Initial Environmental Examination

Project Number: 46391-001

April 2016

VIE: Ha Noi and Ho Chi Minh City Power Grid Development Sector Project

Prepared by Ha Noi Power Corporation for the Asian Development Bank.

Initial Environmental Examination

April, 2016

LOANS 3161/8286-VIE: HA NOI AND HO CHI MINH CITY POWER GRID DEVELOPMENT SECTOR PROJECT

Sub-project: Construction of 110kV transmission line from the 500/200kV Thuong Tin Substation to the 110kV Thanh Oai Substation

Hanoi, Viet Nam

Prepared by Ha Noi Power Corporation for the Asian Development Bank

ABBREVIATIONS

ADB:	Asian Development Bank
AH:	Affected Household
AP:	Affected people
BOD:	Biochemical Oxygen Demand
COD:	Chemical Oxygen Demand
CTF:	Clean Technology Fund
DARD:	Department of Agriculture and Rural Development
DCST:	Department of Culture Sport and Tourism
DHC	Dong Hai Consulting and Construction Joint Stock Company
DoLISA:	Department of Labour Invalids and Social Assistance
DoNRE:	Department of Natural Resources and Environment
EA:	Executing Agency
EIA:	Environment Impact Assessment
EMP:	Environment Management Plan
EO:	Environmental Officer
ESU:	Environmental and Social Unit
EVH HANOI:	Ha Noi Power Corporation
EVN:	Electricity of Viet Nam
GHG:	Greenhouse gas
GRM:	Grievance Redress Mechanism
HANOI DPMB	Ha Noi Development Project Management Board
IA:	Implementation Agency
IEE:	Initial Environmental Examination
MoLISA	Ministry of Labour Invalids and Social Assistance
MoNRE:	Ministry of Natural Resources and Environment
NPA:	National Protected Area
PCB:	Polychlorinated biphenyls
PCR:	Physical Cultural Resources
PIC:	Project Implementation Consultant
PPC:	Provincial Peoples Committee
REA:	Rapid Environment Assessment
ROW:	Right-of-way
RP:	Resettlement Plan
TSS:	Total Suspended Solids
UXO:	Unexploded Ordnance

CURRENCY EQUIVALENTS

(as of 27 March 2016)

Currency Unit	–	Vietnam Dong VND
VND 1.00	=	$0.000045
$1.00	=	D22,400

NOTES

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TABLE OF CONTENT

TABLES

FIGURES

I. EXECUTIVE SUMMARY

1. The Project, financed through Asian Development Bank's (ADB) sector loan modality, will strengthen the capacity and reliability of power infrastructure in Ha Noi and Ho Chi Minh City through the rehabilitation and development of 110 kV and 220 kV transmission system and associated substations to supply their medium voltage (MV) distribution system. The project also strengthens the institutional capacities of Hanoi Power Corporation (EVN HANOI) and Ho Chi Minh City Power Corporation (EVNHCMC), which are responsible for the power supply in their respective areas.

2. The Initial Environmental Examination (IEE) of Construction of 110kV transmission line from the 500/200kV Thuong Tin substation to the 110kV Thanh Oai substation subproject addresses one of the non-core subprojects that were identified by Electricity of Viet Nam (EVN) for Hanoi. The IEEs of other non-core projects[1] are being prepared separately.

A. Subproject summary

3. The subproject Construction of 110kV transmission line from the 500/200kV Thuong Tin substation to the 110kV Thanh Oai substation consist of construction of a new 110kV transmission line which consists of 13 towers with total length of overhead line is 10.119km.

4. The new 110kV transmission line goes through nine (8) communes/town in two (2) Thuong Tin and Thanh Oai districts, Hanoi city. The departure point is from the 500/200kV Thuong Tin Substation at Van Phu commune (Thuong Tin district) and arrival point at the 110kV Thanh Oai Substation in Kim Bai town (Thanh Oai district).

B. Potential Impacts and Mitigation

5. The IEE of Thuong Tin-Thanh Oai 110kV transmission line indicates that the potential environmental impacts of the project will primarily occur during the construction phase. The common construction-related disturbances such as noise, dust, erosion, sedimentation, solid and liquid waste pollution, worker camp issues, reduced access, increased vehicles and traffic disruptions, damage to existing roads traversed by the transmission line, increased risk of worker and public injury can be managed with standard construction practices and management guidelines (e.g., IFC/World Bank 2007). There are no rare or endangered wildlife, critical habitat, protected areas in the project sites. There are also no heritage nor cultural sites, schools, market or hospital found within the project sites which consist of agriculture land and built-up urban areas.

6. A total of 6,147m^2 of agriculture land and trees will be permanently lost. The lost land and compensation is addressed in detail in the Resettlement Plan (RP) prepared separately. The overhead wire of the new 110 kV transmission line will traverse cultivation areas, some small irrigation canals and local roads.

7. There are no expected negative induced, or cumulative environmental impacts associated with the subproject objective of providing needed additional electrical power to reduce electricity load for the 110kV Ha Dong – Van Dinh transmission line and also supports for the overall goal of developing Hanoi electric network.

8. The Environmental Management Plan (EMP) prepared for the subproject provides a comprehensive impacts mitigation plan and environmental monitoring plan to minimize and manage the potential impacts of the project. The EMP also prescribes an Emergency

[1] The non-core subprojects were developed by EVN to follow implementation of the higher priority core subprojects

Response Plan for the construction sites and identifies the need for capacity development and training of the IA/ESU in environmental management and assessment as focused on the implementation of the EMP.

C. Conclusions

9. The IEE concludes that the feasibility design of the project combined with available information on affected environments is sufficient to identify the scope of potential environmental impacts of the project. Providing that significant changes to the project description do not occur at the detailed design phase and that new sensitive environmental or cultural resources are not determined, further detailed environmental impact assessment (EIA) of the project is not required.

II. INTRODUCTION

A. Background to IEE

10. The goal of the Ha Noi and Ho Chi Minh Power Grid Development Sector Project is to strengthen the capacity and reliability of the power infrastructure in Ha Noi and Ho Chi Minh City, Viet Nam through the rehabilitation and development of the 220 kilovolt (kV) and 110 kV high-voltage power transmission systems and associated substations to supply their medium voltage (MV) distribution system. The Project also aims to strengthen the institutional capacities of Ha Noi Power Corporation (EVN HANOI) and Ho Chi Minh City Power Corporation (EVNHCMC) that are responsible for the power supply in their respective areas.

11. The Construction of 110kV transmission line from the 500/200kV Thuong Tin substation to the 110kV Thanh Oai substation will be implemented as part of sector loan for the overall Project under ADB's Operation Manual Section D3 – Sector Lending. The subproject was selected by EVNHANOI as one of the non-core subprojects for Ha Noi.

B. Assessment Context

12. The Project was assigned Environmental Category B pursuant to the ADB's Safeguard Policy[2] and recent good practice sourcebook guidance[3]. 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 environmental management plan[4]. The IEE was prepared for the new 110kV transmission line in the feasibility design stage using available data and information on sensitive ecological and cultural receptors that exist for the subproject site.

13. The detailed design for the construction of the new 110kV transmission line subproject will follow subproject approval. The Environmental Management Plan (EMP) that has been prepared for the subproject (Section IX) will need to be updated where necessary to meet the final detailed designs.

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

14. The Construction of 110kV transmission line from the 500/220kV Thuong Tin substation to the 110kV Thanh Oai substation subproject will be implemented according to the directives set down for use of Official Development Assistance (ODA) by GoV Decree No. 382013/ND-CP dated April 23rd, 2013 , and in accordance with the provisions for the parent sector project.

A. Viet Nam Regulatory Framework for Environmental Assessment

15. The Viet Nam Law on Environmental Protection (LEP 20014) prescribes the requirements for environmental assessment (EA) for development and domestic project interventions that affect the natural and social environments. Government Decree 18/2015/ND-CP on environmental protection planning (EPP), strategic environmental assessment (SEA), environmental impact assessment (EIA), and environmental protection

[2] ADB, 2009. Safeguard Policy Statement, ADB Policy Paper.

[3] ADB, 2012, Environmental Safeguards, A Good Practice Sourcebook, Draft.

[4] Footnote 2, page 19.

plans in conjunction with Circular 27/2015/TT-BTNMT on stipulation of strategic environmental assessment, environmental assessment and environmental protection plans.

16. The updated screening criteria of Decree 18 distinguish projects that require an Environmental Impact Assessment (EIA) from projects requiring the environmental protection plans. The difference between the two processes reflects the level of assessment, and final review and appraisal that is required. At the time of writing Decree 18 requires that an EIA be prepared for the Construction of 110kV transmission line from the 500/200kV Thuong Tin substation to the 110kV Thanh Oai substation.

B. Applicable Environmental Laws, Policy, Environmental Standards, Guidelines

17. The following are key directives for environmental assessment and protection in Viet Nam:

- Law on Environmental Protection No. 55/2014/QH13 dated 23th June 2014;
- Law on Water Resources No.17/2012/QH13 dated 21st June 2012;
- Law on Cultural Heritage No.32/2009/QH12 dated 18th June 2009 on amending and Supplementing a Number of articles of the Law on Cultural heritages No.28/2001/QH10 dated 29th June 2001;
- Land Law No.45/2013/QH13 dated 29th November 2013;
- Decree No.18/2015/ND-CP, dated 14th February 2015 on environmental protection planning (EPP), strategic environmental assessment (SEA), environmental impact assessment (EIA) and environmental protection plans;
- Circular No.27/2015/TT-BTNMT dated on 28th May 2015 on stipulation of strategic environmental assessment, environmental assessment and environmental protection plans;
- Decree No.38/2015/NĐ-CP dated on 24th April 2015, on management of waste and discarded materials;
- Decree No.59/2007/NĐ-CP dated on 09/4/2007 by the Government about Solid Waste Management.
- Decree No. 179/2013/ND-CP dated on 14th November 2013, on the sanction of administrative violations in the domain of environmental protection;
- Decree No.45/2013/ND-CP dated on 10th May 2013 detailing some Articles of the Labor Code on working hours, rest hours and labor security and labor hygiene;
- Decision No.16/2008/QĐ-BTNMT dated on 31/12/2008 by the Ministry of Natural Resources and Environment about Promulgation of the National Technical Regulations for the Environment.
- Circular No.38/2015/TTN-BTNMT dated on 01/9/2015 on stipulating hazardous waste management;
- Decision No.60/2002/QĐ-BKHCNMT dated on 07th August 2002 about Promulgation of the Guidance for Disposal of Hazardous Wastes.
- Decision No.3733/2002/QĐ-BYT issued by Ministry of Healthcare dated on 10th October 2002 About the Application of 21 Labour Health and Safety Standards;
- Decision No.155/1999/QĐ-TTg dated on 16th July 1999 by the Government on Promulgation of the Management Mechanism for Hazardous Waste.

Environmental Standards and Regulations

Water quality:

- QCVN 01:2009/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 14:2008/BTNMT – National technical regulations on quality of domestic wastewater
- QCVN 24:2008/BTNMT– Industrial wastewater discharge standards
- TCVN / QCVN - Standard methods for analysing environmental quality

Air Quality:

- QCVN 05:2009 – National technical regulation on ambient air quality
- QCVN 06:2009 – National Technical regulation on hazardous substances in ambient air
- TCVN 6438:2005 – Road vehicles Maximum permitted emission limits of exhausted gases

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 heavy metals concentrations in soil

Vibration and Noise:

- QCVN 26:2010/BTNMT: National technical regulation on noise
- QCVN 27:2010/BTNMT: National technical regulation on vibration

International Guidelines

- World Bank Group, 2007. Environmental Health and Safety Guidelines, Wash. DC.
- AWWA Standard Methods for Measurement and Analysis Environmental Quality

Directives of the Electrical Power Industry in Viet Nam

- Electricity Law, No. 28/2004/QH11, Issued: 03/12/2004
- Government Decree, No. 81/2009/NĐ-CP, on the safety protection of high-voltage power grids, Issued 17/08/2005
- MIT Circular, No. 03/2010/TT-BCT, on safety protection of high-voltage power grid works, Date issued: 22/01/2010
- Decree No.14/2014/ND-CP dated Feb. 26th, 2014 promulgated by the GOV regarding the detailed regulation on the implementation of the Electricity Law on electric safety, put into force from Apr. 15th, 2014.
- Decree No.134/2013/ND-CP dated Oct. 17th, 2013 by the GOV regarding the regulation on penalty of administrative contravention of electricity sector, hydropower dam safety, effective and saving energy expenditure.
- Circular No.31/2014/TT-BCT dated Oct. 2nd, 2014 issued by the Ministry of Industry and Trade (MOIT) regarding the detailed regulation on some contents of electrical safety.

International Environmental Management Conventions

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

- 1992, United Nations Framework Convention on Climate Change
- 1992, Convention on Biological Diversity

C. ADB Safeguard Policy

19. The ADB Safeguard Policy Statement (ADB SPS, 2009) along with the recent good safeguard practice sourcebook clarify the rationale, scope and content of an 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).

- 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 Environmental Impact Assessment 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 Initial Environmental Examination is required).
- Category C projects are likely to have minimal or no negative environmental impacts. An environmental assessment for Category C projects is not required but environmental implications need to be reviewed. The Rapid Environmental Assessment (REA) checklist of the subproject is presented in Appendix A.

IV. SUBPROJECT DESCRIPTION

20. The new 110kV transmission line subproject consists of building thirteen (13) towers with total length of overhead line is 10.119km. The new 110kV transmission line has the following features:

- Departure point: 110kV busbar of 500kV Thuong Tin substation, located at Van Phu commune – Thuong Tin district, Hanoi city
- Arrival point: busbar of 110kV Thanh Oai substation, located at Kim Bai town, Thanh Oai district, Hanoi city
- Number of left or right turns: 13
- Long span: crossing over cultivation area of two district, point G5 – G6 (2.136,5m)
- Crossing over road: 8 (highway: 1)
- Number of crossing over other lines: 18 (0.4kV line: 5; 10kV line: 1; 35kV line: 7; 220kV line: 1)

21. The location of new transmission line is shown in

22.

23. Figure 1.

24. The departure point of the new 110kV transmission line starts from the 500/220kV Thuong Tin substation to the 110kV Thanh Oai substation, and consists of following specifications:

- Voltage: 110kV
- Number of circuits: 2
- Length: 10.119km
- Tower: hot-dip galvanized steel
- Conductor: ACSR 240/32
- Insulator: 70KN ceramic or glass
- Optical cable: OPGW-57
- Foundation: cast-in-place reinforced concrete

25. The TL passes plain area, mainly rice field (two crops/year) and cross some road, river, small canals and other transmission lines. The description of transmission line route for each section is shown in Table 1

Table 1. Description of transmission line route

Project site	Length of route (m)	Tower No.	Existing Environment
Thuong Tin district			
Van Phu commune	226.6	Departure point - G1	Agriculture land and fish pond
Tien Phong commune	1196.4	G1- G2	The route mainly passes rice field, crosses one 0.4kV power line and one 35kV power line and two communication cables. It affects one temporary house within ROW (shelter for raising duck). The route crosses over inter-district road of Thuong Tin – Binh Da.

Project site	Length of route (m)	Tower No.	Existing Environment
Tien Phong commune	891m	G2 – G3	The route passes Tien Phong Industrial Park, crosses three 35kV power lines and then mainly passes rice and crop field.
Tien Phong commune	227.0	G3 – G4	The route passes rice field and crosses over Nhue river, one 0.4kV power line and one communication cable. The route passes over the left side of internal pumping station.
Thanh Thuy commune	395.6	G4 – G5	The road completely passes rice field and crosses over inter-commune concrete road, 0.4kV power line and fish pond.
Thanh Thuy commune	2136.5	G5 – G6	The road completely passes rice field of two District (Thuong Tin-Thanh Oai) and crosses over communication cable, 35kV power line, 0.4kV power line and inter-commune concrete road
Thanh Oai district			
Thanh Van commune	1253.8	G6 – G7	Run along agriculture land and cross over national road which is being constructed
Van Khe commune	856.0	G7 – G8	The road passes a inter-commune concrete road and crosses two 0.4kV power line
Tam Hung commune	540.5	G8 - G9	The route passes rice field and cross over a small irrigation canal
Tam Hung commune	50.1	G9 – G10	The route passes rice field and runs under one 220kV power line.
Tam Hung commune	409.6	G10 – G11	Cross one irrigation canal and run along rice fields
Tam Hung commune	1228.5	G11 – G12	The route passes rice field and crosses over inter-commune concrete road, one 6kV power line, internal pumping station and Hoa Binh River.
Kim Bai town	316.4	G12 – G13	The route passes rice field area
Kim Bai town	232.7	G13 – arrival point	The route crosses over drainage canals and rice field area.

Figure 1: General layout of the alignment

A. Construction works

1. Civil work volume

26. The quantity of major works of the subproject is shown in Table 2.

Table 2. Quantity of major works

Description of work	Unit	Amount
Excavating foundation	m^3	30,724
Backfilling foundation	m^3	28,021
Surplus soil	m^3	2,702
Concrete M100	m^3	535,26
Concrete M200	m^3	2.167,47
Steel pile	Ton	213,26
Formworks	m^2	3.137,81
Cement PC30	Ton	930,07
Sand	m^3	1.336,97
Macadam	m^3	2.467,79

2. Construction method

27. Based on the characteristics and requirements for the project that construction method is traditional construction method in 4 months. During the construction phases of the project, 4 teams with about 40 workers will be mobilized at the same time.

* ***Preparation of tower foundation*:**

28. Construction measure is mainly by hand and partly by machine. This work includes:

- Tower foundation site levelling

29. Soil for site levelling for construction yard is got in place or salvaged from tower foundation excavation. This yard will be used to gather materials and devices, and be the place for tower installation and tower foundation casting

- Tower foundation excavation

30. Tower foundation excavation will be conducted according to design drawings and in compliance with current regulations. Talus range and earth and rock depth will be determined by records of geological boreholes and specified in appendix in unit price for basic construction No. 6061 / QD-BCT dated November 14th, 2008 of the Ministry of Industry and Trade.

31. After finishing foundation cast, it will be filled with soil immediately. Soil will be filled in layers, compacted in accordance with dimension in design drawings. Soil used for filling foundation is being reused/salvaged from soil excavated from foundation pits and soil used for levelled the site.

- Concrete tower foundation:

32. Before pouring concrete, steel must be washed, foundation pits must be cleaned.

33. Lining concrete: lining concrete layer uses rock 4x6, M100 is mixed in situ, and concrete will be put down foundation pit by chute. Levelling will be conducted by hand with

using of engine plate vibrator. Note that it must install formwork for the edge of the foundation pit in order to create drainage ditches around the foundation pit.

34. Structural Concrete: Use Concrete B15 (M200), rock 2x4. The interval between the concrete plate and foundation framework during gabarit and bolts alignment will not exceed 24 hours to avoid concrete segregation.

35. Before pouring concrete, formwork and steel acceptance is to be conducted in compliance with design. In case, groundwater is filled in foundation pit, it will be collected or pumped out continuously during concrete pouring and until concrete is hardened. Maintain newly poured concrete structure in accordance with regulations.

- Installation of lightning conductor

36. Lightning conductor will be calculated for each foundation location in accordance with geotechnical conditions. Lightning conductor will be scattered around the foundation pit bottom, tag of lightning conductor will be put up in combination with steel of tower foundation and must be 1- 1.5m higher than surface of concrete cylinder. All details must be galvanized to be protected.

**** Construction of tower foundations*:**

37. Reinforced concrete pile has dimension of 300 x 300 cm with length of 8-35m. These piles will be purchased at the pile casting plant (ordered according to detailed drawing) and transported to the foundation locations.

- Pile driving

38. Pile driving is the most important task for the quality of the project while it also affects to the overall progress of the project. Thus, pile driving will be carefully prepared and pile driving procedure will be complied with regulations.

- Pile grillage casting

39. After driving all piles at the same position is completed, it needs excavate soil to design elevation, beat the top of the piles, pouring lining concrete and install formwork, tie steel,…similar to the normal position (Note: In order to promote the construction schedule can use fresh concrete for casting pile framework).

*** Installation of towers:**

40. For single-tubular steel tower, tower will be transported to the construction site and erected by crane 25T. For shaped steel tower, tower will be erected by climbing method, both erect and joint by hand.

- During tower erection process, the following requirements are obeyed:
- Bolts must be tightened and checked in accordance with regulation on holding power.
- Thread of bolts at the bottom must be destroyed to prevent from theft.
- After installation is completed, tower need be tested horizontal and longitudinal inclination.
- The installation of porcelain accessories;
- Insulator string will be installed by hand, so it needs to prepare with tools for construction such as pulley, hauler, winches, cables...
- Insulators and accessories should be cleaned before installation. Construction unit must test to detect broken and cracked insulators, check joint pins before installation.

**** Wire pull and scatter, and deflection modification***:

41. Wire pull and scatter will be mainly conducted by hand (primer cable scatter) in combination with tractors, brake machine to keep wire reel at a certain altitude and control wire pulling speed. Before pulling wire, it needs to do temporary anchors at the arms of the anchor post. These anchors are removed only when the anchor rope of anchoring intervals at two sides were pulled completely. The anchoring locations crossing over the weak soil areas must use many anchor holes for an arm.

