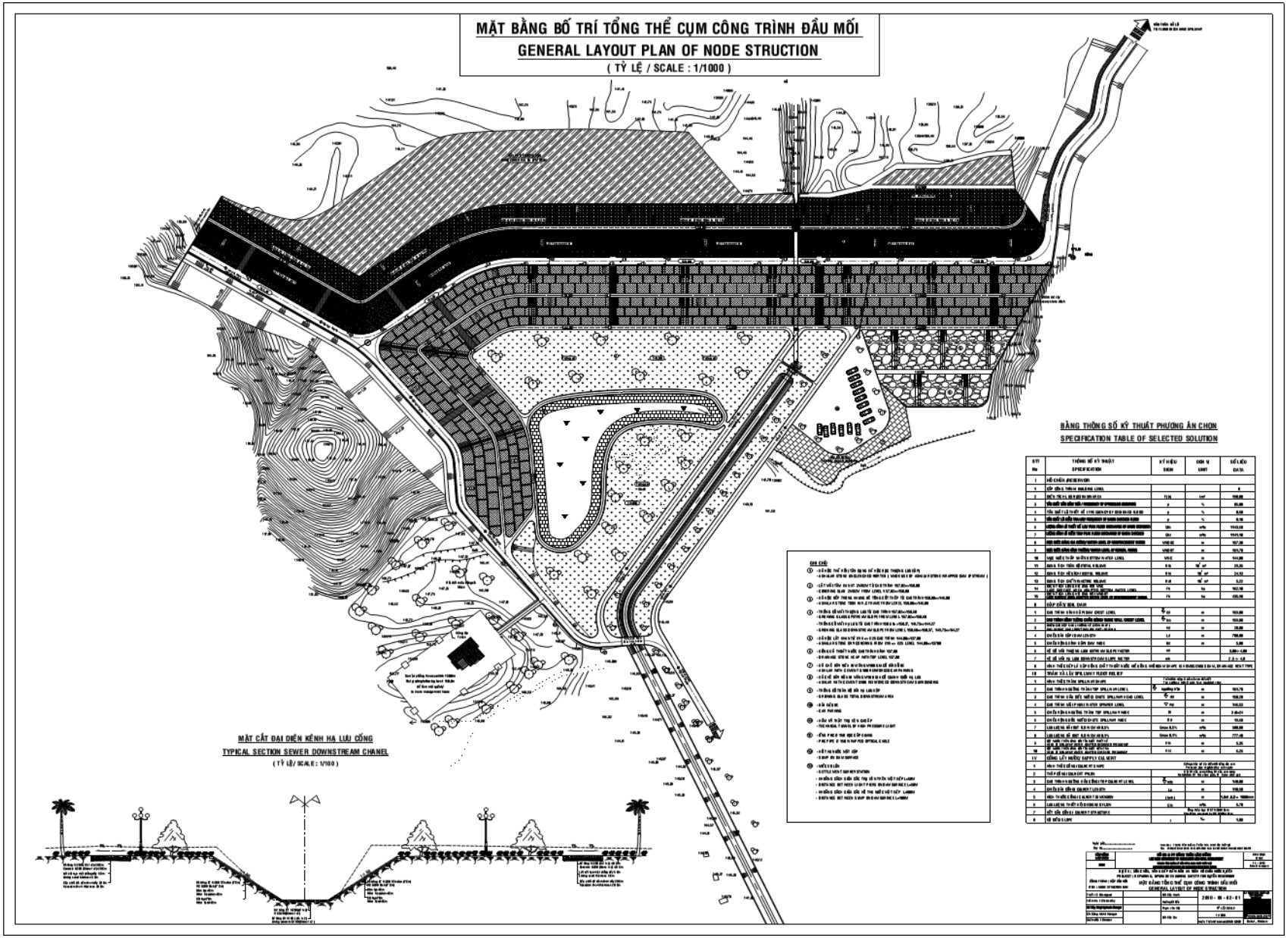
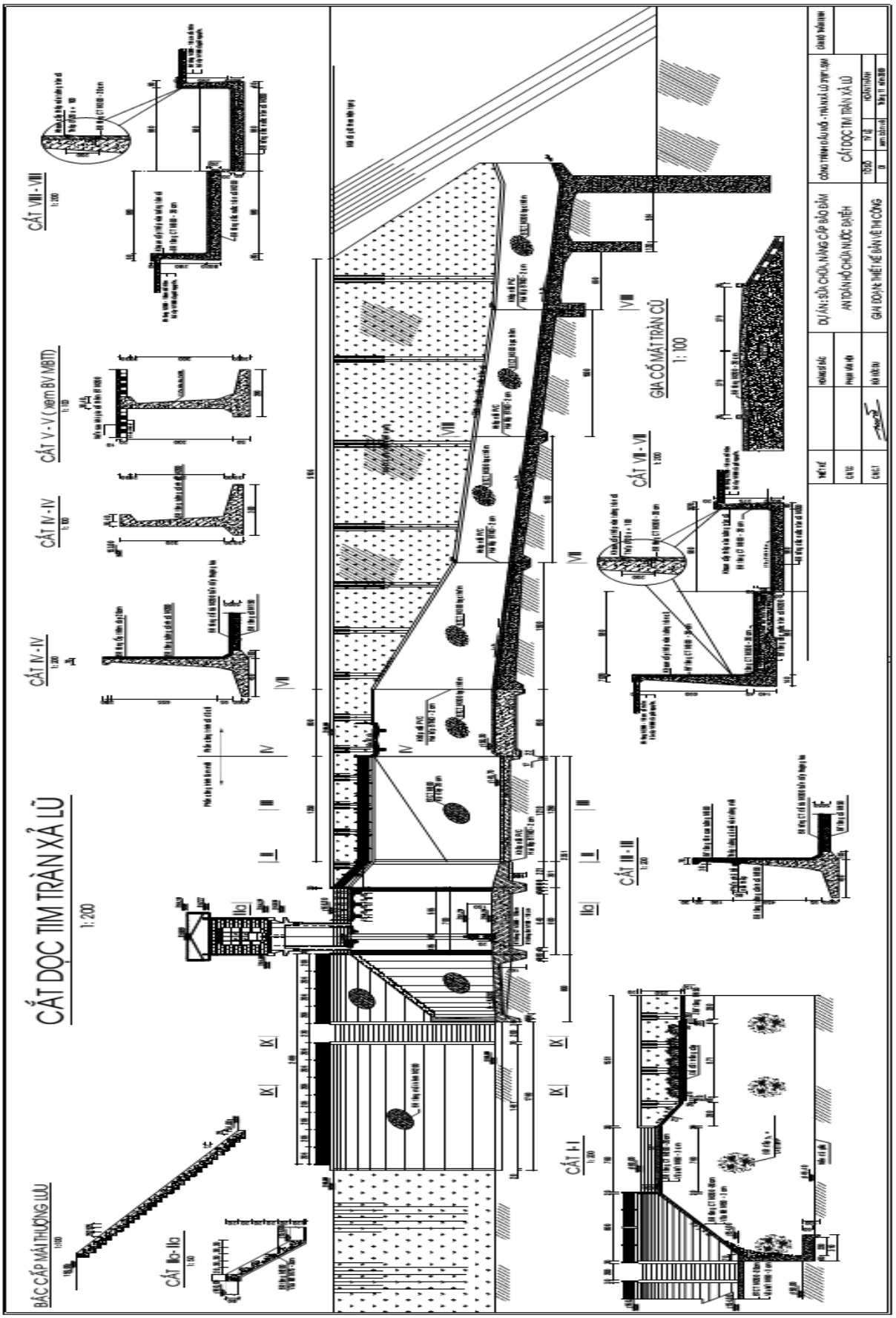
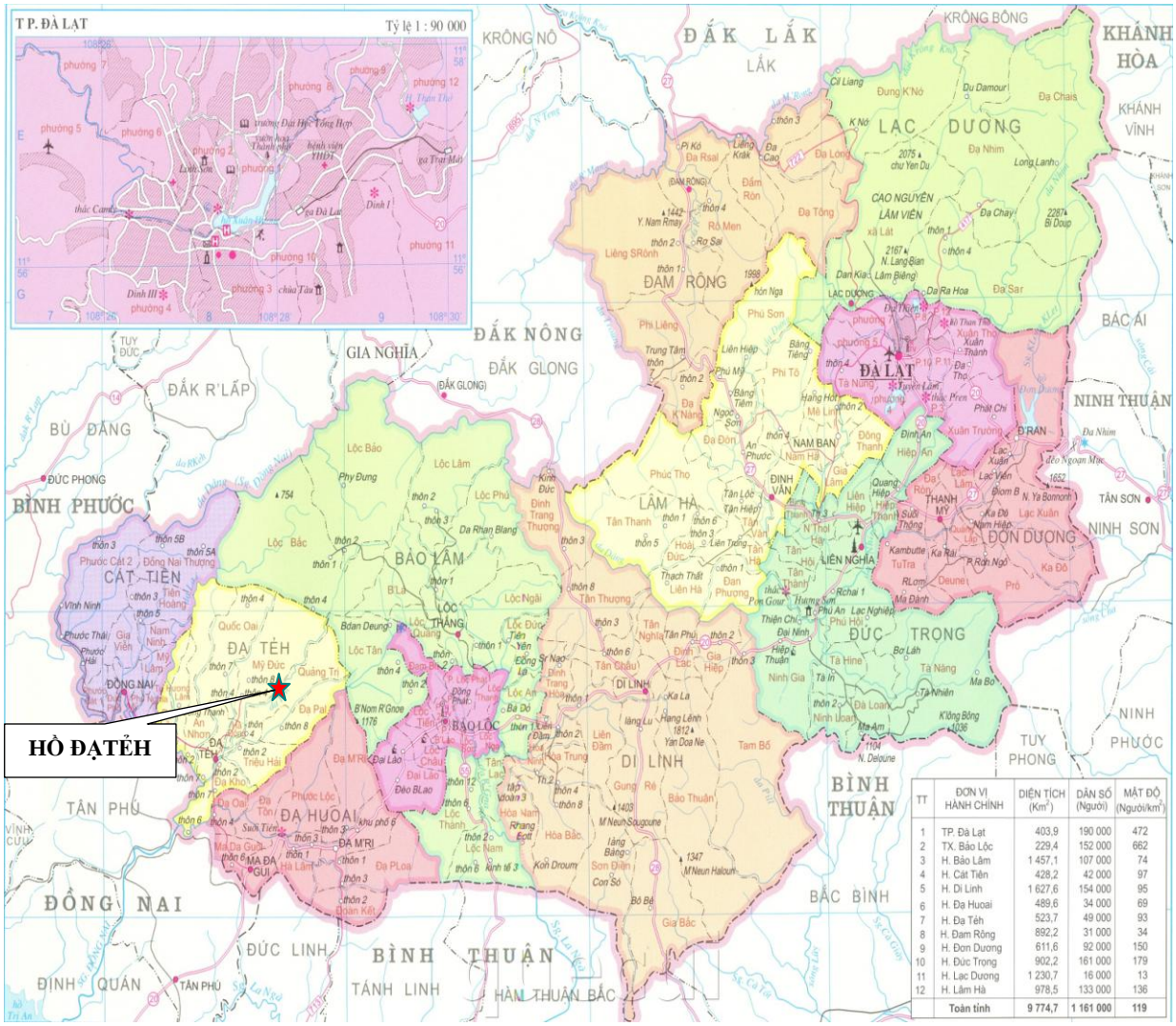
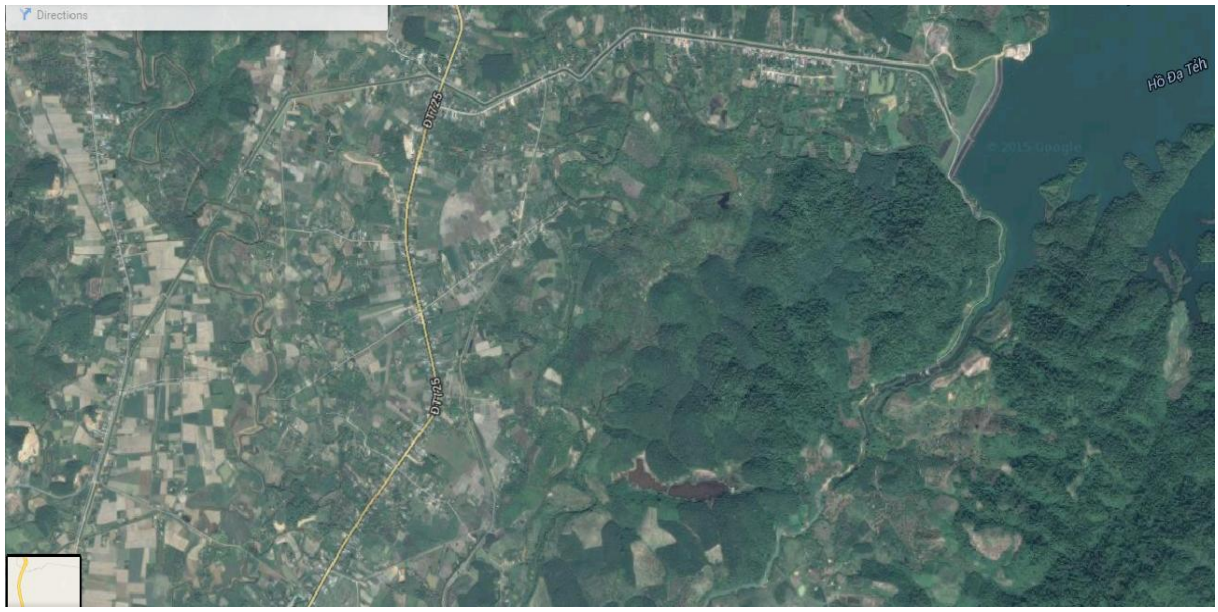

MẶT BẰNG BỐ TRÍ TỔNG THỂ CỤM CÔNG TRÌNH ĐẦU MỐI
GENERAL LAYOUT PLAN OF NODE STRUCTION
(TỶ LỆ / SCALE : 1/1000)
MẶT CẮT ĐẠI DIỆN KÊNH HẠ LƯU CỐNG
TYPICAL SECTION SEWER DOWNSTREAM CHANEL
(TỶ LỆ/ SCALE: 1/100)
BẢNG THÔNG SỐ KỸ THUẬT PHƯƠNG ÁN CHỌN
SPECIFICATION TABLE OF SELECTED SOLUTION


