

Initial Environmental Examination

December 2015

VIE: Power Transmission Investment Program Multi-Tranche Financing Facility Tranche 3

Subproject: 220kV Duc Hoa Substation

Prepared by Southern Viet Nam Power Projects Management Board (SPPMB) for National Power Transmission Corporation and the Asian Development Bank. This is a revised version of the draft originally posted in June 2015 available on <http://www.adb.org/projects/documents/vie-ptip-t3-duc-hoa-220kv-ss-jun-2015-iee>.

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Initial Environmental Examination

November 2015

Preparation for Tranche 3 of ADB Multi-tranche Financing Facility for the Power Transmission Investment Program in Viet Nam

Second transformer bank for 220 kV Duc Hoa substation
Long An Province, Viet Nam

Prepared by
Southern Viet Nam Power Projects Management Board:
Electricity of Viet Nam

CURRENCY EQUIVALENTS

(as of 24 May 2015)

Currency Unit	–	Dong
D1.00	=	\$0.00005
\$1.00	=	D21,770

ABBREVIATIONS

ADB:	Asian Development Bank
AP:	Affected people
BOD:	Biochemical Oxygen Demand
COD:	Chemical Oxygen Demand
DoNRE:	Department of Natural Resources and Environment
EA:	Executing Agency
ECA:	Environmental Compliance Audit
EIA:	Environmental Impact Assessment
EMF:	electromagnetic field
EMP:	Environment Management Plan
EO:	Environmental Officer
ERP:	Emergency Response Plan
ERT:	Emergency Response Team
ESU:	Environmental and Social Unit
GRM:	Grievance Redress Mechanism
IA:	Implementing Agency
IEE:	Initial Environmental Examination
LEP 2014:	Law on Environmental Protection No. 55/2014/QH13
MFF:	Multi-tranche Financing Facility
MoLISA:	Ministry of Labour Invalids and Social Assistance
NPT:	The National Power Transmission Corporation
PCB:	Polychlorinated biphenyls
PECC:	Power Engineering Consulting Joint Stock Company
PTC:	Power Transmission Company
SPPMB:	Southern Viet Nam Power Project Management Board
SPS:	Safeguards Policy Statement (2009)
TSS:	Total Suspended Solids
UXO:	Unexploded Ordnance

WEIGHTS AND MEASUR

km:	kilometre
kg:	kilogram
kV:	kilovolt
ha:	hectare
mm:	millimetre

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EXECUTIVE SUMMARY

The National Power Transmission Corporation (NPT) of Viet Nam requested that an extension to the 220 kV Duc Hoa substation be included in Tranche III of Multi-tranche Financing Facility (MFF) for the Power Transmission Investment Program for Viet Nam. The goal of the program is to develop and improve the quality and reliability of power supply throughout Viet Nam. The Second transformer bank for 220 kV Duc Hoa substation is one of nine individual subprojects that comprise Tranche III. The subproject will meet the immediate power needs of rapidly developing industrial development of Long an province with particular reference to needs of the districts of Duc Hoa, and Duc Hue and adjacent areas

Preliminary engineering designs, and safeguard requirements of the subproject have been completed including the approval of the Environmental Impact Assessment (EIA) to meet the regulations of the Long An Provincial Department of Natural Resources and Environment (DONRE). The Initial Environmental Examination (IEE) presented herein was prepared pursuant to the Asian Development Bank (ADB) Safeguards Policy Statement (2009) (SPS)¹. The IEEs of the other eight subprojects of Tranche III were prepared separately.

A. Subproject Summary

The major components of the subproject are summarized below.

- Installation of the second transformer into the 25.6 ha 220kV Duc Hoa substation, Bau Cong Hamlet, Tan My commune, Duc Hoa District, Long An province.
- Additional supporting equipment at the substation for fire prevention, i.e., fire extinguishers and emergency oil trap.

B. Potential Impacts and Mitigations

The IEE of the Second transformer bank for 220 kV Duc Hoa substation indicates the impacts of the new transformer are restricted to the construction-installation phase of the transformer. The construction-related disturbances such as noise, dust, erosion, solid and liquid waste, reduced access, increased vehicle traffic and potential increased traffic accidents, increased risk of worker and public injury can be managed with standard construction practices and management guidelines (e.g., IFC / World Bank Environmental, Health and Safety Guidelines for electric power transmission and distribution (2007)).

Because subproject will occur inside the existing Duc Hoa substation the subproject will not require resettlement or land acquisition. There are no perceived negative induced, or cumulative environmental impacts of the subproject. There are no rare or endangered wildlife, critical habitat, or protected areas in the subproject site which is located in Long An. The substation is not near a national protected area. The sensitivity of the new transformer and entire substation to climate change is assessed as low.

The existing Duc Hoa substation in which the transformer will be installed required an Environmental Compliance Audit (ECA) pursuant to the ADB SPS. The ECA of the substation was conducted to ensure there are no environmental issues or risks associated with the substation. The ECA indicated that the relatively new 220 kV Duc Hoa substation meets all legal

¹ADB, 2009. Safeguard Policy Statement, ADB Policy Paper.

and regulatory requirements of Viet Nam for electric power operations for the protection of the environment.

The brief Environmental Management Plan (EMP) prepared for the subproject prescribes impacts mitigations and environmental monitoring to minimize and manage the potential impacts of the subproject. The EMP also prescribes an emergency response plan (ERP) for the construction sites and identifies the need for capacity development and training of the implementing agency (IA) Environment and Social Unit (ESU) in environmental management and assessment as focused on the implementation of the EMP.

C. Conclusions

The IEE concludes that the feasibility design of the Second transformer bank for 220 kV Duc Hoa substation combined with available information on affected environments is sufficient to identify the scope of potential environmental impacts of the subprojects. Providing that significant changes to the subproject descriptions do not occur at the detailed design phase, and new sensitive environmental or cultural resources are not determined, further detailed EIA of the subproject is not required.

I. INTRODUCTION

1. The NPT of Viet Nam requested the a new transformer for the 220 kV Duc Hoa substation be included in Tranche III of the MFF for the Power Transmission Investment Program for Viet Nam. The Duc Hoa subproject is one of nine individual subprojects that comprise Tranche III.

2. The goal of the program is to develop and improve the quality and reliability of electrical power supply throughout Viet Nam. The Duc Hoa subproject will meet the immediate power needs of rapidly developing Long An industrial zones. The NPT is the executing agency (EA) of the subproject with the Southern Vietnam Power Projects Management Board (SPPMB) being the IA.

3. The IEE presented herein was prepared pursuant to the requirements of the ADB SPS. The IEEs of the other eight subprojects of Tranche III were prepared separately.

4. The Duc Hoa subproject was assigned Environmental Category B pursuant to the ADB SPS and recent good practice sourcebook guidance². A category B project will have potential adverse impacts that are less adverse than the impacts of category A project, are site-specific, largely reversible, and can be mitigated with an EMP³. The results of the rapid environmental assessment of the subproject are in Appendix A.

5. The IEE was prepared for the Duc Hoa subproject in the feasibility design stage using available data and information on sensitive ecological and cultural receptors that exist for the subproject site. The EIA required by the Viet Nam Law on Environmental Protection No. 55/2014/QH13 (LEP 2014) and Decree 18/2015/ND-CP has been completed and approved by the Duc Hoa Provincial DONRE (Appendix C)

²ADB, 2012, Environmental Safeguards, A Good Practice Sourcebook, Draft.

³Footnote 6, pg 19.

6. The detailed designs for the extension of the Duc Hoa subproject will follow after subproject approval. The EMP will need to be reviewed to meet the final detailed designs of the subproject.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

7. The Second transformer bank for 220 kV Duc Hoa substation will be implemented according to the directives on use of Official Development Assistance by GoV Decree No. 131/2006/ND-CP which was promulgated on November 9, 2006, and in accordance with the provisions of the parent Sector Project.

A. Viet Nam Regulatory Framework for Environmental Assessment

8. The recently revised Viet Nam LEP 2014 prescribes the requirements for environmental assessment for international and domestic project interventions that affect natural and social environment. Following the LEP 2014, the supporting Government Decree No. 29/2011/ND-CP on strategic environmental assessment, and EIA was replaced by Decree No. 18. Supporting Circular No. 27/2015/TT-BTNMT (29 May 2015) detail guideline for Decree No. 18.

9. The screening criteria of Decree No. 18 distinguish projects that require a full EIA from comparatively simpler projects that require an IEE. The difference between the Government EIA and IEE reflects the required level of assessment, and final review and appraisal that is required. The screening criteria for power transmission projects in Decree No. 18 are based on voltage. All projects undertaken with voltages exceeding 110 kV require EIAs.

10. Thus, the Second transformer bank for 220 kV Duc Hoa substation required a GoV EIA to satisfy the GoV regulatory framework. The EIA was prepared and approved in accordance with Viet Nam Law and approved by the Long An Provincial Peoples Committee on 31 December 2014. The GoV Environmental Compliance Certificate for the subproject is found in Appendix C.

B. Power Transmission Sector Regulatory Framework

11. Table 1 summarized key laws and policies governing the power sector in Viet Nam that apply to the subproject. Specific legal directives and required approvals for the subproject are summarized in Table 2.

Table 1. Power Network Legislation and Associated Legal Instruments

Laws and Regulations	Description
A. Law	
Law No. 24/2012/QH13 (20 Nov 2012)	Amends and supplements a number of articles of the Electricity Law No. 28/2004/QH11 (3 Dec 2004)
Electricity Law No. 18/2004/QH11 (3 Dec 2004)	Prescribes the electricity development planning and investment; electricity saving; electricity markets; rights and obligations of organizations and individuals conducting electricity activities and using electricity; protection of electric equipment and facilities, electricity works and electric safety.
B. Decrees	
Decree No. 81/2009/NĐ-CP (17 Aug 2005)	Prescribes the safety and protection of high-voltage power grids.
Decree No. 14/2014/ND-CP	Stipulates in detail the implementation of electricity

Laws and Regulations	Description
(26 Feb 2014)	law regarding electricity safety, including: safety in generation, transmission, distribution and use of electricity in production; compensation and assistance of housing, works, land and plants in the safety corridor of overhead power transmission line upon the construction of high-voltage grid.
C. Circular	
Circular No 22/2010/BXD (3 Dec 2010)	Regulates labor safety in work construction, construction and installation of equipment which are newly built, repaired, renovated, relocated, embellished or restored; dismantling of works and warranty for maintenance works.
Ministry of Industry and Trade Circular No. 03/2010/TT-BCT (22 Jan 2010)	Regulates protection on high-voltage power network

C. Land Development and Construction Regulatory Framework.

12. Directives for land development and construction that are relevant to the power transmission sector are summarized in Table 2.

Table 2. Applicable land development and construction law and policy

Laws	Description
A. Law	
Land Law No 45/2013/QH13 (29 Nov 2013)	Prescribes the regime of land ownership, powers and responsibilities of the State in representing the entire-people, owner of land and uniformly managing land, the regime of land management and use, and the rights and obligations of land users.
B. Decrees	
Decree No. 44/2014/ND-CP (15 May 2014)	Regulates methods for land pricing, adjustment to land price brackets and land price lists, specific land pricing and provision of consultancy on land pricing.
Decree No. 37/2014/ND-CP (15 May 2014)	Details some articles of the Law on Land concerning compensation, support, and resettlement upon land expropriation by the State.
C. Circulars	
Circular No. 36/2014 / TT-BTNMT (30 Jun 2014)	Specifies detailed methods of valuation of land prices, construction, adjustment of land prices; specific land prices valuation and land prices valuation consulting service.
Circular No. 37/2014/TT-BTNMT (30 Jun 2014)	Provides detailed regulation on compensation, assistance, and resettlement when the State acquires land.
Document of Prime Minister No. 1665/TTg-CN (17 Oct 2006)	Regards management of clearance of site, mine and explosive ordnance for construction

D. ADB Safeguard Policy

13. The ADB SPS along with the recent good safeguard practice sourcebook clarify the rationale, scope and content of an executing agency (EA) and supported by technical guidelines (e.g., Environmental Assessment Guidelines 2003). Projects are initially screened to determine the level of assessment that is required according to the following three environmental categories (A, B, or C).

14. Category A is assigned to projects that normally cause significant or major environmental impacts that are irreversible, diverse or unprecedented such as hydroelectric dams (an EIA is required). Category B projects have potential adverse impacts that are less adverse than those of category A, are site-specific, largely reversible, and for which mitigation measures can be designed more readily than for category A projects (an IEE is required). Category C projects are likely to have minimal or no negative environmental impacts. An environmental assessment for Category C and FI projects is normally not required but environmental implications need to be reviewed.

E. Applicable Environmental Laws, Policy, Standards, and Guidelines

15. The following are additional applicable directives for environmental assessment and protection for domestic and international development in Viet Nam:

Table 3: Environmental Protection Laws and Regulations

Laws and Regulations	Description
A. Laws	
Law on Environmental Protection No. 55/2014/QH13 (23 Jun 2015) (LEP 2014)	This Law provides statutory provisions on environmental protection activities; measures and resources used for the purpose of environmental protection; rights, powers, duties and obligations of regulatory bodies, agencies, organizations, households and individuals who are tasked with environmental protection.
Biodiversity Law No. 20/2008/QH12 (13 Nov 2008)	Pursuant to the 1992 constitution of the Socialist Republic of Vietnam, which was amended and supplemented under Resolution No. 5/2001/QH10 (25 Dec 2001) of the 10 th National Assembly, this law stipulates biodiversity conservation and sustainable development.
B. Decrees	
Decree No. 18/2015/ND-CP (14 Feb 2015)	Provides the requirements for Environmental Protection Plan, Strategic Environmental Assessment, EIA and Environmental Protection Scheme.
Decree No. 19/2015/ND-CP (14 Feb 2015)	Regulation detailing a number of articles of the Environmental Protection Law.
Decree No 80/2014/ND-CP (6 Aug 2014)	This Decree regulates drainage and treatment of wastewater in urban areas, industrial zones, economic zones, processing and export zones, and rural residential areas. It also prescribes the rights and obligations of organizations, individuals and households having activities related to drainage and treatment of wastewater within Vietnam's territory.
Decree No. 179/2013/ND-CP (14 Nov 2013)	Prescribes the sanction on administrative violations on the domain of environmental protection.
Decree No. 59/2007/NĐ-CP (9 Apr 2007)	Prescribes the regulations on solid waste management
C. Circulars	
Circular No. 27/2015/TT-BTNMT (29 May 2015)	Guidance for Strategic Environmental Assessment, EIA, and Environmental Protection Plan.
Circular No. 01/2012/TT-BTNMT (16 Mar 2012)	Regulation on setting-up, assessment, approval, inspection and certification of the implementation of detailed environmental protection project; setting up and registration of simple environmental protection projects.
Circular No. 22/2014/TT-BTNMT (5 May 2014)	Provides the guidelines for the implementation of the Government's Decree No. 35/2014/ND-CP (29 Apr 2014), amending and supplementing a number of articles of the Government's decree No. 29/2011/ND-CP (18 Apr 2011), providing strategic environmental assessment, EIA and environmental protection commitment.
Circular No 12/2011/TT-	Regulation on the management of Hazardous Waste. Under this law,

Laws and Regulations	Description
BTNMT (14 Apr 2011)	generators of hazardous waste are required to register with MONRE/DONRE and to have separate hazardous waste storage area. The treatment and disposal of hazardous waste will be contracted through a registered hazardous waste management company.
Circular No. 39/2010/TT-BTNMT (16 Dec 2010)	National technical regulation on noise (QCVN 26/2010/BTNMT) and on vibration (QCVN 27/2010/BTNMT)
Circular No 25/2009/TT-BTNMT (16 Nov 2009)	National technical regulation on hazardous waste threshold (QCVN 07:2009/BTNMT).
Circular No 32/2013/TT-BTNMT (25 Oct 2013)	National technical regulation on ambient air quality (QCVN 05/2013/BTNMT)
D. Decisions	
Decision No. 16/2008/QD-BTNMT (31 Dec 2008)	National technical regulation on surface water quality (QCVN 08.2008/BTNMT); Underground water quality (QCVN 09/2008/BTNMT) and Domestic wastewater (QCVN 14/2008/BTNMT)

a. Environmental Standards and Regulations

Water quality:

- QCVN 01:2008/BYT – National technical regulations on quality of drinking water
- QCVN 08:2008/BTNMT – National technical regulations on quality of surface water
- QCVN 09:2008/BTNMT – National technical regulations on quality of groundwater
- QCVN 10:2008/BTNMT – National technical regulations on quality of coastal water
- QCVN 14:2008/BTNMT – National technical regulations on quality of domestic wastewater
- QCVN 24:2008/BTNMT – Industrial wastewater discharge standards
- QCVN 02:2009/BYT – National standard of domestic water supply
- TCVN 5502:2003 – Supplied water – Requirements for quality
- TCVN 6773:2000 – Water quality – Water quality for irrigation purposes
- TCVN 6774:2000 – Water quality – Water quality for aquaculture protection
- TCVN 7222:2002 – Water quality for concentrated domestic WWTP
- TCVN / QCVN – Standard methods for analyzing environmental quality

Air Quality:

- QCVN 05:2013 – Standards for ambient air quality
- QCVN 06:2008 – Maximum allowable concentration of hazardous substances in the ambient air
- TCVN 6438:2001 – Maximum permitted emission limits of exhausted gases from vehicles

Solid Waste Management:

- QCVN 07:2009 – National technical regulations for classification of hazardous wastes
- QCVN 25:2009 – National technical regulations for wastewater of solid waste sites
- QCVN 03:2008/BTNMT – National regulation for heavy metal concentrations in soil

Vibration and Noise:

- QCVN 26:2010/BTNMT – national technical standard for noise
- TCVN 6962:2001 – Allowable vibration level for public and residential areas
- TCVN 6962:2001 – Allowable vibration and shock from construction activities

International Guidelines

- IFC / World Bank Environmental, Health and Safety Guidelines for electric power transmission and distribution (2007)
- AWWA Standard Methods for the Examination of Water and Wastewater

b. International Environmental Management Conventions

16. Viet Nam is signatory to the following relevant international conventions:

- Stockholm Convention on Persistent Organic Pollutants (2002)⁴
- Convention Concerning the Protection of the World Cultural and Natural Heritage (1972)
- Vienna Convention for the Protection of the Ozone Layer (1985)
- Montreal Protocol on Substances that Deplete the Ozone Layer (1987)
- Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Copenhagen (1992)
- United Nations Framework Convention on Climate Change (1992)
- Convention on Biological Diversity (1992)

III. SUBPROJECT DESCRIPTION

17. The 220 kV Duc Hoa substation with a new transformer will improve its existing capacity to meet the peak load demand growth and socio-economic development of Long An province, mainly industrial demand in districts of Duc Hoa, Duc Hue and adjacent areas. The project will also provide power supply to several 110kV substations in the area, improve the reliability, power quality and create flexibility in the operation of the local grid. The substation with a single transformer started operation in April 2015. Well wall-fenced, the substation is constructed with sufficient infrastructure for long-term and safe operation which comprises of its main electrical component, operational asphalted lanes, water supply and drainage system, lighting system, dedicated storage for hazardous waste, an operation house and firefighting equipment.

A. Regular Operation of Existing Duc Hoa Substation

18. The substation has a total of 11 staff who operate and maintain the substation. They are all engineers and receive training from Power Transmission Company (PTC) No.4 for 6-9 months and must pass three examinations before starting operation works. The staff are assigned three 8-hour shifts every day divided into 5 teams. They are not eligible to conduct major repairing works which should be done by an authorized maintenance team of Ho Chi Minh City PTC (affiliating to PTC No.4).

19. An Operational Manual and Work Conduct Policy for the substation were introduced for the substation. Prepared by PTC No.4, they include operation and maintenance procedures, emergency responses and usage of toolkits. The substation monitors safety implementation by recording two indicators: 1) temperature on a daily basis and 2) checking radiation and electromagnetic field (EMF) safety once a year.

B. Oil tank and Emergency Procedure

20. Oil used for the transformers is of non- Polychlorinated biphenyls (PCB) type as strictly required by Electricity of Vietnam. A 45m³ emergency oil tank has been installed for the 1st transformer to prevent oil leaks and spillages. The capacity is sufficient to contain all oil in the current transformer and the future 2nd transformer to be constructed. Oil is checked once a year to verify the oil quality, detect oil losses, and supplement if needed. A separate emergency procedure for oil accidents was introduced to all staff of the Substation. They include:

- Report directly to Head/Deputy Head of the substation.
- Isolate area of oil leaks and spillages.
- Notify PTC No.4 to proceed with replacing and repairing equipment and troubleshooting leaks and spillages.

⁴ link http://www.pops.int/documents/implementation/nips/submissions/nip_vietnam.pdf

- Collect the oil if the oil spill from the tank, prevent oil from affecting the aquatic environment and the community
- Notify specialized unit to collect, transport and process the trapped oil in the oil tank.

21. The main work of this project is the installation of the second transformer and associated equipment in the same premise of the existing Duc Hoa substation. A set of additional supporting equipment, i.e. fire extinguishers and emergency oil trap, for the safe operation of the entire substation will also be set into place.

22. The new transformer will be installed inside the 24.6 ha 220 kV Duc Hoa substation located in Bau Cong Hamlet, Tan My Commune, Duc Hoa District, Long An Province in southern Viet Nam north of the Mekong delta (Figure 1). It is bounded by a communal road to the north, gardens to the south and the east and the land property of Hong Phat Company to the west.



Figure 1. 220 kV Duc Hoa substation

C. Primary electrical component.

23. The substation will be equipped with another 220/110/22kV power transformer with the following specifications:

- Capacity ratio: 220/110/22kV-250MVA
- Group of winding: YNa0d11
- High voltage winding: potential level $225 \pm 8 \times 1,25\% / 115 / 23\text{kV}$

24. The 2nd transformer utilizes the diagram similar to the 1st one, which is described as below:

- 220kV side: the same system diagram with 02 busbars.
- 110kV side: the same system diagram with 02 busbars.
- 22kV side: the same system diagram with sectionalized busbar.

D. Civil work.

25. The civil works include ground preparation for the transformer, gate tower, electric box and cable trench. The substation layout is presented in Figure 2.

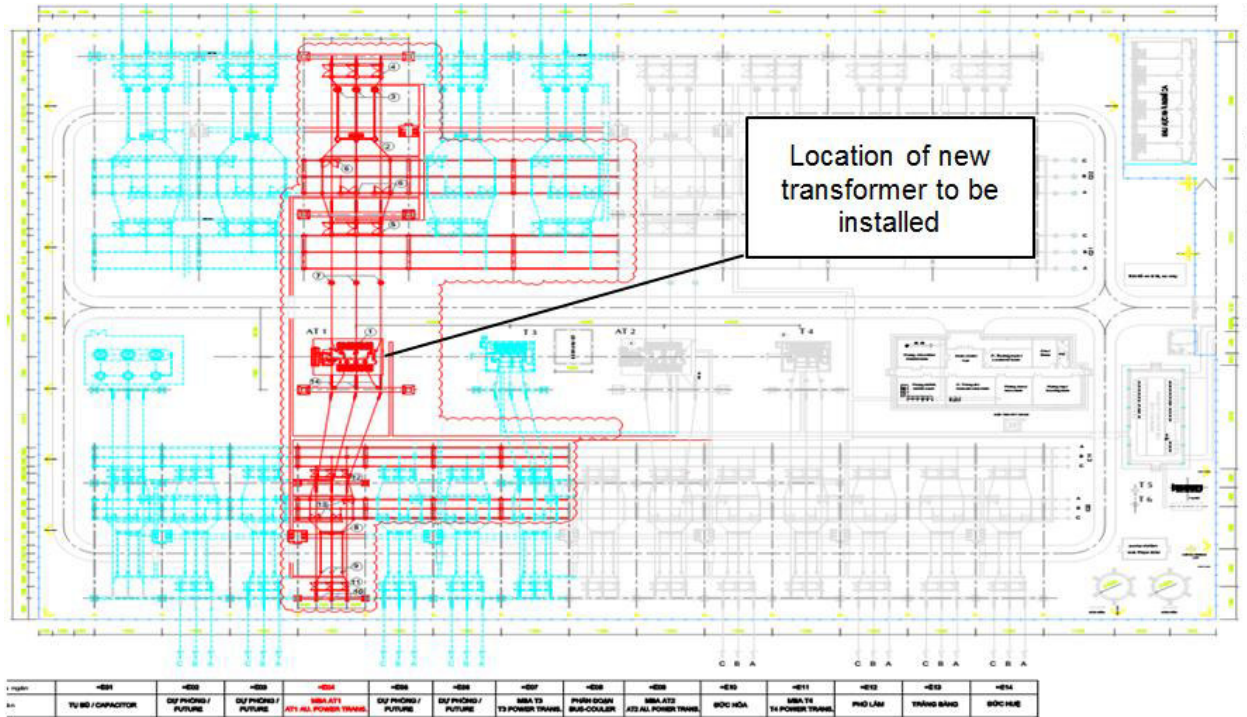


Figure 2. Plan view of new 220kV Duc Hoa substation

E. Supporting components

26. The fire protection system at this stage includes fire cooling sprinkler system, automatic misting system at 220 kV transformers and the primary fire prevention toolset such as portable fire extinguishers. The communication and Supervisory Control And Data Acquisition (SCADA) system utilizes the existing configuration at the substation.

F. Construction of New Transformer in Duc Hoa Substation

27. The construction of the 2nd transformer will be conducted in one month which will require a total of 30 workers among whom 26 are well trained technicians. The workers will install 140m² work-camp outside of the substation. Electricity and water supply needed for construction are provided by the existing sources in the substation on contractual basis. A 110m² equipment storage house will be temporarily built inside the substation and decommissioned immediately after completion.

28. The main construction activities include: 1) earthwork and concrete work for the 2nd transformer ground and 2) erection work of steel frame. Constructing materials are procured locally and electric equipment is procured in Ho Chi Minh City about 27 km from the site. They will be transported to the site using the existing access road. A list of machines to be used in the construction phase is provided below (Table 4).

Table 4. Construction equipment for the 2nd transformer in Duc Hoa Substation

Machine	Quantity	Usage
Water pump 10m ³ /h	1	For construction
10 ton Crane	2	For erection of frame and machines
90 ton Crane	2	For erection of the 2nd transformer
Machines for installing and testing water pipeline	1	For firefighting and pumping
250 liter concrete mixer	1	For concrete mixing
80 liter mortar mixer	1	For mixing mortar and grout
Table vibrators	2	For concretizing works
Wire vibrator	1	For concretizing works
8 ton truck	2	For transporting soil, sand, gravel, rock
5-12 truck	2	For transporting other material
1-1.25ton excavator	1	For excavating ground
Oil filtering machine	1	For installing the transformer
Vacuum pump	1	For installing the transformer
23kW welding machine	3	For installing steel frame
Steel bender	1	For installing steel frame
Steel drilling machine	2	For installing steel frame

29. During the operation phase of the 2nd transformer the number of substation staff will remain 11 as it is now and therefore new transformer will not require additional consumption of water and electricity or drainage and waste handling facility. However, while most of the existing infrastructure remains unchanged, the volume of septic tank for wastewater will increase from 6m³ to 10m³ after the expansion.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

1. Climate

30. The Duc Hoa substation is situated in the Southern Climate Zone which is typified by a tropical monsoon climate. Being situated between southeastern and southwestern sub-regions results in a combination the unique climatic characteristics of the Mekong Delta and the Southern East. There are two seasons a year: the dry season from November to April and the rainy season from May to October. In general, the province has abundant moisture, sunshine, and a narrow diurnal temperature range due to the subequatorial climate with monsoon.

a. Temperature

31. Ambient temperature is high and changes very little in annually. Average monthly temperature from 2009 – 2013 was 26.1 – 27.7°C (Table 5). The mean difference between the hottest month and the coldest month is about 4-5°C. The cool months of year are from December to January while the hot months are April and May.

Table 5. Temperature regime at some stations in Long An Province

Stations	Monthly average temperature(°C)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tan An	24.48	25.04	26.48	28.06	27.5	27.3	26.46	26.58	26.42	26.5	26.14	25.14
MocHoa	23.94	26.46	27.74	28.84	28.46	27.94	27.22	27.72	27.9	27.9	27.52	26.48

Source: Long An Statistical Yearbooks 2009-2013

32. According to the report of the Working Group on Climate Change and Development, (2007), in the Mekong region average temperatures over the last century have risen between 0.3 to 0.8°C. Further temperature increases are expected along with more extreme weather events, such as floods and droughts, changes in the amount and distribution of rainfall, disruption of seasonal monsoons, and rising sea levels.

b. Sunlight hours

33. Average total number of sunlight hours in Duc Hoa are approximately 2.500-2.800 hours per year (Table 6).

Table 6. Average number of sunlight hours

Station	Mean for Month (hrs)												Year Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Tan An	266	251	279	247	225	184	195	186	186	200	226	240	2686

Source: National technical regulation on natural condition data in construction_QCVN 02:2009/BXD

c. Humidity and Rainfall

34. Average relative humidity in Long An is 80-82% (Table 7) In the dry season relative humidity is as low as 78%. The average evaporation is 1,204.5 mm/year.

Table 7. Monthly mean humidity in Moc Hoa Station

Station		Mean for Month (%)												Year Avg
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Moc Hoa	Avg	76.8	77.0	76.3	76.5	82.0	84.6	85.0	84.6	83.8	82.4	79.2	76.7	80.4
	Min	53.7	52.3	50.1	51.4	60.5	64.7	65.4	66.5	68.5	68.5	63.6	57.7	60.2

Source: National technical regulation on natural condition data in construction_QCVN 02:2009/BXD

35. The rainy season starts which is from May to November accounts for 91.7 to 93.8% of the annual rainfall. The dry season starts from December to April with much lower rainfall (Table 8). As a consequence the river flow is minimal, water table lowers, and seawater intrusion through the rivers reaches maximum levels.

Table 8. Average Monthly Rainfall at Tan An and Moc Hoa Stations 2009-2013

Station	Mean Value by Month (mm)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Tan An	16.8	17.9	12.9	59.5	223.8	162.3	229.3	188.5	264.9	273.4	115	46	
Moc Hoa	10.8	11.2	23.8	81.4	81.8	174.8	199.8	226.1	263.9	328.2	145	57	

Source: Long An Statistical Yearbooks 2009-2013

36. In Duc Hoa District, water resources rely on rainfall and supply from Vam Co Dong River. The rainfall in rainy season accounts for 85% of annual precipitation. The water volume is abundant but unevenly distributed making excessive surface runoff and soil erosion in lowlands (Table 9).

Table 9. Duc Hoa annual rainfall distribution

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average rainfall (mm)	16	7	18	82	225	277	259	205	318	353	148	62	1970

Source: Duc Hoa District Masterplan for Environmental Protection, 2011

d. Wind velocity.

37. During the rainy season the prevailing wind direction is south-west with the frequency of 70%, from May to November. Arriving from the sea the wind brings vapor and rain in the rainy season. In the dry season the prevailing wind direction is southeast with the frequency of 60-70% from December to April. In the rainy season, the average wind speed is greater than in the dry season, but the monthly difference is minimal. The average monthly wind speed is from 1.5 to 2.5 m/s; the highest wind speed monitored can reach approximately 30-40 m/s coming with the occurrence of thunderstorms, mostly in the rainy season with the west or southwest winds.

Table 10. Average wind velocity in Long An province

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
V_{avg} (m/s)	1.8	2.6	2.8	2.2	1.7	2.3	2.3	2.6	1.8	2.1	2.2	1.7	2.2
V_{max} (m/s)	12	19	16	20	40	18	20	30	18	16	19	12	20
Prevailing direction	SENE	SENE	SE	SE	W,SW	SW	SW	SW	SW	SW	N	N	

Source: Long An Statistical Yearbooks 2009-2013

38. In Duc Hoa District thunderstorms occur 110 to 140 days from May to November. Thunderstorms can be dangerous if accompanied by thunder and lightning with wind speed approaching 30-40 m/s.

2. Air quality

39. Data available for ambient air quality in the whole area were retrieved from secondary sources, i.e. studies by Long An DOMRE and Ho Chi Minh City Institute of Environment and Natural Resources.⁵ These studies concluded that the air quality in Long An is being degraded by industrial development and urban expansion. Most polluted areas are within and adjacent to existing industrial zones and the cities. Open landfills and large-scale animal farms that are not well managed are the major sources of air pollution in the rural areas of Long An Province.

40. However, air quality at the Duc Hoa substation site is good (Table 11). Results of the analysis verified that air quality (dust, SO₂, NO₂ and CO) measured are within the limits set by QCVN 05: 2013 / BTNMT (Viet Nam National Standard on Ambient Air Quality). The noise level at the points of measurement is also much lower than limits in QCVN 26:2010/BTNMT (Viet Nam National Standard on Noise). This suggests the overall good quality of ambient air in the subproject area.