42. When pulling wire, not to put wire to be pulled on the ground and the hard structures in order to prevent from wear out or scratched. Pulley will be used for keeping and pulling wire through the tower locations. For installation of fibber cable, characteristics of optical cable will be studied carefully to avoid damaging it. For TL sections crossing over roads, other power lines, communication lines, houses etc., scaffold will be put firmly to support the process of wire pull. At each cross the road or other lines that two (2) sign boards will be installed at each side with the distance 50m to warn of possible risk and under the circular 17/2012/TT-BGTVT dated 29/5/2012.

B. Material demand and supply sources

43. Supply source of materials and equipment for the subproject includes two categories: domestic and abroad supply sources as follows:

- Power equipment which is imported and transported to Hanoi and stored in a warehouse of EVNHN. Then it will be transported by road to the construction site.
- Other materials and equipment will be domestically purchased.
- The materials source such as cement, sand, and stone will be bought directly within subproject area with the transport distance to the main route various from 2 km.
- Steel for tower foundations, lightning conductor will be bought from Hanoi and the transport distance to the main route is 40km.

C. Waste treatment

44. Domestic sewage: number of construction workers for each tower foundation is very few (about 8-10 people/tower foundation/ location), time for constructing each tower foundation is short (about 11 – 12 days). Thus, workers will be proposed to hire local resident's houses for staying, domestic sewage generated by workers' living activities will be collected in domestic sewage treatment system of residents. Domestic solid waste of workers (about 4-5kg/day/ tower foundation location) will be collected into dustbins and disposed at local regulated site.

45. The surplus soil (about 2,702 m^3) is agricultural soil therefore it can be dumped at the low-lying area or dump at the area where are accepted by local people. The remained amount will be transported by trucks to the disposal site where is permitted by the local authority. Selection of disposal site and transport of refused soil to disposal site will be performed by the construction contractors with the PMB's supervision. Contractor will select disposal site and prepare disposal plan, then consult with the local authorities to get the formal agreement and permission. Construction waste will be treated as the following diagram (Figure 2):

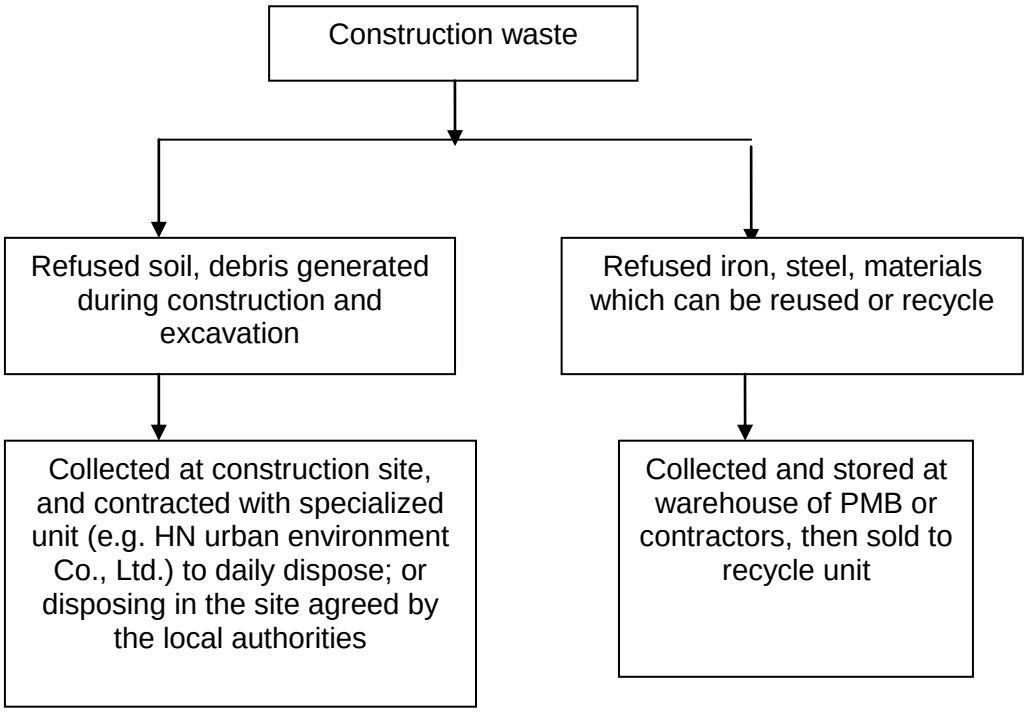

Figure 2. Management of construction waste

V. DESCRIPTION OF THE ENVIRONMENT

46. The environmental baseline information was obtained primarily from Ha Noi Statistical Yearbooks, state of the environment reports (SoER) prepared by Ha Noi DoNRE, hydro-meteorological data national centre, and supplemented from the literature including other environmental assessments conducted for the same area. The description of affected environment focuses on natural features and land use.

A. Physical environment

1. Climate

47. The project area has fairly typical tropical monsoon climate, which is characterized by hot, rainy summers and cold, dry winters. The summer period which extends from May to September is hot and humid and receives most rainfall. The winter period from November to March is comparatively mild and dry while spring (April) can bring light rains.

a. Local temperature

48. The average annual and monthly air temperatures in Hanoi during 2005 to 2013 are presented in Table 3 and Figure 3.

Table 3. Average monthly air temperature in Hanoi (Son Tay station)

Month Year	Jan	Feb	March	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	AVE-Temp
2005	15.7	15.5	18.8	23.4	28	29.3	28.8	27.9	27.5	25.3	21.9	16.7	23.4
2010	18	20.8	21.9	23.2	28.2	30.2	30	28	27.9	24.8	21	18.8	24.4
2011	12.4	17.5	16.9	23.5	26.3	28.8	29.6	28.4	27.2	24.3	23.2	18.3	22.9
2012	14.6	16.1	19.6	25.9	28.3	29.8	28.9	28.8	27	26	22.8	18.3	23.8
2013	15.2	19.5	23.8	24.6	28	29.1	28.1	28.3	26.4	24.7	22.1	15.3	23.8

(*Source: Hanoi Statistical Yearbook 2013)*

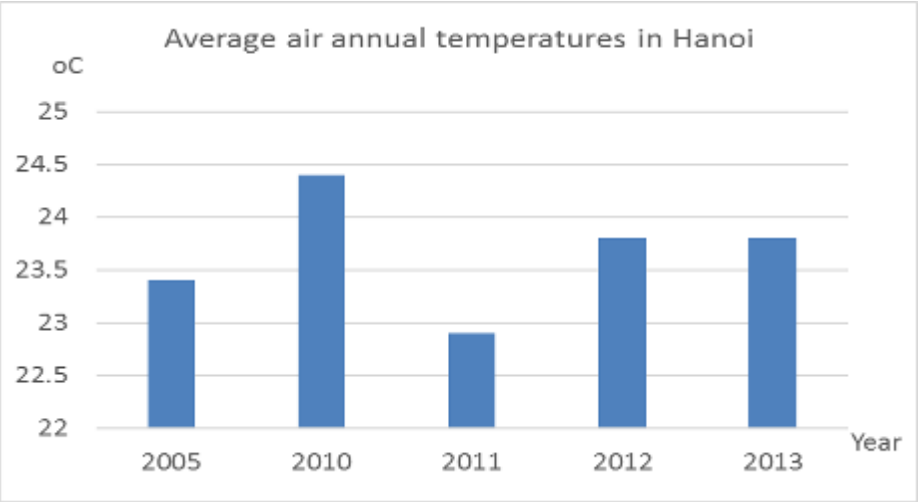

Figure 3. Average annual air temperature in Hanoi

49. Monthly temperature in Hanoi is recorded in 5 years from 2005 to 2013. The average annual temperatures in this period fluctuate slightly with highest temperatures in June and July and lowest temperatures in January and February.

b. Sunlight hours

50. Average annual and monthly sunlight in Hanoi during 2005 to 2013 are presented in Table 4 and Figure 4.

Table 4. Average sunlight hours in Hanoi (Son Tay station)

Month Year	Jan	Feb	March	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2005	29.5	19.5	33.6	73.6	182.8	121.6	191.7	128	162.4	113	128	67.2	1250.9
2010	27.4	88.5	39.6	54.7	124	145.5	205.3	136.2	150.1	122.5	102.2	74.9	1270.9
2011	1.7	34.9	8.9	55.9	136.3	129.4	162.1	172.2	111.4	80.5	111.4	79.9	1084.6
2012	2.4	15.9	24.2	101.7	166.1	106.8	150.5	186	118.3	120.6	94.9	35.9	1123.3
2013	9.2	43	76.8	87	162.8	176.7	139.4	153.3	107.3	140	57.7	150.6	1303.8

(*Source: Hanoi Statistical Yearbook 2013)*

51. Sunshine has fluctuated between years in Hanoi with the greatest fluctuation occurring between months. The months which experience the greatest sunshine are June, July and August, whereas the months with the least sunshine are December, January and February.

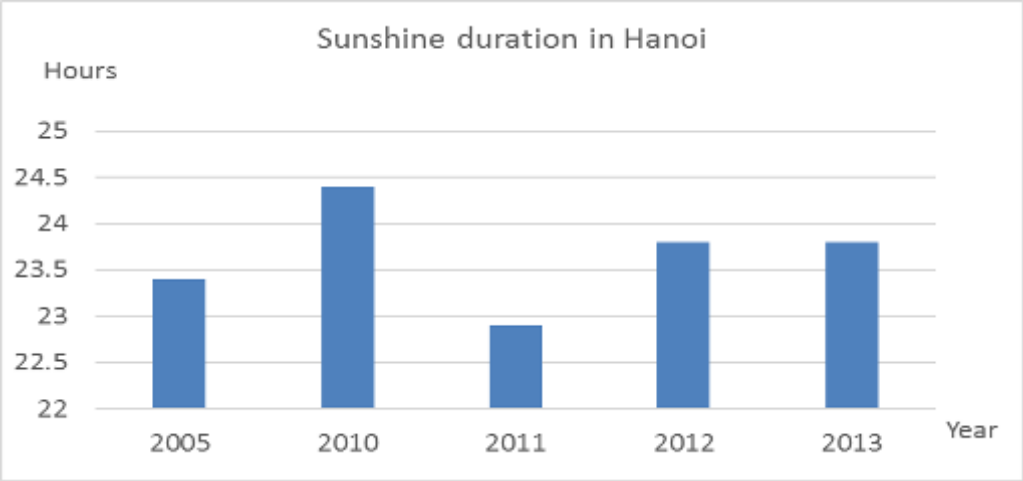

Figure 4. Total sunshine in Hanoi

c. Humidity and Rainfall

52. Hanoi climate is subtropical hot and humid with abundant rainfall. Average humidity varies from 84% to 85% during 2005 to 2013 (Table 3 and Figure 5). Total average annual rainfall in Hanoi from 1504.6mm to 1822.8 mm. Table 5 and Figure 5 show the average precipitation in the Son Tay meteorological station during 2005 to 2013.

Table 5. Average monthly humidity in Hanoi (Son Tay station)

Month Year	Jan	Feb	March	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2005	84	88	86	89	87	83	85	90	88	80	85	76	85
2010	84	83	81	87	85	81	83	89	87	81	80	84	84
2011	83	86	86	85	83	86	82	86	85	84	84	77	84
2012	89	86	86	83	86	81	85	85	85	82	84	85	85
2013	88	89	84	86	84	81	88	86	89	80	82	79	85

(*Source: Hanoi Statistical Yearbook 2013)*

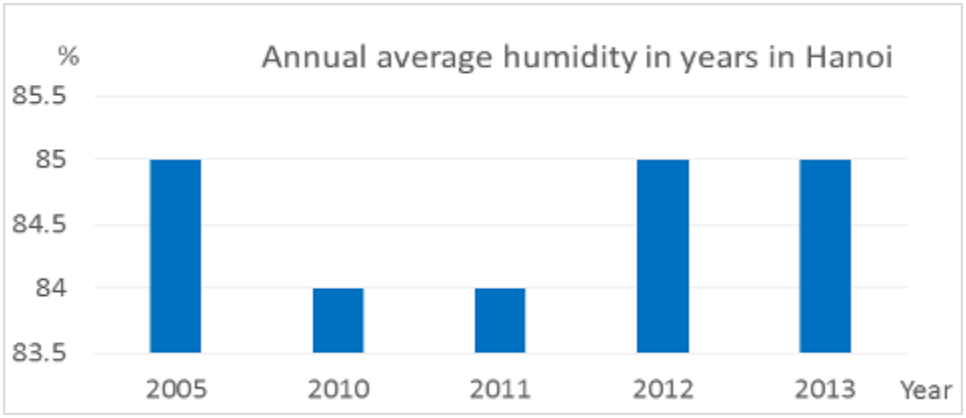

Figure 5. Annual average humidity in Hanoi

53. The Climate in the project is influenced by a wet monsoon tropical climate because the average humidity is high. While differences in humidity among months are comparatively high, the average humidity among years does not fluctuate significantly.

54. Total rainfall among years in Hanoi fluctuates slightly from 1504.6mm in 2010 to 1822.8mm in 2012. Observation at the meteorological station indicates that highest rainfall occurs in rainy season from May to September with August showing maximal rainfall of 469.7mm. Dry season rainfall is low ranging from November to March with November being the lowest rainfall month at an average 4.3mm (Table 6 and Figure 6)

Table 6. Monthly rainfall in Hanoi (Son Tay station)

Month Year	Jan	Feb	March	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
2005	13.8	31.9	23.7	27.2	74.4	239.8	355	469.7	307.2	32.8	113.1	21.4	1710
2010	51.8	3.9	5.7	79.5	77.4	276.1	313.1	329.2	209.6	131.9	4.3	22.1	1504.6
2011	14.6	19.6	97.5	67.8	207	378.7	176.1	373	230.9	143.5	11.4	61.5	1781.6
2012	29	14	28	51.1	391	205.3	411.4	386.6	154.2	100.4	39.1	12.7	1822.8
2013	16.1	30.8	34.9	35.5	173.1	223.3	360	381.2	389.7	116.9	21.8	35.1	1818.4

(*Source: Hanoi Statistical Yearbook 2013)*

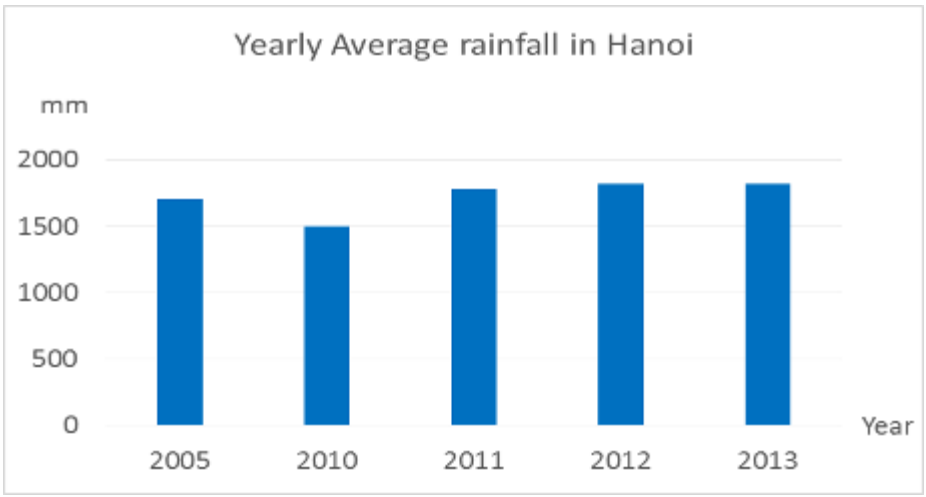

Figure 6. Annual rainfall in Hanoi

55. The subproject is located in areas that experience lightning. The average annual lightning days is 75 days ranging from 45 days to 105 days/year. During these evens high winds and heavy rain also occur which will affect the subproject.

d. Wind velocity

56. In the subproject area prevailing winds direction are north by northwest. Average greatest long-term average is 16m/s. Average monthly wind speed in Hanoi is shown in Table 7.

Table 7. Average monthly wind speed in Hanoi

Month	Jan	Feb	March	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
m/s	1.9	2.1	2.0	2.1	2.2	1.8	1.8	1.6	1.6	1.7	1.7	1.7	1.9

(Source: Vietnam building Code 02:2009/BXD)

2. Air quality

57. Environmental sampling works and analysis are conducted in Oct. 2013 by Institute of Technical Biochemistry and Documents for air, water and soil. Sampling locations are located at a residential area near the subproject site which could be affected during construction phase. Details of sampling parameters and locations are listed in the Table 8, **Error! Reference source not found.**7**Error! Reference source not found.**.

Table 8: Air quality – sampling locations

Sampling parameters and standards	Sample code	Location
CO, SO2, NO2, Noise, Dust Vietnam standard QCVN 05:2009/BTNMT for air quality, QCVN 26:2010/BTNMT for Noise	KXQ1	Start point of transmission line, to the west of Thuong Tin 500kV substation
	KXQ2	At the location nearby pole G1
	KXQ3	At the location nearby the Vietnam Central Mental Hospital 1
	KXQ4	At Tien Phong trade traditional village, Tien Phong commune
	KXQ5	Nearby Nam Vang Co.,Ltd. Tien Phong commune
	KXQ6	Lang hamlet, Tien Phong commune
	KXQ7	At cultivation area of Du Du 1, Thanh Thuy commune
	KXQ8	Nearby pole G6, Tam Da village, Thanh Van commune
	KXQ9	Nearby pole G7, Quan Nhan village, Tam Hung commune
	KXQ10	Nearby pole G8, Bui Xa village, Van Khe commune
	KXQ11	At the section of Hoa Binh river cut through Kim Bai town, nearby pump station
	KXQ12	Nearby pole G9
	KXQ13	Nearby pole G10
	KXQ14	At the location to the west of Thanh Oai 110kV substation

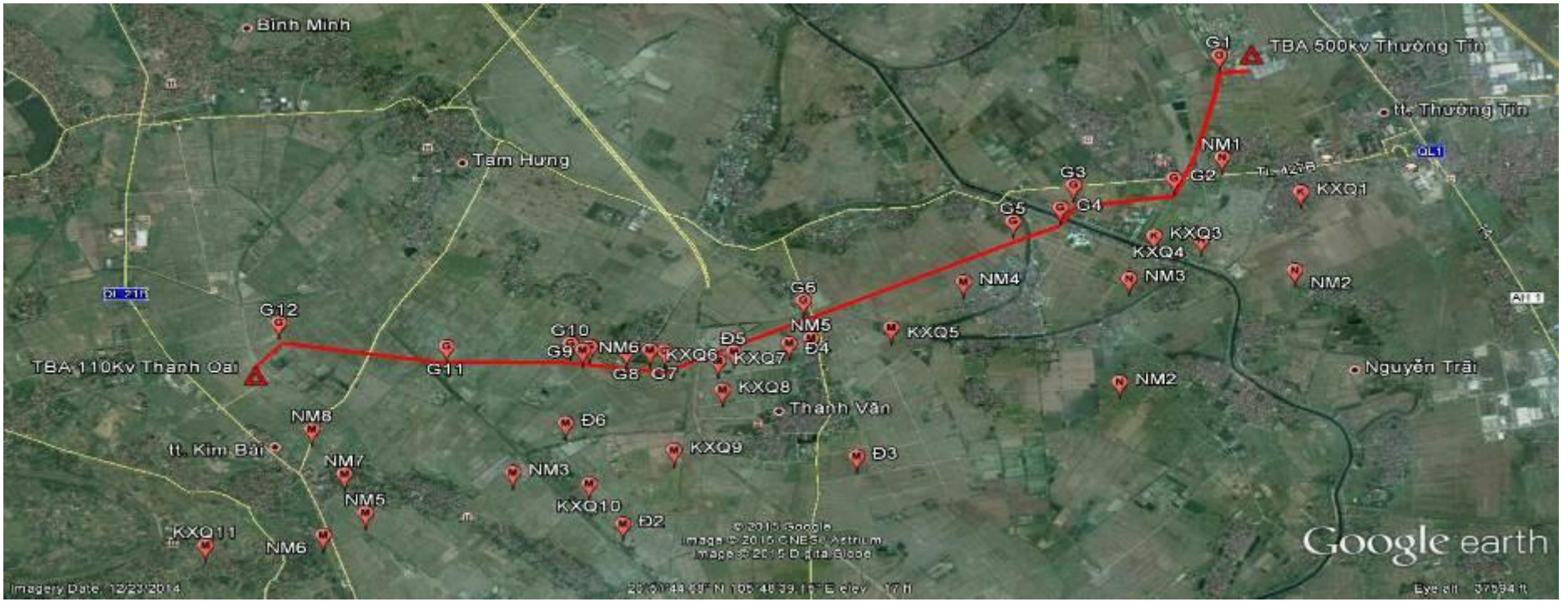

Figure 7. Sampling locations

58. For each location and each environmental parameter, direct result values of sampled environmental parameters are converted to rate of sample's value and respective Vietnam standard. Therefore, all environmental parameters and sampling locations could be organized in one diagram[5].