CẮT DỌC TIM TRÀN XẢ LŨ
1: 200
GIA CỐ MẶT TRÀN CŨ
1: 100
CẮT VIII - VIII
CẮT V - V (xem BV MBTT)
CẮT IV - IV
CẮT IV - IV
CẮT VII - VII
CẮT III - III
CẮT I-I
BẬC CẤP MÁI THƯỢNG LƯU
CẮT IIo - IIo
DỰ ÁN: SỬA CHỮA, NÂNG CẤP BẢO ĐẢM AN TOÀN HỒ CHỨA NƯỚC DA TEH
CẮT DỌC TIM TRÀN XẢ LŨ
GIAI ĐOẠN THIẾT KẾ BẢN VẼ THI CÔNG

MẶT BẰNG TỔNG THỂ TRÀN XẢ LŨ
(TỈ LỆ : 1/200)
SỞ NN & PT NÔNG THÔN LÂM ĐỒNG
TRUNG TÂM QUẢN LÝ ĐẦU TƯ & KHAI THÁC THỦY LỢI
DỰ ÁN : SỬA CHỮA, NÂNG CẤP ĐẢM BẢO AN TOÀN HỒ CHỨA NƯỚC DA TẺH
CÔNG TRÌNH : TRÀN XẢ LŨ : 3 CỬA 6 x 1.5 m
MẶT BẰNG TỔNG THỂ TRÀN XẢ LŨ
2020 - 05 - 03 - 01

Appendix A2: Types of Map





BÌNH ĐỒ TỔNG THỂ HỒ ĐẠ TẺH
TỶ LỆ 1:5000
KÊNH ĐÔNG
CT PHỤ TRỢ
CỐNG LẤY NƯỚC
TUYẾN ĐẬP
TUYẾN TRÀN
Hồ đạ Tẻh
Hồ đạ Tẻh
Hồ đạ Tẻh
Làm trường Đạ Tẻh
Làm trường Đạ Tẻh
giáp xã Ly Dục

Appendix A3: Policy framework, institution and regulation

8.5. Applicable National Law and Regulations

❖ **Application of environmental-related legal framework**

- Law on Environmental Protection (2014) No. 55/2014/QH13 on defining issues on strategic environmental assessment, environmental impact assessment and environmental protection commitment for development activities. EIA report is conducted simultaneously with preparation of investment project (feasibility research report);
- The Decree No. 18/2015/ND-CP promulgated on 14th February 2015 on planning environmental protection, strategic environmental assessment, environmental impact assessment and environmental protection plan;
- The Directive No. 26/CT-TTg of the Prime Minister on 25th August 2014 on implementing the Law on Environmental Protection;
- The Circular No. 01/2012/TT-BTNMT dated 16th March 2012 on defining formulation, appraisal and approval, inspection and certification of implementation of detailed environmental protection plans; formulation and registration of simple environmental protection plans;
- The Decree No. 29/2011/ND-CP of the Government dated 18th April 2011 on providing strategic environmental assessment, environmental impact assessment and environmental protection commitment;
- The Circular No. 16/2009/TT-BTNMT of the Ministry of Natural Resources and Environment dated 7th October 2009 on defining national technical regulations on environment, air quality and some hazardous substances in the ambient air;
- The Decision No. 22/2006/QD-BTNMT of the Ministry of Natural Resources and Environment dated 25th December 2006 on the compulsory application of Vietnam's standards about the environment.

❖ **Application of Legislative Framework on land use and recovery in the investment projects**

The Law on Land No. 45/2013/QH13 approved on 29th November 2013 by the National Assembly of the Socialist Republic of Vietnam;

The Decree No. 43/2014/ND-CP dated 15th May 2014 on guiding the implementation of 2013 Law on Land;

The Decree No. 44/2014/ND- CP dated 15th May 2014 on defining land price;

The Decree No. 47/2014/ND-CP dated 15th May 2014 on compensation, support and resettlement upon land recovery by the State;

The Decree No. 37/2014/ND-CP dated 30th June 2014 on detailing the compensation, support and resettlement upon land recovery by the State;

The Circular No. 23/2014/TT-BTNMT of the Government dated 19th May 2014 on stipulating the certificates of land use right, house ownership and other assets on land.

❖ **Legislative Framework on using and managing the construction of investment projects**

The Law on Construction No. 50/2014/QH13 approved on 18th August 2014 by the National Assembly of the Socialist Republic of Vietnam;

The Decree No. 15/2013/ND-CP dated 6th February 2013 on quality management of construction works;

The Decree No. 207/2013/ND-CP issued on 11th December 2013 on amending and supplementing a number of Articles of the Decree No. 48/2010/ND-CP of the Government dated 7th May 2010 on contracts in construction activities;

The Decree No. 12/2009/ND-CP dated 10th February 2009 on managing investment projects on the construction of works.

❖ **Legislative framework on general exploitation of water natural resources, forest protection, cultural heritages and biodiversity**

The Law on Water Resources approved on 21st June 2012 by the National Assembly of the Socialist Republic of Vietnam;
The Decree No. 42/2012/ND-CP of the Government dated 11th May 2012 on management and use of rice-farming land;
The Decree No. 112/2008/ND-CP of the Government dated 20th October 2008 on management, protection and integrated exploitation of resources and environment of hydro-power and irrigation reservoirs;
The Decree No. 120/2008/ND-CP of the Government dated 1st December 2008 on managing river basin;
The Decree No. 72/2007/ND-CP of the Government dated 7th May 2007 on dam safety management;
The Decree No. 149/2004/ND-CP of the Government dated 27th July 2004 on issuing permits for water resource exploration, exploitation and use, or for discharge of wastewater into water sources;
The Law on Cultural Heritage No.28/2001/QH10 approved on 12th July 2001 by the National Assembly of the Socialist Republic of Vietnam. Article 13 – The following acts are strictly prohibited: Appropriating or deviating cultural heritages; Ruining or posing a danger of ruining cultural heritages; Conducting illegal excavations at archaeological sites or illegal construction, encroaching upon the land within historical-cultural relics, famous landscapes and beauty spots; Illegally purchasing, selling, exchanging and transporting vestiges, antiques, national precious objects pertaining to historical-cultural relics, famous landscapes and beauty spots; illegally taking abroad vestiges, antiques and national precious objects;
The Law on Bio-diversity No.28/2008/QH12 approved on 13th January 2008 by the National Assembly of the Socialist Republic of Vietnam. Chapter III- Conservation and Natural Sustainable Bio-diversity Development and Chapter IV- Conservation and Development of Species.

❖ **National policies on dam safety**

The Decree No. 72/ND-CP of the Government dated 7th February 2007 on dam safety management;
The Directive of the Government at the Statement No. 21/CT-TTg dated 14th October 2013 on strengthening management and assuring reservoir safety;
The Circular No. 33/2008/TT-BNN dated 4th February 2008 on guiding a number of Articles in the Decree No. 72/ND-CP;
The Circular No. 34/2010/TT-BCT of the Ministry of Industry and Trade dated 7th October 2010 on defining dam safety management of hydro-power plants.

❖ **Resettlement Policy**

The Legislation of the Socialist Republic of Vietnam (1992) affirms the rights of citizen on using and protecting the house ownership.
The Legislation of the Socialist Republic of Vietnam (2013).
The Law on Land No. 45/2013/QH13 on defining administrative regulations on land in general. The 2013 Law on Land supersedes the previous versions in 1987 and 1993.
The Law on Complaint No. 02/2011/QH11 approved by the National Assembly of the Socialist Republic of Vietnam;
The Decree No. 43/2014/ND-CP dated 15th May 2014 on implementing the Law on Land.
The Decree No. 44/2014/ND-CP dated 15th May 2014 on defining land pricing;
The Decree No. 47/2014/ND-CP dated 15th May 2014 on compensation, support and resettlement upon land recovery by the State;
The Decree No. 75/2012/ND-CP dated 3rd October 2012 on implementing the Law on Complaint.
The Decree No. 38/2013/ND-CP dated 23rd April 2013 on management and use of official development assistance (ODA)
The Decree No. 42/2012/ND-CP of the Government dated 11th May 2012 on management and use of rice-farming land;

The Circular No. 37/2014/TT-BTNMT dated 30th June 2014 on compensation, support and resettlement upon land recovery by the State;
The Decision No. 1956/2009/QD-TTg of the Prime Minister dated 17th November 2009 on approving the Master Strategy on Vocational Training for Rural Workers up to 2020.
The Decree No. 197/2004/ND-CP of the Government dated 3rd December 2004 on compensation, support and resettlement upon land recovery by the State.
The Circular No. 116/2004/TT-BTC of the Government dated 17th December 2004 on guiding the implementation of the Decree No. 197/2004/ND-CP dated 3rd December 2014 on compensation, support and resettlement upon land recovery by the State.
The Decree No. 188/2004/ND-CP of the Government on 16th November 2004 on methods of determining land prices and assorted-land price brackets.
The Circular No. 36/2014/TT-BTNMT dated 30th June 2014 on land pricing method; compilation and adjustment to land price lists; determination of specific land prices and consultancy on land pricing.
The Circular No. 114/2004/TT-BTC dated 16th November 2004 on guiding the implementation of the Decree No. 188/2004/ND-CP;
The Decree No. 17/2006/ND-CP of the Government dated 27th January 2006 on amending and supplementing a number of Articles of the Decree on guiding the implementation of the Law on Land and the Decree No. 187/2004/ND on transforming the State-own companies into joint stock companies.
The Decree No. 84/2007/ND-CP of the Government dated 25th May 2007 on additionally stipulating the grant of land use right certificates, recovery of land, exercise of land use rights, order and procedures for compensation, support and resettlement upon land recovery by the State, and settlement of land related complaints.
The Decree No. 123/2007/ND-CP issued on 27th July 2007 on amending and supplementing a number of Articles of the Decree No. 188/2004/ND-CP dated 16th November 2004 on methods of determining land prices and assorted-land price brackets;
The Decree No. 69/2009/ND-CP of the Government dated 13th August 2009 on additionally stipulating the land use, land price, land recover, compensation, support and resettlement.
The Decision No. 52/2012/QD-TTg of the Prime Minister on 16th November 2012 on employment and vocational training support policies for laborers subject to agricultural land recovery.

❖ **Gender policy**

The Law on 73/2006/QH11 on general equality approved on 29th November 2006 on the National Assembly;
The Directive No. 07/2007/CT-TTg 3/5/2007 of the Government on implementation of Law on Gender Equality;
The Decree No. 70/2008/ND-CP of the Government dated 4th June 2008 on detailing the implementation of a number of Articles of the Law on Gender Equality;
The Decree No. 55/2009/ND-CP of the Government dated 10th June 2009 on sanctioning of administrative violations of gender equality;
The Decree No. 48/2009/ND-CP of the Government dated 19th May 2009 on providing for measures to assure gender equality;
The Circular No. 191/2009/TT-BTC of the Ministry of Finance dated 1st October 2009 on guiding the management and use of budget for gender equality and activities for the advancement of women;
The Circular No. 07/2011/TT-BTP of the Ministry of Justice dated 31st March 2011 on guiding the realization of gender equality in legal aid personnel and activities;
The Decision No. 2351/QD-TTg of the Prime Minister dated 24th December 2010 on approving the 2011-2020 national strategy for gender equality.

❖ **Development policy for ethnic minority community**

The Decree No. 82/2010/ND-CP of the Government dated 20th July 2010 teaching and learning of the language and writing of ethnic minorities in schools.

The Decree No. 60/2008/ND-CP of the Government dated 9th June 2008 on defining functions, duties, authorities and organizational structure of the Committee for Ethnic Minorities.

The Decision No. 06/2007/QD-UBDT of the Committee for Ethnic Minorities dated 12th January 2007 on the strategy of media for the program 135-phase 2.

The Decree No. 70/2001/ND-CP: all asset registration of the family and land use rights must be subscribed with both names of husband and wife

The Decision No. 134/2004/CP of the Prime Minister dated 20th July 2004 on some policies to support residential land, productive land, housing and clean water for poor, disadvantaged ethnic minorities households;

The Decision No. 03/2005/QD-BNN of the Minister of Agriculture and Rural Development dated 7th January 2005 on promulgating the Regulation on exploitation of timber for providing dwelling-house support to poor ethnic minority people meeting with difficulties under the Decision No. 134/2004/QD-TTg of the Prime Minister dated 20th July 2004;

The Decision No. 33/2007/QD-TTg of the Prime Minister dated 5th March 2007 on policies on price and freight subsidy and the scheme on human resource development for ethnic minority areas;

The Decision No. 32/2007của/QD-TTg of the Prime Minister dated 5th March 2007 on providing loans to develop production of extremely disadvantaged ethnic minority households;

The Decision No. 1592/QD-TTg of the Prime Minister dated 12th October 2009 on constant implementation of support policies on production land, residential land and potable water for poor ethnic minority households up to 2010;

The Decision No. 05/2007/QD-UBDT of the Committee for Ethnic Minorities dated 6th September 2007 on recognizing communes of three ethnic minority and mountainous regions according to their development levels

The Circular No. 06 of the Committee for Ethnic Minorities dated 20th September 2007 on guiding support of services, subsistence improvement to improve legislative knowledge in accordance with the Decision No. 112/2007/QD-TTg

❖ **Poverty elimination**

The Decision No. 33/2007/QD-TTg of the Prime Minister dated 20th July 2007 on support policies to improve the legislative knowledge in accordance with the program No. 135, 2nd phase.

The Decision No. 1956/2009/QD-TTg of the Prime Minister dated 17th November 2009 on approving the Master Plan on vocational training for rural laborers by 2020

The Resolution No. 30a/2008/NQ-CP of the Government dated 27th December 2008 on the support program for fast and sustainable poverty reduction in 61 poor districts.

❖ **Vietnam standards and codes on environmental protection**

(i) Water environment:

QCVN 08:2008/BTNMT – National Technical Regulation on Surface Water Quality;

QCVN 09:2008/BTNMT – National Technical Regulation on Underground Water Quality;

QCVN 14:2008/BTNMT – National Technical Regulation on Domestic Waste Water Quality;

QCVN 39:2011/BTNMT – National Technical Regulation on Irrigation Water Quality;

(ii) Air environment:

QCVN 05:2013/ BTNMT – National Technical Regulation on Ambient Air Quality;

QCVN 06:2008/BTNMT – National Technical Regulation on some hazardous substances in the ambient air.

(iii) Soil environment:

QCVN 03 : 2008/BTNMT - National Technical Regulation on Allowable Limit of Heavy Metals in soil;

QCVN 04: 2008/BTNMT – National Technical Regulation on chemical residues in soil and plant protection;

QCVN 43:2012/BTNMT - National Technical Regulation on Sediment Quality.

(iv) Solid waste management:

QCVN 07: 2009/BTNMT - National Technical Regulation on Hazardous Waste Thresholds.

(v) Vibration and noise:

QCVN 26:2010/BTNMT – National Technology Regulation on Noise;

QCVN 27:2010/BTNMT – National Technology Regulation on Vibration.