Table 11. Air pollutants measured at the Duc Hoa Substation

Location	Temp. (°C)	Noise(dA)	Pollutant concentration(mg/m ³)			
			Dust	SO ₂	NO ₂	CO
K1	31.2	58–60	0.142	0.012	0.032	20
K2	30.9	61–62	0.24	0.023	0.051	16
QCVN05:2013/BTNMT	-	≤70	0.3	0.35	0.2	30
Sampling location			Coordinates			
K1	On access road at gate of the Substation		X=1122542, Y=665890			
K2	Inside the existing Substation		X=1122489, Y=665811			

Source: Duc Hoa Substation EIA prepared by Power Engineering Consulting Joint Stock Company (PECC) 5, 2014

⁵ Nguyen Van Phuoc et al 2011, Projecting environmental pollution generated by industrial development to the year 2020 in Long An Province, Journal of Science and Technology, vol.14, No.m1, 2011.

3. Topography, Geology and Soils

41. Duc Hoa district and Tan My Commune lie in Vam Co Dong River Basin which consists of various terraces and mudflats. This geomorphological zone is formed by aggressive-accumulative and accumulative processes. The foundational soils of fluvial, marine and fluvial - marine deposits are composed mainly of clay, silt and fine to medium grained sand. It has been assigned to late Pleistocene – late Holocene (Q_1^3 and Q_2^3).

42. According to the results of an investigation, done by PECC4 in July 2014, in conjunction with field work and laboratory analysis, soil in the subproject area is divided the 4 layers as presented as follows:

Topsoil layer: soft to plastic, blackish grey clay

Layer 1 (CL): Plastic, brownish grey sandy clay with tree roots. Found at borehole G21.6 with thickness of 5.7m;

Layer2 (CL): Stiff to very stiff, yellowish, white, brownish grey sandy clay. Found at boreholes G21.5 and G21.7 with thickness from 5.1m to 11,6m;

Layer 3 (SC): Stiff yellow sandy clay. Found at boreholes G21.6 and G21.7 with thickness from 5.0m to 5.5m.

43. Duc Hoa District possesses the transitional characteristics of being between the edge of the ancient alluvial dunes and plains along the Vam Co Dong River and alum swamps, lowering from northwest to southeast. Riparian lowland and alum swamps are fragmented by the density of natural rivers. Currently, the area is susceptible to flooding, storm surges and flooding rains in the rainy season. The PECC5 calculated the probability of flooding to Duc Hoa substation by high tides and floods in nearby Sai Gon River and Vam Co Dong River. It is concluded that the design of the substation can sustain the maximum level of flooding.

a. Soil

44. The following are the three major groups of soil in Duc Hoa District:

Alum soil: distributed along the Vam Co Dong River and Thai My Canal, accounting for 29% of the total land area of the district. The soil consists of loam and clay, with high toxic concentrations of Cl^- , SO_4^{2-} , Al_{3+} , Fe_{3+} . This soil area is often flooded during the rainy season and suitable only for rice and sugarcane.

Grey soil: situated in the center of the district, along the provincial road 10, which extends from Loc Giang to Duc Hoa town; accounting for about 48% of the total land area of the district.

Alluvial soil: occupying of about 23% of the total land area of the district; composing of sand and loam. Most ancient alluvial land area suffers lack of water in the dry season.

4. Surface and groundwater resources

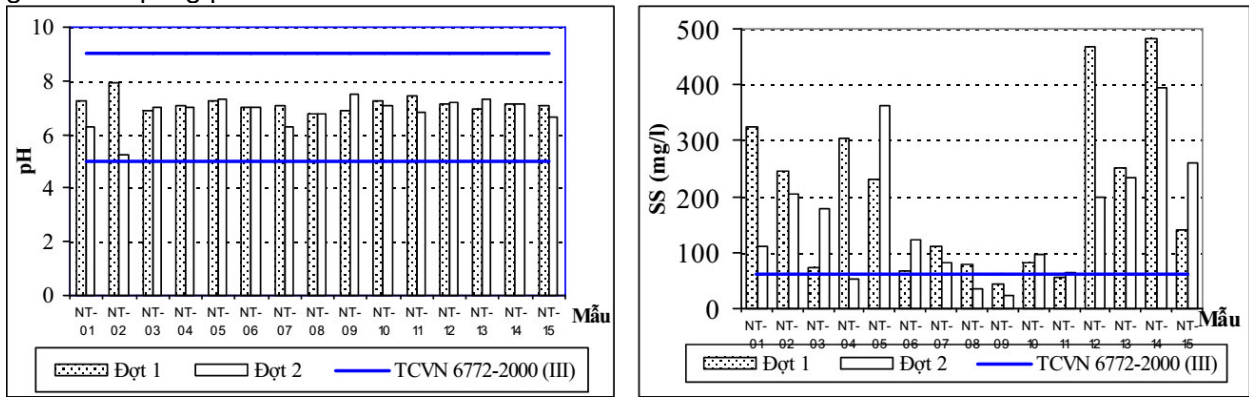
45. Vam Co Dong River is the major river that runs along the boundary between the districts of Duc Hoa and Duc Hue. Originating from Cambodia it flows through Tay Ninh and Long An provinces of Viet Nam before entering into the sea via Soai Rap estuary. The section coming through Duc Hoa District is 40 km long and 17 m wide on average, with the riverbed slope of 0.21%. The canal system in the district is quite developed functioning as irrigation channels and inner waterways

46. Duc Hoa is affected by both upstream flooding from Mekong River and localized flooding in lowland usually from September to November. Flooding can last for continuous 20-30 days with high water level of +0.3-0.5m. The substation site is designed to be located on an elevated terrace and not prone to localized flooding.

47. Groundwater in Long An in general and Duc Hoa District in particular has not been comprehensively investigated. As of writing, such data for Duc Hoa are retrieved from a study by the Federation of Geology and Hydrology for Mekong Delta region and the results of the provincial rural water program prior to 2003. They showed that groundwater resources exploitable in the district lie in a depth range from less than 100m to 300m. Currently groundwater of less than 100 m depth is being exploited for domestic use.

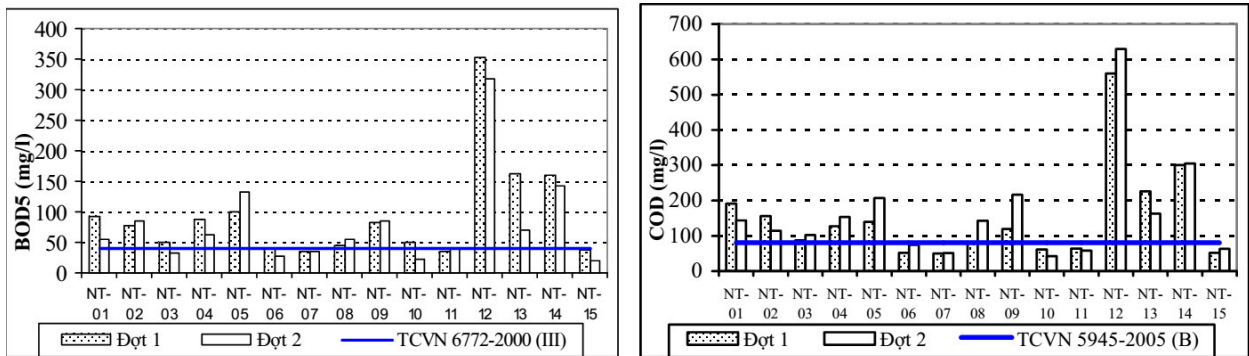
5. Water quality

48. Recent official data on water quality for Long An Province and Duc Hoa District are unavailable. The state of water environment was determined with the 2011 EA report for Duc Hoa district supplemented with data collected by PECC4 in 2014 (Figures 3 and 4). The results of analysis asserted that most measured parameters exceed the allowable limits by Vietnamese standards for domestic wastewater. Some even are 7-8 times surpassing the limits such as SS (Suspended Solid), COD (Chemical Oxygen Demand), BOD (Biochemical Oxygen Demand) at given sampling points.



Source: Duc Hoa District Master Plan for Environmental Protection to 2025, with vision to 2020

Figure 3. pH and Suspended Solid (SS) in urban wastewater in Duc Hoa Town



Source: Duc Hoa District Master Plan for Environmental Protection to 2025, with vision to 2020

Figure 4. BOD and COD in urban wastewater in Duc Hoa Town

49. A recent survey of wastewater from the Duc Hoa substation was conducted in September 2014 (Table 12). The team sampled wastewater at the discharge gate to the irrigation canal in front of the substation. The analysis showed that most sampled parameters, except for COD, in domestic wastewater treated in the substation's septic tanks are within the limits allowed by column B - National technical regulations for domestic wastewater QCVN 14:2008/ BTNMT.

Table 12. Surface wastewater quality at Duc Hoa substation, 2014

No.	Parameter	Unit	Result	QCVN14:2008/BTNMT, Colum B
1	pH	-	6.6	5– 9
2	Total suspended solid(TSS)	mg/l	95	100
3	COD	mg/l	25	15
4	BOD ₅	mg/l	13	50
5	Nitrate	mg/l	4.79	50
6	Phosphate	mg/l	0.39	10
7	Coliform	MPN/ml	4.000	5.000

Source: Duc Hoa EIA report, October 2014

6. Groundwater quality

50. As indicated above survey for Duc Hoa district in 2011 the major concern is about alum groundwater. It is found in many areas at particularly upper aquifers, where water is exploited to use for domestic purposes and irrigation. Though no data is present, it is likely that groundwater in the town is being affected by the pollution from dug and drilled wells that are not well managed, as seen in many other locations in Mekong River Delta.

51. The industrial facilities in main industrial zones use groundwater at depth > 200 m. For domestic use, local people have to drill wells a few dozen meters deep for clean water. But so far, the quality of water wells has not been investigated. According to the survey data, there are 50,000 wells in Duc Hoa District with a depth of 150-250 m. Many households extract 5-10 m³/day from 2-4 wells in the dry season to ensure adequate water supply

7. Electromagnetic field (EMF) safety

52. EMF were measured at Duc Hoa substation in Dec 2014. The data indicate that EMF intensity remains within the allowed level of safety for operators and people nearby (Table 13).

Table 13. Measurement of electromagnetic field at Duc Hoa substation, 2014

No.	Location (Frequency 0-30kHz)	Safety Standard <5kV/m/8hrs
1	Office	0.0046
2	Control box	0.0035
3	Control panel	0.042
4	At substation gate	0.15
5	At the transformer	0.22
6	10m from the transformer	0.034

Source: EIA report for 220 kV Duc Hoa substation, 2014.

B. Biological Environment

1. Vegetation and Land Use

53. As of 2000 the forested area of Long An province covers 44.5 ha, Melaleuca trees and eucalyptus are two main types of plants with a total volume of approximately 1.26 million m³. However, the plant and animal resources of the mangrove forest ecosystems in the alum lowlands in Long An has been exploited and devastated. Mangrove forests have been depleted steadily in the area due to development (Long An Province Environmental Masterplan 2015 with vision to 2020).

54. The forested area in Duc Hoa District sharply decreased over the last ten years, from 597.4 ha in 2006 to 11.4 ha in 2015 (Table 14). The forest consists of mainly Melaleuca (cajuput) and eucalyptus trees planted in the eastern districts for rehabilitating alum lowlands. The quality of forest plantations is poor because limited protection and other growing land use purposes (Duc Hoa District Statistical Yearbook, 2013 & IEE survey data).

55. Land use in Duc Hoa district is summarized in Table 14. In Tan My Commune where the substation is sited, the vegetation is characterized by agricultural crops, mostly rice, sugarcane, peanut, corn and vegetables. There is no forest in the commune.

Table 14. Duc Hoa District Land Use in 2015

Commune/ Town	Total land area (ha)	Wet rice (ha)	Perennial crops (ha)	Forest (ha)	Water bodies (ha)	Special use (ha)	Unused (ha)
	23930	8781	6598	11	1218	7063	258
Tan My	4753	1378	1806		427	1142	
Tan Phu	4027	1530	1248		362	885	
Hau Nghia Town	989	277	208		20	484	
Hoa Khanh Tay	2862	315	1088			1202	258
Hoa Khanh Nam	1015	386	213		20	396	
Duc Hoa Town	733	359	279		29	66	
Duc Hoa Thuong	3078	1169	954		277	678	
My Hanh Nam	3102	558	651		62	1830	
Hoa Khanh Dong	1487	1328	57	0.4	17	84	0
Huu Thanh	1883	1480	93	11	4	295	0

Source: Survey by Social Safeguard Team in 2015.

2. Wildlife

56. The area of the existing Duc Hoa substation is in extensively modified habitat (as defined by the ADB SPS. Similarly, no natural habitat⁶ exists. Wildlife in the area is sparse due to the long-term agricultural development, and limited forest habitat. Aquatic birds such as storks are found according to Long An Province's Environmental Masterplan 2015 with vision to 2020 and Duc Hoa District Statistical Yearbook 2013. Apart from local statistics, discussions with environmental authorities in Duc Hoa Province and Duc Hoa District indicate that there are also no rare or extinct animals in the subproject area. There are no rare or extinct wildlife species in the area. Moreover, the new transformer will be installed inside the substation property on a cleared and graveled site (Figure 5c).

⁶ Natural habitat is land and water areas where the biological communities are formed largely by native plant and animal species, and where human activity has not essentially modified the area's primary ecological functions. See ADB.2009. SPS. Manila (Glossary)

3. Conservation Areas

57. There are no conservation areas within the proximity of the substation.

C. Socioeconomic condition

1. Population

58. Duc Hoa district is relatively populous in the province. According to the statistics of 2012, the population of Duc Hoa district is 227,563 with a density of 476 people/km². The density of the province is 323 people /km². The population is distributed unevenly, often concentrated in the town, and along the main roads. The highest population is concentrated in the towns of Duc Hoa, Hau Nghia and Hiep Hoa. Almost all of Duc Hoa District are Kinh people of 99% of the total; the other 1% belongs to Khmer, Cham, Chinese and Nung ethnic groups. There are no ethnic minorities in Tan My Commune.

2. Local Economy

59. Recently Duc Hoa district has steadily industrialized and urbanized (Table 15). A 2010 statistics shows the strong proportion of the industry sector in local GDP, almost 69% compared to 17% for agriculture and 14% for services and trade. Five industrial parks and 14 industrial clusters with over 1,500 companies are operating, of which is the largest industrial parks in the Province. 35,000 workers are employed. The poverty incidence is as low as 3.3% in 2014.

Table 15. Industrial zones in Duc Hoa district

Industrial zone	Area (ha)
Duc Hoa 1 – Hanh Phuc	274.33
Duc Hoa 2 – Xuyen A	483.13
Duc Hoa 3	2300
Tan Duc	569
Duc Hoa Dong	500

60. The farming sector in Tan My Commune aligns with that of Duc Hoa District in a descending trend. The dominant crops are wet rice, bean, corn and vegetables. Due to its low productivity and income, a large number of farmers seek work in other sectors. As of April 2015, only 21% of household work in farm and 79% in commerce and services in 159 self-run shops.

Table 16. Income and poverty in Duc Hoa district, 2014

No.	Commune/Town	Number of households	Monthly income (VND)	Number of poor households
1	Tan My	2691	4,200,000	403
2	Tan Phu	2451	3,060,000	123
3	Hau Nghia Town	1851	4,350,000	37
4	Hoa Khanh Tay	2344	4,500,000	117
5	Hoa Khanh Nam	1551	4,150,000	31
6	Duc Hoa Town	2487	2,500,000	373
7	Duc Hoa Thuong	2514	3,100,000	126
8	My Hanh Nam	3151	4,800,000	63
9	Hoa Khanh Dong	2811	2,150,000	27
10	Huu Thanh	2757	2,400,000	45
	Total	24608		819

Source: Survey by Social Safeguard Team in 2015.

61. The local handicraft industry and trades in Duc Hoa district remains stagnant and rather of low value. These activities are diverse involving bamboo basket weaving, bamboo screen production, palm-leaf conical hat production, fish sauce processing, rice milling, farm product processing etc. Although small-sized and disperse, the industry helps generate jobs and income for farmers in offseason periods. On average, a household can employ 2-3 workers and a production unit creates jobs for 20-25 people.

3. Social Infrastructure

a. Public Health and Sanitation.

62. Currently, Duc Hoa District has 01 district level general hospital in the town of Hau Nghia with 235 beds and medical staff of 278 people. This improves the quality of health care for local people. There are also 10 communal clinics and 3 regional polyclinics. In the whole province, 16 hospitals located in different districts and urban areas provide people better access to healthcare services.