59. Figure 8 shows that all environmental parameters (CO, SO_2, Dust, Noise) have values below standard. It means no signs of pollution with the mentioned parameters at the sampled location as nearby residential area and project area.

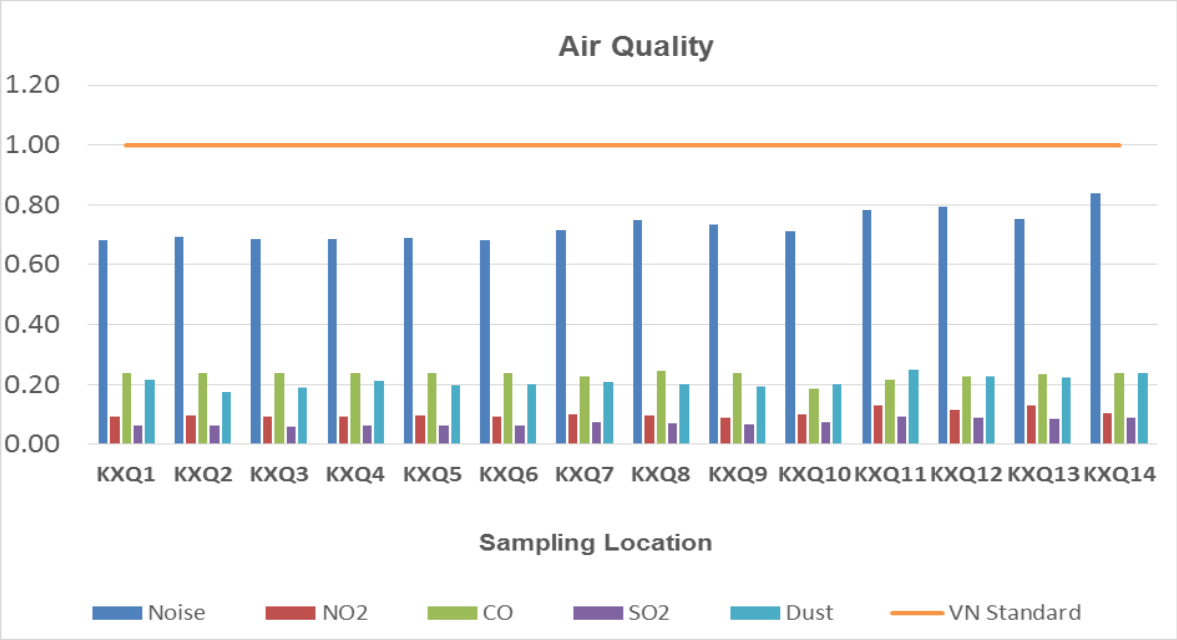

Figure 8: Air quality

(Source: Hanoi-PC EVN, 2014)

3. Topography, geology and soil

a. Topography

60. The majority of the Hanoi area is located in the Red River delta with an average elevation of 15m to 20m above sea level. The hilly area is in the north and northwest of Soc Son district of the southern edge of Tam Dao Mountains with elevations from 20m to over 400m. The highest peak is Chan Chim peak at 462m. The topography of Hanoi decreases from north to south and from west to east. The main topographic form of Hanoi is a plain enriched by the alluvial river with high alluvial terraces; among them are low lying areas with lakes. Particularly the high terraces are only in Soc Son district in northern and eastern of Dong Anh district. In addition, in Hanoi are mountainous terrains and hills concentrated in Soc Son mountain area.

61. The subproject area is a flat delta belong to Tu Nhien, Van Phu, Hoa Binh, Tien Phong, Hien Giang communes (Thuong Tin district); Thanh Thuy, Thanh Van, Tam Hung communes, Kim Bai town (Thanh Oai district).

b. Geology

62. The geology in the subproject area consists of mostly clay, sand and clay derived marine sediment.

[5] The method using "Rate of sample value to respective standard" for diagram presentation is also applied in other environmental indicators (water, soil environment) in the next sections.

- Layer 1: Layer 1 is widely distributed on the ground of thickness from 0.3 – 0.4m. The main components of layer 1 are thick mud.
- Layer 9: Layer 9 is lightning semi-solid state that underlies layer 1. The thickness of the layer varies from 0.7 – 3.2m. Eleven (11) soil samples from layer 9 were analyser to show the major components to be clay brown, yellow, grey – green. The land status is slightly tight, semi-rigid and saturated.
- Layer 9A: Layer 9A is distributed below the layer 9 and found scattered at some drilled holes (K1, K2 and K7 – K14). The thickness of the layer is greater than 3.0m. Ten (10) soil samples from layer 9A were analysed to show the major components to be clay grey-green, dark grey mixed organic material. The land status is slightly tight, fluidized and saturated.
- Layer 14: Layer 14 is distributed below the layer 9 and found scattered at some drilled holes (K3 – k6) with the thickness of the layer greater than 3.0m. Seven (7) soil samples from layer 14 were analysed to reveal the essential components of the soil to be sand particles smooth grey, dark grey. The land status is slightly tight, fluidized and saturated.

c. Soil

63. Most of surface area of the Red River Delta (RRD) which includes Hanoi is covered by sediment formation. The youngest formation with around 3000 years of age is mainly original from lacustrine and shallow-sea sediment. In Hanoi area, their highest thickness reaches around 30 m; the sediment formations are predominated by soft soils. Hanoi has 18 major soil types include 36 769 ha of alluvial soil accounting for 56%, 16 819 ha of degraded land accounting for 26%, the other soils is 12019ha accounting for 18%.

64. The soil quality at the subproject area has been investigated by the Institute of Technical Biochemistry and Documents (2013). Eight (8) samples located at cultivation areas along the subproject's transmission line are selected and listed in the Table 9

Table 9. Soil quality – sampling locations

Sampling parameters and standard	Sample code	Location
Zn, As, Pb QCVN 03:2008/BTNMT	D1	At cultivation area of Van Trai village, Van Phu commune, nearby pole G1
	D2	At Tien Phong trade traditional village, Tien Phong commune, nearby pole G2
	D3	At cultivation area of Nhan Hien village, Hien Giang commune, nearby pole G5
	D4	At cultivation area of Du Du 1, Thanh Thuy village
	D5	At cultivation area of Tam Da village, Thanh Van commune, nearby pole G6
	D6	At cultivation area of Le Duong village, Tam Hung commune, nearby pole G6
	D7	At cultivation area of Kim Bai town, nearby pole G9
	D8	At the location to the south of Kim Bai substation

65. Analyzed results for soil quality in Figure 9 shows that all metal concentrations (As, Pb, Zn Cu) have sampled values lower than maximum limitation given by QCVN 03:2008/BTNMT for agricultural activities.

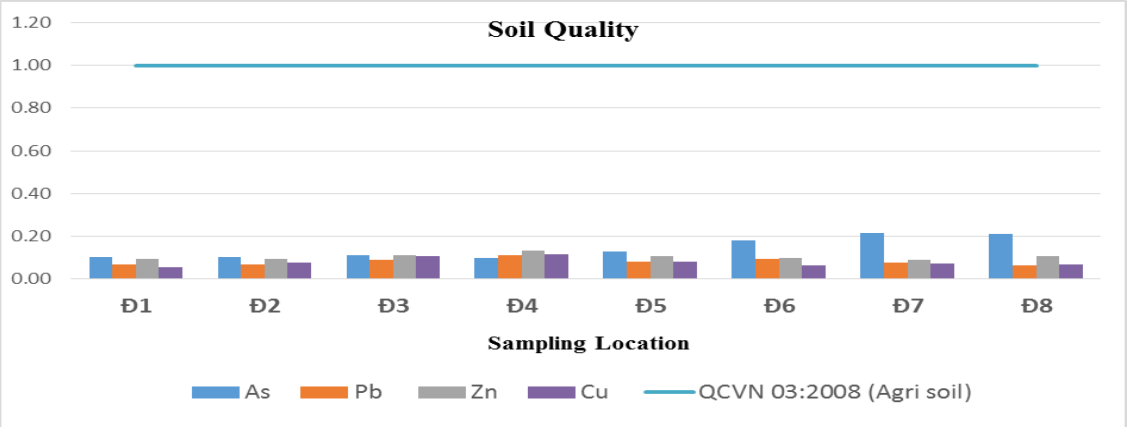

Figure 9. Soil quality

4. Surface water quality

66. The water quality at the project area has been investigated by the Hanoi –PC EVN in their EIA report (2014). Sampling locations for surface water quality are located at irrigation canal along the new 110kV transmission line. Details sampling locations are listed in the Table 10 .

Table 10: Surface water quality – sampling locations

Sampling parameters and standard	Sample code	Location
pH, TSS, DO, COD, BOD5, Pb, PO_4^{3}, Fe, NO_2^{-}, NO_3^{-}, $NH4^{-}$, Hg, Pb Coliform QCVN 08:2008/BTNMT	NM1	At the canal nearby Thuy Ung bridge, Van Phu commune
	NM2	Nhue river, nearby Chiec bridge, Tien Phong commune
	NM3	Irrigation canal of Nhan Hien village, Hien Giang commune
	NM4	Irrigation canal of Tam Da village, Thanh Van commune
	NM5	Irrigation canal of Quan Nhan village, Van Khe commune
	NM6	Irrigation canal of Bui Xa village, Van Khe commune
	NM7	Hoa Binh river, nearby Dia Muoi bridge slab, Kim Bai town
	NM8	Phuong Vi river, to the east of Thanh Oai substation

67. Total 14 environmental quality parameters were sampled at the eight locations. The analysed result shows that DO concentrations at all locations are better than minimum acceptable value. However, PO_4^{3-} concentration at all locations exceeds the acceptable limitation in QCVN 08:2008/BTNMT by 1.2 to 2.1 times (Figure 10).

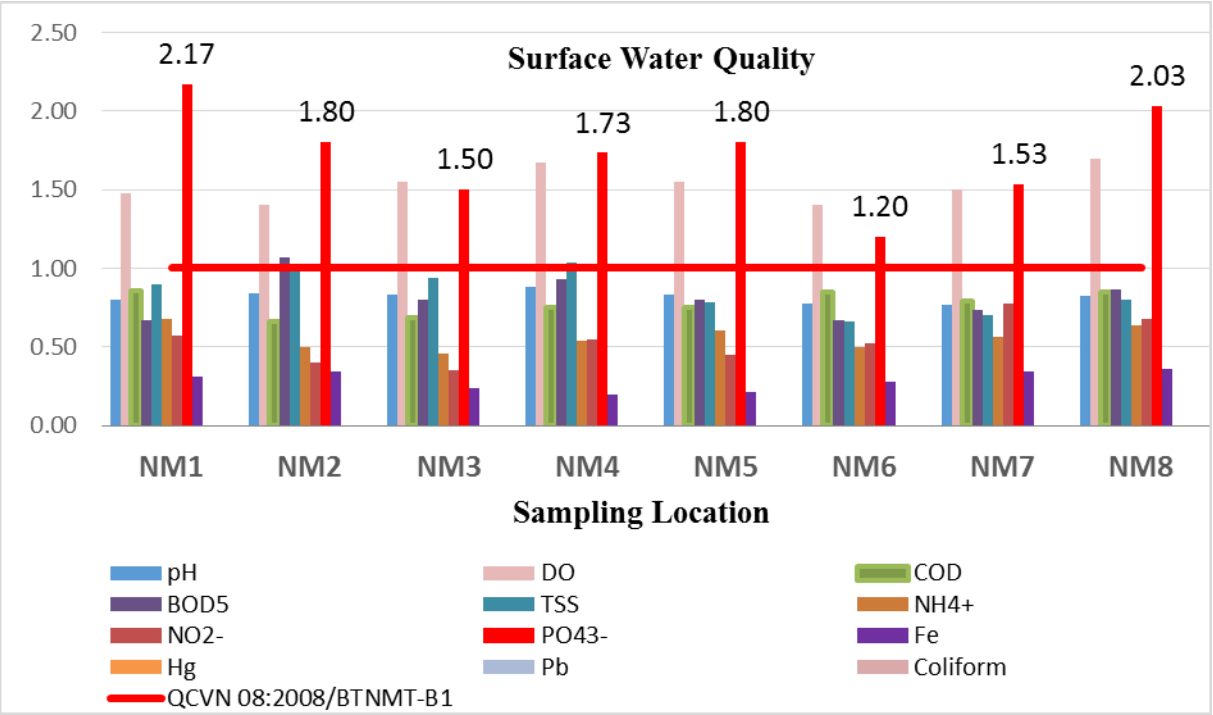

Figure 10: Surface water quality

(Source: Hanoi-PC EVN, 2014)

5. Ground water quality

68. Eight (8) locations for groundwater sampling at the subproject area. All are located in residential drill wells as listed in Table 11

Table 11: Ground water quality - sampling location

Sampling parameters and standard	Sample code	Location
pH, CN, TDS, Fe, NO3-, Zn, SO_4^{2-}, Mn2+, COD, Hardness, NO_2^-, CN, As, Pb, Hg, Coliform, NH4 QCVN 09:2008/BTNMT	NN1	Mr.Cao Van Binh's drilling well, Van Trai village, Van Phu commune
	NN2	Mr. Nguyen Quang Nam's manufacturer, trade traditional village at Tien Phong commune
	NN3	Mr. Nguyen Van Manh's drilling well, Nhan Hien village, Hien Giang commune, nearby pole G5
	NN4	Mr. Vu Duc Son's drilling well, Du Tien village, Thanh Thuy commune, nearby pole G6
	NN5	Ms. Nguyen Thi Lien's drilling well, Tam Da village, Thanh Van commune
	NN6	Ms. Nguyen Thi Hoa's drilling well, Van Khe village, Tam Hung commune
	NN7	Ms. Nguyen Thi Chi's drilling well, Quang Nhan village, Tam Hung commune, nearby pole G7
	NN8	Mr. Do van Minh's drilling well, 3rd residential group, Kim Bai commune

69. Total 18 environmental parameters are taken for analysis. Concentrations of pH are within acceptable range from 5.5 – 8.5 following QCVN 09:2008/BTNMT. Coliform is not found in the samples.

70. The main environmental parameters and analysed results are presented in the Figure 11

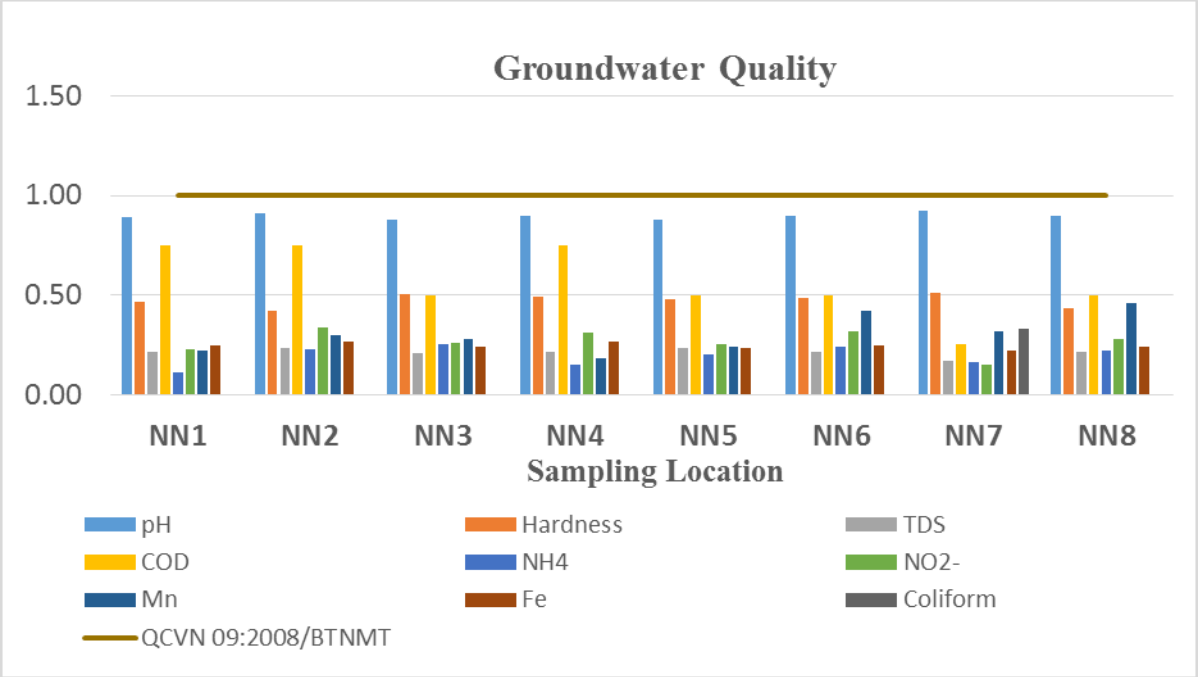

Figure 11: Ground water quality

(Source: Hanoi-PC EVN, 2014)

71. The Figure 11 shows that all the groundwater parameters have values lower than permitted levels given in the QCVN 09:2008/BTNMT.

6. Hydrological geology

72. Hydrological condition in Hanoi is dominated by the Red river and Nhue River. In the subproject area, Nhue River has sufficient flowing capacity to ensure the irrigation demand for agricultural production activities, activities for industrial and residential community in the whole Thuong Tin district. The new transmission line goes through Nhue River (1 times). It has a total length of 74 km counting from upstream of Lien Mac culvert to Phu Ly curvet and then it is confluent with the Day River. Nhue River flows through the 61.5 km territory of Ha Noi with an average width of 30-40m. Flow distribution is dependent on the seasonal distribution of rainfall. The rainfall data in five years showed flow well unevenly distributed and represent two distinct seasons: the rainy season and dry season. The rainy season starts from May to October, rainfall accounts for 80-85% of the year, flow capacity is 150 150 m_3/s. The dry season is from November to April next year. In the dry season, water levels and water discharge is small. The flow volume of the dry season accounted for 20-25% flow throughout the year, flow capacity is 41m_3/s. Nhue River also receives a large volume of wastewater from the residential areas, villages, factories into neighboring areas. Nhue River serves as a drainage river for wastewater from Hanoi city. Since it is polluted, its use purpose is only irrigation.

73. During investigation time (July. 2013), the stable groundwater is on the surface. Three (3) samples at K6, K9 and K12 were analysed to show that the groundwater has weak intrusion (lateral flow) characteristics according to ISO 3994-85.

7. Radiation

74. Magnetic field is also measured at stations. Analysed results in Table 12 shows that all values measured at 14 locations are lower than limitation. It could be concluded that the nearby areas suffer no impact from magnetic field.

Table 12. Measured Radiation

Locations	KX Q1	KX Q2	KX Q3	KX Q4	KX Q5	KX Q6	KX Q7	KX Q8	KX Q9	KX Q10	KX Q11	KX Q12	KX Q13	KX Q14
Values	0.54	0.45	0.35	0.43	0.52	0.4	0.5	0.54	0.48	0.52	0.53	0.5	0.47	0.52
QCSS[6]	220													

B. Biological environment

1. Vegetation and Land Use

75. Ha Noi has 23,510 ha of forest land (former Hanoi: 6,740ha and former Ha Tay: 16,770 ha), which makes up 6.9% of its natural area, of which 3,922ha is natural forest and 19,568ha is planted forest. Its natural preserves are composed of Ba Vi National Park, Chua Huong Natural Forest (My Duc District). Forest in Ha Noi is a vital resource for keeping the ecological environment balance and preventing hill land from eroding. In addition, forest creates landscapes for tourist activities and resort build up.

76. As previous description, main land use along overhead line is cultivation areas of rice and some other vegetation (bean). On the other hand, along the new transmission line several kinds of vegetables are grown such as cabbage, pumpkin, tomato,...and fruits such as orange, longan,….in residential areas;

2. Wildlife

77. The subproject area is both rural and urban with clouded residential area. No significant wildlife occurs any longer within the area. There are no climbing animals that could interfere with the transmission line. A check of websites e.g. Birdlife International does not identify any bird migration routes through Vietnam. The Asian Flyway does not pass through Vietnam and instead heads south through the Philippines.

3. Conservation Areas

78. There are no conservation areas within the proximity of transmission line.

C. Socio-economic condition

1. Population

79. Thuong Tin district has a total area of 127.59 km^2 with 214,000 people. The district is divided into 29 administrative units includes 1 town and 28 communes.

80. Thanh Oai district has a total area of 132.2km^2 with184,400 people. The district is divided into 21 administrative units includes 1 town, 20 communes.

2. Local economy

81. In 2008, gross domestic product (GDP) of the city (the expanded city) rose 10%, of which industrial additional value is up 11.7%, service 10.78%, agro-forestry-fishery 2.68%. Its

[6] Recommended by International Radiation Protection Association (IRPA)

economic structure in 2008 is as follows: service making up 52.17%, industry-construction 41.28%, agriculture-forestry-fishery 6.55%.

82. In 2013, economy in Hanoi maintains the growth rate; the GDP of Hanoi increased by 8.25% over the same period last year. The value of agriculture, forestry and fishery increased 2.46%. The added value in industry and construction increased 7.57% and the service rose 9.42%. The capital development fund of Hanoi city was estimated at VND 279.000 billion, up 12% over the previous year.