8.6. World Bank Safeguards policies Triggered

According to WB's safety policies, ESIA report must combine the economic, financial, legislation, social and technical analysis of the Project to ensure the environmental and social issues are properly concerned regarding selection of project, location and decisions related to technological solutions. Five (05) safety policies of WB should be initiated for the Project, including:

Environmental Assessment (OP/BP 4.01)

Object culture source (OP/BP 4.11)

Indigenous person (OP/BP 4.10)

Mandatory Resettlement (OP/BP 4.12)

Dam safety (OP/BP 4.37)

Appendix A4: Environmental and social screening

The environmental and social impacts are screened in following table:

Table A4-1: Environmental and social screening

Screening questions	Yes	No	Comments
1. Is it likely for the sub-project to have significant negative impacts on natural living environment or important natural living environment?			
Losing or degrading land and water where (i) native creatures live, and (ii) people's activities have not significantly changed basic ecological functions of the project site.		✓	The construction and upgradation of the sub-project will not lose land where wild creatures live.
Losing or degrading important natural living environment such as sanctuary, area protected by traditional local community (for example, unwholesome environment), biodiversity; vulnerable and rare species, species in danger of extinction.		✓	Temporarily recover 1ha of hill land at the right abutment in order to form material field for banking. In addition, about 7,000m^2 will be used as yard and shed in hamlet 8, My Duc commune (dam lower) as unoccupied land managed by the commune; there are no valuable vegetations, but bushes and grassplots. It can only be repaired or upgraded around the reservoir contact area, including overflow, dam, drain, management road (all are available). The sub-project is located in hamlet 8, My Duc commune which is a purely agricultural area, without environmental sensitive areas such as reserve, areas protected by traditional local community, etc.
2. Is the sub-project likely to have significant negative impacts on tangible cultural resources?			
Losing or degrading tangible cultural resources, structures, groups of structures, natural characteristics and landscapes that are important to archaeology, palaeontology, history, architecture, religion, aesthetics or other cultural importance.		✓	There are no impacts on tangible cultural resources since the sub-project is constructed only based on the project actual state. Furthermore, there are no assets or architectural projects related to archaeology, religion and aesthetics in My Duc commune.
It can result in conflicts with national laws, or international obligations in accordance with relevant international environment agreement and convention of UNESCO or impacts on famous and important vestiges useful for scientific tourism.		✓	The project is repaired and upgraded based on Da Teh reservoir project built in 1995. The project is surely implemented within national legal framework and international obligations in accordance with relevant international environment conventions or agreements.
3. Is the sub-project likely to have significant negative impacts on land and natural resources used by ethnic minority?			
It can result in impacts on land or territory under traditional ownership, or used or possessed		✓	At the sub-project site, there are no works or houses, yards, sheds of the residents or the government. The project does not use land or

Screening questions	Yes	No	Comments
by custom, and where access to natural resources is very important to the stability of culture and livelihood of ethnic minorities. It can have impacts on cultural value and spirit that symbolize such land and resources or impacts on natural resource management and long-term sustainable of influenced natural resources.			territory under traditional ownership or use or possess by custom. As presented above, hamlet 8, My Duc commune having upgraded or repaired items of the sub-project is agriculture area, most population are Kinh people, there are no relevant land area, natural resources used by ethnic minority.
4. Is the sub-project likely to have significant negative impacts on the population to move?			
It results in the people's movement or land and asset recovery on life and difficulty in recovering livelihood		✓	The sub-project temporarily recover 1ha hill land at the right abutment of the earth dam to form building material field, which is managed by People's Committee of My Duc commune and completely compensated for the subject owner in 2010. The sub-project do not appropriate agricultural land, no households have to move, nor on livelihood of the people in the project site. No households are affected by production, agricultural land, land, housing and assets on the land.
5 . Does the sub-project ask for a significant dam construction?			
Does the sub-project ask for a significant dam construction: - High from 10 to 15 m or above - High from 10 to 15m, with complicated design. - High less than 10m but it is expected to become a big dam during the sub-project operation?		✓	The biggest height of Da The dam is 28m. However, the sub-project only repairs or upgrades, not construct the major dam. The safety report on the sub-project of repairing, renovating and improving the safety of Da The reservoir was made in accordance with the principles of dam safety of Vietnamese government as well as the policies of World Bank.
Do the sub-project activities depend on the effectiveness of: - An existing dam or a dam being constructed - A substation or a water supply system taking water from the reservoir controlled by a major dam or a dam being constructed. - The conduction dam or downstream hydraulic structure from an existing dam or dam being constructed, where every incident of the riverhead dam may cause huge damage to the architectural and irrigational project or the water supply project funded by World Bank, are the projects depending on capacity		✓	The sub-project is carried out to improve capacity, ensure safety for the dam and the residents in lowlands. While repairing and upgrading, some items of the dam and the reservoir are repaired, increasing the utilization effectiveness. The dam is constructed with its actual state, not increasing capacity or irrigation area after investment.

Screening questions	Yes	No	Comments
and operation of an existing major dam or a dam being constructed in order to supply water and cannot be operated if the dam is damaged.			
6 . Is the sub-project likely to result in purchase of utilization of pesticide?			
Does the product formula fall within IA and IB classification of World Bank, or Does any product formula fall within type II?		✓	The purchase or utilization of pesticide does not fall within the portfolio of the sub-project.
7. Is the sub-project likely to have irreversible impacts or uneasy to mitigate impacts?			
Result in losing the aquifer recharging area, affecting the quality of the water store and the water store is in charge of supplying drinking water for centers of large population.		✓	The construction, upgradation of the sub-project items only take place in the contact area of Da The reservoir, a very small temporarily occupied area, which will not affect the quality of the water store. The land temporarily used for construction include construction plan, shed, site management house, material yard with total area of about 2 ha, allocated along the management road in an unoccupied area. Furthermore, the residents in TDA area (74.35%) are supplied with clean water for eating, drinking and living; therefore, it is unlikely that the project will affect the water store for supplying water for the resident area. The sub-project is carried out in order to supply water better for agriculture production, not having impacts on the water quality of the water store related to domestic water.
Result in any impacts, the period of which is quite long, affecting a very wide geographical area or impact of strong intension.		✓	Total construction time of the sub-project is 24 months. The construction, upgradation and repairing of Da The reservoir are carried out in dry season; there are hardly impacts in terms of irrigational water for the beneficiary area during the construction time. The repaired reservoir will ensure safety for the residents behind the dam and supply water in a stable and effective way, which gradually contribute to the economic development of the community.
8. Is the sub-project likely to result in a wide diversity of significant negative impacts?			
Many sites in different locations are affected, each impact cause loss of living environment, resources, land or significant degraded quality of resources.		✓	Area for subsidiary areas for building the sub-project construction area unoccupied yard, lakeside yard. The arrangement aims at limiting at a maximum impacts of these site activities on surrounding resources and environment.
Significant negative and potential impacts may expand beyond the construction site.		✓	Dust may be dispersed outside the construction site, but in a narrow scope. The construction site is rural area with lots of trees, so fume and dust are easily diluted, impacts can be limited if mitigation measures are applied well.
Impacts across boundary (in			The sub-project is carried out completely in

Screening questions	Yes	No	Comments
addition to small changes in activities on waterway).		✓	Vietnam territory with no impacts across boundary.
Interrupt migration cycle of wild animals or grazers or nomads or semi-nomad.		✓	The sub-project is carried out in hamlet 8, My Duc commune, Da The district; at present, no wild animals are detected, only grazed animals such as buffalo, cow, etc. of households. The sub-project construction does not interrupt the migration cycle of animals. There are no nomads or semi-nomads in the project site.
9.Is the sub-project unprecedented?			
Unprecedented at national level?		✓	A lot of similar projects have been implemented.
Unprecedented at provincial level?		✓	Many reservoirs with capacity of over 1 million m^3 in Lam Dong province have been upgraded and repaired.
10. Is the sub-project controversial and able to attract attention of NGOs and national or international social organizations?			
Considered risky or likely to have special controversial aspects.		✓	As repairing sub-project, it has been operated for a long time with specific management unit and target of service. Therefore, it is not possible to have special controversial aspects.
Possible to result in objections of those who want to show or prevent the construction.		✓	The consulting results show that government and residents are 100% agree and support the sub-project implementation.

The list of environmental and social impacts of the sub-project is as follows:

Table A4-2: Potential Environmental and Social Impacts to be Solved

No.	Will the sub-project have following environmental impacts?	Yes	Low	Medium	High	Unknown	Comments
1.	Violation of historical/cultural area.	✓					There are no historical/cultural vestiges in area or the project site
2.	Violation of ecosystem (for example: sensitive natural living environment or reserve, national park, natural reserve, etc.)	✓					The sub-project only renovates the actual state; it does not expand or violates the natural reserve, etc. Furthermore, within a radius of 20km from Da The reservoir, there are no sensitive natural reserve or natural living environment. Therefore, the sub-project activities will ***not violate the ecosystem.***
3.	Distort landscape and increase waste amount.		✓				During the construction, the sub-project will temporarily recover 1ha hill land managed by People's Committee of My Duc commune located on the right abutment as banking material field. The project does not cause immigration and re-settlement. There are 3 sources of solid water discharged from the construction, including: (i) construction waste such as debris from elevating surface (plants, animal droppings, fencing walls, etc.), cement bags, oil tanks, etc.; (ii) domestic waste from worker sheds in the construction site; and (iii) remanent excavated soil. In addition, waste mud from water closet may contain harmful bacteria and is source of pollution that should be treated during the construction. So, all impacts identified above are assessed to be LOW and TEMPORARY.
4.	Break down vegetational cover or cut down trees.		✓				The sub-project is constructed based on the project actual state; therefore, no vegetational cover is broken down or damaged. Only unoccupied area, about 1,000m^2 managed by the commune is used as worker shed, management house for the sub-project. However, this site has not vegetational cover.
5.	Short-term change in quality or flow (for example, increased water turbidity due to waste from sheds and erosion, construction waste).		✓				At high peak, there may be 150 workers on the construction site, amount 8,100 liters of wastewater is discharged every day (On average a worker uses 60 liters/day, 90% of waste discharged). Domestic wastewater flowing into water resources will increase content of pollutants in water, causing water pollution. 20 vehicles of different types operate regularly on the construction site. Average amount of oil used for exchange is 18 liters/vehicle, 2 times/vehicle/year on average (real construction time). With about 20

No.	Will the sub-project have following environmental impacts?	Yes	Low	Medium	High	Unknown	Comments
							vehicles, about 2,160 liters waste oil is discharged during the construction period. Oil overflow from construction devices or machinery cleaning water may cause pollution and reduce quality of water resources and aquatic ecosystems. Waste water and petroleum compounds may be absorbed into ground and will gradually permeated into underground water fielding stratum and cause pollution of water fielding stratum. In addition, waste water from water-closet of worker shed, if not applied properly, may also change the quality of water resources in surrounding area. However, this impact is SMALL and TEMPORARY.
6.	Increase cloudiness or pollutants in the atmosphere during the construction.		✓				While repairing and upgrading the reservoir project items, some activities will have negative impacts such as dust and exhaust emission, affecting the life of local people: - Operation of devices and trucks on road; - Transportation of construction materials; - Every day during construction time about 15 trucks on road. Dust and exhaust may cause respiratory diseases or pulmonary diseases for the residents (such as sinusitis, asthma, etc.) if they directly contact pollution sources for a long time. However, this impact is SMALL and TEMPORARY for following reasons: - The construction site of the sub-project is a large mountainous area. Dust may be easily diluted in the atmosphere and blown in the wind. - The construction site of the sub-project (dam and its subsidiary works) is mainly in hamlet 8, My Duc commune. This is thinly-populated area. Only a few households living near the construction site. - The road for construction material transportation is through the thinly-populated area, so this impact is assessed to be small. - The number of vehicles/construction devices do not cause much noise, so when going through the resident area, they will not emit a large amount of exhaust.
7.	Increasing noise/vibration		✓				Noise may be made by vehicles transporting construction materials and construction

No.	Will the sub-project have following environmental impacts?	Yes	Low	Medium	High	Unknown	Comments
							devices (excavator, earthmover, roadroller, compressor) which may affect the residents living along the road in Da Teh area. However, this impact is SMALL and TEMPORARY for following reasons: - The sub-project site is quite open, clear with lots of plants and fruit trees, which may reduce noise. - The resident area is located near the road and the construction work is allocated thinly with low population density. - The number of construction devices/vehicles making big noise is not significant.
8.	Resettle households? If yes, how many households?		✓				The sub-project does not move or re-settle households, or affect building land, production land as well as assets of any households.
9.	Use environmentally / culturally sensitive resettlement area.	✓					The sub-project is not located in environmentally or culturally sensitive area.
10.	Risks of disease transmission from workers to local people (and vice versa).		✓				Temporary presence of workers living in households or shes and exchange with local people may cause infectious diseases from workers to local people and vice versa. During the construction, use of water resources that do not meet hygiene standards for workers in shes or construction sites may also cause gastric, intestine diseases or spread of infectious insects (that is hermorrgahic fever, marsh fever, etc.) when immigrant workers catch diseases due to insect (mosquito) bite, and then transmit to othrs. In addition, some social diseases such as HIV/AIDS, syphilis, etc. are possible.
11.	Potential conflicts between workers and local people (and vice versa).		✓				During the construction, about 150 technical workers from other provinces live and work in the local area. During this period, there may be conflicts between local people and workers from other areas due to differences in culture or communication or job competition. However, these impacts are SMALL and TEMPORARY for following reasons: i) According to the state regulations, contractors will have to declare temporary residence and absence to My Duc commune government of all workers to their living and working area during the project implementation. ii) Immigrant workers will be disseminated and instructed by contractor about communication, information with local government and local people. In addition,