63. According to data from the Ministry of Labour Invalids and Social Assistance (MOLISA)'s Department for Social Vices Prevention, in Long An province, by 2014, 4,167 HIV-infected patients are detected, 2,421 patients with AIDS, and 1,320 deaths. The number of HIV/AIDS patients with records is 1501, in which 1,351 patients who live at home and 150 patients are treated in 4 HIV/AIDS treatment clinics in the province. There are 185 out of 192 communes, wards and towns with infected patients, equivalent to infection rate of 96.4%.

64. 95% of communal households have sanitary toilets and 83% have access to clean water (2,557 households). Domestic and industrial waste remains problematic to local authority with regard to waste collection, transportation and disposal. Currently there is no landfill for the district. All wastes collected in the urban and industrial zones are handled by the District Civil Works Company who then transports to the Phuoc Hiep-Cu Chi landfill in Ho Chi Minh City. According to Long An Provincial Master Plan for Waste Treatment Sites in 2010-2020 with vision to 2030, a waste treatment facility will be built in Duc Hoa Dong Commune for the whole Duc Hoa district but no details on construction date are given.

65. Drainage system in urban areas, e.g. Duc Hoa Town and Hau Nghia town, has been established but far from completed. The domestic wastewater is discharged to surrounding ditches and irrigation canals without treatment. Animal excreta from large-scale farms and aquaculture activities such as caged fish raising are also polluting local surface water.

b. Education

66. The education system in Long An province in general and Duc Hoa district in particular covers pre-schooling to tertiary level. At provincial level, there are 422 schools from elementary to high school; 2 universities and 6 technical and vocational colleges. There are 31 educational organizations present in Duc Hoa district composed of 10 kindergartens, 11 elementary schools, 9 secondary schools and 1 high school. One hundred percent of children of schooling age have received universal education.

c. Communications:

67. The subproject area is being covered by many telephone networks such as Viettel and VNPT telecoms, and some other telecom companies. Therefore, it is highly convenient for people to communicate and develop this sector.

d. Water and electricity:

68. The subproject area is supplied with 11 concentrated water schemes which cover 83% of the district's households (Table 17). Main water source came from underground water from upper aquifers. There are about 50,000 wells with depths ranging from 150-250m. As of 2015, 100% of commune households have access to electricity.

Table 17. Water supply in Duc Hoa District, 2015.

No.	Commune/Town	Total HHs	Tapwater	Drilled well	Dug well	Rivers, ponds, streams
1	Tan My	2691	2557	81		53
2	Tan Phu	2451	2156	221		74
3	Hau Nghia Town	1851	1795		37	19
4	Hoa Khanh Tay	2344	2227	70		47
5	Hoa Khanh Nam	1551	1504		31	16
6	Duc Hoa Town	2487	2350	94		43
7	Duc Hoa Thuong	2514	2389		50	75
8	My Hanh Nam	3151	3056		63	32
9	Hoa Khanh Dong	2811	1176	963	672	
10	Huu Thanh	2757	1369	1253	135	

Source: Survey by Social Safeguard Team in 2015.

4. Infrastructure for transportation

69. The transportation system in Duc Hoa district is well developed and connected, with provincial highways No. 822, 823, 824, 825 as the main traffic routes connecting with Highway 1A and Trans-Asian Highway. The N2 route links the district with Ho Chi Minh City and other Mekong Delta Provinces. The inter-district main roads among urban communes and districts have been asphalted or concreted while the smaller rural roads are paved with gravels and small rocks for better travel.

5. Cultural and Heritage Sites

70. In Duc Hoa, there are 5 cultural and historical sites recognized at national and provincial level. They include Binh Ta archeological site, Go Don relics, Go Xoai relics, Go Nam Tuoc relics and Duc Hoa Junction historical site. Four of them are related to Hindu cultural and religious traditions established from 1– 630 A.D as OcEo Culture in the ancient Funan Kingdom. The IEE with PECC5 investigated all possible sensitive receptors in a range of 5km from the Duc Hoa substation. It is found that no such sites are within 500m of the substation, therefore no impacts from the subproject are incurred. The table below presents all environmental sensitive receptors around the concerned site.

Table 18. Environmental Sensitive Receptors around the substation

Substation	Name of receptors	Distance from substation (km)
220kV Duc Hoa substation, Tan My Commune	Bau Cong Church	4
	Lap Dien Church	6
	Rung Mui Temple	5
	Communal People's Committee Office	10
	Primary school	5
	Secondary school	10
	Kindergarten	5
	Communal clinic	10

Source: IEE consultant and PECC5 team, April 2015

6. Unexploded Ordnance (UXO) Clearance

71. After decades of war, UXO remains a significant issue in Viet Nam. However, the risk of UXO accidents regarding the subproject is zero since clearing of UXO has been conducted before the construction of the Duc Hoa substation since 2010. The ground within the boundary of the substation for the construction of the 2nd transformer has been prepared; therefore additional UXO clearance is not necessary.

7. Subproject affected people

72. No local residents will be affected by the installation of the 2nd transformer and related construction activities inside the substation. There are about 20 households living near the substation. The nearest distance of the households to the substation is 300m.

D. Additional features of 220 kV Duc Hoa substation

73. The site of the substation and the site where the new transformer will be installed are presented in Figure 5.



 A wide-angle photograph of a large, flat, open area within a substation. The ground is mostly dirt and gravel. In the foreground, there is a concrete curb with red and white stripes. A long, low wall with a yellow top section runs across the middle ground. In the background, there are several tall, thin poles and a clear sky.	<p>Fig 5c: Location inside substation for 2nd substation</p>
 A photograph showing a yellow wall of a substation on the right side. To the left of the wall, there is a large pile of dark, charred wood or debris. In the background, there is a line of green trees under a blue sky with some clouds. A street lamp is visible near the wall.	<p>Fig 5d: Cajuput woods adjoining the substation site</p>
 A photograph of a large, open, flat area of land. The ground is dirt and gravel, with some scattered debris. In the background, there are several tall, thin poles and a line of trees. A small red and white striped marker is visible in the foreground. The sky is clear.	<p>Fig 5e: Land owned by Hong Phat Company adjacent to 220 kV Duc Hoa substation</p>

Figure 5. Features of 220 kV Duc Hoa substation site

V. INFORMATION DISCLOSURE AND PUBLIC CONSULTATION

A. Information disclosure

74. Disclosure to APs and stakeholders of information on the 220 kV Duc Hoa substation that occurred during the IEE was conducted in a formal meeting format. Formal disclosure forms the beginning of continued information disclosure and stakeholder involvement as the subproject is implemented. Information on the subproject was provided to stakeholders in the local language. As part of the stakeholder communication strategy regular information exchange and meetings with stakeholders are strongly encouraged throughout implementation of the subproject.

75. The IEE must be easily available to the stakeholders contacted during examination in written and verbal forms in local language of Vietnamese. At the minimum the Executive Summary of the IEE must be translated to local language and distributed to all affected persons (APs). The IEE will be available on the NPT and SPMB websites, and at the subproject site. Similarly, all subproject reporting with specific reference to stakeholder consultation minutes, environmental monitoring, and reports on EMP implementation released by the EA/IA will be available at the same offices and websites. The IEE will be available on the ADB website as well as EMP reporting that is prepared by the EA/IA after implementation begins.

B. Public Consultation

76. Stakeholder consultations were developed to meet the requirements of meaningful consultation as stipulated by the ADB SPS. The strategy embodied the principles of meaningful engagement, transparency, participation, and inclusiveness to ensure that affected and marginalized groups such as women, and the poor, were given equal opportunities to participate in the design of the subproject.

1. Identification of Stakeholders

77. Stakeholders were identified and engaged in a participatory manner. Stakeholder communication focused on institutional stakeholders, affected communities, and persons directly affected by proposed subproject interventions. The stakeholders of the subproject include:

- Mass organizations such as Women’s Union, and Farmers Union which provided information for the design of the various subproject interventions, and which might participate in implementation of measures and interventions;
- Households and businesses living along the transmission line and near the substation site who may be directly and/or adversely affected, and who have an interest in the identification and implementation of measures to avoid or minimize negative impacts; and
- Other institutions or individuals with a vested interest in the outcomes and/or impacts of the subproject including (i) Provincial Peoples Committee, (ii) District People’s Committee; (iii) Project EA, (iv) PECC4, and (v) commune leaders.

2. Public consultation meeting

78. A written consultation with local People’s Committee and Commission was previously held by the Vietnamese EIA team (PECC4) in 28 July 2014. A follow up direct community consultation meeting was held by the IEE consultant to discuss the location and impact of the

substation for both environmental and social aspects. The meeting is convened in Tan My Commune, Duc Hoa District of Long An Province on 20th of April 2015. The public meeting consisted of the following two component procedures:

1. The engineering consultant introduced the subproject including the substation location, design and communes and wards; and
2. The environmental consultant presented ADB's environmental policy, safety regulations in the Viet Nam power sector, anticipated environmental impacts and respective mitigation measures (to be developed in IEE), the grievance redress mechanism (GRM) for environmental and resettlement problems.

79. During the meeting people raised their questions and comments on the environmental issues. The PECC5 consultant and IEE national consultant, as representatives of EA/IA, answered and explained all questions to the participants. While some locals directed their concerns to the proposed component of the subproject, a larger number of the concerns were related to the adverse impacts from operation of the existing substation. These impacts are presented in the following table.

80. The participants of the public consultation meeting included Commune leaders, representatives of mass organization such as Women Union and affected people. The total number of people consulted was 15 (Appendix B).

3. Results of Public consultations

81. Comments from communal authorities are collected by PECC5 consultation in writing. The main comments of communal authorities are as follows:

- Agreement with the environmental impacts of the project addressed in the locality.
- Agreement with the solutions and measures to mitigate environmental impacts of the project.
- The project owner will ensure all mitigation measures during the construction phase are implemented, especially to avoid disturbances to environmental and social life and to rehabilitate roads if harmed.
- The Operator of the substation will strictly follow regulations during the upgrading and operation of the substation.

82. The summary of comments/questions from local authorities/people and answers of consultants are summarized in Table 19. Subsequent formal consultations are not required by an IEE. However, required input from stakeholders and response from project owners will occur through the GRM (see below). The concerns and issues of the subproject expressed by the meeting participants are addressed by the EMP. Follow-up consultation and coordination meetings with the community will be undertaken by the project owner and contractor.

Table 19. Summary of concerns and issues with subproject

Location and time	Comments/questions local people	Response of IA, and consultants	Project Response⁷
Tan My Commune, Duc Hoa District, Long An Province April 20, 2015	Construction activities must comply with the schedule in order to avoid negative influence on living conditions and farming activities of local people.	A detailed EMP is prepared to ensure that the contractor of the subproject will avoid and prevent any potential impacts on the local environment and social life.	The EMP prescribes requirements for establishing construction schedules during the pre-construction stage
	Wastewater discharge from the existing substation floods surrounding rice fields and damages the productivity.	Though the issue is not directly related to proposed component of the project, it is highly appropriate for further investigation for the future operation of the substation. If these concerns are founded the local people are encouraged to file their complaint to the local authority. ⁸	While peripheral the EMP does prescribe wastewater and drainage management requirements associated with the operation of the new transformer.
	Waste from construction activities must be cleaned	The Project Owner will ensure that the constructor strictly follow EMP which provide details of waste management at site.	The EMP prescribes specific mitigation sub-plans construction waste management
	Restore the access road after completing construction	The Project Owner will ensure that the constructor will repair and restore the access road for normal traffic as good as pre – construction period.	The existing dirt access road is wide and used by other large trucks. Any damage caused by subproject will be repaired
Conclusion	Tan My Commune People's Committee (CPC) and local people agree with the installation of the 2 nd transformer in the 220 kV Duc Hoa substation. Impacts from the current operation of the substation on local people will be handled in due time. Project Owner and the contractor will implement the EMP to minimize potential adverse impacts of the proposed subproject		

⁷ Concerns and issues identified are addressed by EMP.

⁸ A field visit to the substation site was made following the consultation meeting. The construction of the drainage ditch around the substation exposed acidic alum soil that contaminated the surrounding rice fields. Though the rice field area is very small and far from the substation and the impact on productivity would be subsequently insignificant, the IEE consultant recommends the Project Owner to concretize the ditch to avoid this contamination in the 2nd phase of the subproject.

VI. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION

83. The assessment of potential impacts of the subproject is structured by the three development phases of the subproject defined by: *pre-construction*, *construction*, and *post-construction operational phase*. The structure is carried forward to the EMP for the subproject (see section IX).

A. Subproject Benefits

84. The single comprehensive benefit of the subproject is the provision of needed additional electrical power to Duc Hoa district and throughout Long An while reducing power outages or brownouts.

B. Pre-construction Phase

85. There are no negative impacts during pre-construction. No resettlement or land acquisition will be required because transformer will be installed inside substation.

86. The subproject EMP will be reviewed during the pre-construction phase to ensure that the EMP fully addresses the final schedule activities for the installation of the new transformer. The key impact management measures to be implemented during the pre-construction phase are:

- Completion of detailed activities of the transformer installation including scheduling equipment delivery along the busy access road; and
- Updating and initiation of the brief subproject EMP.

C. Construction Phase

87. The primary subproject activities consist of the transportation of the pre-assembled transformer and associated equipment along the existing access road to the substation followed by the installation of the transformer on the cleared site inside the substation property. Thus, the potential environmental impacts of the new transformer centre on: 1) use of the busy access road for transformer equipment delivery, and risk of increased traffic accidents and dust and noise production; and, potential worker accidents during transformer installation. There is no risk of soil erosion or pollution from construction wastes because the transformer will be installed on a level site inside a large fenced substation area. Rice fields and land use outside of the fenced substation will not be affected.

88. Construction management measures to mitigate the above common potential impacts associated with the installation of the transformer are itemized below. The mitigation measures are detailed in the subproject EMP.

- Regular use of wetting agents will be employed at substation site, and along the busy access road.
- All equipment delivery and construction vehicles, and gas powered equipment will be maintained in proper working order to minimize emissions, and not operated at night if possible to minimize noise.
- Speed limits will be posted and adhered to by construction vehicles.
- Local workers will be used as much as possible to prevent or minimize influx of migrant workers, and incidence of social disease and community unrest.

- Dedicated fuel storage areas must be established away from public areas and marked clearly.
- To minimize the risk of public and worker injury GoV Ministry of Labour Invalids and Social Assistance regulations on Occupational, Safety, and Community Health⁹ and IFC / World Bank Environmental, Health and Safety Guidelines for electric power transmission and distribution (2007) must be applied.
- Aggregates (e.g., sand, gravel, rock) that are transported by truck will be covered.
- Prolonged use of temporary storage piles of file will be avoided, or covered, or wetted regularly to prevent dust and erosion.
- Storage of bulk fuel will be on covered concrete pads away from the public and worker camp. Fuel storage areas and tanks must be clearly marked, protected and lighted. contractors will be required to have an emergency plan to handle fuel and oil spillage

D. Operation Phase

89. The potential impacts of the operational transformer are restricted to worker safety, and possible spills of hazardous waste (e.g., transformer oils). These potential impacts are addressed by existing occupation and worker safety directives and guidelines of Ministry/Department of Labour Invalids and Social Assistance, and operation regulations for substations (e.g., Table 1), and current regulations for operating substations and environmental protection as introduced above (Tables 2 and 3).

E. Climate Change

90. There have been numerous recent reports and summaries, e.g.^{10,11,12} of climate change scenarios for Viet Nam based on the most recent climate change projections of the different Global Circulation Models (GCM). The fact sheet for Viet Nam¹³ compiled by the MONRE of Viet Nam summarizes projected climate change for Viet Nam as follows.

91. By 2100 average annual air temperature in the country is expected to increase by 2.3 C° with the frequency of heat waves increasing by 100-180%, and cold surges decreasing by 20-40%. Total rainfall, and extreme rainfall events is expected to increase everywhere in the country with particular increases occurring in the mountainous northern areas. However, rainfall is expected to decrease during dry season. By 2100 mean sea level is expected to increase by 1.0 m.

1. Climate Risk and Vulnerability¹⁴

92. The sensitivity of the 220 kV Duc Hoa substation subproject to climate change is considered low as determined by the initial rapid environmental assessment of the subproject (Appendix A). The substation site is well drained which will not expose it to increased flooding from increased frequency and severity of rainfall events. Integral to the transformer installation is elevation of the substation which makes the facility resilient to potential increases in the flooding of the adjacent canal that connects to the Mekong delta.

⁹ e.g. Circular No: 22/2010/TT-BXD, date issued: 03rd December 2010.