83. The total value of production in 2013 at Thanh Oai district reached 2.372,8 billion. State budget revenues reached 149.147 billion. Thanh Oai district's economic structure has shifted with the proportion of construction industry accounted 52.9%, services accounted 27.4%, agriculture 19.7%.

84. In 2013, the state budget revenues at Thuong Tin district reached 236 billion. Thuong Tin district's economic structure has shifted with the proportion of construction industry accounted 53.4%, services accounted 32.5%, agriculture 14.1%.

3. Social infrastructure

Public Health and Sanitation

85. Ha Noi is the largest Vietnamese health center. According to the figures from Vietnam Statistics Agency in 2007, former Ha Noi had 232 health stations, 26 clinics, 19 hospitals, 4,448 patient beds, 1,705 doctors under the Ministry of Health. Former Ha Tay had 322 heath stations, 17 clinics, 16 hospitals, 4,500 patient beds, and 986 doctors. Its health system is more and more developed; many health centers in districts were upgraded to increase health care services for patients from other provinces. Coupled with the state-run health system, Ha Noi has private hospitals and clinics. In 2008, Ha Noi had 8 private hospitals with some 300 patient beds. Ha Noi is to have more 8-10 private hospitals by 2010 when total patient beds amount to some 2,500. Thuong Tin district has Vietnam Central Mental Hospital 1 with 500 patient beds.

86. Medical station with one doctor and some physicians are all available in each ward of two districts. Private medical services as well as pharmacy shops are also available in the subproject area.

87. Solid wastes are gathered at temporary places within residential area and nearly 80% domestic waste is collected and transfer waste to trucks for further treatment.

Education

88. Ha Noi has hundreds of leading institutes, more than 50 universities and colleges that are training important laborers and supplying some 80,000 graduates to the laborer market. In addition, it supplies skilled and advanced workers for enterprises to scale up their business. Education system in all districts is convenient in the region from kindergarten, primary school, secondary schools, high schools and colleges.

Communications

89. Ha Noi is the biggest communications center in the country. Its communications network satisfies swift communication information demand nationwide and worldwide. Infrastructure for transport, communications and electricity are being constantly improved so that people's standard of living and access to services has improved appreciably. All households in the subproject area have TV and telephone. All communes or wards have their own mass communication facilities. The post office locations are a short distance for all people. The subproject area is covered by many telephone networks as Viettel and VNPT telecommunications, and a number of other telecommunications companies. Thus, it is very convenient for people to communicate and develop this sector.

Water and electricity and transport

90. All households in two districts are fully supported with electric system. 90% population of two districts use sanitary water in which rate of using clean water is nearly 17%.

91. Local roads have been upgraded with concrete up to 90% of total existing road system.

4. Cultural and Heritage Sites

92. In general, no cultural heritage sites are located within the subproject area. The nearest distance from Thuong Tin substation to residential area (Phap Van pagoda) is 650m. The nearest distance from 110kV Thanh Oai substation to residential area (Thanh Oai gymnasiums) is 600m.

5. UXO Clearance

93. After decades of war UXO is a significant issue in Vietnam. Thus, Hanoi DPMB has sent the official letter No. 433/HANOI DPMB-KTGS dated 16 March 2016 to Hanoi Capital City High Command regarding the UXO clearance at tower foundations of the 110kV transmission line from 500/220kV Thuong Tin to 110 Thanh Oai Substation. The Hanoi Capital City High Command has replied in official letter No. 449 BTM-CoB suggesting the UXO clearance should be implemented for 110kV transmission line from 500/220kV Thuong Tin to 110 Thanh Oai substation (see Appendix D). Therefore the UXO will be conducted before the construction starts.

6. Subproject affected people

94. Communities will be affected by loss of land and loss of assets within the RoW. All households that are affected by permanent or temporary losses will be compensated according to the Resettlement Plan (RP). Loss of land includes both permanent and temporary loss of land.

95. According to Resettlement Plan conducted by EPC (2014), the permanent losses of land for 51 foundations of 13 towers are 6,147m^2. The temporary loss of land is nearly 3,792m^2. Total of loss of land is shown in Table 13.

Table 13 . Total of loss of land

District/commune	Total of loss (m^2)	Permanent loss of land (m^2)	Temporary loss of land (m^2)	Public land (m^2)
Thuong Tin	**4059**	**2711**	**1227**	**121**
Tu Nhien	1330	1018	312	
Hoa Binh	0	0	0	
Van Phu	1379	847	411	121
Tien Phong	150	68	82	
Hien Giang	1200	778	422	
Thanh Oai	**5880**	**2975**	**2565**	**340**
Kim Bài Town	400	277	123	
Tam Hung	2300	1158	946	196
Thanh Van	2430	1200	1086	144
Thanh Thuy	750	340	410	
Total	**9939**	**5686**	**3792**	**461**

(Source: Subproject RP, 2016)

96. No graves are to be relocated.

7. Features of transmission line sites

97. Supplementing views of the site for the new 110kV transmission line are shown in Table 14

Table 14. Views of the new 110kV transmission line

Illustrated photos	Area description
	Departure point: 110kV busbar of 500/200kV Thuong Tin substation, located at Van Phu commune. The substation is located on current cultivation area.
	Tower G1 at Van Phu commune – Go field. Tower G1 laid on current cultivation area of Van Trai village where rice and vegetation are grown

Illustrated photos	Area description
	Alignment of 110kV transmission line at Tien Phong trade traditional village – Tien Phong commune. TL goes parallel with 500kV transmission line
	The transmission line goes across Nhue River at Hien Giang commune.
	Alignment of transmission line to location of G7 – Thanh Van commune, where are residential area, pond and rice field

Illustrated photos	Area description
	Location crossing over 220kV existing transmission line at Tam Hung commune
	Arrival point: busbar of 110kV Thanh Oai substation at Kim Bai town. This substation is built on cultivation area currently.

VI. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATIONS

98. Environmental impacts are screened and assessed in three phase of subproject implementation defined as: pre-construction; construction and post-construction operational phase. Safety hazards and other environmental risks are also verified during assessment.

A. Subproject Benefits

99. The primary targeted benefit of the subproject is provision of needed electrical power to reduce electricity load for the 110kV Ha Dong – Van Dinh transmission line and also supports for the overall goal of developing Hanoi electric network.

B. Potential Impacts and Mitigation Measures during Pre-construction Phase

a. Land acquisition and compensation

100. Impact: The total affected land area caused by the subproject is 9,939 m^2 including 5,686 m^2 of permanently acquired land; 3,792 m^2 of temporarily acquired land and 461 m2 of public land. All of the affected area is annual crop land, with 2,711 m^2 in Thuong Tin district and 2,975 m^2 in Thanh Oai district (Table 13). The project does not affect buildings and structures therefore no relocation and resettlement is required. The project will only affect some crops and plants. The total area of agricultural land temporarily affected during construction of tower foundation is 3792 m^2, which is entire annual crop land. These soils will be refunded immediately after construction is complete.

There are also about 169 661 m^2 of land is limited to use within the safety corridor of the grid (Righ of Way). For land under the ROW, people can still use for farming and housing is still allowed to exist as a safety corridor under the provisions on the protection of electrical safety corridor (Decree No. 14/2014 / ND-CP dated 26 February 2014). However, if some trees affect safety of electricity works they need to be cut down. Other trees with height fewer than 6 m can be allowed to exist, but their branches must be trimmed and height restrictions should be strictly controlled.

The total area of permanently acquired land belongs to 50 households with 168 people. There are 8 households severely affected due to the acquisition of 10% to 30% of productive land. According to the survey results, no vulnerable household is affected by the project. No poor households will become poorer by the impact of the project. The details of the land losses and compensation are found in the draft Resettlement Plan (RP).

101. Mitigation measures: Details of mitigation measures in pre-construction stage are elaborated in the RP for this subproject and specifically expressed in the EMP, which may include:

- Affected persons are informed ahead on the subproject implementation and participated in acquisition and inventory of land, consulted in compensation assistance
- Comply with the regulations of the Land Law 2013 and decrees, circulars, decisions on compensation, assistance and resettlement of the Government and Hanoi City People's Committee.
- Comply with the regulations of the Electricity Law, the Decree No. 14/2014/ND-CP and relevant regulations.
- Ensure compensation payment to be implemented clearly, openly and fairly in compliance with legal regulations. Estimated cost of compensation and assistance for AHs whose trees/crops will be cut by the subproject is proposed approximate VND 22,506,788,983.
- Budget for compensation payment will be enough and available.
- Conduct design of tower height to minimize impacts due to crops and trees clearance.
- Construct completely each work item to minimize the duration of temporary land use for the project construction.
- Coordinate to address people's claims/grievances relating to compensation.
- Trees and vegetation should be protected; tree clearance should be done within designated area.

b. UXO clearance

102. Impacts: In the subproject area, UXO may still exist because is located in the heavily bombed area (especially in 1972). In addition it was proposed by the Hanoi Capital City High Command in official letter No. 449 BTM-CoB that the UXO clearance should be implemented for 110kV transmission line from 500/220kV Thuong Tin to 110 Thanh Oai substation. Thus,

if UXO clearance is not implemented, it may cause risks of worker's and people's life when conducting the project construction...

103. Mitigation measure: The UXO clearance should be implemented before preparing and clearing site for constructing the project. It is necessary to coordinate with the competent agency for UXO clearance in the proposed subproject area. The proposed guidance for UXO clearance is as follows:

- Execution of demining and UXO is done following these steps:
  + Covering UXO detection and clearance area,
  + Clearing the grounds
  + Detection by the detector to a depth of 0.3 m
  + Mark, digging test and resolve signal to a depth of 0.3m
  + Detect bomb by detector to a depth of 5m (put in step with high sensitivity)
  + Excavation, checked resolve signal to a depth of 3m
  + Excavation, checked resolve signal to a depth of 5m
- Note: before detecting UXO under wet fields, marshes pond with a depth <0.5 m, it must to embankment and drain water to avoid remaining tidy UXO. When detecting UXO on terrestrial land, warning boards and guard have to be arranged to avoid accidents due to entrance of people, animals or vehicles.
- Collecting, sorting, transportation management and destruction of mines and explosives are under strict safety standards for preservation, transport and use of explosives in TCVN 4586-1997, issued by Explosive Engineering Command Ministry, and the other current regulations.
- Competent unit shall be responsible to notify the military commander in the Hanoi city (Capital city commander) on the implementation mission: clearance location, construction schedules and staying time in the locality

c. High risk of negative impacts due to inappropriate detailed design

104. Impacts: If the detailed design does not consider the environmental issue (e.g. wrong site selection, not suitable construction technology, hazardous material use ect.) that the subproject can cause negative impacts during construction and operation. Example, wrong subproject site selection can increase impact during construction stage, such as (i) difficulty to access of local people to road, residential area, cultivation area, irrigation canal,…; (ii) negative impact on traffic along the transportation road or at the section crossing the traditional village; (iii) negative impact on waterway during the excavation time, pulling and scattering the wire . In reality, the Thuong Tin – Thanh Oai TL will be crossing several roads, power lines, communication cables, rivers, ponds and lakes as presented in the Table 16

Table 15. The crossover objects of some TL section

Project site	Tower No.	Intersect with/crossover
Thuong Tin district		
	Departure point - G1	- Fish pond
Tien Phong commune	G1- G2	– One 0.4kv power line and – One 35kv power line and – Two communication cables. – Inter-district road of Thuong Tin – Binh Da.
Tien Phong commune	G2 – G3	– Three 35kv power lines.
Tien Phong commune	G3 – G4	– Nhue river, – One 0.4kv power line and

Project site	Tower No.	Intersect with/crossover
		– One communication cable.
Thanh Thuy commune	G4 – G5	– Inter-commune concrete road, 0.4kv power line and fish pond.
Thanh Thuy commune	G5 – G6	– Communication cable, – 35kv power line, – 0.4kv power line and – Inter-commune concrete road
– Thanh Oai district		
Thanh Van commune	G6 – G7	– National road which is being constructed
Van Khe commune	G7 – G8	– Two 0.4kv power lines
Tam Hung commune	G8 - G9	– Small irrigation canal
Tam Hung commune	G9 – G10	– The route runs under one 220kv power line.
Tam Hung commune	G10 – G11	– Cross one irrigation canal and run along rice fields
Tam Hung commune	G11 – G12	– Inter-commune concrete road, – One 6kv power line, – Internal pumping station and – Hoa binh river.
Kim Bai town	G12 – G13	– The route passes rice field area
Kim Bai town	G13 – arrival point	– Drainage canal

105. Mitigation measures: The mitigation measures may include: During detailed design process, consultants have to consider the environmental issues for the design, specifically

- Arrange transmission line direction to avoid residential areas, especially residential areas at traditional village of Tien Phong and Hoa Binh communes; the detailed design for foundation of tower also should avoid the tombs on the production land at Thanh Van and Hien Giang communes;
- Design the height to suspense wires of the overhead transmission line section for ensure electromagnetic field not affect to people's health. EO of PMB with the support from PIC will be responsible for reviewing detailed design of the subproject to ensure proposed mitigation measures included in the detailed design. Furthermore, after feasibility study was approved, the PMB will notify the local authorities and people of activities and schedule of the subproject so that they can organize their production and business suitably.

d. Low effectiveness of mitigation implementation due to inadequate bidding document establishment

106. Impacts: If terms of reference content in the bidding documents of civil works and equipment supply exclude provisions for environmental protection, then the bids submitted by bidders may ignore the environmental issues. Therefore, it will result in disturbance and pollution during construction and operation phases of the subproject.

107. Mitigation measures: State in bidding documents that contractor must have experience in EMP implementation, or provide staff with sufficient experience; bidding document and construction contracts have to include provisions that require contractors to comply with the mitigation measures proposed in IEE. The mitigation plan is organized into a series of mitigation sub-plans that address specific potential impact areas of the subproject. The sub-plans will assist the contractors with the development of their SEMPs as part of their bid documents, and ultimately will allow the EO/IA, PIC, and contractors to focus more or less on the different potential impact areas as they arise with the implementation of the final designs of the subproject. Therefore, EO of HANOI DPMB have to ensure that the civil work contracts are included mitigation sub-plans of the EMP which are drafted for example for: a) trees and vegetation removal and Site Restoration, b) domestic waste from workers; c)

refused excavated soil and other wastes; d) noise, dust, and exhausts; e) liquid wastes; f) construction and urban traffic; g) worker and public safety; h) cultural chance finds. Detailed environmental impact mitigation plan is presented in Table 18.

e. *High risk of negative impacts due to inappropriate c*onstruction site arrangement

108. Impacts: There are several impact sources such as disposal site selection, the planning of material transportation and storage facilities. The selection of disposal site will affect local land area if the soil excavated from foundation pits are polluted. This can lead to cause pollution for residents living near the site if the selection process is not careful. If the selection of stockpile and material gathering site is not careful that it may create dust, noise, exhaust which affect people who are living near this site, especially in densely populated areas . Also, if the selection of stockpile and material gathering site is not reasonable that can impact on the business of the households due to temporary acquired land.

109. Mitigation measures: The mitigation measures are detailed further in the EMP that may include:

- Selection of disposal site: disposal site will be proposed and selected by the PMB in next phase when having detailed design drawings. The PMB will be responsible for consultation with local authorities to get their formal agreement and permission for this site before commencing the subproject. The PMB will required civil contractor to prepare a disposal plan. Based on this disposal plan, civil contractor will be responsible for contracting with specialized unit (e.g URENCO) to collect, transport and dispose the refused excavated materials to the permitted disposal site. .PMB will be responsible for supervision and include this content in civil work contracts.
- Contractor will arrange the temporary yards for stockpile and material gathering site within the tower foundation area or the ROW in order to avoid arising impacts due to land acquisition.
- Contractors will obtain the license for safety and environmental requirements of mobilized machines and vehicles.

C. Potential Impacts and Mitigation Measures during Construction phase

110. Short-term construction-related impacts common to the construction of the subproject are mainly reduced and/or blocked public access, disrupted agriculture, noise, dust and air pollution from NOx, SOx, and CO caused by construction truck traffic and heavy equipment use, soil and paddy pollution caused by equipment operation and maintenance, public and worker accidents, increased traffic accidents, erosion and paddy sedimentation, solid waste and domestic pollution from worker camps, damage to existing roads traversed by the transmission lines, social disease and community problems caused by migrant workers.

a. Air quality

111. Impacts: Dust, noise and exhaust fume will be generated from construction vehicles, material transportation vehicles; soil excavation of tower foundation pits and during construction period. Dust, noise and exhausts will affect to ambient air environment in the construction site and along the transport roads. The residential areas near the construction site and road of transportation will be impacted by these impacts, especially the residential area at Tien Phong and Hoa Binh traditionnel trade village. However, these impacts are short-term and will be stopped when the construction is completed hence these impacts are negligible.

Dust and emission from construction vehicles, equipment. Dust may be generated by excavation and earth moving operations. Dust generated on construction sites would cause a

nuisance at residential receptor sites given their distance from the works. Exhaust emissions may occur as a result of poor maintenance of equipment or vehicles.

Noise can be generated during construction period and it will affect local residents and construction workers. Noise generated by construction and transportation activities: Noise will be generated by activities of machines, equipment and means such as truck, crane etc. But the subproject area is far from the residential areas. In addition the machines, equipment and means will be only operated in the daytime. Thus, noise impact is insignificant and short term. It impacts only on some households living along transportation roads.

112. Mitigation measures: The mitigation measures are detailed further in the EMP that may include:

- Monitor the quality of ambient air based on visualization method, which requires water spraying if dust is visible. The air quality measurement: dust, CO, NOx, SOx, noise has been conducted only one time as baseline data during pre-construction phase
- Contractor will ensure that transportation means, machines and equipment must have effective certificate of environmental achievement (QCVN 04: 2009/BGTVT and QCVN 05: 2009/BGTVT) issued by the register department before using for the subproject construction;
- All construction vehicles and gas powered equipment will be maintained in proper working order to minimize emissions, and will not be operated at night if possible to minimize noise nuisance.
- Aggregates (e.g., sand, gravel, rock) that are transported by truck will be covered
- Speed limits should be posted and adhered to by construction vehicles
- Temporary stockpiles/storage yards will be covered, or sprayed regularly to prevent dust and erosion.
- Reduce excavation and filling duration, and excavated soil will be used to fill right after complete work

b. Water quality:

113. Impacts: Sources causing impacts on water environment include domestic sewage and construction sewage. The locations where water quality can be impacted are Nhue River at section between G3 – G4 poles, Hoa Binh River between G11 – G12 poles, the irrigation canals between G8 – G9 poles, G10 – G11 poles and G13 to arrival point. However, the impact on water quality at these locations is not significant and can be mitigated and controlled as shown below:

- Domestic sewage is generated by worker's life activities. Number of workers is about 40 people, thus domestic sewage volume generated is small, about 2.6m^3. Components of domestic sewage include residues, SS, organic matters (BOSD/COD), nutrient matters (N,P). Workers live in the camp area therefore domestic sewage generated will be collected in movable toilets. For this reason, impacts of domestic sewage will be mitigated; emission source can be managed and controlled.

- Construction sewage: includes mainly water pumped from the tower foundation pits, abundant water from concrete maintenance of tower foundation pits, abundant water from concrete mixing. Components of tower foundation pit pumped sewage are mainly SS, mineral salt and organic matters washed from the ground surface, thus it can cause increase in the turbidity of surface water sources near to the subproject site. Sewage from concrete maintenance of tower foundation pits, concrete mixing only include SS without hazardous substances impacting on environment.

- Referring to the section crossing Nhue River, local soil erosion and land slide could occur. Therefore, surface water quality at this section can be affected. However, no excavation and electricity pole installation for both approaches of the transmission line to the river. Thus, the impacts of construction activities on water quality of Nhue River should be negligible. But, as an extra mitigation measure a civil works and erosion mitigation sub-plan of the EMP will need to be followed by the contractor to prevent all erosion and river sedimentation.

- Refused oil, lubricant and grease; clouts with oil, grease, lubricant; waste sewage from equipment and means with oil, grease and SS will cause surface water source pollution if not collected and treated. According to research result of "Research of refused lubricant, oil recycle into liquid fuel" conducted by military science and technology center – Ministry of National Defence in 2002, the average volume of oil, lubricant refused from construction machines and vehicles is 7 litters for every changing time. Period for changing lubricant and maintenance is 3÷6 months depending on machines' and vehicles' intensity of activity. With about few types (<10) of machines and vehicles, construction duration of 5 months, volume of refused oil and lubricant is about 70 litres.

114. Mitigation measures: The mitigation measures are shown detailed further in the EMP that may include:

- For domestic sewage: Hire local people's houses for workers' stay. Only construct camps for the TL sections far from the residential areas. In the case worker camps need to be built, provide mobile toilets with septic tanks to locate at the workers' camps. Periodically hire competent unit to collect toilet waste according to regulations. Construct preliminary wastewater treatment system to treat domestic wastewater before discharging into water bodies.
- For construction sewage:

- Arrange construction sewage collection holes for depositing SS before wastewater flows into surface water sources. The detail for technical specification for these holes is depended on each tower foundations or each excavated holes. The common dimensions can be 0.5mx0.5mx0.4m (height x wide x deep).