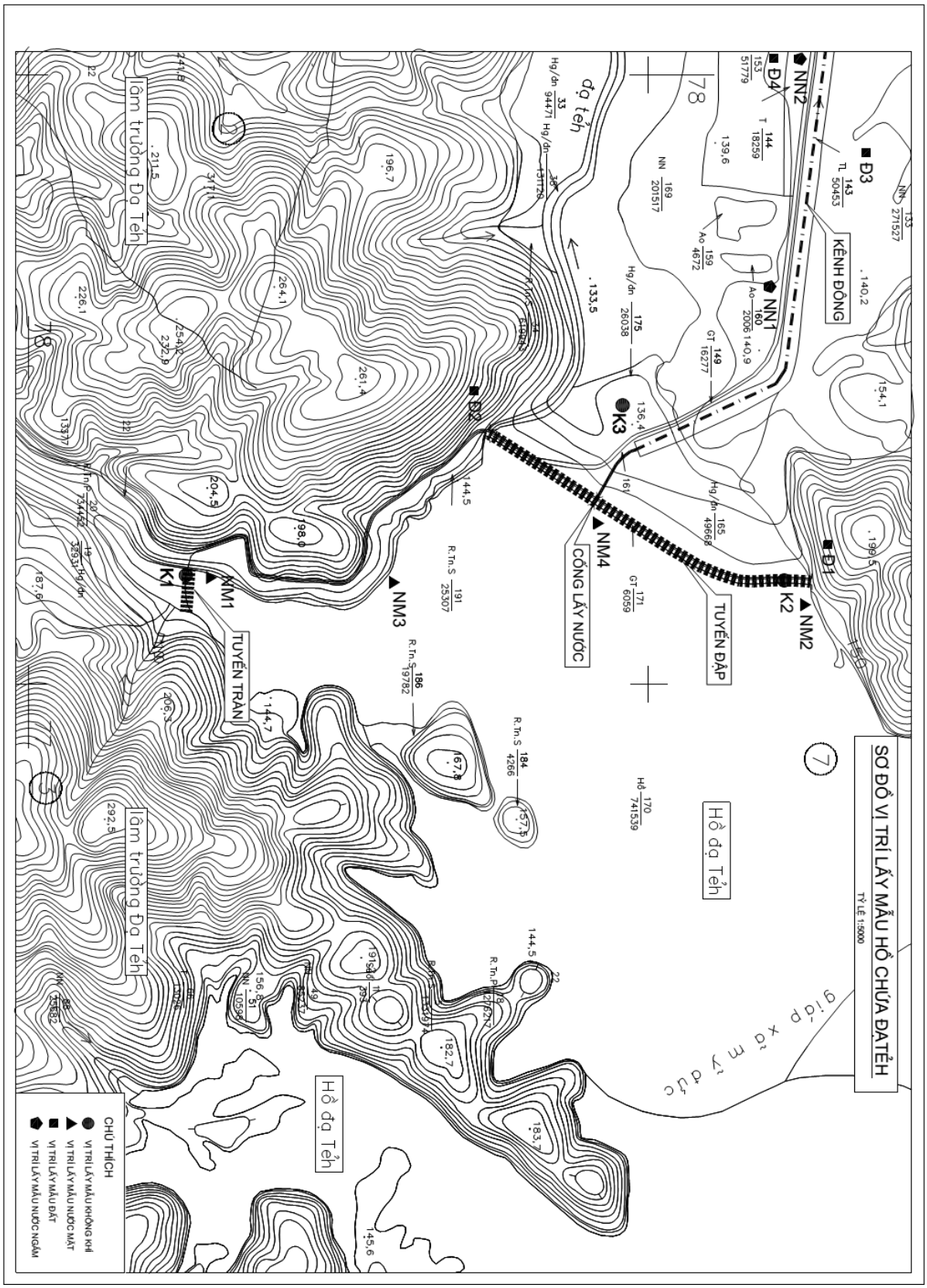
No.	Will the sub-project have following environmental impacts?	Yes	Low	Medium	High	Unknown	Comments
							contractors have regulations in worker management. iii) A number of workers (about 30%) can rent house in local area in order to carry out simple jobs such as excavating soil, eradicating, carrying construction materials.
12.	Use explosives and harmful chemicals.	✓					The sub-project does not use explosives or harmful chemicals during the construction.
13.	Use the sites where accidents of mine blast or blast of remaining materials since the war.	✓					The sub-project does not use the sites where bomb or mine accidents have happened. Some material gathering locations and worker sheds are unoccupied and safe for local government and local people to introduce and allow. In the areas where excavation is carried out, bomb and mine will be disarmed in order to ensure safety in construction.
14.	The construction may cause disorder of transportation, roadway or waterway.		✓				The construction may have impacts on travelling, local traffic will be in risk of accidents: a) increasing risks of accidents due to increasing vehicles across inter-commune road and construction site (where excavating, gathering construction devices, waste on or on roadside, project, etc.) may cause danger, especially at night when vision is limited; floating dust will limit vision; b) the construction of dams and subsidiary projects such as management road will limit local people's travel as well as receive social infrastructure such as school, market, etc. However, this impact is SMALL and TEMPORARY for following reasons: i) Output of site vehicles is divided; ii) Amount of construction vehicles/devices travelling on road during peak hour is not significant' iii) A part of scope of contractor work must secure health and safety on the construction site for individuals and the construction site is not permitted to let risks happen to safety of local people. Therefore, contractors will take measures to mitigate impacts during the construction.
15.	Will the construction cause any damage to other existing roadway, bridge or rural infrastructure of the local area?		✓				The transportation of construction materials or wastes on rural roads may damage roads if these trucks are overloaded and operate in rainy season. Other rural infrastructure works such as canal route, electric cable system, information cable are not affected by the sub-project construction because these works are located on the safety corridor of the main route. On

No.	Will the sub-project have following environmental impacts?	Yes	Low	Medium	High	Unknown	Comments
							the management road, there is not electrical cable or information cable works. Social infrastructure in the local area is not affected by the construction. The main canal route of Da The irrigational system along the road maybe affected by materials spilled from trucks during the transportation or big loading capacity trucks. These impacts and LOW and TEMPORARY for following reasons: (i) Most projects are constructed in dry season so trucks transporting materials have few impacts on road quality; (ii) Amount of construction materials and trucks transporting materials is small during peak times; iii) Regulations load as well as speed of vehicles is regulated in order to make sure that damages to infrastructure will not happen.
16.	Will excavation during the sub-project construction cause soil erosion?		✓				The construction of dam may cause erosion of dam body or surrounding positions. However, these impacts are LOW and TEMPORARY because dam faces are constructed in dry season. All construction positions are above lake water level and dam foot is built by cement, making it difficult for soil erosion.
17.	Is it necessary to open new service road in the short-term and in the long-term?	✓					It is not necessary to open new and temporary service road because existing routes are still capable of transporting construction materials or waste.
18.	Separate or break up living environment of animals, plants?	✓					+ The fauna and flora system under the reservoir will not be affected because the project does not have impacts on water quality or water level. + For terrestrial fauna and flora system: Around the sub-project site and the indirectly affected sites, there are no positions which are currently living environment of animals and plants.
19.	Long-term impacts on air quality.	✓					Sources of air pollution are mainly dust discharged from vehicles transporting construction materials and waste, etc. on the route in My Duc commune. In addition, air is polluted by construction machines, means of transportation. However, these sources are few and only appear in certain times. Therefore, there are no long-term impacts on air quality. Only some temporary impacts.
20.	Risks of accidents for workers and the community during the		✓				The construction may cause risks of accidents due to machinery operation, excavation, aggradation or material transportation if

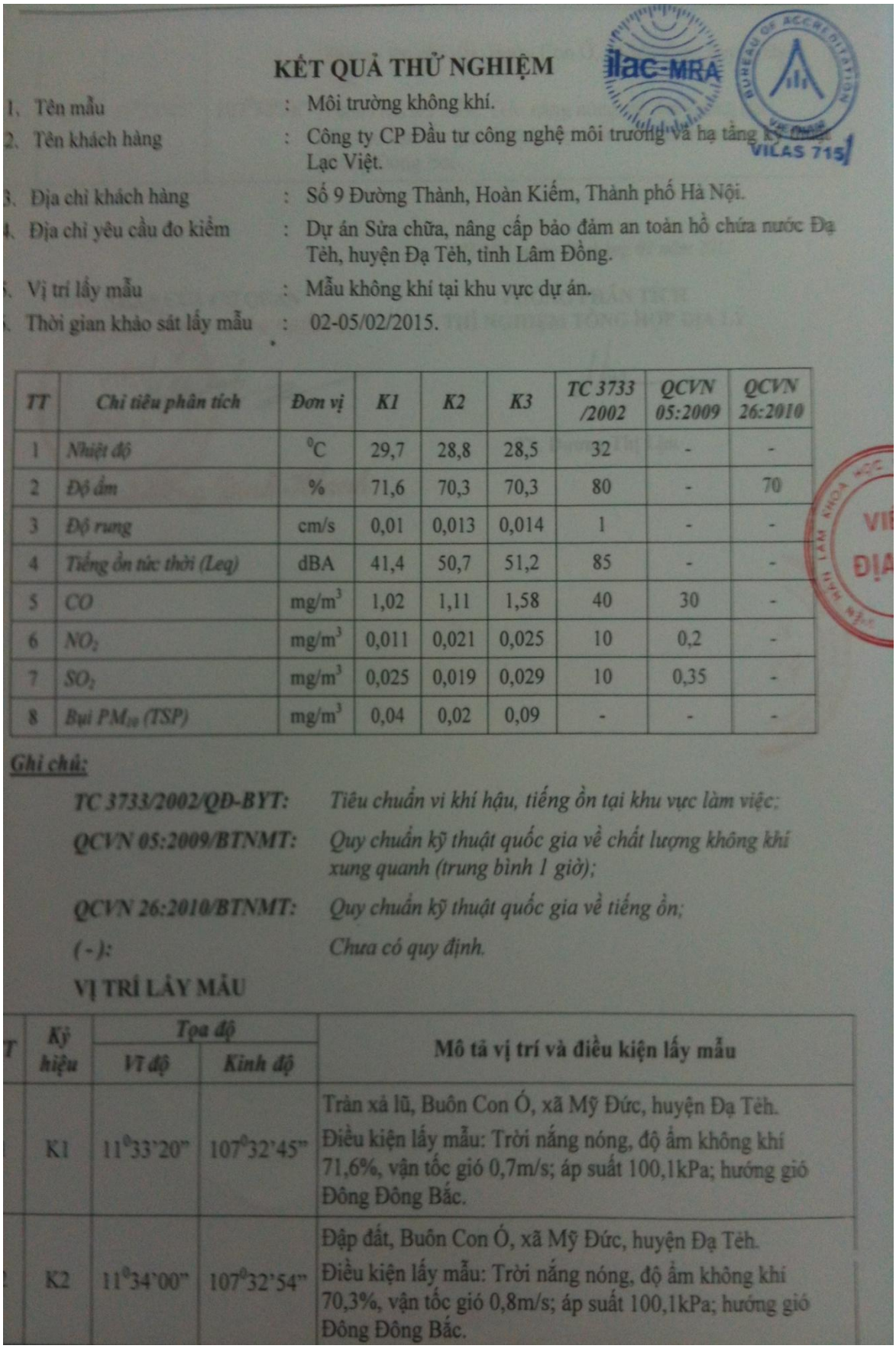
No.	Will the sub-project have following environmental impacts?	Yes	Low	Medium	High	Unknown	Comments
	construction.						workers do not strictly conform to the regulations on labor safety. In addition, the construction may cause labor accidents for the community if people are not restricted to enter the site. However, this impact is MEDIUM and TEMPORARY for following reasons: i) Amount of construction machines are not many; ii) Many works will be constructed manually such as carrying materials, pouring concrete, etc. Therefore, risks of accidents will reduce; iii) The construction is mostly carried out in dry season; therefore, accidents are limited; iv) Construction sites are far away from resident areas, distance from the nearest resident area is over 500.
21.	Use harmful or dangerous materials and generate harmful waste.	✓					The sub-project does not use or generate harmful substances. During the construction, a small amount of machine oil may leak into environment.
22.	Risks to safety and people's health.		✓				During the construction, there may be risks of labor safety, respiratory diseases due to pollution, exhaust, dust, etc.
23.	Impacts on domestic water supply and production during the construction of project items.		✓				Total estimated construction time is 24 months, most of which are upgrading earth damming system in dry season. The construction of drain, overflow and dam will not affect the water intake for production.
24.	Increase flood, transportation of sand in downstream area.	✓					Da The reservoir is an independent reservoir, the reservoir downstream is watering area. The construction will need water discharge unit dead water level; however, in dry season, water in the reservoir is not much. In addition, the site has a good drainage system, so this impact is assessed to be LOW and TEMPORARY.
Will the sub-project require land recovery or limitation of access to resources?							
25.	Recovery (temporarily or permanently) public land (public or private) for construction.		✓				During the construction, the sub-project will temporarily recover 1ha of hill land located in the right abutment. This site is managed by People's Committee of My Duc commune. The project owner has finished compensation in 2010.
26.	Use land currently seized or regularly used for production purpose (for example: gardening, farming, grazing, fishing, forest).		✓				1ha of production forestland at the right abutment is managed by People's Committee of My Duc commune is seized temporarily as banking material field during the sub-project construction.
27.	Move individuals, families or business activities.		✓				The sub-project does not cause emigration and re-settlement.

No.	Will the sub-project have following environmental impacts?	Yes	Low	Medium	High	Unknown	Comments
28.	Temporarily or permanently loose fruit trees, farm produce trees or housing infrastructure.		✓				The sub-project does not affect farm produces, fruit trees or building infrastructure.
29.	Limit local people's access to reserve parks and reserves.	✓					The sub-project site does not have reserve parks, hence no impacts.
Will the sub-project have impacts on ethnic minority?							
30.	Groups of ethnic minority live within or near the sub-project.		✓				In the sub-project site, very few ethnic people live. In the sub-project site, 91.2% are Kinh people, 8.3% are Chau Ma people and 0.5% are ethnic minorities living dispersedly and alternately with Kinh people/ Therefore, the sub-project has not influence on partial ethnic minorities.
31.	Members of ethnic minority groups in the area are likely to be beneficiaries or hurt by the project.		✓				Ethnic minorities in My Duc commune and others in the commune are beneficiaries of the sub-project.
Will the sub-project require for construction or dependence on a dam?							
32.	Related to the construction of a big dam?	✓					Da The reservoir has the lowest dam of 15m (28m), so it is a big dam as defined by WB.
33.	Depend on water supplied from an existing is being constructed dam or retaining dam?		✓				There is no dammed lake in the upstream of Da The reservoir.

Appendix A5: Diagram of sampling and monitoringenvironment



Appendix A6: Analysis results of environmentalsamples



KẾT QUẢ THỬ NGHIỆM

1. Tên mẫu : Môi trường không khí.
2. Tên khách hàng : Công ty CP Đầu tư công nghệ môi trường và hạ tầng kỹ thuật Lạc Việt.
3. Địa chỉ khách hàng : Số 9 Đường Thành, Hoàn Kiếm, Thành phố Hà Nội.
4. Địa chỉ yêu cầu đo kiểm : Dự án Sửa chữa, nâng cấp bảo đảm an toàn hồ chứa nước Đạ Tẻh, huyện Đạ Tẻh, tỉnh Lâm Đồng.
5. Vị trí lấy mẫu : Mẫu không khí tại khu vực dự án.
6. Thời gian khảo sát lấy mẫu : 02-05/02/2015.