¹⁰ ADB (2013). Viet Nam and Climate Change Assessment and Impacts, 31 pgs + Appendices

¹¹ MONRE, 2009. Climate Change and Sea Level Rise Scenarios, 15 pgs + Appendices

¹² UNEP, 2010. Assessment of Capacity Gaps and Needs of Southeast Asian Countries Addressing Impacts, Vulnerabilities, and Adaption to Climate Variability and Climate Change, 215 pgs + references

¹³ MONRE 2010, Climate Change Fact Sheet for Viet Nam

¹⁴ sensu, ADB (2014) Climate Proofing ADB Investment in the Transport Sector: Initial Experience, 88 pgs + Appendices

2. Contribution to Global Climate Change

93. Consideration of climate change includes measures to reduce the contribution of the subprojects to greenhouse gas production. Effort through design will be taken to reduce the carbon footprint of the project by ensuring for example that speed limits along upgraded roads are established and subsequently enforced, vehicles that use the access road are maintained in good working order, and all lighting installed at the subproject component sites use light bulbs that are energy efficient.

VII. ANALYSIS OF ALTERNATIVES

94. The main work of this project is the installation of the second transformer and associated equipment in the same premise of the existing Duc Hoa substation. No alternative subproject designs or locations were available for the IEE.

VIII. PUBLIC GRIEVANCE REDRESS MECHANISM (GRM)

A. Type of Grievances

95. Any AP can submit a grievance to SPPMB or PTC No.4 if they believe a practice is having a detrimental impact on the community, the environment, or on their quality of life. The public was introduced to and apprised of the GRM during initial public consultations. Grievances may include:

- Negative impacts on a person or a community (e.g. health and safety issues, nuisances, etc.).
- Dangers to health and safety or the environment.
- Social impacts due to construction activities or impacts on social infrastructure.
- Failure to comply with standards or legal obligations.
- Improper conduct or unethical behavior of contractor leading to nuisance of AP(s).

B. Grievance Redress Mechanism (GRM)

96. A subproject grievance can be defined as an actual or perceived subproject-related problem that gives ground for complaint by an AP. As a general policy, SPPMB (during construction) and PTC No.4 (during operation) will work proactively toward preventing grievances through the implementation of impact mitigation measures and community liaison activities that anticipate and address potential issues before they become grievances. Nonetheless, during construction and operation it is possible that unanticipated impacts may occur if the mitigation measures are not properly implemented, or unforeseen issues occur. In order to address complaints, a project GRM will be developed in accordance with ADB requirements and Government procedures.

97. The GRM will be established to provide an effective and transparent channel for lodging complaints and for addressing grievances. The GRM will be established prior to the construction of the subproject and will be maintained during operation and maintenance.

98. For complaints received about the construction works, the SPPMB will involve the contractor. When these are not resolved, any complaint is then facilitated by the SPPMB through the ESU under the Compensation Department. For complaints about substation operation, the PTC No.4 will act on the complaint. These will be entry points to whom the AP

could directly register their complaints. Contact details for the entry point of complaints will be publicly disseminated on information boards at the substation. Mechanisms to contact the point of entry will be through face-to-face meetings, written complaint, telephone conversations, or email.

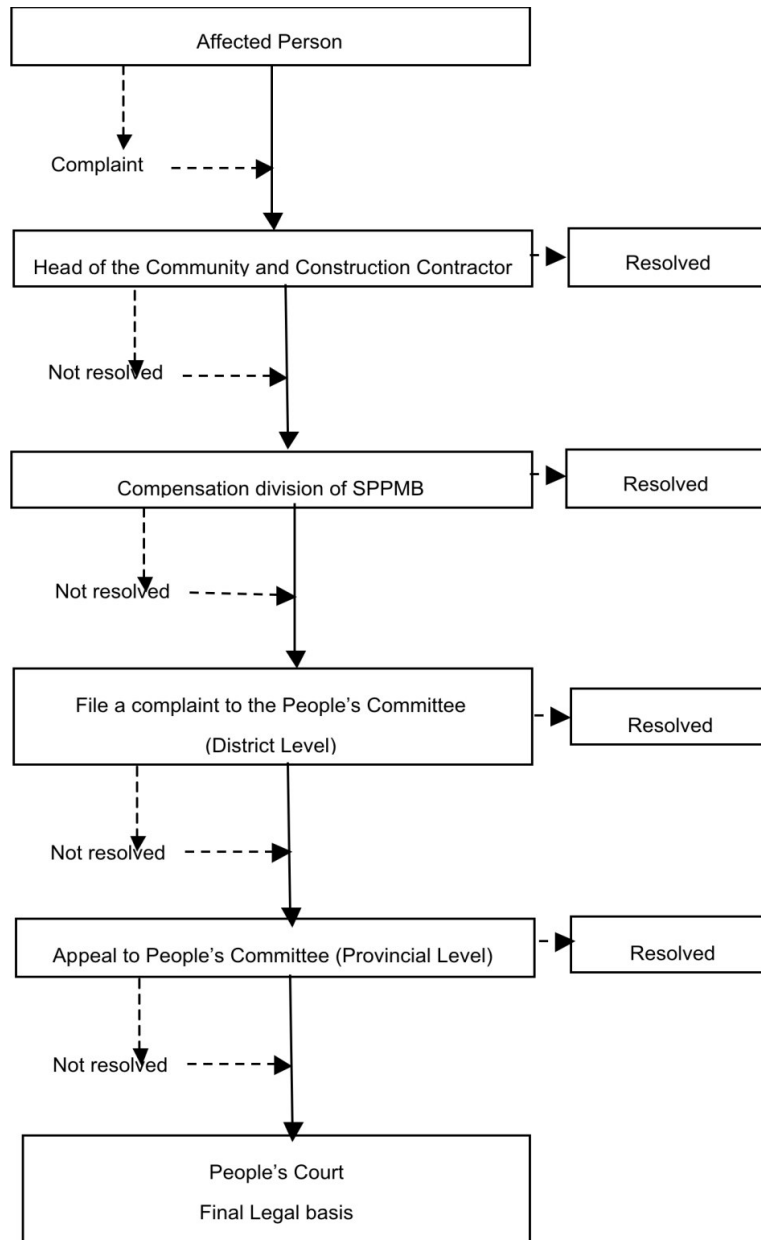


Figure 6. The Grievance Redress Mechanism

99. The following are the steps for the GRM (Figure 6):

Step 1: For complaints occurring during the construction phase, APs can register the complaint directly to the contractor and the head of the commune by means of contact information prescribed in the information boards at the substation site. Upon receipt of the complaint, the Contractor is required to record/document all complaints and to coordinate with the complainant immediately and to provide mitigation actions to the complaint within two weeks. The contractor is required to report complaints

received, resolved, and unresolved to the SPPMB through the monthly progress report.

- Step 2:** If the complainant is not satisfied with the action(s) undertaken by the contractor, the AP can inform the head of the commune about the matter, which will document the complaint in the complaints register. The commune head/authority through the Commune People's Committee will then call a meeting of the complainant, SPPMB-Compensation Department and the contractor to resolve the complaint. After discussion of the possible solutions, the SPPMB monitors the resolution of the complaint. The contractor shall be required to report any action to the SPPMB in the monthly project progress reports.
- Step 3:** If the complainant is not satisfied with the action(s) undertaken at the level of Commune People's Committee, the AP may elevate the case to the district level for resolution.
- Step 4:** Complaints not resolved at the district level is elevated to the People's Committee at the provincial level for resolution.
- Step 5:** When the complaint is not resolved at the People's Committee at the provincial level, the complaint is then elevated to the People's Court. The decision of the People's Court becomes the final legal basis for the decision on the complaint.

C. Legal Guarantees for Complaints and Grievances

100. Under the regulations in Viet Nam, APs having complaints or grievances will not be responsible for paying any administrative and legal fees in filing their complaints. Any site clearing is not allowed while the resolution of the complaint is still pending.

101. In cases where the AP is illiterate, the AP can ask assistance from one representative of his household who can then write all the complaints and grievances to be submitted to the district level for resolution.

102. Under the law, all meetings to resolve complaints and grievances will be documented and the minutes of meetings will be disclosed and posted at the Commune People's Committee.

IX. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

103. A brief EMP has been prepared for subproject. The EMP integrates the results of the IEE into a formal plan for the IA and contractor to prevent or minimize potential environmental impacts. The EMP addresses the results of the public consultations on the subproject that were convened as part of the IEE. The EMP, *inter alia*, consists of an Impacts Mitigation Plan, a Monitoring Plan, and an ERP, and the institutional responsibilities for the EMP.

A. Institutional Arrangements and Responsibilities

104. At the feasibility stage the primary management framework responsible for the implementation of the EMP for the new transformer at the 220 kV Duc Hoa substation is summarized as follows. The NPT is the EA. The EA takes overall responsibility for implementing the EMP with executive support from the Southern Viet Nam Power Project Management Board (SPPMB) which is the IA of the subproject. The IA under the direction of the EA implements the subproject and EMP with an assigned environmental and social unit (ESU) whose sole responsibility is to implement the EMP.

105. The ESU oversees and assists the work of the environmental officer (EO) of the construction contractor who implements the EMP with the CEMP¹⁵. The day-to-day installation operations including monitoring of waste management and worker safety during the installation of the transformer will be the responsibility of the PTC No. 3 or 4. A summary of indicative responsibilities for implementation of the EMP is provided below. The PTC No. 3 and 4 will operate the substation and new transformer.

106. The responsibilities of the EA with support from Electricity of Vietnam include:

1. Overall responsibility for implementation of EMP including providing sufficient budget for EMP implementation;
2. Provide coordination and supervision for the limited environmental monitoring for IA/ESU;
3. Liaise with ADB on the implementation of the EMP; and
4. Coordinate resolution with IA/ESU with issues arising from the implementation of EMP.

107. The responsibilities of the IA/ESU include:

5. Notify DONRE to verify GoV approvals of subproject are met;
6. Articulation of CEMP requirements in contractor bid documents which included appended EMP;
7. Conduct bid evaluations, specifically completeness of CEMP;
8. Undertake day to day management of EMP implementation activities;
9. Ensure compliance with any environmental or social loan covenants and assurances with respect of entire subproject
10. Lead required follow-up meetings with all affected stakeholders in public consultations;
11. Prepare and submit quarterly reports on EMP implementation to IA/EA;
12. Oversee implementation of CEMP by contractor;
13. Undertake regular construction site inspections to ensure contractor implements CEMP properly; and
14. Ensure EO of contractor submits monthly reports on construction mitigations and monitoring.

108. The responsibilities of EO of contractor include:

15. Implement CEMP for construction phase of subproject; and
16. Prepare and submit monthly reports on mitigation and monitoring activities of CEMP any environmental issues at construction sites.

109. The DONRE is the provincial agency which oversees environmental management of Long An province. The DONRE with District staff provides direction and support for environmental protection-related matters including application of the LEP 2014, EIA, and environmental standards.

110. The ADB provides guidance to EA/IA with any issues related to EMP.

B. Summary of Potential Impacts and Their Mitigation Measures

111. The potential impacts and impact mitigation measures of the EMP are presented for the three phases of subproject implementation (pre-construction, construction, operation) in Table 20.

¹⁵ Contractor Environmental Management Plan prepared by contractor from EMP which is part of bid documents.

Table 20. Impact Mitigation Plan

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ¹⁶ (USD)	Responsibility	
							Supervision	Implementation
Pre-construction Phase								
Finalize activities and scheduling for installation of transformer	No negative environmental impacts	1. Implement efficient and safe transformer installation procedure.	Inside substation, along access road	Before subproject implemented	Once	No marginal cost ¹⁷	IA/ESU	IA/PTC No.4
Disclosure, and engagement of community	No negative impacts	2. Inform community of transformer installation schedule including increased traffic periods along access road 3. Initiate GRM	For all installation activities.	Beginning of subproject	Quarterly	No marginal cost	IA/ESU	IA/PTC No.4
Complete bid documents	No negative environmental impact	4. Ensure EMP appended to contractor tender documents which instruct contractors to use EMP to construct their CEMPs, and that CEMPs must be budgeted.	Substation	Before construction	As required	No marginal cost	IA/DONRE	IA/PTC No.4
Confirm approved construction waste disposal sites	No negative impact	5. Notify DONRE to confirm disposal areas for construction waste.	Substation	Before construction	As required	No marginal cost	IA/DONRE	IA/PTC No.4
Capacity development	No negative environmental impact	6. Develop and schedule training plan for IA/ESU/EO to be able to fully implement CEMP, and to manage implementation of mitigation measures by contractors.	Substation	Before construction	As required	No marginal cost	IA/DONRE	ESU
Construction Phase								
Installation of Transformer								
Training and capacity	Prevent of impacts through education	1. Implement training and awareness plan for IA/ESU//EO and contractors.	IA office, construction sites	Beginning of construction	After each event	No marginal cost	IA	ESU
Implement Noise and dust mitigation subplan	Dust Noise	2. Regularly apply wetting agents to exposed soil and access road. 3. Cover or keep moist all stockpiles of construction aggregates, and all truck-loads of aggregates. 4. As much as possible, restrict working time at substation site	Substation, access road	Fulltime	Monthly	No marginal cost	IA/ESU	contractor

¹⁶ Costs will need to be updated during detailed design phase.

¹⁷ No marginal cost indicates that costs to implement mitigation are to be built into cost estimates of bids of contractors

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost ¹⁶ (USD)	Responsibility	
							Supervision	Implementation
		between 07:00 and 17:00. 5. Maintain equipment in proper working order 6. Replace unnecessarily noisy vehicles and machinery. 7. Vehicles and machinery to be turned off when not in use. 8. Construct temporary noise barriers around excessively noisy activity areas where possible.						
Implement Construction traffic sub-plan	Traffic disruption, accidents, public injury	9. Schedule construction vehicle activity during light traffic periods along access road. . 10. Post speed limits, and create dedicated construction vehicle roads or lanes. 11. Inform community of location of construction traffic areas, and provide them with directions on how to best co-exist with construction vehicles on their roads. 12. Demarcate additional locations where pedestrians can develop road crossings away from construction areas. 13. Increase road and walkway lighting where necessary for safety.	Access road	Fulltime	Monthly	No marginal cost	IA/ESU	contractor
Implement worker and public safety sub-plan	Public and worker injury, and health	14. Worker and public safety guidelines of MOLISA will be followed. 15. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns will be developed, posted, and enforced on all roads used by construction vehicles. 16. Appropriate safety clothing and footwear will be mandatory for all construction workers. 17. Adequate medical services must be on site or nearby all construction sites. 18. Drinking water must be provided at all construction sites. 19. Sufficient lighting to be used during necessary night work. 20. All construction sites will be examined daily to ensure unsafe conditions are removed.	Substation, access road	Fulltime	Monthly	No marginal cost	IA/ESU	contractor
Operational Phase								
Operation of new substation	Increased risk of worker or public injury	1. Occupational health and safety regulations and guidelines of MOLISA and IFC / World Bank Environmental, Health and Safety Guidelines for electric power transmission and distribution (2007) will be applied to operations of substation.	At substation	Fulltime	Quarterly	O and M	PTC No.4	

C. Monitoring Plan

112. The brief environmental monitoring plan for the three phases of subproject implementation is provided in Table 20 which consists of environmental indicators, the sampling locations and frequency, method of data collection, responsible parties, and estimated costs.

113. The standards for ambient environmental quality (e.g., water and air quality) for Viet Nam listed in section II will guide the monitoring program. The environmental standards provided by IFC / World Bank Environmental, Health and Safety Guidelines for electric power transmission and distribution (2007) will be followed to supplement standards that are not provided by the GoV.

114. Performance monitoring is required to assess the overall performance of the EMP. A performance monitoring system is normally developed by the EA for the entire subproject. Selected indicators of major components of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 21.

D. Reporting

115. Regular reporting on the implementation of mitigation measures, and on monitoring activities is required. Reporting is the responsibility of IA/ESU and will be conducted in conjunction with regular meetings with stakeholders as part of the continuation of stakeholder communications. The mitigation and monitoring plans (Tables 19-20) summarize proposed timing of reporting.

116. A report on environmental monitoring and implementation of EMP will be prepared quarterly for the EA by the IA/ESU. The IA/ESU report will also be sent to the DONRE. The reports will table all indicators measured with the monitoring plan of EMP including performance monitoring indicators (Table 21), and will include relevant GoV environmental quality standards.

117. EA/IA will prepare and submit periodic environment monitoring reports to ADB as provided in the legal agreements (at the minimum on a semi-annual basis during the construction stage and on an annual basis during the operation stage). The monitoring reports will be disclosed on ADB website upon receipt by ADB following the ADB Public Communications Policy (2011).