- Make an earth dyke around all excavation/trench sites and along all rice paddy and surface waters to prevent soil erosion and sedimentation..

- All the reparation and, maintenance of machines, equipment and transportation means will be implemented at garages not in the construction sites. Refused oil and gearse, waste sewage from washing machines, equipment and means, clouts with oil, grease will be collected and treated at these garages as stipulated

c. Traffic system

115. Impacts: The overhead transmission line crosses over roads 08 times, of which it crosses over HW21B (section of tower G6 – G7) 01 times. Therefore, the tower foundation excavation, transportation of construction materials, wire scatter and pull of the overhead transmission line section can cause existing road surface, increase in the quantity of transportation means on roads, increase in traffic jam and increase in risk of traffic accidents. There is also a potential to cause runoff sand, stone, soil in the roads during the construction materials transportation. Especially, the installation of tower G2 to G3 and overhead line which are near trade traditional village at Tien Phong commune will directly affect on the residential daily activities. The impacts on daily activities mainly related to traffic disruption, safety hazard.

However, the transmission line and tower foundation mostly located at and cut through agriculture land. On the other hand, the subproject area are located on the suburb with the traffic density is not high. Therefore, the impact on traffic system is small.

116. Mitigation measures: In order to reduce the impact, the construction contractor must consider proper construction solutions which might include:

- Prepare implementation alternative for the transmission line at every inter-cross location;
- Contact with management unit of the roads for coordination to ensure construction safety and uninterrupted traffic activities;
- Informing the construction schedules by inviting community representatives to the regular meetings as well as using communication means such as laud speakers or post information materials at the CPC bulletin board.
- Setting the rule of limit traffic speed to the driver at the section cross residential area;
- Open excavations should be fenced, and trenches covered where public walkways or vehicles must cross.
- Where possible construction vehicles should use different roads or dedicated lanes of roads shared by the public.
- Conduct road upgrading or repairing if collapse occurs due to the subproject construction;

d. Solid waste

117. Impacts: Sources of solid waste include domestic waste and construction waste. * * Impacts due to domestic solid wastes created by workers' daily-life activities. The number of workers is about 40 people. Thus, domestic solid waste amount is about 20kg/day. This includes: organic matters, plastic, paper, glass and other inorganic matter, of which organic matters are accounted for the main part. The domestic solid waste can contain pathogenic bacteria/viruses that are harmful for human health and domestic animals. Therefore, it is necessary to collect and dispose domestic solid waste daily and effectively.

Impacts due to construction solid wastes created by construction activities which include: refused filled and excavated soil and rock, fallen materials; empty cement sacks, wooden barrel used for packaging equipment and devices, clouts etc. The excavated soil volume is proposed to be 30,724m^3, from that about 28,021m^3 will be reused for backfilling foundations . The remained excavated soil that can not be reused will be collected, transported to the permitted disposal sites and treated according to regulations.

Hazardous wastes such as oil, grease and other petroleum products, etc. will be generated

The households who live near the construction site, especialy residential areas at traditional village of Tien Phong and Hoa Binh communes, workers' camps, dumping sites will be affected by this impact. However, the impact is not significant and mitigatable

118. Mitigation measures: The mitigation measures for this impact are detailed shown in EMP that may include:

- Solid waste must be soon cleaned and transported outside. Contract to local environment services is a good option for the construction contractors.
- Hire residents' houses for workers' staying. Camps are constructed only for the TL sections that are far from the residential areas.
- Regularly collect solid wastes from construction sites and transport these to designated dumping sites;
- Packaging materials such as wooden barrel, plastic, cardboard boxes used for equipment and devices, electrical parts will also be generated reused or recycled if possible.

- For hazardous waste (i.e. waste oil, grease and other petroleum products, etc.),, set up collection systems, and temporary storage around the construction sites then contract government licensed companies to collect and transport these to hazardous waste disposal areas of the district or province
- Utilize salvage excavated soil, rock for filling, solidating tower foundations according to excavation and filling balance method.
- For excavated soil which can not be reused, it will be collected and transported to the disposal site agreed by the local authorities through consultation with them.Reused or recycled empty cement sacks, steel, lubricants, fuels, and wood debris, plastic, cardboard boxes used for equipment and devices, electrical parts will also be generated as much as possible.
- The hazadous wastes such as refused oil and grease, clouts with oil, used batteries will be collected. The constructor will and assign acontract with legaly authorised unit to collect treat hazardous wastes. Regarding the disposal licence for disposal of construction solid waste, the constructor will arrange to obtain it when they start construction work. It also depends on the calculated waste amount, if they reuse or local people want to take the excavated soil for filling pond, house base, the disposal licence may not be required

e. Social problem

119. Impacts: Concentration of workers (40 people) in the subproject site can cause disorder and insecurity, disturbance in the locality due to conflicts between workers and local people, social evils. The presence of migrant workers temporarily residing in local housing facilities or interacting with local people in public places (i.e. market, local stores, entertainment places, etc.) may give arise to social problems such as gambling, prostitution, spread of infectious diseases (i.e. HIV/AIDS, etc), and others. However, these impacts are insignificant, short-term, only occur in the construction phase (about 4 months) and will stop when the project construction finishes.

Near the tower G6 at Thanh Van commune are some tombs. Although the earth work is required for construction tower foundation, it do not directly impacts on the tombs because is the tombs are located far from the tower. However, the contractors need to apply extra mitigation measures to prevent impact on those toms to respect spiritual life of local people

120. Mitigation measures: The construction contractor should ensure construction measures during construction time that may include:

- Construction units will implement temporary residence registration and provide accurate information about the quantity and stay time of all construction workers to CPCs within the project area during the construction phase. They should also establish the relationship with the local authorities to discuss and take decisions necessary for their management;
- Require workers not to take part in or cause social evils; any contravener shall be strictly treated in accordance with laws;
- Forbidding the workers stand on or seat on the tombs.
- Consult local authorities to determine the possibility of renting houses for workers instead of erecting camps for better domestic solid management.
- Establish rules in camp. Orient workers on the proper way of communicating with the local community, and conduct seminars on personal health, sanitation and prevention of contagious diseases;
- In order to minimize the risk of injury to the local residents and the workers, it needs to comply with the GOV's regulation on Occupation, Safety and public health, or the

World Bank's Environment Health and Safety Guidelines (2007) that govern the safe and orderly operation of civil works should be followed.

- Contractor will negotiate with potentially affected households and residential representatives to proper compensation for any affects.

D. **Potential Impacts and Mitigation Measures during Operation phase**

a. ***Biological environment***

121. Impacts: In the operation phase, the process of periodic maintenance and repair of the transmission line, branches and tops of the trees violating the transmission line safety inside the ROW, and trees outside the ROW with the risk of falling down or branches affecting to the ROW must be trimmed and cut down. According to the survey result, the transmission line mainly crosses over cultivated areas. Therefore, after the transmission line is come into operation, the cutting of branches and/or top of trees in the maintenance and repair process will have negligible impact on biodiversity of ecological environment.

122. Mitigation measures: During maintenance process, only cut down trees and branches that would affect the safety of the transmission line as specified in the Decree No. No. 14/2014/ND-CP of the Government dated February 26th, 2014. Take care of plants inside and outside the scope of the ROW are as follows:

Trees, crops in the ROW: According to Decree No.14/2014/ND-CP, rice and crops must be away from electric tower foundations at least 0.5m. Trees can be grown within the ROW but the vertical distance from the highest point of tree to the sag point of lowest conductor of 110kV transmission line while in maximum deflection state must not be less than 3.0m for the transmission line outside city, town.

Trees outside the ROW: In case where there are trees outside the ROW of the overhead transmission line and outside city, town, the distance from any part of the fallen tree to any part of the transmission line must not be less than 1.0m for 110kV. For valuable trees growing rapid in the short term with the risk of causing unsafety for the TL, they must be cut down and forbid to be grown near the ROW.

- It will be not allowed to cut down or trim trees and branches of trees which locate outside the ROW without affecting to the safety of the TL during operation.
- Use manual method to clear plants. Not use herbicide for plant clearance.
- Trees and branches of trees which are cut down will be collected by local people for firewood or the operation agency will contact to local authorities to collect, transport and handle them as stipulated.
- Recommend local people to grow trees theirs height meets the requirements of height as stipulated. Local people will not be allowed to grow trees growing rapidly and their height might exceed the allowable limits, that affect to the safety of the TL.
- Operation unit is responsible for establishing rules on fire fighting and prevention. Arrange necessary tools and means for firefighting as stipulated.

b. Occupational health and safety of the workers during the TL periodic maintenance process:

123. Impacts: The occupational health and safety issues during the operation of high voltage transmission line include electrocution risk due to exposure to high voltage systems when maintaining and repairing the transmission line or living under the ROW; accident risk due to working in heights; potential exposure to electric and magnetic fields when maintaining and repairing the transmission line or living under the ROW. Other accidents

that may occur include lightning, fire and explosion, tower collapse.

Exposure to high voltage systems: Workers may come in contact with power lines/equipment during the maintenance and repair of the 10.119 km 110kV transmission line from the 500/200kV Thuong Tin substation to the 110kV Thanh Oai substation and electrocution from direct contact with high-voltage electricity is a hazard directly related to facilities.

Working at height: Accidents may occur when working at height of 13 towers of the transmission line. However, a working safety plan may be implemented to reduce risks that include testing of structural integrity prior to proceeding with the work and the use of fall protection measures.

Exposure to electric and magnetic fields (EMF): Typically, workers repairing and maintaining the TL have higher exposure to EMF than community because of working in close proximity to electric power equipment. Impact of EMF on operators when conducting the transmission line maintenance and repair: Under the Decree No. 14/2014/ND-Cp dated Feb. 26th, 2014 promulgated by the GoV, working time at place with EMF is regulated as in Table 17:

Table 16. EMF intensity and allowable limits of working time during one day

EMF intensity (E) (kV/m)	< 5	5	8	10	12	15	18	20	20 <E<25	≥25
Allowable limits of working time during one day (minu.)	Not limited	480	255	180	130	80	48	30	10	0

124. Operators of the TL are arranged to work in shifts, crews ensuring working time as stipluated, ensuring time for contacting with EMF. Thus EMF will not significant impact on operators' health.

125. Mitigation measures: The mitigation measures for this impact are shown in EMP that may include:

- Occupational safety and health regulations and guidelines of MoLISA should be applied to operations and maintenance of T/L. Maintenance workers must obey strictly regulation on working time in area impacted by electro magnetic field according to "technical regulation on power safety in T/Ls and substation repair, management, operation and construction" attached to Decision No.1559 EVN/KTAT dated on October 21, 1999 by EVN; and ensure safety distance for working areas according to *"National technical regulation on power safety QCVN 01:2008/BTC".*
- Provide worker protection equipment and clothes, and special repair tools for connecting branches. And frequently check labour protection and safety equipment and clothes.
- Periodically examine workers' health.

Follow safety measures when working at height during maintenance and repair the TL, particularly:

- All workers will be examined health for working at height, equip sufficiently labour protection tools and cloths.
- Workers who climb on towers will have Safety Certificate of Class 3 or above and sufficient conditions for working at height. Safety belts will be attained used standard of the nearest inspection, not exceed over 6 months. During movement and working at height, workers will wear safety belts and the safety leather belts must be tightly tied with the tower.
- All equipment, tools and means will be carefully examined for quality and quantity

before used. It should carefully check the suspending cables before climbing on the tower.

- Not permitted to work at height when it is going in night; it has fogs; it has strong wind with above class V.

Occupational EMF exposure will be minimized through the implementation of an EMF safety program that includes

- Identification of potential exposure levels in the working area including survey of exposure levels and establishment of safety zones
- Properly limit time for contacting with EMF for trained workers as stipulated and those equipped with appropriate PPE when entering safety zones.
- Utilization of personal monitors during work activities.
- Post safety signs and warning signs.

In addition, in the operation phase, training for workers will be conduct so that worker can respond to risks/failures and meet the operation procedures. An emergency and safety guideline will be prepared and disseminated to the workers for handling risks/failures occurring in the operation process, e.g. risks of electric shock, fire, explosion, tower collapse. Coordinate with the local authorities at commune, district levels to propagandize, disseminate knowledge of safety of the ROW to communities and residents living near the T/L. Equipment maintenance areas will be located away from the residential areas.

c. Community Health And Safety

126. Impacts: Impacts of electro magnetic field to people. EMF levels are expected to be within the standards because the design of transmission line is in compliance with Decree No. 118/2004/ND-CP dated on 10 May 2005. However, EMF levels should be regularly monitored.

127. Mitigation measures: The mitigation measures for this impact are detailed in EMP that may include:

- Comply with the conditions of Article 6 of Decree No. 106/2005/NĐ-CP by the GOV dated on August 17, 2005 concerning the detailed regulations and guidelines on the Electricity Law on the safe protection for high voltage power network.
- Putting danger warning boards at necessary places.
- Ensure T/L towers are marked with clearly visible danger warning signs to keep public out.

d. Climate change

128. Regional Global Circulation Modeling project greenhouse-climate change induced changes to the frequency and severity of rainfall events in the subproject area. The foundations of the transmission towers will be high enough to avoid exposure of the base of the tower to local flooding events.

129. The collective mitigation for operational effects is to prevent public access to the transmission towers. This management action would be implemented with effective clear signs indicating the dangers of the facilities.

130. Other potential impacts concern the effect of the uncontrolled housing development. A safe distance from overhead line at least 6m has been incorporated in regional master plan by design consultant. In addition, dissemination of safety information on transmission system to local residents as well as periodic remedial action from commune government officers in conjunction with EVN Hanoi operations staff are required.

VII. GRIEVANCE REDRESS MECHANISM

131. A well-defined grievance redress and resolution mechanism will be established to address affected persons (AP) grievances and complaints regarding environmental issues, land acquisition, compensation and resettlement in a timely and satisfactory manner. All APs will be made fully aware of their rights, and the detailed procedures for filing grievances and an appeal process will be published through an effective public information campaign. The grievance redress mechanism and appeal procedures will also be explained in a project information booklet (PIB) that will be distributed to all APs.

132. APs are entitled to lodge complaints regarding any aspect of affected environments, land acquisition and resettlement requirements such as noise, pollution, entitlements, rates and payment and procedures for resettlement and income restoration programs. APs complaints can be made verbally or in written form. In the case of verbal complaints, the committee on grievance will be responsible to make a written record during the first meeting with the APs.

133. An appointed grievance committee with environmental and social issues will be set up in the local communes comprising of the local leaders. The designated communal officials shall exercise all efforts to settle the APs' issues at the commune level through appropriate public consultation. All meetings shall be recorded by the grievance committee and copies shall be provided to the APs. A copy of the minutes of the meetings and actions undertaken shall be provided to the EA/IA, and ADB as requested.

134. Procedures for grievance redress is defined as below and summarized in Figure 2. Procedures described below should apply easily to both social and environmental issues and be consistent with the legal procedures for grievances/disputes resolution in Viet Nam.

i. Stage 1: APs can lodge their grievance/complaint verbally or in written form to the Contractor/HANOI DPMB because initial environment issues will be most likely be construction-related. The Contractor/ HANOI DPMB are responsible for receiving, discussing, negotiating with the APs to solve their grievance/complaint within 15 days from the date the complaint is received. All meetings shall be recorded and copies of the minutes of meetings will be provided to APs.

ii. Stage 2: If no understanding or amicable solution can be reached or if no response is received from the Contractor/HANOI DPMB within 15 days from filing the complaint, the APs can elevate the case to the Commune People's Committee (CPC). The CPC will respond within 15 days upon receipt of APs complaints. All meetings shall be recorded and copies of the minutes of meetings will be provided to APs.

iii. Stage 3: If the AP is not satisfied with the decision of the Ward/Commune People's Committee within 15 days since the date of submitting complaints, or in the absence of any response, the APs can appeal to the Precinct/District People's Committee (DPC). The DPC will respond within 15 days from the day the complaint is received.

iv. Stage 4: If the AP is still not satisfied with the decision of the District People's Committee or in the absence of any response within the stipulated time, the APs, as a last resort may submit his/her case to the Provincial People Committee (Hanoi People' Committee). Hanoi People' Committee will review and issue a decision on the appeal within 15 days from the day the complaint is received.

v. Stage 5: If the AP is still not satisfied with the decision of the Hanoi People' Committee or in the absence of any response within the stipulated time, the APs, as a last resort may submit his/her case to the Court at City level. The court will address the appeal by written decision and submit copies to the respective entities which include the EA, PPC, DPC, CPC and the APs. If, however, the AP is still not satisfied

with the City Court's decision, the case may be elevated to the court at higher level (the Higher Court).

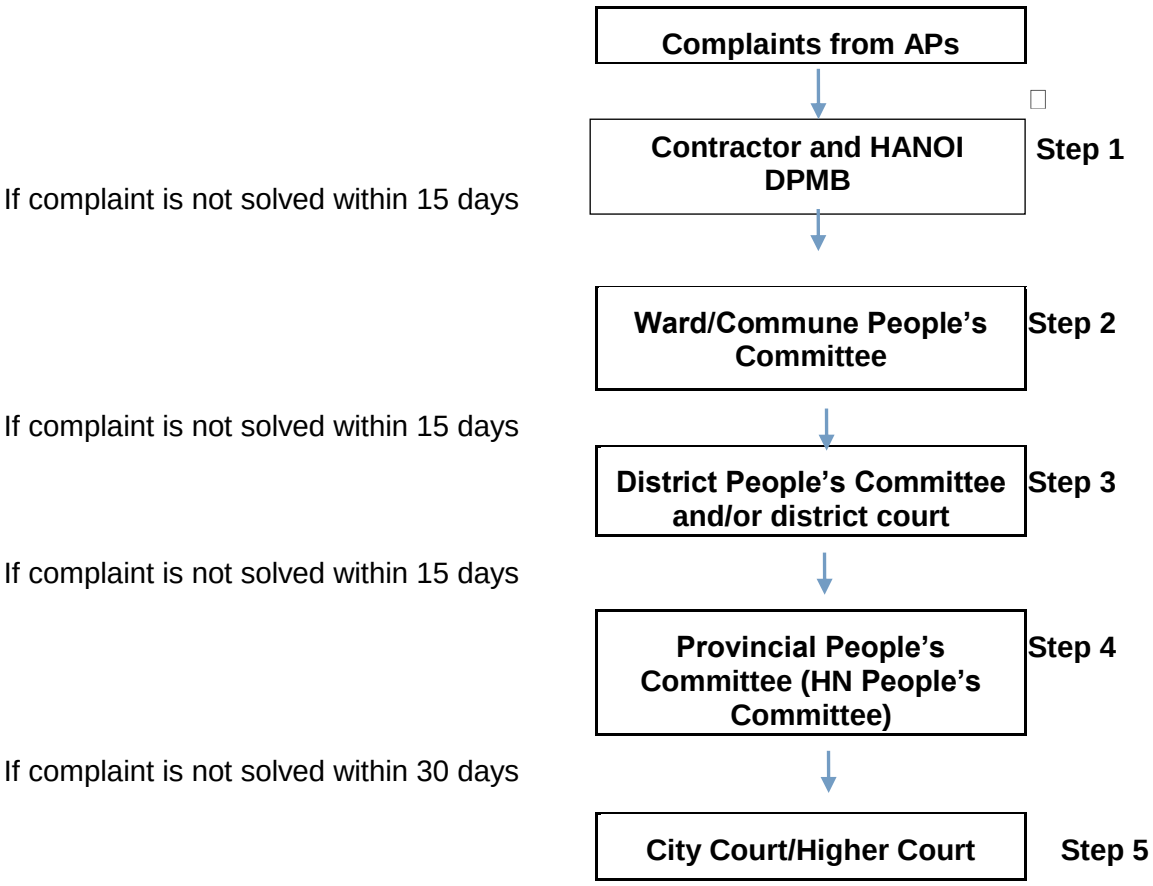

Figure 12. Public grievance redresses process

135. The EA and EVN will be responsible for checking the procedures and resolutions of grievances and complaints. The EVN/EA must have expertise and experience in social and environmental issues associated with infrastructure developments. The EVN/EA may recommend further measures to redress unresolved grievances. Environmental specialists will provide the necessary training to improve grievance procedures and strategy for the members of the grievance committee when required.

136. In cases, APs can not write or are not unable to express their grievances verbally, they are encouraged to seek assistance from the local authority, NGOs, or other members in their family, village heads or community chiefs in order to their grievances to be recorded in writing, and to approach to the documents, and any survey or valuation of assets, to ensure that where disputes occur, all details have been recorded accurately enabling all parties to be treated fairly. Throughout the grievance redress process, the responsible agency will ensure that the concerned APs are provided with copies of complaints and decisions or resolutions reached.