TT	Chỉ tiêu phân tích	Đơn vị	K1	K2	K3	TC 3733 /2002	QCVN 05:2009	QCVN 26:2010
1	Nhiệt độ	^{0}C	29,7	28,8	28,5	32	-	-
2	Độ ẩm	%	71,6	70,3	70,3	80	-	70
3	Độ rung	cm/s	0,01	0,013	0,014	1	-	-
4	Tiếng ồn tức thời (Leq)	dBA	41,4	50,7	51,2	85	-	-
5	CO	mg/m^3	1,02	1,11	1,58	40	30	-
6	NO_2	mg/m^3	0,011	0,021	0,025	10	0,2	-
7	SO_2	mg/m^3	0,025	0,019	0,029	10	0,35	-
8	Bụi PM_{10} (TSP)	mg/m^3	0,04	0,02	0,09	-	-	-

Ghi chú:

TC 3733/2002/QĐ-BYT: Tiêu chuẩn vi khí hậu, tiếng ồn tại khu vực làm việc;

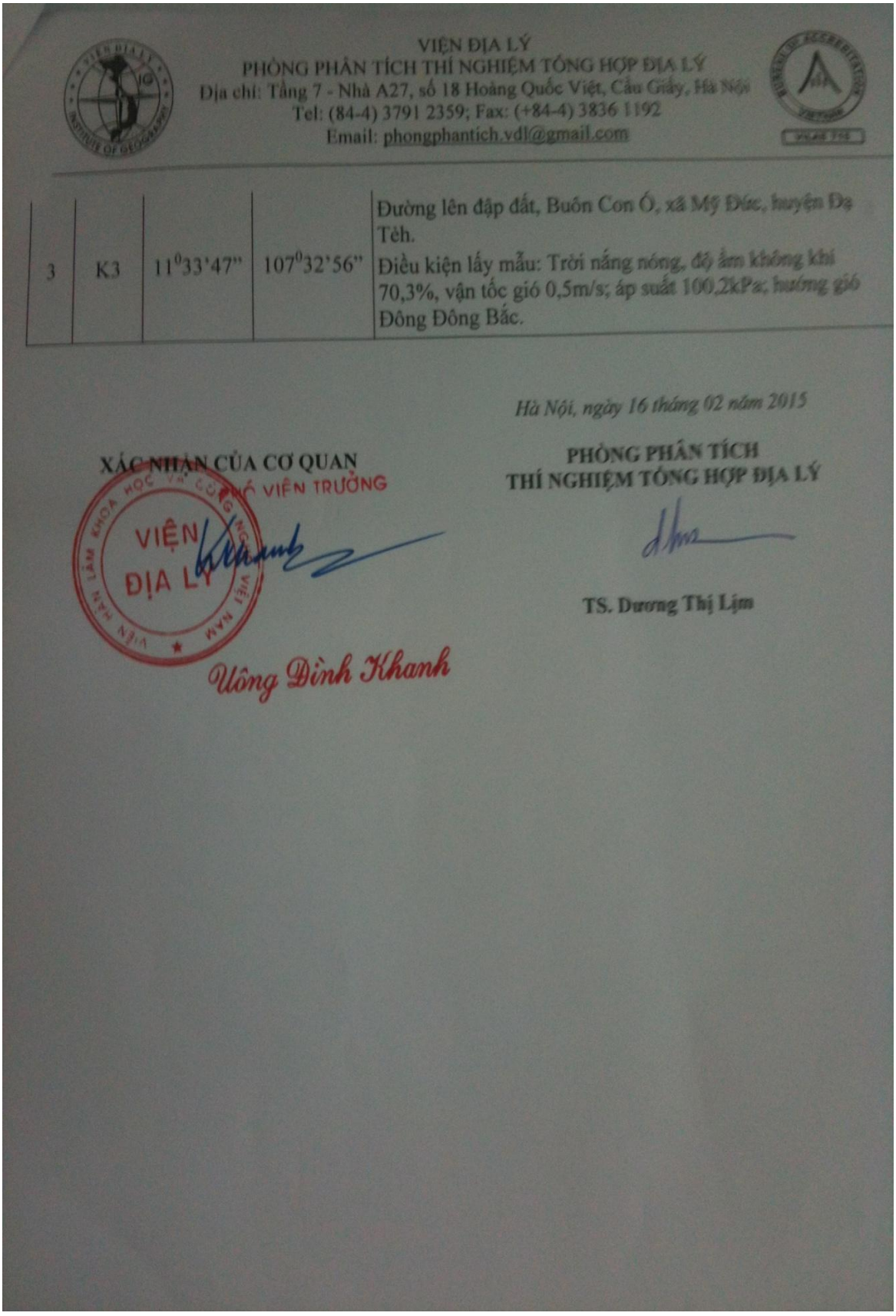
QCVN 05:2009/BTNMT: Quy chuẩn kỹ thuật quốc gia về chất lượng không khí xung quanh (trung bình 1 giờ);

QCVN 26:2010/BTNMT: Quy chuẩn kỹ thuật quốc gia về tiếng ồn;

(-): Chưa có quy định.

VỊ TRÍ LẤY MẪU

T	Ký hiệu	Tọa độ		Mô tả vị trí và điều kiện lấy mẫu
		VT độ	Kinh độ	
	K1	11^{0}33'20"	107^{0}32'45"	Tràn xả lũ, Buôn Con Ó, xã Mỹ Đức, huyện Đạ Tẻh. Điều kiện lấy mẫu: Trời nắng nóng, độ ẩm không khí 71,6%, vận tốc gió 0,7m/s; áp suất 100,1kPa; hướng gió Đông Đông Bắc.
	K2	11^{0}34'00"	107^{0}32'54"	Đập đất, Buôn Con Ó, xã Mỹ Đức, huyện Đạ Tẻh. Điều kiện lấy mẫu: Trời nắng nóng, độ ẩm không khí 70,3%, vận tốc gió 0,8m/s; áp suất 100,1kPa; hướng gió Đông Đông Bắc.



VIỆN ĐỊA LÝ
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Tel: (84-4) 3791 2359; Fax: (+84-4) 3836 1192
Email: phongphantich.vdl@gmail.com

3	K3	$11^0$33'47"	$107^0$32'56"	Đường lên đập đất, Buôn Con Ó, xã Mỹ Đức, huyện Đa Tèh. Điều kiện lấy mẫu: Trời nắng nóng, độ ẩm không khí 70,3%, vận tốc gió 0,5m/s; áp suất 100,2kPa; hướng gió Đông Đông Bắc.

Hà Nội, ngày 16 tháng 02 năm 2015

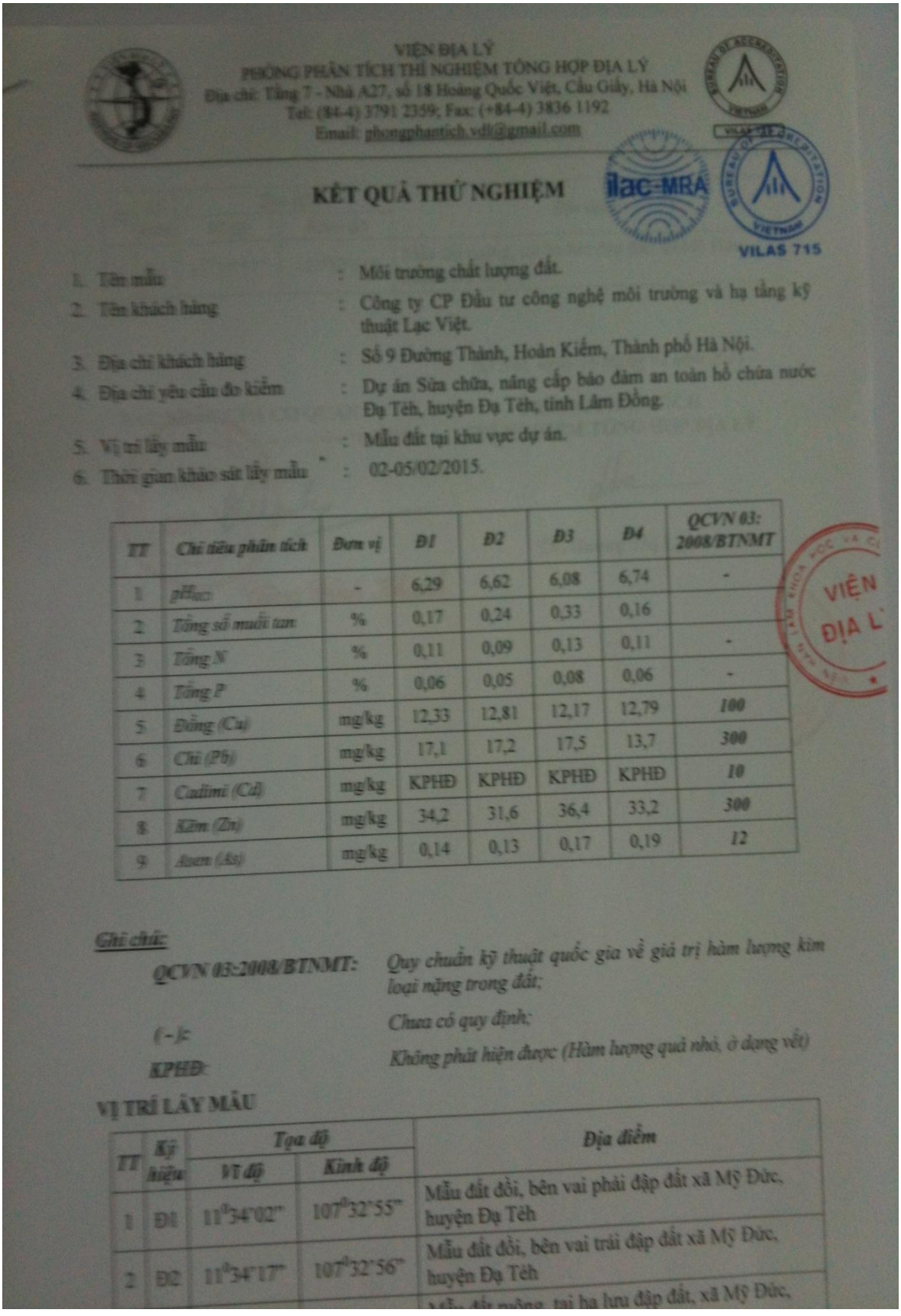
XÁC NHẬN CỦA CƠ QUAN
PHÓ VIỆN TRƯỞNG

VIỆN ĐỊA LÝ

Uông Đình Khanh

PHÒNG PHÂN TÍCH
THÍ NGHIỆM TỔNG HỢP ĐỊA LÝ

TS. Dương Thị Lịm



VIỆN ĐỊA LÝ
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VILAS 715

KẾT QUẢ THỬ NGHIỆM

1. Tên mẫu : Môi trường chất lượng đất.
2. Tên khách hàng : Công ty CP Đầu tư công nghệ môi trường và hạ tầng kỹ thuật Lạc Việt.
3. Địa chỉ khách hàng : Số 9 Đường Thành, Hoàn Kiếm, Thành phố Hà Nội.
4. Địa chỉ yêu cầu đo kiểm : Dự án Sửa chữa, nâng cấp bảo đảm an toàn hồ chứa nước Đạ Tẻh, huyện Đạ Tẻh, tỉnh Lâm Đồng.
5. Vị trí lấy mẫu : Mẫu đất tại khu vực dự án.
6. Thời gian khảo sát lấy mẫu : 02-05/02/2015.

TT	Chỉ tiêu phân tích	Đơn vị	Đ1	Đ2	Đ3	Đ4	QCVN 03: 2008/BTNMT
1	pH_{KCl}	-	6,29	6,62	6,08	6,74	-
2	Tổng số muối tan	%	0,17	0,24	0,33	0,16	
3	Tổng N	%	0,11	0,09	0,13	0,11	-
4	Tổng P	%	0,06	0,05	0,08	0,06	-
5	Đồng (Cu)	mg/kg	12,33	12,81	12,17	12,79	**100**
6	Chì (Pb)	mg/kg	17,1	17,2	17,5	13,7	**300**
7	Cadimi (Cd)	mg/kg	KPHĐ	KPHĐ	KPHĐ	KPHĐ	**10**
8	Kẽm (Zn)	mg/kg	34,2	31,6	36,4	33,2	**300**
9	Asen (As)	mg/kg	0,14	0,13	0,17	0,19	**12**

VIỆN ĐỊA LÝ

Ghi chú:

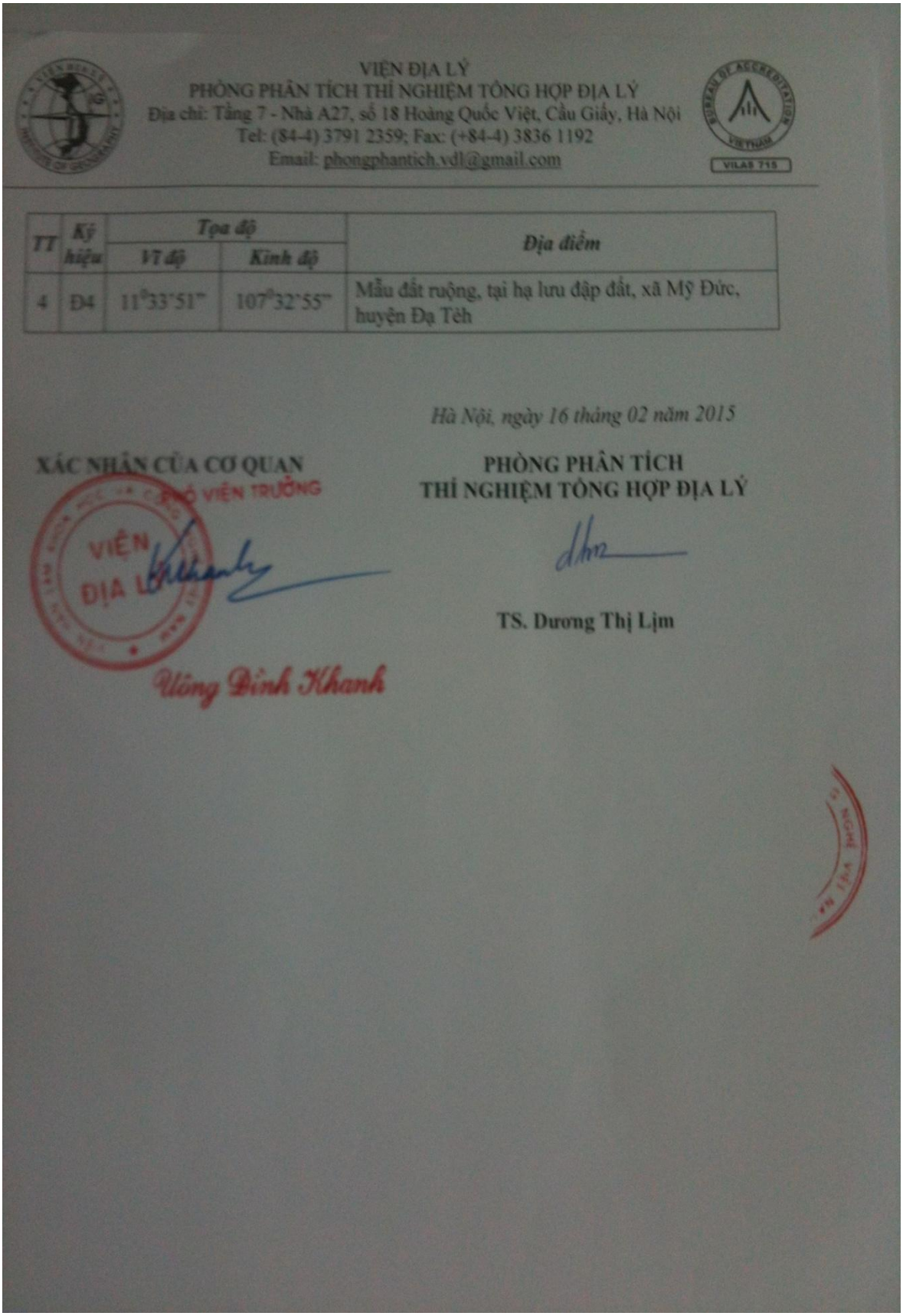
QCVN 03:2008/BTNMT: *Quy chuẩn kỹ thuật quốc gia về giá trị hàm lượng kim loại nặng trong đất;*