Table 21. Environmental monitoring plan for the 220 kV Duc Hoa substation

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD)
Supervision	Implementation						
Pre-construction Phase – Review Baseline Conditions							
Qualitative air quality: dust, noise	At substation and along access road	Using field and analytical methods approved by DONRE.	One day and one night measurement	One baseline supplement report before construction phase starts	IA/ESU	ESU	\$1,000.
Construction – installation of new transformer into Duc Hoa substation							
Qualitative air quality: dust, noise, vibration, and hazardous waste spills	Baseline sites of pre-construction phase.	Using field and analytical methods approved by DONRE, & visual observation. Allowable noise levels as per bid documents	Quarterly during construction periods Daily visual records	Monthly	IA/ESU		\$1,000./yr
Domestic (worker) and construction solid waste and wastewater inside and outside substation.	All construction sites and worker camps		Monthly				
Public comments and Complaints	Using hotline number placed at construction areas	Information transferred by telephone hotline number posted at all construction sites.	Continuous public input	Monthly	IA/ESU		no marginal cost
Incidence of worker or public accident or injury, including vehicle condition and operating permit compliance with local laws	At all construction areas	regular reporting by contractors/ ESU	Continuous	Monthly	IA/ ESU	contractor	no marginal cost
Operation of new transformer in Duc Hoa substation							
Incidence of worker accidents, spills on hazardous materials, and EMF ¹⁸	At substation and along connector lines	Regular documentation and reporting	Continuous	Quarterly	PTC No.4		O and M
Ambient noise, dust, along access road and inside substation	Substation property and road	Regular documentation and reporting	Continuous	Quarterly	PTC No.4		\$500/yr
Groundwater and soil quality	Substation property and road	Regular documentation and reporting	Once a year and when any leak/spill is detected.	Quarterly	PTC No.4		\$500/yr

¹⁸ EMF levels will fall within required levels as per GoV Law and IFC / World Bank Environmental, Health and Safety Guidelines for electric power transmission and distribution (2007)

Table 22. Performance monitoring indicators for Duc Hoa subproject

Environmental Component	Key Indicator	Performance Objective	Data Source
Pre-construction Phase			
Public Consultation and Disclosure	Affected public and stakeholders	Meetings with public stakeholders contacted during IEE and new stakeholders convened for follow-up consultation and to introduce grievance mechanism	Minutes of meeting, and participants list
EMP	Final EMP	All stakeholders contacted during IEE re-contacted for follow-up consultation	EMP
Bid Documents	Requirements of EMP (CEMP ¹⁹)	EMP appended to bidding documents with clear instructions to bidders for CEMP	Bid documents
Training of IA/ESU	Training course(s) and schedule	By end of pre-construction phase, required course(s) that will be delivered are designed and scheduled	Course(s) outline, participants, and schedule
Construction Phase			
Air quality	Visual dust and noise	Levels never exceed pre-construction baseline levels	IA/ESU and contractor monitoring reports
Public and worker safety	Frequency of injuries	Adherence to GoV occupational health and Safety regulations ²⁰	Contractor reports
Traffic	Frequency of disruptions and blocked roadways	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports
Operation of Duc Hoa substation			
Worker and Public Safety	Frequency of accidents and spills	No increase in pre-construction frequency	PTC No.4

E. Estimated Cost of EMP

118. The marginal costs for implementing the EMP are primarily for environmental monitoring because the costs for implementing impact mitigation measures are included with the construction costs in contractor bid documents. The preliminary cost for the implementation of the EMP for the subproject including an estimated environmental training budget for NPT/PPBM is approximately USD \$9,000.00 which is summarized in Table 23. The environmental costs in Table 23 are primarily for field sampling which include professional per diems of technicians.

Table 23. Estimated costs for Environmental Monitoring Plan of EMP

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline	
cultural receptors	no cost
environmental quality	\$1,000.00
Construction Phase	
environmental quality	\$2,000.00
public consultation	no cost

¹⁹ Contractor Environmental Management Plan developed from EMP in contractor bidding document

²⁰ OSH Guidelines provided by MOLISA and IFC / World Bank Environmental, Health and Safety Guidelines for electric power transmission and distribution (2007)

119. An estimated budget of USD \$5,000.00 is required for training of the EA/IA/ESU on environmental assessment and management, and the implementation of the EMP. The estimated costs of the EMP and training will need to be updated by the IA/ESU during the pre-construction phase.

X. EMERGENCY RESPONSE PLAN (ERP)

120. The contractor must develop emergency or incident response procedures during construction and operation phases of the new 220 kV Duc Hoa substation and connector lines to protect workers and the public. The ERP outlines the roles and responsibilities of persons from first identification of an incident or emergency to the final steps of safe and complete closure of the situation. The detailed requirements for the ERP are described in Appendix D.

XI. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

121. Currently there is insufficient experience and capacity for environmental assessment and management in SPPMB for the implementation of the EMP, and to develop future safeguards for the non-core subprojects. The ESU/IA of the subproject will develop and deliver training courses to the IA staff including the EO of the Contractor. The purpose of the course(s) is to strengthen the ability of the project owner including the ESU to oversee implementation of the EMP by construction contractors. Costs for training will be included with costs for implementation of the EMP.

122. Training on the implementation of an EMP will address two thematic areas. The first area will be principles environmental assessment and management focused on the potential impacts of subproject activities on the natural and social environments. The second area will be environmental safeguard requirements of the ADB and GoV with specific reference to the EMP.

XII. CONCLUSION AND RECOMMENDATION

123. The initial examination of the Second transformer bank for 220 kV Duc Hoa substation in Bau Cong Hamlet, Tan My commune indicates that potential environmental impacts are construction-related impacts and disturbances that can be mitigated and managed.

124. The public consultation meetings underscored the need for effective management of construction impacts such as noise, dust, traffic disruptions, and public safety. Follow-up meetings with the consulted stakeholders to address any construction-related issues are required. The civil construction impacts of elevated dust, noise, traffic disruptions, erosion and sedimentation, and public and worker safety can be managed effectively with standard construction practices (e.g., IFC / World Bank Environmental, Health and Safety Guidelines for electric power transmission and distribution (2007)).

125. The IEE concludes that the description of the feasibility design of the subproject combined with available information on the affected environment is sufficient to identify the scope of potential environmental impacts of the subproject. Providing that significant changes do not occur to the design of one or more of the subproject components, and that new sensitive environmental or PCR components are not identified in pre-construction phase, further detailed EIA of the subproject is not required.

XIII. REFERENCES CITED

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- ✓ ADB, 2009. Safeguard Policy Statement, ADB Policy Paper.
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- ✓ Duc Hoa District 2012, Statistical Yearbook.
- ✓ Duc Hoa District 2011, Environmental Masterplan to 2015 with Vision to 2020.
- ✓ Ministry of Construction, 2009. Viet Nam building Code 02:2009/BXD
- ✓ PECC5, 2014. 220 kV Duc Hoa Environmental Impact Assessment Report.
- ✓ Social Safeguard Team 2015, SIA data collected for Duc Hoa Substation.
- ✓ Long An Province, Statistical Yearbook, 2013.
- ✓ World Bank Group, 2007. Environmental, Health, and Safety Guidelines. Washington DC., Power Transmission and Distribution, 96 pgs.

APPENDIX A: RAPID ENVIRONMENTAL ASSESSMENT OF SUBPROJECT

Rapid Environmental Assessment Checklist Power Transmission

Country/Project Title: Preparation for Tranche 3 as part of the MFF Power Transmission Investment Program financed by ADB: Second transformer bank for 220 kV Duc Hoa

Sector / Division: Energy / SEEN

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
▪ CULTURAL HERITAGE SITE		X	
▪ PROTECTED AREA		X	
▪ WETLAND		X	
▪ MANGROVE		X	
▪ ESTUARINE		X	
▪ BUFFER ZONE OF PROTECTED AREA		X	
▪ SPECIAL AREA FOR PROTECTING BIODIVERSITY		X	
B. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE...			
▪ encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?		X	
▪ encroachment on precious ecosystem (e.g. sensitive or protected areas)?		X	
▪ alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?		X	
▪ damage to sensitive coastal/marine habitats by construction of submarine cables?		X	
▪ deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?		X	
▪ increased local air pollution due to rock crushing, cutting and filling?		X	
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		X	

Screening Questions	Yes	No	Remarks
▪ chemical pollution resulting from chemical clearing of vegetation for construction site?		X	
▪ noise and vibration due to blasting and other civil works?	X		Minimal noise is anticipated during installation of transformer. EMP prescribes noise and dust mitigation plans. There will be no blasting..
▪ dislocation or involuntary resettlement of people?		X	
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		X	
▪ social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?	X		Minor potential impact. The EMP includes mitigation measures for managing traffic caused by construction to prevent of minimize disturbance to regular traffic and local community
▪ hazardous driving conditions where construction interferes with pre-existing roads?	X		As above mitigation measures EMPs exists for managing construction truck traffic to prevent of minimize disturbance to regular traffic and local community
▪ creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?		X	
▪ dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?		X	See RP
▪ environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?		X	
▪ facilitation of access to protected areas in case corridors traverse protected areas?		X	
▪ disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?		X	
▪ large population influx during project construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)?		X	
▪ social conflicts if workers from other regions or countries are hired?		X	
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?		X	
▪ risks to community safety associated with maintenance of lines and related facilities?		X	

Screening Questions	Yes	No	Remarks
<ul style="list-style-type: none"> community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization? 		X	Human health effects of EMF have not been established by international medical community (see Appendix of IEE). Land subsidence, lowering of groundwater table and salinization are not expected to occur.
<ul style="list-style-type: none"> risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation? 		X	
<ul style="list-style-type: none"> community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning? 	X		Minimal risks if any. Information campaign will be provided to community prior to and during construction. EMP will have provisions to reduce or mitigate these impacts.

Checklist for Preliminary Climate Risk Screening

Country/Project Title: Preparation of Tranche III of MFF for Power Distribution Development
 Project: Second transformer bank for 220 kV Duc Hoa substation

Sector: Power Transmission

Subsector: Transmission

Division/Department: SEEN / SERD

Screening Questions		Score	Remarks
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	-
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	-
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	-
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	-
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	-

Result of Initial Screening (Low, Medium, High):Low

Other Comments:n/a

APPENDIX B: MINUTES AND PARTICIPANTS OF PUBLIC CONSULTATIONS

Table 24. The summary of public consultation meeting and number of participants

No	Name of subprojects	Location	Date	Participants		
				Male	Female	Total
1	220 kV Duc Hoa substation	Tan My Commune, Duc Hoa District, Long An Province	20 April 2015	10	4	14

B.1: PUBLIC CONSULTATION OF TAN MY COMMUNE

a. LIST OF PARTICIPANTS

Date (Ngày tháng) : 20 April 2015

Location (địa điểm) : Tan My Commune, Duc Hoa District, Long An Province

No. TT	Họ và tên (Name)	Nam (M)	Nữ (F)	Chức vụ (Position)	Cơ quan/Địa chỉ (Organization/Address)	Chữ ký (Signature)
1	Phung Van Me	X			Tan My Commune	
2	Pham Van Liem	X				
3	Huynh Van Canh	X				
4	Trinh Van Thieu	X				
5	Trinh Van Chuong	X				
6	Huynh Thi Thin		X			
7	Le Thi Son		X			
8	Huynh Van Duc	X				
9	Huynh Van Truc	X				
10	Huynh Thanh Binh	X				
11	Tran Van Tu	X		Hamlet Head	Bau Cong Hamlet	
12	Nguyen Dang Huy	X		Staff	Land Administration	
13	Nguyen Thi Ngoc Huu		X	Chairperson	Communal Women Union	
14	Duong Thi Huong Thao		X	Vice chairperson	Communal Youth Union	
15	Nguyen Minh Thoi	X		Vice Chairman	Communal People's Committee	

b. MINUTES OF MEETINGS AND PHOTOS- TAN MY COMMUNE

TA-7742 VIE: Power Transmission Investment Program (MFF)
CHƯƠNG TRÌNH ĐƯỜNG DÂY TRUYỀN TẢI ĐIỆN (MFF)

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

Long An, Ngày 20 tháng 4 năm 2015

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

Tiêu dự án: Lắp máy 2 trạm 220kV Đúc Hòa
Phường/Xã: Tân Mỹ, Quận/Huyện: Đức Hòa, Thành phố: Long An

I. Thành phần tham dự

- Ông/Bà <u>Nguyễn Minh Thời</u>	Chức vụ: <u>PCT UBND xã</u>
- Ông/Bà <u>Nguyễn Đăng Huy</u>	Chức vụ: <u>Chủ tịch chi bộ</u>
- Ông/Bà <u>Phạm Văn Tranh</u>	Chức vụ: <u>BQL DA địa phương</u>
- Ông/Bà <u>Trần Minh</u>	Chức vụ: <u>Tư vấn ADB</u>
- Ông/Bà <u>Trần Thái Sơn</u>	Chức vụ: <u>PECC 5</u>
- Ông/Bà	Chức vụ
- Đại diện những người bị ảnh hưởng: người (chi tiết xem danh sách đính kèm)


I. Nội dung tham vấn

- *Tư vấn thiết kế giới thiệu dự án:* Vị trí trạm, tuyến đường; vị trí và chiều dài tuyến trên địa bàn phường, xã.
- *Tư vấn môi trường trình bày về:* Chính sách môi trường của ADB; Các quy định về môi trường trong ngành điện của chính phủ Việt Nam; Các tác động về môi trường và các biện pháp giảm thiểu tương ứng (như trong IEE); Cơ chế khiếu nại khi có các vấn đề môi trường xảy ra

II. Ý kiến thảo luận

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

- *Đóng ý về các tác động môi trường và biện pháp giảm thiểu đề xuất trong báo cáo ĐTM*
- *Từ việc thực hiện lắp máy 1 của TDA, chú ý đầu tư và chọn nơi thi công cần lưu ý:*



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- Quản lý chất thải rắn từ thi công và sinh hoạt của công nhân trong quá trình thi công
- Vấn đề phòng điện của trạm trong mùa mưa có thể ảnh hưởng đến sức khỏe của người dân
- Hoàn nguyên truyền thống thi công sau khi hoàn thành để trạm hoạt động bình thường của người dân
- Giải toán vấn đề môi trường là vấn đề chiến lược gây ô nhiễm bụi, chất thải vật liệu ra môi trường, đất bị nhiễm phèn, nước thải xả ra ruộng.

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

III. Kết luận

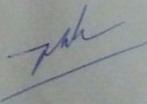
- Đồng ý với phương án thi công, tài động môi trường và các biện pháp giảm thiểu ảnh hưởng tại địa phương.
- Chủ đầu tư sẽ cam đoan, đảm bảo môi trường thi công và thực hiện xử lý triệt để các tài động trong và sau khi thi công kết thúc.