137. If all efforts to resolve disputes under the grievance procedures remain unresolved or unsatisfactory, AHs have the right to directly discuss their concerns or problems with the ADB office in Southeast Asia through the ADB office in Viet Nam. If AHs are still not satisfied with the responses of the ADB office in Viet Nam, they can directly contact the ADB Office of the Special Project.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Overview of Environmental Management Plan

138. An environmental management plan (EMP) has been developed for the implementation of the subproject. The purpose of the EMP is to integrate the results of the IEE into a formal management plan that is implemented in parallel with the subproject to prevent or minimize the potential environmental impacts and issues that were identified by the IEE. The EMP addresses the results of the public consultations on the project that were convened as part of the IEE.

139. The EMP, *inter alia*, consists of an Impacts Mitigation Plan, a Monitoring Plan, and an Emergency Response Plan. The EMP also prescribes the institutional responsibilities for the implementation of the EMP. The EMP is a management tool that provides a set of directives and guidelines that the project owner follows to prevent or minimize unnecessary environmental impacts of the project (Table 18).

Table 17: Environmental Mitigation Plan

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
Pre-Construction, Detailed Design Phase of 110kV new transmission line								
Land acquisition and compensation	The total area for permanent land acquisition is about 6,147m^2. The total area of the RoW is 151,792.50 m^2	1. Affected persons are informed ahead on the subproject implementation and participated in acquisition and inventory of land, consulted in compensation assistance 2. Comply with the regulations of the Land Law 2013 and decrees, circulars, decisions on compensation, assistance and resettlement of the Government and Hanoi City People's Committee. 3. Comply with the regulations of the Electricity Law, the Decree No. 14/2014/ND-CP and relevant regulations Present and past land use should be reviewed to assess whether excavated soils are contaminated spoil. 4. Conduct design of tower height to minimize impacts due to crops clearance 5. Detailed implementation mitigation measures outlined in the project Resettlement Plan. 6. Coordinate to address people's claims/grievances relating to compensation. 7. Ensure compensation payment to be implemented	project site	Before project implemented	See resettlement plans	See resettlement plan	IA/EO	Resettlement committees

[7] Costs will need to be updated during detailed design phase

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implement ation
		clearly, openly and fairly in compliance with legal regulations 8. Construct completely each work item to minimize the duration of temporary land use for the project construction.						
UXO clearance (bombs, mines and other explosives)	Impact on people's and worker's safety	9. Before preparing and clearing site for constructing the project, it is necessary to coordinate with the competent agency for UXO disarmament in the proposed project area. Area of UXO disarmament 10. The process of UXO clearance must be compliance with decree 96/2006 dated on 4/5/2006 of the Prime Minister and Circular 146/2007/TT-BQP on guiding the implementation of the prime minister of management and implementation of bomb, mine and explosive materials	All construction sites	At the beginning of the subproject construction	Once	See monitoring plan below	EO/IA	EO/GOV
Detailed designs of subproject, bidding document establishment	No impacts. But the activities will design and proposed mitigation measures for impacts during construction and operation phase	11. The detailed designs of the subproject should ensure the following measures: a) identification of spill management prevention plans, and emergency response plans for all construction sites; b) no disturbance or damage to culture property and values; c) minimal acquisition of agriculture lands f) none or minimal disruption to normal pedestrian and vehicle traffic along all road segments with contingency alternate routes;	Subproject location	Before the commencement construction	When designing details, establishing bidding documents, and when feasibility study is approved	No marginal cost	PIC	IA/EO

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
		g) for built-up areas include specific plan to notify and provide residents and merchants of construction activities and schedule to minimize disruption to normal commercial and residential activities. 12. During the feasibility study, the subproject management board has to consult with the 8 CPCs where the subproject crossing over for agreement upon the location of the transmission line and towers.						
Construction site arrangement	No impact. This activity help to prevent or avoid impacts by disposal and civil works	13. The HANOI DPMB will require civil contractor to prepare a disposal plan. Based on this disposal plan, civil contractor is responsible for contracting with specialized unit to collect, transport and dispose the refused excavated materials to the permitted disposal site. HANOI DPMB is responsible for supervision and include this content in civil work contracts 14. Constructor develops transportation plan for equipment and materials to reduce negative impacts. 15. Constructor will arrange the temporary yards for stockpile and material gathering site within the tower foundation area or the ROW. 16. Contractors must have the license for safety and environmental requirements of mobilized machines and vehicles.	along ROW, subproject site	Before project implemented	01 time before construction begins	No marginal cost	PO/PMB/PIC	PMB/Contractors
Construction Phase of 110kV new transmission line								

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
Tree cutting and site clearance	Cause the loss of vegetation and landscape deformation	17. Only cut down trees at the tower foundation construction locations, within the lines of wire pull and scatter, and trees (both within and out of the ROW) whose height exceed the allowable limits and may impact on the TL safety. 18. Use manual method to clear plants. Not use herbicide for plant clearance. 19.Completely construct every work. Arrange construction after harvest to reduce impact on people's production and reduce temporary acquisition time if the construction will be taken place on rice field or crop land. 20.After completing the construction, temporarily acquired land will be cleared, levelled, compacted to return to people for continuing their production at limit level as stipulated. 21.The PO in coordination with the local authorities to monitoring the tree cut down and clearance for subproject construction. 22.Set up rules, fire forbidding signs in places where fire is forbidden, or near combustibles. Forbid arc welding, gas welding in areas where there is gasoline, flammable substances. Forbid the use of electricity for unregulated cooking. 23.Contractor is responsible for arranging necessary tools	All construction sites	From the beginning to completing the subproject construction	Monthly	No marginal cost	PIC/EO	ES/contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implement ation
		and means for firefighting as stipulated.. 24. In case fire occurrence, stop all works to focus workforce, tools and means on fire fighting. Inform immediately to firefighting police, local authority and people for coordinating firefighting. The PO will be responsible for all cost of firefighting and damage by fire.						
Concentratio n of worker and domestic wastes generated	Generate domestic wastes causing environmental pollution; generate social problems, spread diseases	25. Hire residents' houses for workers' staying. Only construct camps for the TL sections away from the residential areas. 26. Contractors consider unskilled jobs for hiring local labors to conduct to prevent or minimize influx of migrant workers, and incidence of social diseases and community unrest. 27. Hire mobile WC with septic tank for camps and put dustbins at camps for collecting domestic sewage, rubbish and treating them adequately. 28. Worker camps must have adequate rainwater drainage system. 29. Examine periodically worker health. Equip medicine cabinet for protecting workers' health in time. 30. Manage, propagandize and educate to enhance the awareness of environmental sanitation and health protection for workers. 31. Establish the specific food safety regulations for	All worker camps	Throughout constructio n phase	Monthly	No marginal cost	IA/EO	ES/contra ctor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
		construction workers. 32. Construction units need implement temporary residence registration for all construction workers to CPCs within the project area. They need also establish the relationship with the local authorities to discuss and take decisions necessary for their management 33. Require workers not to take part in or cause social evils; any contravener shall be strictly treated in accordance with laws. 34. Establish rules in camp. Propagandize, educate workers and create good relations with people in order to avoid conflicts arising. HIV/AIDS education should be given to workers. 35. Require workers to respect and not to violate the cultures, habits and customs, religious beliefs, historical and cultural parks, pagodas, and temples in the localities						
Implement Solid and liquid construction waste sub-plan	Contamination of land and surface waters from construction waste	36. Management of general solid and liquid waste of construction will follow the Decree No.59/2007/NĐ-CP dated on 09/4/2007 by the Government about Solid Waste Management, Decree No.38/2015/NĐ-CP dated on 24th April 2015, on management of waste and discarded materials, and will cover, collection, handling, transport, recycling, and disposal of waste created from construction activities and worker force. Areas of disposal of solid and liquid waste to be determined by competent authority The	All construction sites and worker camps	Throughout construction phase	Monthly	No marginal cost	PIC / EO and DONRE	ES/contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implement ation
		expected of disposal site is Xuan Son, however exactly name of disposal site will be determined after have the agreement of local authority 37. A schedule of solid and liquid waste pickup and disposal must be established and followed that ensures construction sites are as clean as possible. Construction solid waste should be separated and recyclables parts should be reused. <u>Hazardous Waste</u> 38. Collection, storage, transport, and disposal of hazardous waste such as used oils, gasoline, paint, and other toxics must follow Circular No.38/2015/TTN-BTNMT dated on 01/9/2015 on stipulating hazardous waste management. Only the licensed agency can collect, transport the hazardous solid waste to the regulated disposal and treatment site 39. Wastes should be separated (e.g., hydrocarbons, batteries, paints, organic solvents) 40. Wastes must be stored above ground in closed, well labeled, ventilated plastic bins in good condition well away from construction activity areas, all surface water, water supplies, and cultural and ecological sensitive receptors. 41. All spills must be cleaned up completely with all contaminated soil removed and handled with by contaminated spoil sub-plan.						

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
Construction materials transportation, and storage	Noise, dust and exhausts impact on ambient air environment quality	42. Regularly spray water to district/commune roads at Tien Phong and Binh Minh commune. Where the construction materials and excavated soil are transported over. 43. Cover or keep moist all stockpiles of construction aggregates, and all truck loads of aggregates. 44. Minimize time that excavations and exposed soil are left open/exposed. Backfill immediately after work completed. 45. As much as possible, restrict working time at substation site between 07:00 and 17:00. 46. Maintain equipment in proper working order 47. Vehicles and machinery to be turned off when not in use.	All construction sites	Beginning of construction (for license of equipment, machines and means) and throughout construction phase	Monthly	No marginal cost	PIC/EO	ES/Contractor
Construction materials transportation, and storage	Traffic accidents, increase in traffic activities, damage to roads, traffic disruption	48. Prepare implementation alternative for the TL at every inter-cross location. 49. Contact with management unit of the roads for coordination to ensure construction safety and uninterrupted traffic activities. 50. Arrange reasonable work to avoid traffic obstacle such as avoid transport construction materials in rush hour from 6 to 8AM or 4 to 6PM 51. At the locations crossing over the HW21B (section of	All construction sites.	Throughout construction phase	Monthly	No marginal cost	PIC/EO	ES/contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
		tower G6 – G7), it needs to set up scaffolding during wire scatter and pull process. 52. Set up signal light when constructing at night. 53. Put up warning boards at intersection road . 54. Speed limits should be posted and adhered to by transportation means. 55. Limit transportation of materials in rush-hours. 56. Transport materials with the allowable load. Not expand trucks' body. 57. For oversize and/or overweight materials and equipment, it must have special purpose transport means. 58. Conduct road upgrading or repair if collapse occurrence due to the subproject construction.						
Implement Utility and power disruption sub-plan	Loss or disruption of utilities and services such as water supply and electricity	59. Contact local utilities and services with schedule, and identify possible contingency back-up plans for outages. 60. Contact affected community to inform them of planned outages. 61. Try to schedule all outages during low use time such between 24:00 and 06:00.	All construction sites.	Throughout construction phase	Monthly	No marginal cost	PIC/EO and Utility company	ES/contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
Wire pull and scatter, and the TL connection to the national grid system	Discontinue utilities and services such as power supply, traffic disruption etc.	62. Coordinate with management unit of the TLs to cut off power to ensure safety during wire pull and scatter process at the inter-cross locations Such as in 0.4kV power line and one 35kV power line and two communication cables (G1-G2), 0.4kV power line and one communication cable (G3-G4) in Tien Phong commune; 0.4kV power line (G4 – G5) and communication cable, 35kV power line, 0.4kV power line (G5 – G6) in Thanh Thuy commune; two 0.4kV power line in Van Khe commune; 6kV power line and Hoa Binh River (G11 – G12) in Tam Hung commune 63. Inform to people for their life and production arrangement before cut-off power. 64. Put up scaffolding during wire scatter and pull process. Put up warning boards. Have protection measures to prevent impact on other TLs. Ensure safety distance to those TLs.	All construction sites.	Throughout construction phase	Monthly	No marginal cost	PIC/EO and Utility company	ES/contractor
Soil erosion	Increase in the turbidity of surface flow, the loss of soil nutrients. Referring to the section crossing Nhue River, local soil erosion and land slide could occur.	65. Berms, and plastic sheet fencing should be placed around all excavations and earthwork areas. 66. Earthworks should be conducted during dry periods. 67. Protect exposed or cut slopes with planted vegetation, and have a slope stabilization protocol ready. 68. Re-vegetate all soil exposure areas immediately after work completed.	All construction sites	Throughout construction phase	Monthly	No marginal cost	PIC/EO	ES/contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
Occupational health and safety of workers	Worker injury and health	69. Health and safety plan (HSP) will be prepared and implemented by the contractor. 70. All workers must be examined health, especially people working at height, and equipped sufficiently labor protection tools. This must be strictly imposed. 71. All construction equipment, tools should be carefully examined for quality and quantity before used. For people working at height, it should carefully check the suspending cables before climbing on the tower; not permitted to work at height when it is going in night; it has fogs; it has strong wind with above class V. Workers who climbed on towers must have Safety Certificate of Class 3 or above, and sufficient conditions for working at height. Safety belts should be attained use standard of the nearest inspection, not exceed over 6 months. During movement and working at height, workers must wear safety belts and the safety leather belts must be tightly tied with the tower. 72. Carefully check boom guy, cable clip before load heavy objects. 73. For tower foundation excavation: (Strictly implement safety measures while excavating tower foundation pits such as mobile equipment (backhoes, concrete truck, trucks removing excavated material etc.) must not be located close the edge of an excavation	All construction sites.	Throughout construction phase (fulltime)	Monthly	No marginal cost	PIC/EO	ES/contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implement ation
		because it may roll over and fall into the excavation. ; Workers should wear hard hat to avoid soil/rock falling on their head etc. 74. Use suitable means of transport for transporting different kind of materials. Check the load of the vehicles before use, fasten and comply with safety regulations on transportation. 75. Strictly comply with safety norms such as TCVN 4086: 1985 on electricity safety in construction; TCVN 5556: 1991 on general requirement to prevent electrocution; TCVN 2572: 1978 on electrical safety signs etc 76. Workers conducting transport and installation of electrical equipment must understand regulations on installation and transport safety of electrical equipment. 77. Use specialized tools and devices to anchor, fasten electrical equipment during movement and installation process. Not use steel wires, cables, chains to tie the insulation parts, the connectors of the base holes. 78. Before switching on power to test the power grid and electrical equipment, it must stop relative all works and people without relative task must go out of the danger area. 79. Fuse of the electrical networks connected to electrical equipment which will be installed must be disconnected during connection time. Fuse is only closed to						

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
		adjust the equipment after everyone is in a safe location. 80. All towers, steel structures and equipment must have earthing system 81. Contractors have to prepare emergency measures in time. When accident occurs, conduct in-site first aid, then quickly drive the wounded to hospital for treatment. It must keep a phone number of the nearest hospital to call ambulance. Besides, it must be equipped medicine cabinet for aid. 82. As existing commune health services are unable to accommodate additional patients from the construction workforce, the contractor will be required to provide first-aid facilities for the workers. At least one trained first-aid worker should be available at each construction camp. 83. HANOI DPMB will be responsible for including these requirements in the contract documents.						
Community health and safety	Local people injury and health	84. Proper fencing, protective barriers, and buffer zones should be provided around all construction sites. 85. Sufficient signage and information disclosure, and site supervisors and night guards should be placed at all sites. 86. Speed limits suitable for the size and type of construction vehicles, and current traffic patterns should be developed, posted, and enforced on all roads used by	All construction sites	Throughout construction phase (fulltime)	Monthly	No marginal cost	PIC/EO	ES/contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
		construction vehicles. 87. Standing water suitable for disease vector breeding should be filled in. 88. Sufficient lighting be used during necessary night work. 89. All construction sites should be examined daily to ensure unsafe conditions are removed.						
Construct drainage system of rainwater, water pumped from the foundation pits	Deposit mud sand; reduce suspended solids in surface rainwater and water pumped from the foundation pits; prevent rainwater and water pumped from the foundation pits from overflowing on the ground	90. Provide drainage system of rainwater, water pumped from the foundation pits when constructing to prevent standing water and local flooding; deposit mud sand; reduce suspended solids in surface rainwater and water pumped from the foundation pits before pumping into environment. 91. Install temporary storm drains or ditches for construction sites 92. Ensure connections among surface waters (ponds) are maintained or enhanced to sustain existing storm water storage capacity. 93. Protect surface waters of Nhue river from silt and eroded soil by preventing soil falling down/run of to the river through making earth dyke at tower excavation area located near river 94. Arrange construction sewage collection holes for depositing SS before running into surface sources.	All construction sites.	Design and construction phases	Monthly	No marginal cost	PIC/EO	ES/contractor

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implement ation
Repair, restore, return the ground after construction completion	Mitigate impacts on environment after construction	95. Repair, recover, and return the road sections, culverts, drainage system and public infrastructures damaged by TL construction. 96. Clear, level and restore the ground after construction completion. 97. Grow trees in temporarily acquired areas.	All construction sites.	throughout construction phase until the project is put into operation.	Monthly	No marginal cost	PIC/EO	ES/contractor
Operation phase								
Cut trees and branches violating the ROW		98. Cut down only trees and branches which will get risk of the safety of the transmission line as specified. 99. Comply with regulations for growing plants inside and outside the ROW. 100. It will be not allowed to cut down or trim trees and branches of trees which locate outside the ROW without affecting to the safety of the TL during operation. 101. Use manual method to clear plants. Not use herbicide for plant clearance. 102. Trees and branches of trees which are cut down will be collected by local people for firewood or the operation agency will contact to local authorities to collect, transport and handle them as stipulated. 103. Recommend local people to grow trees whose height meets the requirements of height as stipulated.	ROW	Fulltime	Biannual	O and M	The high voltage grid management of Hanoi	

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
		104. Propagandize, train operation workers on prevention measures from forest fire; strictly control fire use of operation workers during the TL maintenance and repair process to avoid forest fire occurrence. 105. Operation unit is responsible for establishing rules on fire fighting and prevention. Arrange necessary tools and means for firefighting as stipulated.						
Occupational health and safety of the workers during the TL periodic maintenance process		106. Restricting access to electrical equipment, except workers who are trained and certified to work on electrical equipment. Properly limit time for contacting with EMF for trained workers. (i) Adherence to electrical safety standards. (ii) Proper grounding transmission line. (iii) Provision of PPE for workers, safety measures, personal safety devices, and other precautions during maintenance work or if working in close proximity to the TL. 107. Follow safety measures when working at height during maintenance and repair the TL, particularly: (i) All workers must be examined health for working at height, equip sufficiently labor protection tools and cloths. (ii) Workers who climbed on towers must have Safety Certificate of Class 3 or above and sufficient conditions for	ROW	Fulltime	Biannual	O and M	The high voltage grid management of Hanoi	

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implementation
		working at height. Safety belts should be attained used standard of the nearest inspection, not exceed over 6 months. During movement and working at height, workers must wear safety belts and the safety leather belts must be tightly tied with the tower. (iii) All equipment, tools and means should be carefully examined for quality and quantity before used. It should carefully check the suspending cables before climbing on the tower. (iv) Not permitted to work at height when it is going in night; it has fogs; it has strong wind with above class V. 108. Occupational EMF exposure should be minimized through the implementation of an EMF safety program that includes: (i) Identification of potential exposure levels in the working area including survey of exposure levels and establishment of safety zones (ii) Properly limit time for contacting with EMF for trained workers as stipulated and those equipped with appropriate PPE when entering safety zones. (iii) Utilization of personal monitors during work activities. (iv) Post safety signs and warning signs. 100. In addition, in the operation phase, conduct training for workers in order that they can respond to risks/failures						

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implement ation
		and meet the operation procedures. An emergency and safety guideline needs to be prepared and disseminated to the workers for handling risks/failures occurring in the operation process. Coordinate with the local authorities at commune, district levels to propagandize, disseminate knowledge of safety of the ROW to communities and residents living near the T/L. Equipment maintenance areas must be located away from the residential areas.						
Community Health and Safety		109. To prevent electrocution risk, Hanoi EVN will implement the following: (i) Conduct earthing for the TL, especially all towers. (ii) To ensure absolute safety, operators must comply with operation procedures and safety requirements; (iii) Provision of warning signs and anti-climbing devices on all towers. (iv) Periodically check the distance from wire to the ground and/or other objects as stipulated. Monitor minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around the TL. (v) Check earthing system of buildings under the ROW as stipulated. Ensure that any new buildings within the 72 m-wide earthing zone are earthed. (vi) Observe/Test EMF at resident's buildings for treating appropriately if any complaint.	ROW	Fulltime	Biannual	O and M	The high voltage grid management of Hanoi	

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[7] (USD)	Responsibility	
							Supervision	Implement ation
		110. To prevent impacts of EMF: the community should be warned about the safety distances from the transmission system and power lines through warning signs and the restrictions on erecting any houses or buildings within the ROW and earth zone are to be enforced by operation unit.						

B. Institutional Arrangements and Responsibilities

140. At the feasibility stage, the primary management framework responsible[8] for the implementation of the EMP for the project is summarized as follows. The EVN HANOI is the executing agency (EA). The EA takes overall responsibility for implementing the EMP with executive support from the Hanoi Development Project Management Boad (Hanoi DPMB), a subsidiary of EVN HANOI and the implementing agency (IA) of the project. The IA under the direction of the EA implements the project and EMP with an assigned Environmental and Social Unit (ESU) whose sole responsibility is to implement the EMP.