(-): *Chưa có quy định;*

KPHĐ: *Không phát hiện được (Hàm lượng quá nhỏ, ở dạng vết)*

VỊ TRÍ LẤY MẪU

TT	Ký hiệu	Tọa độ		Địa điểm
		Vĩ độ	Kinh độ	
1	Đ1	$11^0$34'02"	$107^0$32'55"	Mẫu đất đồi, bên vai phải đập đất xã Mỹ Đức, huyện Đạ Tẻh
2	Đ2	$11^0$34'17"	$107^0$32'56"	Mẫu đất đồi, bên vai trái đập đất xã Mỹ Đức, huyện Đạ Tẻh
				Mẫu đất ruộng, tại hạ lưu đập đất, xã Mỹ Đức,



VIỆN ĐỊA LÝ
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VILAS 715

TT	Ký hiệu	Tọa độ		Địa điểm
		VT độ	Kinh độ	
4	Đ4	11°33'51"	107°32'55"	Mẫu đất ruộng, tại hạ lưu đập đất, xã Mỹ Đức, huyện Đạ Tẻh

Hà Nội, ngày 16 tháng 02 năm 2015

XÁC NHẬN CỦA CƠ QUAN
PHÓ VIỆN TRƯỞNG

VIỆN ĐỊA LÝ

Vũ Đình Khanh

PHÒNG PHÂN TÍCH
THÍ NGHIỆM TỔNG HỢP ĐỊA LÝ

TS. Dương Thị Lịm

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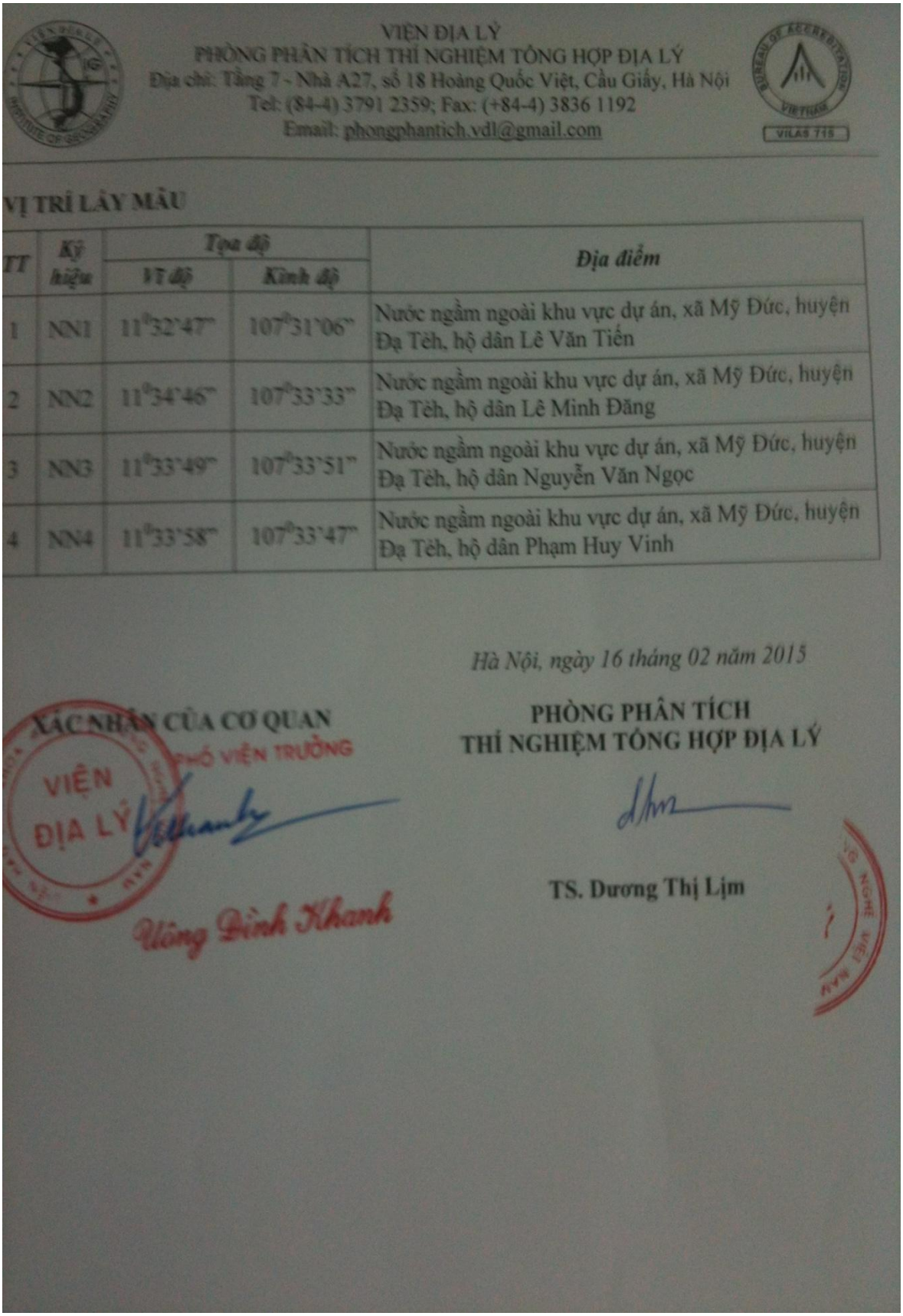
VILAS 71

KẾT QUẢ THỬ NGHIỆM

1. Tên mẫu : Môi trường chất lượng nước ngầm.
2. Tên khách hàng : Công ty CP Đầu tư công nghệ môi trường và hạ tầng kỹ thuật Lạc Việt.
3. Địa chỉ khách hàng : Số 9 Đường Thành, Hoàn Kiếm, Thành phố Hà Nội.
4. Địa chỉ yêu cầu đo kiểm : Dự án Sửa chữa, nâng cấp bảo đảm an toàn hồ chứa nước Đạ Tẻh, huyện Đạ Tẻh, tỉnh Lâm Đồng.
5. Vị trí lấy mẫu : Mẫu nước ngầm tại khu vực dự án.
6. Thời gian khảo sát lấy mẫu : 02-05/02/2015.

TT	Chỉ tiêu phân tích	Đơn vị	NN1	NN2	NN3	NN4	QCVN 09: 2008/BTNMT
1	pH	-	6,08	5,82	6,02	7,28	5,5 - 8,5
2	NH_3-N	mg/l	0,22	0,14	0,12	0,48	0,1
3	NO_2-N	mg/l	0,052	0,032	0,102	0,056	15
4	NO_3-N	mg/l	KPHĐ	0,114	0,284	KPHĐ	1,0
5	PO_4^{3-}	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	-
6	Fe	mg/l	0,157	0,096	0,113	0,748	5
7	Độ cứng	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	400
8	Sulfat	mg/l	15,0	26,3	21,1	160,4	500
9	Cl	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	250
10	TS	mg/l	25	25	18	104	1.500
11	Cu	mg/l	0,03	0,06	0,016	0,05	1
12	Pb	mg/l	0,002	0,005	0,006	0,006	0,01
13	Zn	mg/l	0,014	0,009	0,017	0,011	3
14	Hg	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	0,001
15	As	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	0,05
16	Coliform	MPN/100ml	5	4	3	4	3

Ghi chú:



VIỆN ĐỊA LÝ
PHÒNG PHÂN TÍCH THÍ NGHIỆM TỔNG HỢP ĐỊA LÝ
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Email: phongphantich.vdl@gmail.com

VILAS 715

VỊ TRÍ LẤY MẪU

TT	Ký hiệu	Tọa độ		Địa điểm
		VT độ	Kinh độ	
1	NN1	11°32'47"	107°31'06"	Nước ngầm ngoài khu vực dự án, xã Mỹ Đức, huyện Đạ Tẻh, hộ dân Lê Văn Tiến
2	NN2	11°34'46"	107°33'33"	Nước ngầm ngoài khu vực dự án, xã Mỹ Đức, huyện Đạ Tẻh, hộ dân Lê Minh Đăng
3	NN3	11°33'49"	107°33'51"	Nước ngầm ngoài khu vực dự án, xã Mỹ Đức, huyện Đạ Tẻh, hộ dân Nguyễn Văn Ngọc
4	NN4	11°33'58"	107°33'47"	Nước ngầm ngoài khu vực dự án, xã Mỹ Đức, huyện Đạ Tẻh, hộ dân Phạm Huy Vinh

Hà Nội, ngày 16 tháng 02 năm 2015

XÁC NHẬN CỦA CƠ QUAN
PHÓ VIỆN TRƯỞNG

VIỆN ĐỊA LÝ

Vũ Đình Khanh

PHÒNG PHÂN TÍCH
THÍ NGHIỆM TỔNG HỢP ĐỊA LÝ

TS. Dương Thị Lịm

VIỆN ĐỊA LÝ
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Email: phongphantich.vdl@gmail.com

VIAS 715

KẾT QUẢ THỬ NGHIỆM

1. Tên mẫu : Môi trường chất lượng nước mặt.
2. Tên khách hàng : Công ty CP Đầu tư công nghệ môi trường và hạ tầng kỹ thuật Lạc Việt.
3. Địa chỉ khách hàng : Số 9 Đường Thành, Hoàn Kiếm, Thành phố Hà Nội.
4. Địa chỉ yêu cầu đo kiểm : Dự án Sửa chữa, nâng cấp bảo đảm an toàn hồ chứa nước Đạ Tẻh, huyện Đạ Tẻh, tỉnh Lâm Đồng.
5. Vị trí lấy mẫu : Mẫu nước mặt tại khu vực dự án.
6. Thời gian khảo sát lấy mẫu : 02-05/02/2015.

TT	Chỉ tiêu phân tích	Đơn vị	NM1	NM2	NM3	NM4	QCVN 08: 2008/BTNMT (Cột B1)
1	pH	-	6,28	6,40	6,53	6,22	5,5 - 9
2	TSS	mg/l	23	24	30	42	50
3	COD	mg/l	12	12	12	13	30
4	BOD	mg/l	4	4	4	4	15
5	NH_3-N	mg/l	0,31	0,28	0,33	0,30	0,5
6	NO_3-N	mg/l	0,058	0,055	0,062	0,066	10
7	NO_2-N	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	0,04
8	PO_4^{3-}	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	0,3
9	Cl^-	mg/l	KPHĐ	KPHĐ	KPHĐ	KPHĐ	600
10	EC	µS/cm	11,6	11,7	11,6	11,6	-
11	TDS	mg/l	10	11	10	10	-
12	DO	mg/l	7,01	7,12	7,08	6,92	≥4
13	Cu	mg/l	0,08	0,09	0,09	0,08	0,5
14	Pb	mg/l	0,008	0,008	0,007	0,008	0,05
15	Zn	mg/l	0,06	0,07	0,06	0,06	1,5
16	Dầu mỡ	mg/l	0,07	0,08	0,08	0,09	0,1
17	Coliform	MPN/100ml	3.400	3.400	3.500	4.000	7.500

Ghi chú:

QCVN 08:2008/BTNMT: *Quy chuẩn kỹ thuật quốc gia về chất lượng nước mặt.*

VIỆN ĐỊA LÝ
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Tel: (84-4) 3791 2359; Fax: (+84-4) 3836 1192
Email: phongphantich.vdl@gmail.com

VILAS 715

(-): *Chưa có quy định;*

KPHĐ: *Không phát hiện được.*

VỊ TRÍ LẤY MẪU

TT	Ký hiệu	Tọa độ		Mô tả vị trí lấy mẫu
		Vĩ độ	Kinh độ	
1	NM1	$11^0$33'20"	$107^0$32'45"	Nước hồ Đạ Tẻh, gần khu vực tràn xả lũ, Buôn Con Ó, xã Mỹ Đức, huyện Đạ Tẻh
2	NM2	$11^0$34'00"	$107^0$32'54"	Nước hồ Đạ Tẻh, gần vai phải đập, Buôn Con Ó, xã Mỹ Đức, huyện Đạ Tẻh
3	NM3	$11^0$34'02"	$107^0$32'55"	Nước hồ Đạ Tẻh, Buôn Con Ó, xã Mỹ Đức, huyện Đạ Tẻh
4	NM4	$11^0$33'59"	$107^0$32'57"	Nước hồ Đạ Tẻh, gần vị trí cống lấy nước, Buôn Con Ó, xã Mỹ Đức, huyện Đạ Tẻh