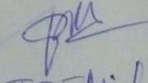
Đại diện Chủ đầu tư

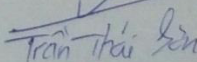
Đại diện cộng đồng

Đại diện tư vấn

Đại diện UBND xã


Phan Văn Thanh


Trần Minh


Trần Thái Sơn


Nguyễn Minh Thới

TA-7742 VIE: Power Transmission Investment Program (MFF)
 CHƯƠNG TRÌNH ĐƯỜNG DÂY TRUYỀN TẢI ĐIỆN (MFF)



PUBLIC CONSULTATION ON ENVIRONMENT AND SOCIAL/RESETLEMENT

THAM VẤN CỘNG ĐỒNG VỀ MÔI TRƯỜNG VÀ
 XÃ HỘI/TÁI ĐỊNH CƯ

LIST OF PARTICIPANTS
 DANH SÁCH NGƯỜI THAM DỰ

Date (Ngày tháng): 20/4/2015
 Location (địa điểm): Xã Tân Mỹ, Huyện Đức Hòa, Long An

No. TT	Họ và tên (Name)	Nam (M)	Nữ (F)	Chức vụ (Position)	Cơ quan/Địa chỉ (Organization/Address)	Chữ ký (Signature)
	Phùng Văn Mễ	X			Bản công - Tân Mỹ	<i>[Signature]</i>
	Phạm Văn Kiên	X			Bản công - Tân Mỹ	<i>[Signature]</i>
	Huyền Văn Cảnh	X			Bản công Tân Mỹ	<i>[Signature]</i>
	Bình Văn Thiệu	X			Bản công Tân Mỹ	<i>[Signature]</i>
	Trần Văn Cường		X		Bản công	<i>[Signature]</i>
	Nguyễn Thị Ngọc Hân (F)		X		Bản công	<i>[Signature]</i>
	LÊ Thị Sơn	X			Bản công	<i>[Signature]</i>
	Nguyễn Văn Đức		X		Bản công	<i>[Signature]</i>
	Huyền Văn Cảnh		X		Bản công	<i>[Signature]</i>
	Nguyễn Văn Cường		X		Bản công	<i>[Signature]</i>
	Nguyễn Đình Hùng	X		Trưởng ấp CĐ.Đ. xã	Tân Mỹ	<i>[Signature]</i>
	Nguyễn Thị Ngọc Hân		X	CT Hội Phụ Nữ	Tân Mỹ	<i>[Signature]</i>
	Đặng Thị H. Thảo		X	phó thị trấn		<i>[Signature]</i>

C .PHOTOS – TAN MY COMMUNE



APPENDIX C: EIA APPROVAL LETTER FOR 220 KV DUC HOA SUBSTATION

ỦY BAN NHÂN DÂN
TỈNH LONG AN

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

Số: 1411/QĐ-UBND

Long An, ngày 29 tháng 01 năm 2015

QUYẾT ĐỊNH

Về việc phê duyệt báo cáo đánh giá tác động môi trường
Dự án Lắp máy biến áp thứ 2 Trạm biến áp 220 kV Đức Hòa
của Ban Quản lý Dự án Các công trình điện Miền Nam

ỦY BAN NHÂN DÂN TỈNH LONG AN

Căn cứ Luật tổ chức HĐND và UBND ngày 26 tháng 11 năm 2003;

Căn cứ Luật Bảo vệ môi trường ngày 23 tháng 6 năm 2014;

Căn cứ Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường;

Căn cứ Thông tư số 26/2011/TT-BTNMT ngày 18 tháng 7 năm 2011 của Bộ Tài nguyên và Môi trường quy định chi tiết một số điều của Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường;

Căn cứ Quyết định số 2437/QĐ-UBND ngày 12 tháng 10 năm 2006 của UBND tỉnh Long An về việc ủy quyền cho Sở Tài nguyên và Môi trường tiếp nhận hồ sơ và tổ chức thẩm định hồ sơ môi trường của các dự án đầu tư trên địa bàn tỉnh;

Theo đề nghị của Hội đồng thẩm định báo cáo đánh giá tác động môi trường họp ngày 4 tháng 12 năm 2014 tại Sở Tài nguyên và Môi trường tỉnh Long An;

Xét văn bản số 9725/AMN-ĐB ngày 31 tháng 12 năm 2014 của Ban Quản lý Dự án Các công trình điện Miền Nam;

Xét đề nghị của Giám đốc Sở Tài nguyên và Môi trường tại văn bản số 142/STNMT-CCBVMT ngày 23 tháng 01 năm 2015,

QUYẾT ĐỊNH:

Điều 1. Phê duyệt nội dung báo cáo đánh giá tác động môi trường của Dự án Lắp máy biến áp thứ 2 Trạm biến áp 220 kV Đức Hòa được lập bởi Ban Quản lý Dự án Các công trình điện Miền Nam (sau đây gọi là chủ dự án) với các nội dung chủ yếu sau đây:

1. Phạm vi, quy mô, công suất của dự án:

a) **Địa điểm:** ấp Bàu Công, xã Tân Mỹ, huyện Đức Hòa, tỉnh Long An.

b) **Công suất:** Trạm biến áp 220 kV.

2. Yêu cầu bảo vệ môi trường đối với dự án:

a) Chủ dự án cần phải thực hiện các công trình khống chế ô nhiễm như đã giải trình trong báo cáo đánh giá tác động môi trường và những yêu cầu sau đây:

- Bụi, tiếng ồn phải được khống chế đạt quy chuẩn QCVN 05:2013/BTNMT, QCVN 26:2010/BTNMT.

- Nước thải phải được thu gom và xử lý đạt quy chuẩn QCVN 14:2008/BTNMT, cột B (K = 1,2) trước khi thải ra nguồn tiếp nhận.

Trường hợp có văn bản pháp luật quy định quy chuẩn mới thay thế hoặc bổ sung quy chuẩn hiện hành thì chủ dự án phải tuân thủ việc áp dụng các quy chuẩn mới.

b) Chất thải rắn phát sinh trong quá trình hoạt động chủ dự án có trách nhiệm thực hiện đúng theo Nghị định 59/2007/NĐ-CP ngày 09 tháng 4 năm 2007 của Chính phủ về quản lý chất thải rắn. Đối với chất thải nguy hại phát sinh từ các hoạt động của dự án phải thu gom, lưu giữ, vận chuyển và xử lý theo đúng quy định tại Thông tư số 12/2011/TT-BTNMT ngày 14 tháng 4 năm 2011 của Bộ Tài nguyên và Môi trường quy định về quản lý chất thải nguy hại.

c) Định kỳ 6 tháng/1 lần chủ dự án phải tiến hành đo đạc các thông số về nước thải và gửi báo cáo về Sở Tài nguyên và Môi trường.

Điều 2. Chủ dự án phải lập, phê duyệt và niêm yết công khai kế hoạch quản lý môi trường của dự án; nghiêm túc thực hiện các yêu cầu về bảo vệ môi trường trong giai đoạn chuẩn bị đầu tư và giai đoạn thi công xây dựng Dự án; lập hồ sơ đề nghị kiểm tra, xác nhận việc đã thực hiện các công trình, biện pháp bảo vệ môi trường phục vụ giai đoạn vận hành của Dự án gửi cơ quan có thẩm quyền để kiểm tra, xác nhận trước khi đưa dự án vào vận hành chính thức theo quy định tại Thông tư số 26/2011/TT-BTNMT ngày 18 tháng 7 năm 2011 của Bộ Tài nguyên và Môi trường quy định chi tiết một số điều của Nghị định số 29/2011/NĐ-CP ngày 18 tháng 4 năm 2011 của Chính phủ quy định về đánh giá môi trường chiến lược, đánh giá tác động môi trường, cam kết bảo vệ môi trường.

Điều 3. Trong quá trình thực hiện, nếu có những thay đổi so với các khoản 1 và 2 Điều 1 của Quyết định này, chủ dự án phải có văn bản báo cáo và chỉ được thực hiện những thay đổi sau khi có văn bản chấp thuận của UBND tỉnh Long An.

Điều 4. Quyết định phê duyệt báo cáo đánh giá tác động môi trường của dự án là căn cứ để quyết định việc đầu tư dự án; là cơ sở để các cơ quan quản lý nhà nước có thẩm quyền kiểm tra, thanh tra việc thực hiện công tác bảo vệ môi trường của dự án.

Điều 5. Ủy nhiệm Sở Tài nguyên và Môi trường thực hiện việc kiểm tra, giám sát việc thực hiện các nội dung bảo vệ môi trường trong báo cáo đánh giá tác động môi trường đã được phê duyệt tại Quyết định này.

Điều 6. Quyết định này có hiệu lực thi hành kể từ ngày ký./.

Nơi nhận:

- CT, PCT.UBND tỉnh;
- Chủ dự án;
- Các Sở: Tài nguyên-Môi trường, Khoa học Công nghệ, Công Thương, Xây dựng, Y tế;
- UBND huyện Đức Hòa;
- Phòng TNMT huyện Đức Hòa;
- UBND xã Tân Mỹ;
- Phòng CSPCTP về môi trường;
- Lưu: VT, STNMT, Nh.

DTM-LAP MÁY BIẾN ÁP THỦ 2 DỤC HOA

TM. ỦY BAN NHÂN DÂN
KT. CHỦ TỊCH
PHÓ CHỦ TỊCH



Nguyễn Thanh Nguyên

APPENDIX D: EMERGENCY RESPONSE PLAN

The contractor must develop emergency or incident response procedures (ERP) during construction. In the operational phase the operator/civil authorities will have responsibility for any emergencies or serious incidents. The construction phase will ensure:

- i) Emergency Response Team (ERT) of the contractor as initial responder;
- ii) the District fire and police departments, emergency medical service, the Department of Public Health (DPH), collectively referred to as the External Emergency Response Team (EERT), as ultimate responders.

The contractor will provide and sustain the required technical, human and financial resources for quick response during construction.

Table 25. Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	<ul style="list-style-type: none"> - Communicates / alerts the EERT. - Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary and requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	<ul style="list-style-type: none"> - Solves the emergency/incident
Contractor Resources	<ul style="list-style-type: none"> - Provide and sustain the people, equipment, tools and funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response and adequate protection, by keeping them informed of Subproject progress.

The ERT will be led by the senior contractor engineer (designated Emergency Response Team Leader [ERTL]) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

The contractor will ensure that ERT members are physically, technically and psychologically fit for their emergency response roles and responsibilities.

Prior to the mobilization of civil works, the contractor, through its Construction Manager, ERTL, in coordination with the EA/IA, will meet with the ultimate response institutions to discuss the overall construction process, including, but not limited to:

- i) Subproject sites;
- ii) construction time frame and phasing;
- iii) any special construction techniques and equipment that will be used; i
- iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;
- v) the contractor's Emergency Management Plan
- vi) names and contact details of the ERT members

The objective of this meeting is to provide the ultimate response institutions the context for:

- i) their comments on the adequacy of the respective Emergency Management Plans
- ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated
- iii) the arrangements for coordination and collaboration.

To ensure effective emergency response, prior to mobilization of civil works, the contractor will:

- i) set up the ERT;
- ii) set up all support equipment and facilities in working condition
- iii) make arrangements with the EERT;
- iv) conduct proper training of ERT members, and encouraged and trained volunteers from the work force;
- v) conduct orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and
- vi) conduct drills for different possible situations.

To sustain effective emergency response throughout Subproject implementation an adequate budget shall be provided to sustain the capabilities and efficiency of the emergency response mechanism, the emergency response equipment, tools, facilities and supplies. Drills and reminders will take place regularly, the former at least every two months and the latter at least every month.

Alert Procedures

Means of communicating, reporting and alerting an emergency situation may be any combination of the following: i) audible alarm (siren, bell or gong); ii) visual alarm (blinking/rotating red light or orange safety flag); iii) telephone (landline); iv) mobile phone; v) two-way radio; and vi) public address system/loud speakers. Some rules relative to communicating/alerting will be:

- (i) Whoever detects an emergency situation first shall immediately :
 - call the attention of other people in the emergency site,
 - sound the nearest alarm, and/or
 - report/communicate the emergency situation to the ERT.
- (ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and will be defined in the Emergency Management Plans.
- (iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: i) the type of emergency situation; ii) correct location of the emergency; iii) estimated magnitude of the situation; iv) estimated persons harmed; v) time it happened; v) in case of a spill, which hazardous substance spilled; and vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions. For an effective reporting/alerting of an emergency situation:
- (iv) The names and contact details of the relevant persons and institutions will be readily available in, or near to, all forms of communication equipment, and strategically posted (at legible size) in all Subproject sites and vehicles:
 - Most relevant construction/operations staffs namely, the ERTL, Deputy ERTL, first-aiders, supervising engineers, foremen
 - EERT institutions/organizations

- Concerned village authority/ies
 - IA Office, substation
- (v) All Subproject sites will have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.
- (vi) Contractor's construction vehicles will also be equipped with the appropriate communication facilities.

Emergency Response Situations

The following tables suggest general procedures that will be refined in the final EMP during detailed design, and described in more detail in the Emergency Management Plans of the contractor.

Table 26. Evacuation Procedure

Procedure	Remarks
Move out as quickly as possible as a group, but avoid panic.	All workers/staff, sub-contractors, site visitors to move out, guided by the ERT.
Evacuate through the directed evacuation route.	The safe evacuation shall have been determined fast by the ERTL/Deputy ERTL and immediately communicated to ERT members.
Keep moving until everyone is safely away from the emergency site and its influence area.	A restricted area must be established outside the emergency site, all to stay beyond the restricted area.
Once outside, conduct head counts.	Foremen to do head counts of their sub-groups; ERTL/Deputy ERTL of the ERT.
Report missing persons to EERT immediately.	ERTL/Deputy ERTL to communicate with the EERT.
Assist the injured in evacuation and hand them over to the ERT first-aiders or EERT medical group	ERT to manage injured persons to ensure proper handling.
If injury warrants special care, DO NOT MOVE them, unless necessary and instructed/directed by the EERT.	ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 27. Response Procedure During Medical Emergency

Procedure	Remarks
Administer First Aid regardless of severity immediately.	Fundamentals when giving First Aid: <ul style="list-style-type: none"> - Safety first of both the rescuer and the victim. - Do not move an injured person unless: <ul style="list-style-type: none"> ✓ victim is exposed to more danger when left where they are, e.g., during fire, chemical spill ✓ it would be impossible for EERT to aid victims in their locations, e.g., under a collapsed structure ✓ instructed or directed by the EERT. First AID to be conducted only by a person who has been properly trained in giving First Aid.
Call the EERT emergency medical services and/or	ERTL/Deputy ERTL or authorized on-site emergency communicator

Procedure	Remarks
nearest hospital.	
Facilitate leading the EERT to the emergency site.	<ul style="list-style-type: none"> ▪ ERTL/Deputy ERTL to instruct: <ul style="list-style-type: none"> - an ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention and lead them to site. - Other ERT members to clear access road for smooth passage of the EERT.
If applicable, vacate site and influence area at once, restrict site, suspend work until further notice.	Follow evacuation procedure.

Table 28. Response Procedure in Case of Fire

Procedure	Remarks
Alert a fire situation.	<ul style="list-style-type: none"> ▪ Whoever detects the fire shall immediately: <ul style="list-style-type: none"> - call the attention of other people in the site, - sound the nearest alarm, and/or - Foreman or any ERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) - report/communicate the emergency situation to the ERTL/Deputy ERTL.
Stop all activities/operations and evacuate.	<ul style="list-style-type: none"> ▪ All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
Activate ERT to contain fire/control fire from spreading.	<ul style="list-style-type: none"> ▪ Guided by the training they undertook, ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.
Call the nearest fire and police stations and, if applicable, emergency medical services.	<ul style="list-style-type: none"> ▪ When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
Facilitate leading the EERT to the emergency site.	<ul style="list-style-type: none"> ▪ ERTL/Deputy ERTL to instruct: <ul style="list-style-type: none"> - an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. - some ERT members to stop traffic in, and clear, the access road to facilitate passage of the EERT.
ERT to vacate the site as soon as their safety is assessed as in danger.	<ul style="list-style-type: none"> ▪ Follow appropriate evacuation procedure.

APPENDIX E: ENVIRONMENTAL COMPLIANCE AUDIT OF DUC HOA SUBSTATION

ENVIRONMENTAL COMPLIANCE AUDIT for present day operations at 220 kV Duc Hoa Substation, Long An Province

AUDIT AND SITE INVESTIGATION PROCEDURE

The audit for Duc Hoa Substation was conducted with a site visit and inspection of the substation facilities, interviews of substation staff and validation of substation records and reports related to environmental management. The site visits were conducted several times from the period March 9 to May 20, 2015. The following substation staff was interviewed during this environmental audit: Nguyen Van Can, Head of Duc Hoa Substation. The audit results were then cross-checked with SPPMB EO and PECC4 engineer consultants. The audit and investigation engaged discussions with the Substation operator at site and over phone calls and later email exchange.

SUBSTATION INFORMATION

Name and Type of facility:	220 kV Duc Hoa Substation
Name of Operating Power Company:	The Power Transmission Company of Ho Chi Minh City under Power Transmission Company No.4 (PTC No.4)
Location:	Tan My Commune, Duc Hoa District, Long An Province
Capacity of substation:	220kV/110kV
Date of operation:	April 2015
No. of connecting transmission lines:	
Transmitting power to:	
-	Duc Hoa 110/22kV Substation through Duc Hoa connector point
-	Phu Lam 110/22kV Substation
-	Trang Bang 110/22kV Substation
-	Duc Hue 110/22kV Substation
Receiving power from:	
-	The 500 kV Cau Bong Substation

Estimated population or area serviced by substation: mostly for industrial purposes, number of beneficiary people unidentified.

The Duc Hoa substation operates within a property of 24.6 ha. The property is operated by Ho Chi Minh City Power Transmission Company under PTC No.4, an affiliate under Vietnam National Power Transmission Corporation. The substation began its operation since April 2, 2015. There are 11 people who are assigned to operate and conduct minor maintenance works on the substation. The staff are applied in three 8-hour shifts every day divided into 5 teams. All the major maintenance and inspections are done by the maintenance department of PTC No.4. Once the substation staff notice any problem, they immediately inform PTC No.4 to determine if major maintenance works is necessary.

An Operational Manual and Work Conduct Policy for the substation were introduced for the substation. Prepared by PTC No.4, they include operation and maintenance procedures, emergency responses and usage of toolkits.