141. The IA/ESU is supported by the [international] Project Implementation Consultant[9] (PIC). The PIC assists with completion of the detailed project designs, updates the EMP to address the detailed project designs, and assist with the implementation of the EMP. The PIC also delivers required capacity development and training to the IA/ESU. The ESU oversees and assists the work of the Environmental Officer (EO) of the construction contractor who implements the contractors EMP (CEMP)[10].

142. External support of the ESU for the implementation of the EMP is provided by the international and national environment specialists (ES) of the PIC, and an Environmental Monitoring Consultant (EMC) which is required to conduct the field sampling and laboratory analyses of the environmental monitoring plan (e.g., water quality, air quality) of the EMP that cannot be performed by the contractor or IA/ESU. A summary of indicative responsibilities for implementation of the EMP is provided below.

143. The responsibilities of the EA with support from EVN include:

- Overall responsibility for implementation of EMP;
- Provide coordination and supervision for environmental and social safeguards and monitoring for IA/ESU;
- Liaise with EVN and ADB on the implementation of the EMP; and
- Coordinate resolution with IA/ESU with issues arising from the implementation of EMP.

144. The responsibilities of the ESU of IA include:

- Assist PIC with updating the EMP to meet final detailed project design;
- Notify DoNRE to verify GoV approvals of project are met;
- Assist PIC with inclusion of CEMP requirements in contractor bid documents including bid evaluations based on updated EMP;
- Undertake day-to-day management of EMP implementation activities;
- Work with EMC on implementation of monitoring plan of EMP;
- Ensuring compliance with loan covenants and assurances in respect of entire project, including EMP (as well as IPPs, GAPs, resettlement plans);
- Lead follow-up meetings with all affected stakeholders;
- Prepare and submit quarterly reports on EMP implementation to IA/EA;

[8] Adapted from management framework for original core subprojects
[9] PIC to be defined
[10] Contractor Environmental Management Plan prepared by contractor as part of bid documents based on EMP

- Oversee implementation of CEMP by contractor;
- Coordinate with ES of PIC for EMP implementation;
- Undertake regular construction site inspections to ensure contractor implements CEMP properly; and
- Ensure EO of contractor submits monthly reports on construction mitigations and monitoring.

145. The responsibilities of the national environmental specialist of the PIC are:

- Provide technical direction and assist the EO/IA with the implementation of the EMP;
- Monitor design and implement capacity development and enhancement training for the EO/IA and environmental staff of the contractor(s);
- Provide advice and support to the EMC with their monitoring activities;
- Support to prepare and review all reports prepared by the EO/IA and the EMC for the EA and the ADB; and
- Review locations where may be contaminated near the subproject site.

146. The responsibilities of Environmental Officer (EO) of Contractor include:

- Implement CEMP for construction phase of project; and
- Prepare and submit monthly reports on mitigation and monitoring activities of CEMP any environmental issues at construction sites.
- The responsibilities of external Environmental Monitoring Consultant (EMC) include:
- Implement the environmental sampling required for monitoring plan of EMP that cannot be conducted by the contractor and ESU/IA/EO.
- Perform required laboratory analyses for monitoring program detailed in EMP; and;
- Prepare and submit quarterly reports to IA/ESU on monitoring activities.

147. The Department of Natural Resources and Environment (DoNRE) is the provincial agency which oversees environmental management of Hanoi. The DoNRE with District staff provides direction and support for environmental protection-related matters including application of the Law on Environmental Protection 2014, Decree No. 18/2015/ND-CP for EIA, and environmental standards.

148. The ADB provides guidance to EA/IA with any issues related to EMP, and reviews biannual reports on EMP activities compiled and submitted by EA.

C Monitoring Plan

149. The environmental monitoring plan for the EMP is provided in Table 19. The monitoring plan focuses on all three phases (pre-construction, construction, operation) of the subproject and consists of environmental indicators, the sampling locations and frequency, method of data collection, responsible parties, and estimated costs. The purpose of the monitoring plan is to determine the effectiveness of the impact mitigations, and to document any unexpected positive or negative environmental impacts of the subproject.

150. The external environmental monitoring consultant (EMC) identified above will implement the environmental monitoring program. The EMC will be responsible for the sampling of environmental parameters that must be analysed in a laboratory. The ESU and EO will coordinate with the EMC. The PIC/IU will provide logistical support to the EMC where necessary for the implementation of environmental monitoring plan.

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

152. After construction is completed, the potential impacts during operation phase will be monitored by EVN HANOI.

Table 18: Environmental Monitoring Plan

Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD)
					Supervision	Implementation	
Pre-construction Phase – Update Baseline Conditions							
A) Air quality and microclimate: dust, CO, NOx, SO_2, -Noise B) Affected surface water quality: TSS, oil and grease, BOD_5, , TDS, TP, TN	At SS site and TL	Using field and analytical methods approved by DoNRE.	One measurement	One baseline supplement report before construction phase starts	PIC/ESU	Environmental Monitoring Consultant	A) $500 B) $500
Construction Phase							
A) Air quality: dust, CO, NOx, SOx, noise B)) Affected surface water quality of Nhue river: TSS, oil and grease C) Analysis of contaminated soil quality (heavy metals (As, Cd, Pb, Hg, Mn), hydrocarbons.	A and B): Baseline sites of pre-construction phase. C) At sites where contaminated soil is suspected.	A – C : Using field and analytical methods approved by DoNRE. Include visual observations of dust and noise from contractor and public reports. D) Visual observation	(A – C): Quarterly during construction periods D) Continuous	Monthly	(A - C):		
					PPMU	PPMU (Monitoring Consultant)	A and B: $1,000/yr C: $1,000/yr
					(D & E) observations:		

Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD)
					Supervision	Implementation	
D) Domestic (worker) and construction solid waste inside and outside construction sites including worker camps. E) Public comments and complaints	D) All construction sites and worker camps E) Using hotline number placed at construction areas	E) Information transferred by telephone hotline number posted at all construction sites.	E) Continuous		PPMU	contractor	D & E $200./yr
Operation							
Incidence of worker accidents,	Along transmission line	Regular documentation and reporting	Continuous		EVNHN		O & M
Electromagnetic field monitoring	In the Substation and along the connection line	Equipment for measuring electromagnetic field	Biannual	Biannual	EVNHN		

Table 19: Performance Monitoring Indicators

Activities of subproject	Mitigation measures	Key Indicator	Performance Objective	Data Source
Pre-construction Phase				
Land acquisition and compensation	Mentioned in Table 18	Mentioned in RP	Mentioned in RP	Resettlement Plan
UXO	Mentioned in Table 18	UXO disarmament	No risk of life safety of workers and people	Monitoring by PIC/PMB
Detailed designs, bidding document establishment, the project approval and submission	Mentioned in Table 18	Design documents Local GOV's letters for agreement of TL alternative Requirements of EMP (SEMP)	All mitigation measures are considered during detailed designs All stakeholders contacted during IEE re-contacted for follow-up consultation EMP appended to bidding documents with clear instructions to bidders for SEMP	Design documents EMP Bid documents
Construction site arrangement	Mentioned in Table 18	- License of disposal - Transportation plan - location of temporary area for stock pile and material gathering - License for safety and environment ensure of vehicles/machines	By end of pre-construction phase, meeting with contractors to check licenses and observation in the construction site for checking the arrangement	Monitoring by PIC/Hanoi DPMB
Training of PMB/EO		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

Activities of subproject	Mitigation measures	Key Indicator	Performance Objective	Data Source
Construction Phase				
Tree cutting and site clearance	Mentioned in Table 18	- Important habitat, rare or endangered species if presenting during tree cutting and site clearance - Fire protection at section crossing forest - Implementation of reforestation	All *present* critical habitat and rare and endangered species if unchanged, and unharmed - Prevent forest fire - Forest coverage	Monitoring by EMC
Concentration of workers and domestic wastes generated	Mentioned in Table 18	- Hygiene situation, availability of toilet and waste basket - Residential register of workers - Rainwater drainage system in worker camps - Food safety regulations - Educating and training about health and hygiene for workers	Rigorous program of procedures to manage worker's camp	EMC and contractor monitoring reports
Refused rock and soil, debrides, other hazardous wastes generated by rock and soil filling and excavation for tower foundation pits, cable trenches, tower installation, and equipment, devices, machines and transportation means	Mentioned in Table 18	Solid waste and liquid waste treatment system Hazardous waste: Oil, gasoline, grease collection and treatment license	- Rigorous program of procedures to manage and store all waste from construction camps and sites practiced, and manage earthworks. - Rigorous program of procedures to manage and store all waste from construction camps and sites practiced.	EMC and contractor monitoring reports,

Activities of subproject	Mitigation measures	Key Indicator	Performance Objective	Data Source
Construction materials transportation, and storage	Mentioned in Table 18	Frequency of disruptions and blocked roadways is reduced Maintenance and operation method of equipment, machines, and vehicles	Disruptions, stoppages, or detours are managed to absolute minimum.	Public input, contractor reports, EMC reports
Noise, dust and exhausts due to construction activities and transportation of materials	Mentioned in Table 18	dust, CO, NO_2, SO_2, noise levels meet Vietnamese standards	The content must not exceed the level at pre-subproject. Complying with mitigation measures for water quality mentioned in table 15	EMC and monitoring report of contractors
Implement Utility and power disruption sub-plan	Mentioned in Table 18	Timing of power cut Methods of pulling wire at section crossing over existing TLs Methods of constructing towers	Minimized time of power cut, effect on existing Tls and works	EMC and monitoring report of contractors
Wire pull and scatter, and the TL connection to the national grid system	Mentioned in Table 18	Timing of power cut Methods of pulling wire at section crossing over existing TLs	Minimized time of power cut, effect on existing Tls	EMC and monitoring report of contractors
Soil erosion	Mentioned in Table 18	Earth dyke, Embankment were built; vegetation are grown on bare land	Land quality and minimize land slide or erosion	EMC and monitoring report of contractors
Occupational health and safety of workers	Mentioned in Table 18	Frequency of accidents, and spills is reduced	No increase in pre-construction frequency	HANOI DPMB

Activities of subproject	Mitigation measures	Key Indicator	Performance Objective	Data Source
		Electromagnetic field monitoring		
Community health and worker safety	Mentioned in Table 18	Frequency of injuries are reduced	Adherence to GoV occupational health and Safety regulations	Contractor reports
Construct drainage system of rainwater, water pumped from the foundation pits	Mentioned in Table 18	pH, TSS, oil and grease, COD, BOD_5, NO^-_3, PO_4^{3-}, Coliform levels meet Vietnamese standards	GoV environmental standards and criteria met Complying with mitigation measures for water quality mentioned in Table 15	Monitoring by EMC
Repair, restore, return the ground after construction completion	Mentioned in Table 18	Remain construction material at the site are collected Construction solid waste; un-clearance of worker camp etc. are cleaned.	Recovery of construction site; remove construction solid waste; clean worker camp etc.	Site observation; Contractor and EMC monitoring reports
Operation Phase of Transmission Line				
Clearance of trees and branches violating the ROW	Mentioned in Table 18	Clearance of trees and branches follow regulations	Ensure safety of the TL	EVNHN
Worker and Public Safety	Mentioned in Table 18	Frequency of accidents, and spills is reduced Electromagnetic field monitoring	No increase in pre-construction frequency	EVNHN

IX. ESTIMATED COST OF EMP

153. 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. From Table 18 the preliminary cost for the implementation of the EMP for the project including an estimated environmental training budget is approximately $8,000 which is summarized in Table 20.

Table 20. Estimated costs for EMP

Activity Type	Estimated Cost (USD)
Pre-construction Phase	
Updating Environmental Baseline - environmental quality	$1000
Construction Phase	
Environmental quality	$2,000
Inspecting environmental compliance	$700
Operation Phase	
Environmental quality	O&M cost (average $1,000.00 per year)
Training and capacity development of EVNHN/ Hanoi DPMB	$1,000
Total	**$5,700**

154. The environmental costs are for field sampling and laboratory analyses which include professional per diems of technicians.

155. An estimated budget of USD $1,000 is required for training of the PO/PMB/EO 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 PIC in conjunction with the PMB/EO during the pre-construction phase.

X. INFORMATION DISCLOSURE AND PUBLIC CONSULTATION

A. Public Consultation

156. The stakeholder consultation strategy was developed to meet the requirements of meaningful consultation as stipulated by the ADB SPS (2009). 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 project.

1. Identification of stakeholders

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

- Institutional stakeholders such as: (i) People's committee of the city, (ii) People's committee of the precinct/district; (iii) Project management agency, (iv) Designed Consultant, and (v) commune/ward leaders;
- Organizations/unions/associations such as Women Union and Farmers Union which provided various information for the design of the subproject, and which might participate in implementation of measures and interventions;
- Households and enterprises living along the transmission line can be people who will be directly affected or be adversely impacted or can be people who will be received benefits from the determination and implementation of mitigation measures against adverse impacts, and
- Organizations, individuals affected by the subproject.

2. Public consultation meeting

158. Community consultation meetings and interviews were held to discuss the baseline conditions and potential environmental and social impacts by the subproject. Consultations meeting and interview were held in the nine wards/town of: (i) Van Phu, Hoa Binh, Tu Nhien, Tien Phong, Hien Giang (Thuong Tin district); (ii) and Thanh Thuy, Thanh Van, Tam Hung, Kim Bai (Thanh Oai district) in May and June 2015.

159. The public meetings consisted of the following three component procedures:

(i) Engineering consultant introduce the project including transmission line and the length of the line that will traverse communes and town;

(ii) Environmental consultant presented ADB's environmental policy, safety regulations in the Vietnam power sector, anticipated environmental impacts and respective mitigation measures (to be developed in IEE), the grievance redress mechanism for environmental and resettlement problems; and

(iii) Social/resettlement consultants presented: ADB's resettlement plan; impacts due to the acquisition of land and properties; policies of GOV and local authorities, the Project's policies in compensation for loss as the state acquired land and properties on land.

160. During the meeting, people presented their questions and comments on environmental issues. Consultants answered and explained all questions of the participants.

161. Participants of the public consultation meeting included the commune/ward leaders, the representatives of Vietnamese Fatherland Front of the locality and the affected organizations/unions. List of participants in the public consultation meetings sees in appendix B.

3. Results of public consultation

162. The main comments from commune authorities are as follows:

(i) The effect of electromagnetic fields on the human health

(ii) The impact of construction work on the daily activities of local people

(iii) Solid waste generated from construction activities must be controlled and transported for treatment.

(iv) Construction methods and work progress must be informed and clarified to local government officers and local residents;

(v) Close cooperation with community is required to the construction contractors. Based on that, generated impacts and disturbance could be timely controlled and minimized.

(vi) The section of transmission line goes through the cultivation area of two (2) trade traditional village (Tien Phong and Hoa Binh communes) where population density is high therefore safety construction method need strictly implement.

(vii) The towers at Thanh Van and Hien Giang communes is located near some graves therefore the construction process need to avoid affecting on its.

163. The summary of comments/questions from local authorities/people and answers of project owner and consultants are summarized in the **Error! Reference source not found.**.

Table 21. Summary of public consultation

Location and time	Opinion of people	Response of owner/consultant	Response of Project
Kim Bai People's Committee 27th May 2015	Construction contractors and project owner need strictly implement the environmental and social regulations.	Agree	As described in the EMP
	Construction waste and dropping material must be removed	Agree	The EMP prescribes careful construction activities, including cleaning the dropping material
	Local people are worried about impact on cultivation activities	Temporary impact on cultivation activities is possible which will be compensated following regulations	Compensation is detailed in Resettlement Plan
Hoa Binh People's Committee 29th June. 2015	The tower location need be calculated to make sure the safety	Agree	The design of all towners are followed the national standards
	Unused materials from construction on cultivation areas must be timely transported for agricultural activities.	Before construction, information of working method and progress will be provided to communal people's committees and head of villages as well as potentially affected households, by construction contractors and construction supervisors	Impacts are included in the section 6.2.
	Thuy Ung Village is a famous trade traditional village in Hoa Binh commune in which population density is high therefore the	Agree	As described in the EMP

Location and time	Opinion of people	Response of owner/consultant	Response of Project
	construction measures must be sure that safe		
Thanh Thuy commune 23rd May 2015	Construction contractors must closely contact with local government and residents during construction	Local government and community representative are determined as stakeholders. Therefore cooperation is definitely required during subproject implementation	This is addressed in Institutional Responsible section
	Safety for residential areas who live along the transmission line	There are safety regulations for transmission line and RoW. If these regulations are followed, the safety will be sure to local people	RoW distances will follow EVN and international standards as per EMP
	Information related to the subproject must be informed to local residents/local government before construction	Agree. Construction contractors must arrange a meeting in communal people's committee for information disclosure, before construction	Actions for environmental protection are incorporated in the **Error! Reference source not found.**
Tu Nhien commune 24th May 2015	All affected land and other affected residential structure must be compensated according to the state law	Subproject implementation is based on local agreement. All compensation in details will be clarified and implemented before construction.	Compensation is detailed Resettlement Plan
Tien Phong commune 24th May 2015	The subproject alignment is crossing the trade traditional village of commune therefore transmission line alignment must be sure that not affect to master plans of commune	Subproject is designed step by step so that the final design will satisfy following the reality.	The design of all components of transmission line will be approved by competent authorities therefore the master plans will be mixed together.
	The safety measures for RoW need be calculated because the line goes parallel with 500kV transmission line and near the Tien Phong trade traditional village	Agree. There are safety standard for transmission line and RoW. If these regulations are followed, the safety will be sure to local people	RoW distances will follow EVN and international standards as per EMP
Van Phu commune	G6 tower is located at irrigation canal	This problem will be send to subproject owner and	Technical design will be reviewed

Location and time	Opinion of people	Response of owner/consultant	Response of Project
26th May 2015		design consultant	and adjusted to avoid the irrigation canal
	In the stretching transmission line, if have any damage due to stretching the line that contractors or project owner need pay for local resident	Agree. Construction contractors will be implement under the supervision not only subproject system but also response from local residents	This is describe in the EMP
Thanh Van commune 28th May 2015	Construction methods and plans must incorporated with solution for nearby graves which potentially be affected during construction. Construction contractors try to avoid the affect to tomb	Generated impacts on local tombs must be supervised from project execution agency and local government.	As described in the EMP
Tam Hung commune 27th May 2015	Construction time should be chosen after finish the crop	This recommendation will be sent to project owner	This recommendation will be consider following the reality
Hien Giang commune 28th May 2015	The tower G15 is located in the area planning of Nam Vang company	This problem will be sent to project owner and design consultant	This recommendation will be consider following the reality
	Some of tomb are located near the towner therefore the contractor need make attention to avoid affecting to these tombs	Agreement. Generated impacts on local tombs must be supervised by subproject execution agency and local government	Protection of cultural property such as tomb is prescribed in EMP
Conclusion	All of the Commune People Committees and residents where subproject goes through that agree and will support the construction of the new 110kV Thuong Tin-Thanh Oai transmission line		

B. Information Disclosure

164. Formal disclosure of information on the subproject that occurred to affected persons and stakeholders during the IEE is meant to form the beginning of continued information disclosure and stakeholder involvement with the project as the project is implemented. As

part of the stakeholder communication strategy, regular information exchange meetings with stakeholders are strongly encouraged throughout implementation of the subproject.

165. The IEE must be easily available to the stakeholders contacted in written and verbal forms and in local language of Vietnamese. At a minimum, the Executive Summary of the IEE should be translated to local language and distributed to all APs. The IEE should be available on the EVN HANOI website, at the EVN HANOI office in Hanoi, and at the project sites. Similarly, all project reporting with specific reference to stakeholder consultation minutes, environmental monitoring, and reports on EMP implementation released by the EA/IA should be available at the same offices and websites.

166. The communal people's committees of the nine wards/town of: (i) Van Phu, Hoa Binh, Tu Nhien, Tien Phong, Hien Giang (Thuong Tin district); (ii) and Thanh Thuy, Thanh Van, Tam Hung, Kim Bai (Thanh Oai district) and affected people were received the draft IEE in Vietnamese version during the public consultation process. The final IEE (after receiving the letter of No objection from ADB) will be translated into Vietnamese language, then send to each ward/communal people's committees for disclosure. By doing this, local people and local authorities can easily refer the final IEE.

XI. EMERGENCY RESPONSE PLAN

The Contractor must develop emergency or incident response procedures during construction and operation phases to protect workers and the public. The emergency response plan (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. Detailed guideline for emergency response plan is described in the Appendix D: Emergency Response Plan.

XII. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

167. Currently there is insufficient experience and capacity for environmental assessment and management in EVN HANOI for the implementation of the EMP, and to develop future safeguards for the non-core projects. The PIC with assistance from the ESU/IA of the project 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, and EMC. Costs for training should be included with costs for implementation of the EMP.