Hà Nội, ngày 16 tháng 02 năm 2015

XÁC NHẬN CỦA CƠ QUAN
PHÓ VIỆN TRƯỞNG

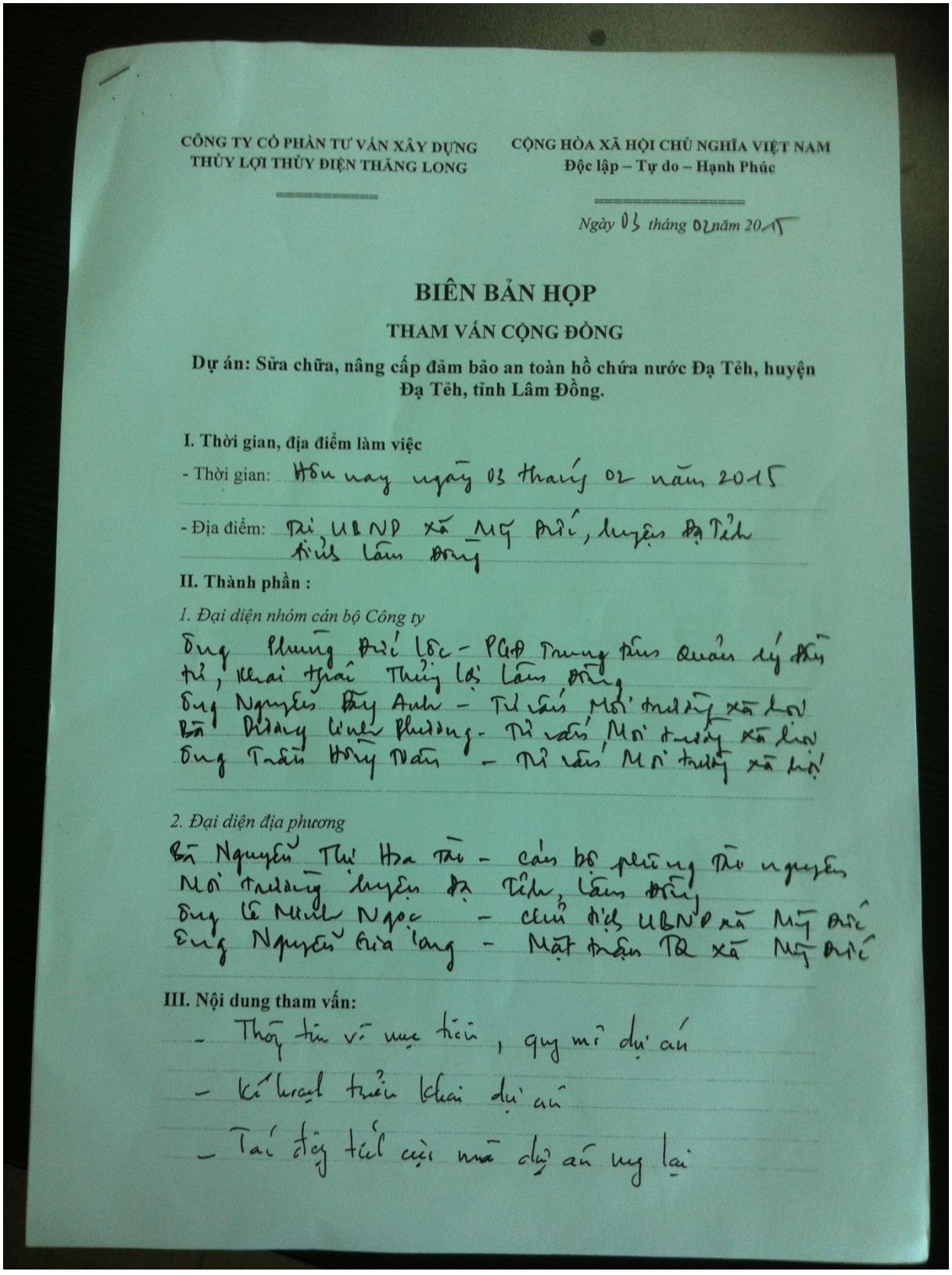
VIỆN ĐỊA LÝ

Uông Đình Khanh

PHÒNG PHÂN TÍCH
THÍ NGHIỆM TỔNG HỢP ĐỊA LÝ

TS. Dương Thị Lịm

Appendix A7: Publicconsultation minutes



CÔNG TY CỔ PHẦN TƯ VẤN XÂY DỰNG THỦY LỢI THỦY ĐIỆN THĂNG LONG

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

Ngày 03 tháng 02 năm 2015

BIÊN BẢN HỌP

THAM VẤN CỘNG ĐỒNG

Dự án: Sửa chữa, nâng cấp đảm bảo an toàn hồ chứa nước Đạ Tẻh, huyện Đạ Tẻh, tỉnh Lâm Đồng.

I. Thời gian, địa điểm làm việc

- Thời gian: Hôm nay ngày 03 tháng 02 năm 2015
- Địa điểm: Tại UBND xã Mỹ Đức, huyện Đạ Tẻh tỉnh Lâm Đồng

II. Thành phần :

1. Đại diện nhóm cán bộ Công ty

Ông Phùng Đức Lộc - PGĐ Trung tâm Quản lý khai thác, khai thác Thủy lợi Lâm Đồng
Ông Nguyễn Duy Anh - Tư vấn Môi trường xã hội
Bà Dương Linh Phương - Tư vấn Môi trường xã hội
Ông Trần Hồng Thắm - Tư vấn Môi trường xã hội

2. Đại diện địa phương

Bà Nguyễn Thị Hoa Tài - cán bộ phòng Tài nguyên Môi trường huyện Đạ Tẻh, Lâm Đồng
Ông Lê Minh Ngọc - chủ tịch UBND xã Mỹ Đức
Ông Nguyễn Hữu Long - Mặt trận TQ xã Mỹ Đức

III. Nội dung tham vấn:

- Thông tin về mục tiêu, quy mô dự án
- Kế hoạch triển khai dự án
- Tái định cư nếu dự án ảnh hưởng

- Sự tham gia giám sát của cộng đồng trong các giai đoạn của dự án

IV. Ý kiến đóng góp của địa phương

- Các tác động tới môi trường nêu ra trong dự án là tương đối đầy đủ
- Lưu ý việc khai thác nguyên vật liệu đắp đập, hạn chế việc lưu thông qua khu dân cư, che chắn bụi

V. Kết luận

Mọi người đều tỏ ý đồng tình và nguyện vọng tha thiết rằng việc nhanh chóng triển khai dự án để tăng hiệu quả kinh tế và an toàn cho đập và vùng hạ du.

Cán bộ thực hiện

Trần Hồng Toàn

Đại diện địa phương

UBND Xã

CHỦ TỊCH

Võ Thanh Ngọc

MTTQ Xã

Nguyễn Gia Lương

COMMUNITY CONSULTATION IN DA TEH DISTRICT

Appendix A8: Pictures of current status of subproject area

DA TEH DAM

SPILLWAY OF DA TEH RESERVOIR

DOWNSTREAM OF DA TEH RESERVOIR

DOWNSTREAM OF DA TEH SPILLWAY

APPENDIX B – **Social**

Appendix B1: Methodogical note

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

(i) *Document review*: The review and analysis of documents related to the Project will provide basic information of the Project and help to explain reasons for existing changes or non-existence. On the other hand, it also helps identify gaps in data need to be collected and evaluated further. The supply sources of documentation may come from Center for Investment Management and Exploitation of Water Resources Lam Dong, Department of Agriculture & Rural Development of Da Teh district, Department of Natural Resources and Environment of Lam Dong province, Division of Natural Resources and Environment of Da Teh district, Statistical Office of Da Teh district, and PC of My Duc commune and Quang Tri.

(ii) *Random sample survey*: to collect information from a large number of affected people through the questionnaire interview with specific questions served for statistical analysis. The survey results will provide the basis for other evaluation studies as they help collect important data about the implementation issues or specific indicators from a sample. This method requires a sampling strategy (shown as below) to evaluate criteria before and after the existence of the Project.

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

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

Appendix B2: Publichealthintervention plan

1. Purposes:

- Contractors, local authorities (Healthcare Facility) well manage risks of public health relating to sub-project implementation.
- Raise awareness of residents, local authorities/workers in project area and help them understand potential impacts on public health during project construction.
- Residents understand how to respond to issues relating to public health arising during construction of sub-project.
- Residents are informed and update project construction plan to prepare plan for preventing diseases harmful to community during construction.

2. The objects that need to be managed:

- Risk factors relating to disease outbreak at construction site, worker camps, dump sites and community.
- Risk factors relating to labor unsafety, traffic, especially on the road transporting materials and waster.
- Worker camp, especially sanitation area and cooking area of workers.
- The compliance of workers in ensuring labor safety and disease prevention.
- Sensitive locations/source of wasters denerating infectious diseases.

3. The issues need to be managed:

- Kinds of diseases, especially infectious diseases that often occur on the project area.
- The risks of spreading infectious diseases or affecting public health caused by employees from other places staying in locality and vice versa.
- The risks of affecting public health due to noise and dust generated from cars, construction machines; and from dump sites or domestic waster from worker camps.
- The risks of accident for people in construction site of the sub-project.
- The risk of accident to community when the number of trucks for transporting construction materials increase.
- The risks of dam safety for households in downstream area.
- Mechanism of reporting and sharing problems relating to outbreak of epidemics or issue of safety for people in the community.

4. Time: Before and during construction of the sub-project:

One month before construction, contractor shall coordinate with local authorities to announce construction plan and potential impacts relating to public health.

5. Location:

- At worker camp.
- At dump sites.
- At construction site
- On My Duc commune

6. Methods of management and supervision:

a. **Indicators for supervision and management*:***

- Number of occupational accidents caused by sub-project construction.
- Number of traffic accidents caused by vehicles serving sub-project construction.
- Number of times/number of workers getting sick, especially getting infectious diseases.

- The availability of medicine cabinet for worker in camps.
- Number of workers who are guided/trained on issues related to public health.
- Documentation guiding first aid and emergency/how to cope with epidemics and accidents that contractor uses and provides to workers.

b. Management methods

- Contractor shall assign a superintendent or a worker to be responsible for issues of labor safety and workers' health to monitor and support relevant issues.
- Contractor coordinates with communal Healthcare Facility, village health staff to timely update epidemics situation in the localities or issues of worker's health, diseases that may spread.
- Contractor coordinates with local authority, health station to inform on issues related to the safety of people in construction area or on the road transporting construction materials/wastes.
- Communal People's Committee/ Healthcare Facility proactively inspect the sanitation, labor safety in construction site and workers' camp.
- Contractor coordinates with Communal People's Committee/ Healthcare Facility to form coordination mechanism when accidents or epidemics occur.

7. Management, monitoring and implementation units:

- **Lam Dong Water Resource Management and Exploitation** is responsible for general supervision of all project activities including communication plan, public health consultation plan. Issues related to public health are also contents reflected in complaint mechanism of the project.
- **Communal Authority**: Communal authority is generally responsible for all issues arising in the commune. Communal authority may assign community monitoring unit to monitor communication and consultation activities in the locality.
- **Communal Healthcare Facility**: Communal Healthcare Facility has the function of management, monitoring, first aid, reporting issues of public health in the commune. Therefore, issues relating to public health are also subject to the monitoring, supervision and support from this unit.
- **Contractor**: The superintendent on behalf of contractor coordinates with local authorities to perform communication and consultation activities relating to public health and workers' health.

8. Funding for implementation

- For contractor: Funding source of contractor is included in construction contract.
- For Healthcare Facility: No fund for this activity because this is responsibility of health units in public health management work.

Appendix B3: Public consultation, Participation and communication strategy

1. **Purposes:**
   - Strengthen access to information in their own interests for residents in project area;
   - Residents are informed, update project construction plans to actively prepare plan for production and living;
   - Information for development: improving information access serving people's life, raising living quality;
   - Enhance residents' participation.
2. **Objects of communication and consultation**
   - People in the commune, especially in project area and villages/hamlets where vehicles transporting construction materials go through
   - Local authority, officials in villages/hamlets
   - Workers and staff at construction site.
   - For the community, encourage the participation of both men and women
3. **Contents of communication and consultation**
   - Contents, main items of the sub-project, implementation capital source;
   - Benefits from the sub-project;
   - Organize sub-project construction in locality: information about employer, construction contractor, performed supervisions;
   - Plan, schedule for construction of main work items;
   - Possible impacts during construction that affect local environment and society and residents in project area;
   - Resident participation mechanism, community monitoring mechanism, complaint settlement mechanism;
   - Problems discovered during project implementation: conflict, combustible materials, acts violating commitments of contractor, employer, etc.
   - Notice of local labor recruitment for construction activities.
4. **Time: Before and during sub-project construction.**

   One month before construction, contractor shall coordinate with local authorities to announce construction plan and potential impacts relating to public health.
5. **Place:**

   At project commune, with priority in sub-project construction area
6. **Methods of communication and consultation**

   Communication and consultation activities are performed through the following methods:
   - *Communication on communal loudspeakers:* Currently, My Duc commune has loudspeaker systems in all hamlets. Most of other communication activities of locality are performed through this method. Therefore, loudspeaker systems are used to notify residents in the commune of relevant issues during sub-project construction.
   - *Public meeting/Public consultation:* This method will be performed with the participation of officials of hamlets in the project commune, residents in Hamlet 1, sub-project construction area and households along the road for transporting construction materials or including dump site.
   - *Communication integrated into operation of departments or authorities:* Every month, the authority often holds meetings with communal officials and departments in the hamlet; therefore, communication contents may be integrated into these activities.
7. **Executor:**

   a. Before project implementation:

Safety Policy Consultant Unit will carry out community communication, consultation on issues of general safety policy.

b. During project implementation:

Project Management Unit, Contractor shall coordinate with local authorities and social organizations, villages/hamlets to build and implement communication activities according to methods as above.

8. Monitor and supervise the implementation

Public communication and consultation plan involves in the participation of following units:

- Project Management Unit of Lam Dong province. Project Management Unit shall be responsible for general supervision of project operations including communication and consultation plan with community's participation. Issues on environment, society, compensation of affected property directly related to residents are also contents reflected in complaint mechanism of the project.
- Communal authority: Communal authority is generally responsible for issues incurred in the commune. Communal authority may assign Community Monitoring Unit to monitor communication and consultation activities in the locality.
- Contractor: The superintendent on behalf of contractor coordinates with local authorities to perform communication and consultation activities relating to public health and workers' health.

Appendix B4: Genderaction plan

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

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

The Project's Gender Action Plan

Achievements	Tasks and Indicators	People in charge	Period
Achievement 1: Improvement of dam safety and irrigating conditions.	The contractors shall prioritize unskilled labor (through subcontracting); at least 30% of the total labor force is local unskilled ones; Among this 30% local labor, female workers shall be prioritized; Male and female labor will receive the same wages for the same type of work; The Contractors shall not employ children; Those locals wish to work for the project shall register at their villages/hamlets. Then, these registrations shall be provided by the Head of the villages and communes to the Contractors for selection in favour of poor and vulnerable households.	PMU/Project Coordinator shall ensure the record of these terms in the Contract; the list of registered labor shall be submitted by communal officials the Contractor; Communal officials shall ensure the achievement of the targeted objectives. The communal women group shall ensure the involvement of local female workers in the Project.	During construction stage
Achievement 2:	At least 30% of women shall participate in agricultural extension	Staff of Provincial PMU,	During construction

Achievements	Tasks and Indicators	People in charge	Period
Enhancement of people's capacity to make advantages of the Project	courses.	District staff, Communal staff.	stage
Achievement 3: Enhancement of awareness on potential social evils of vulnerable objects, especially women and ethnic minorities	Programs on HIV/AIDS and human trafficking. Programs on community-based risk mitigation. Information about risk mitigation will be transferred to the communes and villages affected by the Project using the participatory approach with a focus on the poor and vulnerable households (e.g. ethnic groups, households headed by women, households with elderly and disabled people). The documents and information should be appropriate in terms of language, culture and gender, and especially translated into ethnic languages in the region; Women's Union, the representative of Centre for HIV/AIDS prevention and communal staff shall give training to communicators in each commune/village in the project area. The programs will be implemented at the communes and villages by two communicators (village chief and one member of the Women's Union). The program will be implemented in the villages and on market-days through distribution of project/program materials and use of loudspeakers	The Provincial and Communal Women's Union shall organize and host the program (training and preparation of materials) in collaboration with the district/communal health center. The Village's Women's Union shall popularize and communicate information. The district/communal Health Centers shall support the communal Women's Union. Project coordinator shall provide local and international gender experts and specialists on Ethnic Minorities. Gender experts and specialists on EM shall review existing materials and supplement the required ones for the Program.	Monthly, before and during construction stage
	Program on risk mitigation during project construction stage: PMU and the contractor will coordinate closely with the health services in communes and districts to implement programs on awareness enhancement and education on disease prevention, diagnosis and treatment for laborers. All programs and documents are built with integration of gender issues, including vulnerability and needs of men and women.	PMU The Contractor Local Health Centre Communal staff The Women's Union shall perform general coordination for better HIV prevention.	During construction stage.