ENVIRONMENTAL COMPLIANCE CHECKLIST

No.	Item	Yes	No	Remarks
1. Maintenance of Equipment				
1	Is there an oil containment area around transformers?	x		Oil Tank Volume: 45m ³
2	Is equipment maintenance being done frequently? How often?	x		Oil check conducted once a year
3	Is PCB-containing equipment still in the substation or not		x	
4	Is the substation doing the reliability check on the transformer regularly?	x		Done by PTC No.4 staff
5	When the substation is changing insulating oil of the transformer, is the oil being collected in a container (not to drip on land or discharge into canal)?	x		The oil will be collected in a container when changing insulating oil of the transformer
2. Waste Management				
1	Is domestic solid waste collected and disposed at regularly place?	x		
2	Does the substation register for hazardous management license	x		substation has a specified storage for temporary hazardous wastes with clear signage and protective equipment provided
3	Is hazardous waste collected and disposed by regulated organization?	x		
4	Is used oil being managed? And how	x		A specialized team in PTC No.4 is in charge of managing used oil
5	Are old and used equipment being disposed? How	x		A specialized team in PTC No.4 is in charge of managing used equipment
6	Has the substation domestic wastewater treatment facilities? Describe	x		The operation of the substation creates 1.13m ³ of wastewater per day. The wastewater is then treated by biological technology in septic tank before discharging into nearby irrigation canal
7	Has the substation the facilities to prevent noise? Describe		x	The transformer is designed to work silently. Noise measured at the running transformer is 49.56dBA lower than the limit of 70dBA required in technical regulation on noise QCVN26:2010/BTN MT
8	Has the substation the facilities to prevent dust? Describe		x	Minimal amount of dust created during operation
3. Health and Safety				
1	Are there safety warning signage within the site	x		
2	Are there safety guidelines?	x		
3	Have safety orientation and trainings been conducted for workers?	x		
4	Are workers wearing personal protective equipment (PPE)	x		
5	Does workers be aware on EMF and social diseases	x		
4. Permits and license/s to operate				

No.	Item	Yes	No	Remarks
1	Is the Environmental Certificate for this substation being obtained		x	Already obtained
2	What kind of permits on environment, fire safety are obtained for this substation	x		
3	Training and certification of electrical technicians	x		All staff are engineers, they receive 6-9 month training and must pass 3 examinations by PTC No.4 before operating the substation.
5. EMF monitoring conducted				
	Is the EMF level within the permitted standard?	x		
	Are there measures to prevent the EMF? Describe	x		PPEs are provided to protect workers. Work time is divided into shifts which do not exceed 8 hours each and workers will be examined for EMF exposure once a year.
6. Air quality monitoring				
	Is noise level met standard	x		
	Is dust level met standard	x		

Air quality at/near Duc Hoa substation including EMF

- Sampling locations: outside and within the substation
- Date of sampling: September 2014
- Laboratory: Sac Ky Hai Dang Scientific Services Joint Stock Company (EDC-HD)

Table 1: Air Quality at Cau Bong Substation

Location	Temp. (°C)	Noise (dA)	Pollutant concentration(mg/m ³)			
			Dust	SO ₂	NO ₂	CO
On access road at gate of the Substation	31.2	58–60	0.142	0.012	0.032	20
Inside the existing Substation	30.9	61–62	0.24	0.023	0.051	16
QCVN05:2013/BTNMT	-	-	0.3	0.35	0.2	30
QCVN26:2010/BTNMT	-	≤70	-	-	-	-

Notes: the quality of ambient air in the project area is within the allowable standards.

Wastewater in Duc Hoa substation

Sampling location: at discharging gate after treatment

- Date of sampling: September 2014
- Laboratory: Sac Ky Hai Dang Scientific Services Joint Stock Company (EDC-HD)

Table 2: Waste water quality at Duc Hoa Substation

No.	Parameter	Unit	Result	QCVN14:2008/BTNMT Colum B
1	pH	-	6.6	5– 9
2	Total suspended solid (TSS)	mg/l	95	100
3	COD	mg/l	25	15
4	BOD ₅	mg/l	13	50
5	Nitrate	mg/l	4.79	50
6	Phosphate	mg/l	0.39	10
7	Coliform	MPN/ml	4,000	5,000

Notes: Most sampled parameters, except for COD, in domestic wastewater treated in the substation's septic tanks are within the limits allowed by column B - National technical regulations for domestic wastewater QCVN 14:2008/ BTNMT.

Findings And Observations

Duc Hoa Substation is managed by PTC No.4 that introduces a uniform operational procedure for its affiliated companies.

1. Measures to prevent oil spill and leaks from transformers

A 45m³ emergency oil tank has been installed for the 1st transformer to prevent oil leaks and spillages. Its capacity suffices to contain all oil volume in the current transformer and the 2nd transformer to be constructed. A separate emergency procedure for oil accidents was introduced to all staff of the Substation. They include:

- Report directly to Head/Deputy Head of the substation.
- Isolate area of oil leaks and spillages.
- Notify PTC No.4 to proceed with replacing and repairing equipment and troubleshooting leaks and spillages.
- Collect the oil if the oil spill from the tank, prevent oil from affecting the aquatic environment and the community
- Notify specialized unit to collect, transport and process the trapped oil in the oil tank.

2. Implementation of safety policies and procedures

Safety signage is found all around the transformer and switchyard area. The whole substation is wall-fenced to avoid unauthorized entry. The PTC No.4 conducts safety training to all staff every year. Monthly training and notifications of safety measures and regulations are conducted to staff by Head of the Substation. When the workers were asked about their awareness of the safety policies, they said that they are fully aware of the safety policies and that they are required to strictly observe the safety procedures. It was observed that all of the workers are wearing PPEs and hard hats while moving around the switchyard.

The substation monitors safety implementation by recording the following:

- Temperature on a daily basis
- Checking radiation and EMF safety once a year

3. Maintenance of equipment

Regular maintenance of equipment is done by PTC No.4. The maintenance team of Ho Chi Minh PTC is responsible for Duc Hoa Substation. Oil samples are sent to the laboratory once a year. In case there is abnormal noise at the on/off time of the circuit breaker, the Substation will report to PTC No.4 and oil analysis is done to check the dielectric strength and moisture content.

4. Management of solid/ hazardous/liquid waste

Hazardous wastes such as spent printer cartridges and old batteries are stored in a dedicated area within the substation. It will be collected and disposed of by a specialized company who is hired by PTC No.4.

Solid waste is stored and managed separately and also handled by such hired company. No liquid waste is expected from the operation of the transformer. Oil leaks and spillages will be handled in conforming to oil incident procedures. Domestic wastewater is collected in containment and then disposed to the nearby canal after a simple filtering and treatment.

5. Management of fire incidents

A system of water sprinkler of 4 water hoses is installed around the transformer. Portable fire extinguishers including CO₂ and powder are also equipped in key positions.

Corrective Action Plan: 220 kV Duc Hoa substation is a newly commissioned substation that is still under construction, and operating according to required Viet Nam laws and regulations. No corrective action required.

CERTIFICATE OF ENVIRONMENTAL PROTECTION COMMITMENT FOR DUC HOA SUBSTATION
Duc Hoa District People's Committee
Socialist Republic of Vietnam
Independence- Freedom –Happiness

No: 597/ GXN-UBND

Duc Hoa, March 19, 2008

CERTIFICATE
ENVIRONMENTAL PROTECTION COMMITMENT
For The Project: 220 kV Duc Hoa Substation and 220kV, 110kV connecting lines of Southern Power
Project Management Board in Bau Cong Hamlet, Tan My Commune, Duc Hoa District, Long An
Province

CHAIRMAN OF DUC HOA DISTRICT PEOPLE'S COMMITTEE
CERTIFIES

Article 1. On March 15, 2008, the Southern Power Project Management Board as Project Owner submitted Document No.0793/CV-AMN-PDB dated February 26, 2008 to register the Environment Protection Commitment of 220 kV Duc Hoa Substation and 220kV, 110kV connecting lines to be constructed in Bau Cong Hamlet, Tan My Commune, Duc Hoa District, Long An Province.

Article 2. The Project Owner is responsible to implement fully and correctly environmental protection contents presented in the Environmental Protection Commitment.

Article 3. The Environmental Protection Commitment of the Project is the basis for Project Investment Decision and for the inspection and examination of environmental protection by authorized state agencies.

Article 4. This Certification takes effect from the date of signing.

Recipients:

- Environment Division (DONRE)
- District People's Committee
- District Division of Natural Resources and Environment (7b)
- Southern Power Project Management Board
- Communal People's Committee
- For internal storing

ON BEHAFT OF DPC CHAIRMAN
VICE CHAIRMAN

Nguyen DacKhanh

Signed and Sealed

UY BAN NHÂN DÂN
HUYỆN ĐỨC HOÀ

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

Số: 597/GXN-UBND

Đức Hòa, ngày 19 tháng 3 năm 2008

GIẤY XÁC NHẬN ĐĂNG KÝ
BẢN CAM KẾT BẢO VỆ MÔI TRƯỜNG.

BẢN SAO

Dự án: trạm biến áp 220/110KV Đức Hoà và các đường dây 220, 110 KV đầu nối của Ban Quản Lý Dự Án các công trình điện Miền Nam, địa chỉ ấp Bàu Công, xã Tân Mỹ, huyện Đức Hòa, tỉnh Long An.

ỦY BAN NHÂN DÂN HUYỆN ĐỨC HOÀ
XÁC NHẬN .

Điều 1: Ngày 15/03/2008 chủ dự án là Ban Quản Lý Dự Án các công trình điện Miền Nam có văn bản số 0793/CV-AMN-PĐB ngày 26/02/2008 về việc đề nghị xác nhận đăng ký bản cam kết bảo vệ môi trường của dự án: trạm biến áp 220/110KV Đức Hoà và các đường dây 220, 110 KV đầu nối địa chỉ ấp Bàu Công, xã Tân Mỹ, huyện Đức Hòa, tỉnh Long An.

Điều 2: Ban Quản Lý Dự Án các công trình điện Miền Nam có trách nhiệm thực hiện đúng và đầy đủ những nội dung về bảo vệ môi trường nêu trong bản cam kết bảo vệ môi trường.

Điều 3: Bản cam kết bảo vệ môi trường của dự án là cơ sở để các cơ quan quản lý nhà nước về bảo vệ môi trường giám sát, kiểm tra, thanh tra việc thực hiện bảo vệ môi trường của dự án .

Điều 4 : Giấy xác nhận này có giá trị kể từ ngày ký ./.

Nơi nhận :

- P.môi trường (sở TN&MT)
- UBND Huyện ;
- Phòng TN&MT(7b) ;
- Ban Quản Lý Dự Án các công trình điện Miền Nam;
- UBND H.ĐỨC HOÀ
- Lưu.

CHỮ THỰC BÀN SAO ĐỒNG VỚI BẢN CHÍNH
Số chứng thực 04440 Quyền số 02 SCT/BS

Ngày 30-03-2015
Phó Chủ tịch UBND phường 4 quận 5

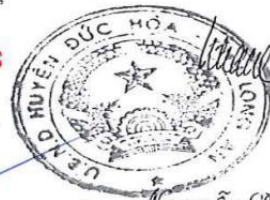


Lê Chi Ngọc Dung

TM.ỦY BAN NHÂN DÂN HUYỆN.

KV-CHỦ TỊCH

PHÓ CHỦ TỊCH



Nguyễn Đức Khánh

APPENDIX F: HEALTH EFFECTS OF ELECTROMAGNETIC RADIATION EMF

The popular concern of negative health effects of exposure to electromagnetic fields (EMF) originally arose from exposure to high voltage transmission lines. Today the concern of EMF has spread to exposure to personal electronic sources of EMF such as microwave ovens and cellular phones. The World Health organization (WHO) as part of their mandate for monitoring global human health with specific focus on developing countries recently conducted an extensive review and assessment of the validity of the concerns of EMF.²¹

Provided below is the recent review and critical summary conducted by WHO of the extensive research on human health and EMF which is reprinted verbatim below. The portion of the research database published in primary is referenced follows the summary.

In the area of biological effects and medical applications of non-ionizing radiation approximately 25,000 articles have been published over the past 30 years. Despite the feeling of some people that more research needs to be done, scientific knowledge in this area is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level EMF s. However, it is believed that some gaps in knowledge about biological effects exist and need further research.

Effects on general health

Some members of the public have attributed a diffuse collection of symptoms to low levels of exposure to EMF s at home. Reported symptoms include headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido. To date, scientific evidence does not support a link between these symptoms and exposure to EMF s. At least some of these health problems may be caused by noise or other factors in the environment, or by anxiety related to the presence of new technologies.

Effects on pregnancy outcome

Many different sources and exposures to EMF s in the living and working environment, including computer screens, water beds and electric blankets, radiofrequency welding machines, diathermy equipment and radar, have been evaluated by the WHO and other organizations. The overall weight of evidence shows that exposure to fields at typical environmental levels does not increase the risk of any adverse outcome such as spontaneous abortions, malformations, low birth weight, and congenital diseases. There have been occasional reports of associations between health problems and presumed exposure to EMF s, such as reports of prematurity and low birth weight in children of workers in the electronics industry, but these have not been regarded by the scientific community as being necessarily caused by the field exposures (as opposed to factors such as exposure to solvents).

Cataracts

General eye irritation and cataracts have sometimes been reported in workers exposed to high levels of radiofrequency and microwave radiation, but animal studies do not support the idea that such forms of eye damage can be produced at levels that are not thermally hazardous. There is no evidence that these effects occur at levels experienced by the general public.

Electromagnetic fields and cancer

Despite many studies, the evidence for any effect remains highly controversial. However, it is clear that if EMFs do have an effect on cancer, then any increase in risk will be extremely small.

²¹ <http://www.who.int/peh-emf/en/>

The results to date contain many inconsistencies, but no large increases in risk have been found for any cancer in children or adults.

A number of epidemiological studies suggest small increases in risk of childhood leukemia with exposure to low frequency magnetic fields in the home. However, scientists have not generally concluded that these results indicate a cause-effect relation between exposure to the fields and disease (as opposed to artifacts in the study or effects unrelated to field exposure). In part, this conclusion has been reached because animal and laboratory studies fail to demonstrate any reproducible effects that are consistent with the hypothesis that fields cause or promote cancer. Large-scale studies are currently underway in several countries and may help resolve these issues.

Electromagnetic hypersensitivity and depression

Some individuals report "hypersensitivity" to electric or magnetic fields. They ask whether aches and pains, headaches, depression, lethargy, sleeping disorders, and even convulsions and epileptic seizures could be associated with EMF exposure.

There is little scientific evidence to support the idea of electromagnetic hypersensitivity. Recent Scandinavian studies found that individuals do not show consistent reactions under properly controlled conditions of EMF exposure. Nor is there any accepted biological mechanism to explain hypersensitivity. Research on this subject is difficult because many other subjective responses may be involved, apart from direct effects of fields themselves. More studies are continuing on the subject.

The focus of current and future research

Much effort is currently being directed towards the study of EMFs in relation to cancer. Studies in search for possible carcinogenic (cancer-producing) effects of power frequency fields is continuing, although at a reduced level compared to that of the late 1990's.

The long-term health effects of mobile telephone usage is another topic of much recent research. No obvious adverse effect of exposure to low level radiofrequency fields has been discovered. However, given public concerns regarding the safety of cellular telephones, further research aims to determine whether any less obvious effects might occur at very low exposure levels.

Key emergent points

- A wide range of environmental influences causes biological effects. 'Biological effect' does not equal 'health hazard'. Special research is needed to identify and measure health hazards.
- At low frequencies, external electric and magnetic fields induce small circulating currents within the body. In virtually all ordinary environments, the levels of induced currents inside the body are too small to produce obvious effects.
- The main effect of radiofrequency EMFs is heating of body tissues.
- There is no doubt that short-term exposure to very high levels of EMFs can be harmful to health. Current public concern focuses on possible long-term health effects caused by exposure to EMFs at levels below those required to trigger acute biological responses.
- WHO's International EMF Project was launched to provide scientifically sound and objective answers to public concerns about possible hazards of low level EMFs.
- Despite extensive research, to date there is no evidence to conclude that exposure to low level EMFs is harmful to human health.
- The focus of international research is the investigation of possible links between cancer and EMFs, at power line and radiofrequencies.

Independent Published Research on Health Effects of EMF

- ✓ **Repacholi MH, Cardis E (1997)** Criteria for EMF health risk assessment. *Radiation Protection Dosimetry*, 72:305-312.
- ✓ **Repacholi MH (ed) (1998)** Low-level exposure to radiofrequency electromagnetic fields: health effects and research needs. *Bioelectromagnetics*, 19:1-19.
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