Achievements	Tasks and Indicators	People in charge	Period
	The Contractor shall: Implement awareness enhancement programs workers and communities, including education and communication on HIV infection and preventive measures. Provide free consulting services and encourage employees to do HIV tests so that they all know about their health status. Support the access to health services and encourage HIV-infected patients to admit their status; Provide medical equipment (free condoms) for workers in the camps;		
Project Management	Guidelines on Gender and Development and Education shall be provided for PMU staff, local agencies and Contractors. All capacity enhancement activities shall include the involvement of women and ethnic minorities.	– Project implementation consultant – PPMU	During design and initial implementation stages

8.7.

Appendix B5: Grievance Redressmechanism

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:

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

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

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

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

(i) The person competent to settle first-time complaints should:
   a) Ask the complainant, relevant agencies, organizations and individuals to provide information, documents and evidence within 07 days of the request as a basis for complaint settlement;
   b) Determine to employ or cancel the emergency measures as defined in Article 35 of this Law;

(ii) The person competent to settle first-time complains should perform the following obligations:
   a) 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;
   b) To settle the complaints against administrative decisions and actions if required by the complainant;
   c) To open a dialogue with the complainant and agencies, organizations and individuals concerned;
   d) To decide complaint settlement and be responsible before the law for settlement results. In case of complaints from authorized agencies,

organizations and individuals, the results shall be notified to agencies, organizations and individuals in accordance with law;

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

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

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

In terms of announcement of complaint settlement decision: In Article 12 of Decree No.75/2012/ND-CP dated October 3rd, 2012 of the Government detailing the implementation of some articles of the Law on Complaint.

(i) Within 15 days from the date of decision of complaint settlement, the person competent to settle the complaint for the second time shall announce the complaint settlement decision by one of the forms specified in Clause 2 in Article 41 of the Law on Complaints.

(ii) In case of announcement at a meeting, the attendees of the meeting must include: the person issuing the complaint settlement decision, the complainant or their representatives, the person subject to complaint and agencies, organizations and individuals concerned. Before conducting a public meeting, the person competent to settle complaints must send a notice to agencies, organizations and individuals involved 3 days in advance.

(iii) The announcement of complaint settlement decision shall be made on the mass media (television, radio, printed and electronic newspaper). If the agency of the person competent to settle complaints has their own portal or website, the complaint settlement decision should be made public on this portal or website. The minimum number of announcement is 02 times on radio, television, and printed publications. The period of announcement on electronic publications, portals or websites should be at least 15 days from the date of notification.

(iv) In case of notice at the office or the Reception Room of agencies and organizations competent to settle complaints, the period for the notice of complaint settlement decision to be posted up is at least 15 days.

The procedure for complaint settlement consists of 4 stages as below:

(i) **The first stage in the Communal People's Committee**: Households affected can file their complaints to any member of the CPC, possibly through the village chief or directly to the CPC in writing. The mission of the CPC officials or village chief is informing the entire CPC the complaint. Then, the CPC will hold a private meeting with the households affected and sign the complaint decision within 10 days. The CPC secretary shall be responsible for compiling and filing documentation of all complaints handled by the CPC. The duration of first-time settlement of complaints shall not exceed 30 days from the date of signing the complaint decision; for complicated cases, this period could be extended but not exceed 45 days from the date of receipt of the complaint. In remote regions difficult for travelling, the time limit for complaint settlement is no more than 45 days from the date of acceptance; for complicated cases, this period could be extended but not exceed 60 days from the date of acceptance (according to Article 28, Law No.02/2011/QH13 dated 11/11/2011). If the complaint is not resolved for the first time or the complainant is not content with the settlement results from the date of receipt of the first-time settlement decision, they have the right to file the

complaint for second time to the People's Court or the District People's Committee.

(ii) **The second stage in the District People's Committee**: According to Article 63 of the Decree No.84/2007/ND-CP of the Government, the procedure for complaint settlement against administrative decisions and actions of the Chairman of the District People's Committee is: (i) Within ninety (90) days from the date of issuance of administrative decisions and actions by the Chairman of DPC regarding land management stipulated in Article 162 of Decree No.181/2004/ND-CP that people of relevant rights and obligations disagree with, complaints can be filed to the DPC; (ii) the Chairman of the DPC shall settle the complaint within the period of 30 days from the date of signing complaint decision. In remote areas difficult for travelling, the duration for settlement is no more than 45 days from the date of acceptance; for complicated cases, this period shall be expended but not exceed 60 days from the date of acceptance; (iii) The settlement decision of the Chairman of the DPC shall be publicly available and sent to the complainant and other people of relevant rights and obligations; (iv)Within forty-five (45) days from the date of receipt of the settlement decision of the Chairman of the DPC that the complainant does not agree with, the appeal can be filed to the People's Court or the provincial People's Committee. The time limit for appeal may be longer, but not more than 60 days from the date of receipt of the decision for complex cases. In remote areas difficult for travelling, this period is no more than 60 days from the date of acceptance, and no more than 70 days for complicated cases (according to Article 37, Law on Complaints No.2/2011/QH13 dated 11/11/2011); (v) The body accepting the complaint shall record this in the Complaint Settlement Logbook.

(iii) **The third stage in the Provincial People's Committee**: The procedure for complaint settlement against administrative decisions and actions of the Chairman of the Provincial People's Committee is (i) Within thirty (30) days (or 45 days for complicated cases) or within 45 days for remote areas (or 60 days for the complicated cases) from the date of issuance of administrative decisions and actions by the Chairman of the PPC regarding land management stipulated in Article 162 of Decree No.181/2004/ND-CP that people of relevant rights and obligations disagree with, the complaint can be filed to the PPC; (ii) The Chairman of the PPC shall settle the complaint within the time limit stipulated in Law on Complaints; (iii) The complaint settlement decision of the PPC shall be publically available and sent to the complainant and other people of relevant rights and obligations; (iv) Within forty-five (45) days from the date of receipt of the settlement decision from the Chairman of the PPC that the complainant does not agree with, the appeal may be filed to the People's Court. The time limit for appeal may be longer but not more than 60 days from the date of acceptance for complicated cases. In remote areas difficult for travelling, this period shall not exceed 60 days from the date of acceptance, and 70 days for complicated cases; (v) the body accepting the complaint shall record this in the Complaint Settlement Diary.

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 and monitoring

1. Consultation and announcement

The main objectives of information announcement and public consultation is to ensure the participation of affected communities, households, local governments and organizations concerned in sharing the Project information, consulting the selection of technical plans, planning impacts on land, income and assets on land... The announcement is an important contribution in accerlerating the Project progress during implementation and preparation, as well as when the project is put into operation with the consensus of the community, government, and PMU. This will minimize the possibility of conflicts and other risks and increase the investment efficiency and social significance of the Project.

The public consultation and announcement should ensure:

- The local authorities as well as the representatives of the people affected shall be involved in the project planning and decision making process. The PMU shall work closely with the commune/district during the implementation of the Project. The involvement of the people affected in the implementation process shall be remained by asking the commune/district to invite the representatives of the affected people to be a part of the Council on Compensation and Resettlement as well as in resettlement activities.
- All information about the items and activities planned for the Project should be shared to the people affected.
- The demands and priorities of the affected people, as well as their responses to the proposed policies and activities, should be collected.
- The affected people should be fully informed of the decisions influencing directly their income and lives, and can be involved in activities and making decisions on issues directly affecting them.
- The transparency in all activities relating to land acquisition, compensation, resettlement and rehabilitation should be ensured.

For the World Bank, those people affected by the project should be fully informed and consulted on resettlement and compensation plans. Consultation is the starting point for all activities related to resettlement. The people affected by resettlement may be afraid that their livelihoods and community relations can be affected, or their rights can not be guaranteed. Being involved in resettlement planning and management helps to alleviate these fears and bring the affected people the opportunity to participate in decisions that affect their lives. The implementation of resettlement without consultation may lead to an inappropriate strategy and ultimate ineffectiveness. Without consultation, the affected people may have negative reactions to the project, causing social problems, significant delay or even cancellation in completion of goals, thereby increasing the costs. As a result, with consultation, the initial resistance can be translated into the constructive participation.

For Vietnam, a further key step in strengthening democracy at grass-roots level is the Directive No.30-CT/TW of the Central Committee of the Communist Party of Vietnam in "Building and implementing regulations on grassroots democracy" and the Decree No.79/2003/ND-CP also on this issue. The key point of this legislation is the famous slogan, which is "People know, people discuss, people do and people inspect." The Ordinance No.34/2007/PL-UBTVQH11 has addressed the matters that should be consulted by local governments and communities before decision-making by the authorities, including building compensation and resettlement plans relating to the project and works in the commune/ward. The Clause 2 in Article 39 of the Law on Land 2003 requires the announcement of

resettlement issues such as reasons, land acquisition plans, relocation plans, overall compensation plans, and land clearance to the people affected.

Thus, consultation and participation is an innovation in the implementation of projects in Vietnam. This policy will address the shortcomings in the implementation of the projects, as both the locals and the person in charge of project implementation are inexperienced in this field.

The following points should be noted to encourage the participation of stakeholders in the consultation process of the project:

- Identify and attract all stakeholders, especially people living in the project area and those affected (men, women, the poor, ethnic minorities...), in the process of consultation and participation;
- Develop participatory strategies for Project planning, implementation, monitoring and evaluation.
- Develop the topics and content needed for promotion and popularization campaigns, as well as negotiation procedures for the affected people on their benefits.
- Attract stakeholders in decision making at all stages of the project (e.g. design plans, compensation methods, implementation schedule, etc...).
- Establish a schedule for completion of activities such as campaigns to provide information, the extents and forms of compensation, benefits, location and relocation plan.
- Develop procedures for complaint settlement.

The public consultation should be regularly carried out for the units in charge of preparation and detailed design of the project categories. This helps to ensure the participation of communities in the proposed designs and limit the adverse impacts on the community. This also helps works to be friendlier with the community and users.

The consultation should also be performed with related parties, including the units to be in charge of management and operation of works to ensure that they are consulted and commented on the designs.

During the construction stage, the Project owner should announce promotion in mass media regarding construction activities and expected schedule, measures to support the people affected and the procedure for receipt of feedbacks from the community. The affected persons shall be informed of the Project policies and procedures to ensure no many changes in their future lives. In case of any questions about the Project, they can inform and obtain the support from the PMU.

The content and method of public consultation/announcement is as follows:

Items	Method of public consultation/announcement	Period	Person in charge
1. Detailed design drawings: Alignment alternatives	Meeting with the government of the ward/commune and relevant units; the representatives of the affected households.	Survey and design stages	the Consultant, PMU
2. Land acquisition, clearance and compensation.	The ward/communal staff, together with PMU staff, shall consult with APs for initial assessments. Land acquisition and	Prior-implementation stage	the Communal People's Committee, PMU

	compensation plans shall be developed and discussed with APs before submission to authorities for decision. Policy announcement and explanation shall be made in meetings with APs.		
3. Project implementation progress, monitoring mechanism and accountability	Meetings in residential blocks, posters and notices in public	The commencement stage and during implementation stage	the Communal People's Committee, PMU
4. Employment and wages of local labor.	Meeting between the Construction unit, local authorities/supervision board and the local	Prior-construction stage	The construction contractor, local authority and the community
5. Potential adverse impacts and mitigation measures	Combined with Item 2 and 3 above	Prior and during implementation stage.	PMU, construction contractor, the communal people's committee

2. Social accountability

The announcement of the proposed plans of the Project to the affected people and stakeholders during community consultation and field survey by the social assessment consultants is to make a paradigm for continuing public information during the project implementation. Moreover, as required at all public meetings, the affected always wish for meetings to regularly exchange information with PMU at the headquarters of CPC where the community will suffer from impacts during project implementation. Therefore, reports on resettlement plans and environmental management plans should reflect the responsibility of PMU in ensuring the regular announcement of information to the public.

In addition to regular meetings between the PMU and the affected communities in CPC offices, the public meetings in all communes where public consultation has been conducted have identified the need to establish the tight connection for easy and quick contact with the PMU. The best way is to provide the phone number and address of the PMU in charge in all locations of the Project's items and the headquarters of all the communes of the entire Project's components.

3. Participatory supervision

In order for the project components to ensure its effecicney and necessasity, it is neccessary to have a monitoring plan with the participation of stakeholders such as the Department of Natural Resources and Environment, Department of Construction, Department of Planning and Investment, Department of Transport ... After completion, the direct management and operation agency/unit of the project items should be involved in the design and construction proceses.

Together with the independent monitoring unit of the project, there should have a community-level supervision division to monitor project activities, especially activities related to resettlement, sanitation and the construction of various items. The supervision division will include representatives of local authorities, representatives of organizations such as the Women's Union, Fatherland Front, Veterans, Association, representatives of local people... This The supervision division in collaboration with independent monitoring unit of the Project will monitor the project activities based on indicators of social safety. Indicators of rehabilitation, production, environmental sanitation, traffic will be built to serve the monitoring plan of the Project. The grasping reality will help community supervision division report information related to the project progress, problems arisen during the project implementation to the PMU for promptly actions. The responsibility of this division is to collect feedback from the people and competent authorities as well as from the PMU. At the same time, people are also involved in the supervision, safety guarantee and sanitation in the construction phase.

The Community supervision division should be involved in the training plan on strengthening monitoring and evaluation of project activities, training on monitoring activity skills as a part of the participatory monitoring plan of the Project.

It is noted that the Resolution 80/CP on community supervision for construction works in localities should be applied.