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

XIII. CONCLUSIONS AND RECOMMENDATION

169. The initial examination of the construction of 110kV transmission line from the 500/220kV Thuong Tin substation to the 110kV Thanh Oai substation indicates that potential environmental impacts are construction-related impacts and disturbances that can be mitigated and managed.

170. 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 2007).

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

XIV. REFERENCES

1. ADB, 2009. Safeguard Policy Statement, ADB Policy Paper.
2. ADB, 2003, Environmental Assessment Guidelines of the Asian Development Bank.
3. ADB, 2012, Environmental Safeguards, A Good Practice Sourcebook, Draft.
4. Hanoi PC-EVN, 2014. Environmental Impact Assessment report
5. General Statistics Office, 2013. Hanoi Statistical Yearbook 2013
6. MOC-Ministry of Construction, 2009. Vietnam building Code 02:2009/BXD
7. World Bank Group, 2007. Environmental, Health, and Safety Guidelines. Washington DC., 96 pgs
8. Subproject Environmental Impact Assessment report, 2016
9. Subproject Resettlement report., 2016 10**.** http://thanhoai.hanoi.gov.vn

11http://thuongtin.hanoi.gov.vn

APPENDIX A: RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST

Instructions:

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: **VIE: Ha Noi and Ho Chi Minh City Power Grid Development Sector Project**

Sector Division: Construction of 110kV transmission line from the 500/220kV Thuong Tin substation to the 110kV Thanh Oai substation

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	The transmission will traverse rice paddy, but not wetlands recognized by RAMSAR Convention
▪ Mangrove		X	
▪ Estuarine		X	
▪ Buffer zone of protected area		X	
▪ Special area for protecting biodiversity		X	
B. Potential Environmental Impacts Will the Project cause…			

Screening Questions	Yes	No	Remarks
▪ encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?		X	The subproject will not cut through the temples and cemetery. The only cultural areas are a few distant grave sites near the tower which will be avoided. The short-term construction waste will be managed and removed as indicated in the mitigation sub-plan of the EMP for the subproject. In addition, the project owner and contractor will strictly implement mitigation measures in construction phase.
▪ 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		The Nhue River flows across the subproject area. Mitigation measures to minimize the water quality reduction will be strictly implement mitigation measures in construction phase
▪ 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	Low impact level during construction phase. Construction water will settled down in grid chamber before flow into the city's drainage. No domestic wastewater of worker-based camps. No chemicals used in construction Mitigation measures will be implemented.
▪ increased local air pollution due to rock crushing, cutting and filling?		X	Low level. There will not be rock crushing, or cutting in the project. However, rock is used to mix concrete and filled into dug channel. The mitigation measures will be implemented to reduce air pollution

Screening Questions	Yes	No	Remarks
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		X	
▪ chemical pollution resulting from chemical clearing of vegetation for construction site?		X	
▪ noise and vibration due to blasting and other civil works?		X	
▪ dislocation or involuntary resettlement of people?		**X**	The subproject affects only agricultural land without houses/accommodations. Required resettlement and compensation for land loss is addressed by RP for subproject
▪ 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		Potential traffic and access disruptions along road crossings of transmission lin, especially access road to Tien Phong and Hoa Binh communes are limited during construction only, which can be easily mitigated.
▪ hazardous driving conditions where construction interferes with pre-existing roads?		X	
▪ 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	

Screening Questions	Yes	No	Remarks
▪ 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	Since the number of workers is small, no worker camps are built but hired local houses. Work sites are also small areas, thus solid waste generated is small. The transmission of communicable diseases from workers to local populations is not likely. However, the Contractor shall implement measures to ensure the hygiene and health of workers and local people, such as hiring hygiene sufficient accommodation, and hiring specialized units to collect waste daily.
▪ risks to community safety associated with maintenance of lines and related facilities?		X	
▪ community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?		X	

Screening Questions	Yes	No	Remarks
▪ 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		There is minimal risk that accidents could happen but not expected to be significant. If so, measures will be in place to deal with them.
▪ 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		These risks may happen only at tower locations. The tower may collapse due to typhoons or tropical cyclones or earthquake, but this hazard will rarely appear in this subproject area and the subproject was designed to withstand the earthquake. Also, in the process of maintenance, the operation unit will conduct regular inspection for timely detection and treatment.

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	**Yes**	**No**	**Remarks**
▪ Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)?		x	
▪ Could changes in precipitation, temperature, salinity, or extreme events over the Project lifespan affect its sustainability or cost?		x	
▪ Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		x	

▪ Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., increasing traffic or housing in areas that will be more prone to flooding, by encouraging settlement in earthquake zones)?		x	

Environments, Hazards and Climate Changes

Environment	Natural Hazards and Climate Change
Arid/Semi-arid and desert environments	Low erratic rainfall of up to 500 mm rainfall per annum with periodic droughts and high rainfall variability. Low vegetative cover. Resilient ecosystems & complex pastoral and systems, but medium certainty that 10–20% of drylands degraded; 10-30% projected decrease in water availability in next 40 years; projected increase in drought duration and severity under climate change. Increased mobilization of sand dunes and other soils as vegetation cover declines; likely overall decrease in agricultural productivity, with rain-fed agriculture yield reduced by 30% or more by 2020. Earthquakes and other geophysical hazards may also occur in these environments.
Humid and sub-humid plains, foothills and hill country	More than 500 mm precipitation/yr. Resilient ecosystems & complex human pastoral and cropping systems. 10-30% projected decrease in water availability in next 40 years; projected increase in droughts, heatwaves and floods; increased erosion of loess-mantled landscapes by wind and water; increased gully erosion; landslides likely on steeper slopes. Likely overall decrease in agricultural productivity & compromised food production from variability, with rain-fed agriculture yield reduced by 30% or more by 2020. Increased incidence of forest and agriculture-based insect infestations. Earthquakes and other geophysical hazards may also occur in these environments.
River valleys/ deltas and estuaries and other low-lying coastal areas	River basins, deltas and estuaries in low-lying areas are vulnerable to riverine floods, storm surges associated with tropical cyclones/typhoons and sea level rise; natural (and human-induced) subsidence resulting from sediment compaction and ground water extraction; liquefaction of soft sediments as result of earthquake ground shaking. Tsunami possible/likely on some coasts. Lowland agri-business and subsistence farming in these regions at significant risk.
Small islands	Small islands generally have land areas of less than 10,000km^2 in area, though Papua New Guinea and Timor with much larger land areas are commonly included in lists of small island developing states. Low-lying islands are especially vulnerable to storm surge, tsunami and sea-level rise and, frequently, coastal erosion, with coral reefs threatened by ocean warming in some areas. Sea level rise is likely to threaten the limited ground water resources. High islands often experience high rainfall intensities, frequent landslides and tectonic environments in which landslides and earthquakes are not uncommon with (occasional) volcanic eruptions. Small islands may have low adaptive capacity and high adaptation costs relative to GDP.

Mountain ecosystems	Accelerated glacial melting, rockfalls/landslides and glacial lake outburst floods, leading to increased debris flows, river bank erosion and floods and more extensive outwash plains and, possibly, more frequent wind erosion in intermountain valleys. Enhanced snow melt and fluctuating stream flows may produce seasonal floods and droughts. Melting of permafrost in some environments. Faunal and floral species migration. Earthquakes, landslides and other geophysical hazards may also occur in these environments.
Volcanic environments	Recently active volcanoes (erupted in last 10,000 years – see **www.volcano.si.edu**). Often fertile soils with intensive agriculture and landslides on steep slopes. Subject to earthquakes and volcanic eruptions including pyroclastic flows and mudflows/lahars and/or gas emissions and occasionally widespread ash fall.

APPENDIX B: MINUTES OF CONSULTATION MEETINGS

Table 22: The summary of public consultation meeting and number of participants

Location	Date	Participants*		
		Male	Female	Total
Kim Bai town	27th May 2015	0	2	2
Hoa Binh commune	29th May 2015	1	0	1
Thanh Thuy commune	23rd May 2015	5	0	5
Tu Nhien commune	24th May 2015	5	0	5
Tien Phong commune	24th May 2015	1	0	1
Van Phu commune	26th May 2015	5	0	5
Thanh Van commune	28th May 2015	10	3	13
Tam Hung commune	27th May 2015	11	1	12
Hien Giang commune	28th May 2015	4	5	6
TOTAL		**49**	**12**	**61**

*This numbers is counted from list of participants;

Investigation and consultation in subproject area was carried out by questionnaires instead of meeting. The consultation process lasted in May 2015. Total 61 local residents participated.

APPENDIX B1: PUBLIC CONSULTATION

A. LIST OF PARTICIPANTS

Date:

Location:

No.	Name	M	F	Position	Organization/Address	Signature
01	Ha Sy Lam		✓	Vice Chairman	Kim Bai town	
02	Vu Thi Long		✓	Commune people's committee officer	Kim Bai town	
03	Vu Van Dang	✓		Vice Chairman	Hoa Binh commune	
04	Nguyen Duc Tue	✓		Vice Chairman	Thanh Thuy commune	
05	Dang Thi Bam		✓	Head of Du Du village	Thanh Thuy commune	
06	Nguyen Xuan Quy	✓		Chairman	Tu Nhien commune	
07	Nguyen Xuan Phien	✓		Vice Chairman	Tu Nhien commune	
08	Nguyen Van Cuong	✓		Commune people's committee officer	Tu Nhien commune	
09	Pham Xuan Thinh	✓		Chairman	Tien Phong commune	
10	Nguyen Minh Thanh	✓		Commune people's committee officer	Tien Phong commune	
11	Nguyen Hong Tien	✓		Chairman	Van Phu commune	
12	Nguyen Van Nang	✓		Commune people's committee officer	Van Phu commune	
13	Nguyen Van Han	✓		Commune people's committee officer	Van Phu commune	
14	Nguyen Huy Oanh	✓		Vice Chairman	Thanh Van commune	
15	Hoang Van Hoa	✓		Commune people's committee officer	Thanh Van commune	
16	Kieu To Hieu	✓		Chairman	Tam Hung commune	

17	Bui Duc Vang	✓		Commune people's committee officer	Tam Hung commune	
18	Bui Van Bai	✓		Head of Van Khe village	Tam Hung commune	
19	Vu Thanh Binh	✓		Chairman	Hien Giang commune	
20	Bui Trung Kien	✓		Commune people's committee officer	Hien Giang commune	

B. MINUTES OF MEETINGS

Question/Opinions people	***Project owner/consultant Reply***
Construction contractors and project owner need strictly implement the environmental and social regulations.	Agreement
Construction waste and dropping material must be removed	Agreement
Local people are worried about impact on cultivation activities	Temporary impact on cultivation activities is possible which will be compensated following regulations
The tower location need be calculated to make sure the safety	Agreement
Unused materials from construction on cultivation areas must be timely transported for agricultural activities.	Before construction, information of working method and progress will be provided to communal people's committees and head of villages as well as potentially affected households, by construction contractors and construction supervisors
Thuy Ung Village is a famous trade traditional village in Hoa Binh commune in which population density is high therefore the construction measures must be sure that safe	Agreement
Construction contractors must closely contact with local government and residents during construction	Local government and community representative are determined as stakeholders. Therefore cooperation is definitely required during subproject implementation
Safety for residential areas who live along the transmission line	There are safety regulations for transmission line and RoW. If these regulations are followed, the safety will be sure to local people
Information related to the subproject must be informed to local residents/local government before construction	Agreement. Construction contractors must arrange a meeting in communal people's committee for information disclosure, before construction
All affected land and other affected residential structure must be compensated according to the state law	Subproject implementation is based on local agreement. All compensation in details will be clarified and implemented before construction.
The subproject alignment is crossing the trade traditional village of commune therefore transmission line alignment must be sure that not affect to master plans of commune	Subproject is designed step by step so that the final design will satisfy following the reality.

The safety measures for RoW need be calculated because the line goes parallel with 500kV transmission line and near the Tien Phong trade traditional village	Agreement. There are safety standard for transmission line and RoW. If these regulations are followed, the safety will be sure to local people
G6 tower is located at irrigation canal	This problem will be send to subproject owner and design consultant
In the stretching transmission line, if have any damage due to stretching the line that contractors or project owner need pay for local resident	Agreement. Construction contractors will be implement under the supervision not only subproject system but also response from local residents
Construction methods and plans must incorporated with solution for nearby graves which potentially be affected during construction. Construction contractors try to avoid the affect to tomb	Generated impacts on local tombs must be supervised from project execution agency and local government.
Construction time should be chosen after finish the crop	This recommendation will be sent to project owner
The tower G15 is located in the area planning of Nam Vang company	This problem will be sent to project owner and design consultant
Some of tomb are located near the towner therefore the contractor need make attention to avoid affecting to these tombs	Agreement. Generated impacts on local tombs must be supervised by subproject execution agency and local government

C. PHOTOS FROM PUBLIC CONSULTATION

	
Meeting at Tu Nhien commune people's committee – Thuong Tin district	Meeting at Thanh Van commune people's committee – Thanh Oai district
	
Random interview the AP at Hien Giang commune – Thuong Tin district	Random interview the AP at Thanh Van commune – Thanh Oai district
	
Meeting at Thanh Thuy commune – Thanh Oai district	Field work at location G6 – Van Phu commune – Thuong Tin district

APPENDIX C. CERTIFICATE OF EIA FOR CONSTRUCTION OF 110KV TRANSMISSION LINE FROM THE 500/220KV THUONG TIN SUBSTATION TO THE 110KV THANH OAI SUBSTATION

HANOI PEOPLE'S COMMITTEE

SOCIALIST REPUBLIC OF VIETNAM

Independence – Freedom – Happiness

No: 4294/QĐ-UBND

Hanoi, August 15th , 2014

DECISION

Approval of Environmental impact assessment report

Project: Construction of 110kV transmission line from the 500/220kV Thuong Tin substation to the 110kV Thanh Oai substation

Location: Thuong Tin district and Thanh Oai district

Investor: Hanoi Power Corporation

Investor representative: Hanoi power network Project Management Unit

HANOI PEOPLE'S COMMITTEE

Pursuant to Law on Organisation of People's Council and People's Committee dated November 26th, 2003;

Pursuant to Law on Environmental Protection dated November 29th, 2005;

Pursuant to Decree No.29/2011/ND-CP dated April 18th, 2001 of the Government regarding Regulation on strategic environment assessment, environmental impact assessment, environmental protection commitment;

Pursuant to Circular No. 26/2011/TT-BTNMT dated July 18th, 2011 of Ministry of Natural Resources and Environment clarifying some articles of Decree no.29/2011/ND-CP dated April 18th, 2001 of the Government.

With reference to the request of the Appraisal Board for the respective EIA report after meeting on 9th May 2014 at Department of Environmental Protection, Ha Noi;

With reviewing the revised EIA report;

By proposal from the Director of Department of Natural Resources and Environment of Hanoi in Official Document no. 4013/TTr-STNMT-CCMT dated 24th July. 2014.

DECISION

Article 1. Approving the Environmental impact assessment report of Project "Construction of 110kV transmission line from the 500/220kV Thuong Tin substation to the 110kV Thanh Oai substation" prepared by the Hanoi power network PMU (hereinafter referred to as the project owner) with the following main contents:

1. Scope, scale and capacity of the project: mentioned in the investment records and reports of projects.

2. The environmental protection requirement for the project:

2.1. The process of construction and dismantlement of buildings must comply with regulations on ensuring order, safety and environmental sanitation during the construction of

buildings in Hanoi promulgated together with the resolution No. 55/2009/QD-UBND dated 17th March 2009 and the dust reduction measures specified in the Decision No. 02/2005/QD-UBND dated October 01st, 2005 of the People's Committee of Hanoi City.

2.2. Noise and vibration in the process of construction shall be prevented by mitigation measures in compliance with the provisions of National Technical Regulation QCVN 26:2010/MONRE (common area) on noise and QCVN 27:2010/MONRE (table 2 – common area) on vibration.

2.3. Dust and emissions generated during the construction shall be prevented by mitigation measures in compliance with the provisions of National Technical Regulations QCVN 05:2013/MONRE on ambient air quality.

2.4. Domestic solid waste must be collected and processed in accordance with Decree 59/2007/ND-CP dated September 04th, 2007 by the Government on the solid waste, the regulations on common solid waste management in the area of Hanoi issued together with Decision No.16/2013/QD-UBND dated 3rd June 2013 of Hanoi city People's Committee.

2.5. Hazardous waste discharged in the process of construction and operation of the project must be classified, collected, stored, managed and disposed according to the provisions of Circular 12/2011/TT- BTNMT dated April 14th, 2011 by the Ministry of Natural Resources and Environment for the management of hazardous waste.

2.6. All wastewater from the process of construction and operation of the project must be collected and treated in accordance with QCVN 14:2008 / MONRE (column B) before being discharged into the public drainage system in the area.

3. Other constraints

3.1. Project owner must be responsible for the implementation and application of the environmental mitigation and remedy measures during the construction and operation of the project.

3.2. Project owner and the unit that manages and operates the project have to implement the annual environmental monitoring program mentioned in the report on assessment of environmental impact. The periodical environmental monitoring results must be sent to the Environment Protection Agency - Department of Natural Resources and Environment in Hanoi for inspection and monitoring.

3.3. Project owner and the unit that manages and operates the project have to compensate those environmental damages that may be caused by the project pursuant to the Environment Protection Law and Decree 179/2013/ND-CP dated 14th Nov.,2013 of Government on handling of violations of law in the field of environmental protection. 3.4. Project and the unit that manages and operates the project have to ensure budget for the investment and construction and operation of environmental treatment facilities as committed in the report on the assessment of environmental impact.

Article 2. Project owner have to establish, approve and publicly list the environmental management plan of the project; strictly satisfy the requirements of environmental protection in the preparation period for investment and the construction period of the project

Article 3. During the implementation process, changes on the content of paragraphs 1 and 2 of Article 1 of this Decision, if any, shall be submitted in a written report by the project owner and shall only be made upon written approval of the appropriate authorities.

Article 4. The Decision approving the report on the assessment of environmental impact shall act as the foundation for project investment decision; as a basis for the State's competent management agencies to supervise and inspect the implementation of environmental protection of the project.

Article 5. Authorizing the Director of the Department of Natural Resources and Environment to authenticate the supplemental cover page of the approved report on the assessment of

environmental impact and execute the examination and monitoring on the implementation of environmental protection in the approved report on the assessment of environmental impact .

Article 6. This decision takes effect from the date of signing. Chief of Office of the People's Committees of the city, Director of the Department of Natural Resources and Environment, the Heads of provincial Departments, Industries concerned, Chairman of People's Committee of Thanh Oai district and Thuong Tin district, Director of the board of management of the power grid project in Hanoi and the civil work contractors are responsible for executing this decision./.

Destination:

- As the article 6;
- The Ministry of Resources and Environment(to report);
- The President of People's Committee of City(to report);
- The Vice- President Mr. Vo Hong Khanh;
- Committee Office, Chief of Office, Vice-chief of office Mr. Pham Chi Cong;
- Sub-Department of Environmental Protection in Hanoi;

ON BEHALF OF PEOPLE'S COMMITTEE

pp. Chairman

Deputy Chairman

(signed and sealed)

Vu Hong Khanh

ỦY BAN NHÂN DÂN THÀNH PHỐ HÀ NỘI	CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM Độc lập – Tự do – Hạnh phúc
Số: 4194 /QĐ-UBND	*Hà Nội, ngày 15 tháng 8 năm 2014*

QUYẾT ĐỊNH

Phê duyệt báo cáo đánh giá tác động môi trường
Dự án: "Xây dựng tuyến đường dây 110kV từ trạm biến áp 500/220kV Thường Tín cấp điện cho trạm biến áp 110kV Thanh Oai"
Địa điểm thực hiện: huyện Thường Tín và huyện Thanh Oai
Chủ đầu tư: Tổng công ty điện lực thành phố Hà Nội
Đại diện chủ đầu tư: Ban quản lý dự án Phát triển Điện lực Hà Nội

UỶ BAN NHÂN DÂN THÀNH PHỐ HÀ NỘI

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

Căn cứ Luật Bảo vệ môi trường ngày 29/11/2005;

Căn cứ Nghị định số 29/2011/NĐ-CP ngày 18/4/2011 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 26/2011/TT-BTNMT của Bộ Tài nguyên và Môi trường ngày 18/7/2011 Quy định chi tiết một số điều của Nghị định số 29/2011/NĐ-CP ngày 18/4/2011 của Chính Phủ;

Theo đề nghị của hội đồng thẩm định báo cáo đánh giá tác động môi trường của dự án: "Xây dựng tuyến đường dây 110kV từ trạm biến áp 500/220kV Thường Tín cấp điện cho trạm biến áp 110kV Thanh Oai" họp ngày 09/5/2014 tại Chi cục Bảo vệ Môi trường Hà Nội;

Xét nội dung báo cáo đánh giá tác động môi trường của dự án: "Xây dựng tuyến đường dây 110kV từ trạm biến áp 500/220kV Thường Tín cấp điện cho trạm biến áp 110kV Thanh Oai" đã được chỉnh sửa, bổ sung;

Xét đề nghị của Giám đốc Sở Tài nguyên và Môi trường Hà Nội tại Tờ trình số 4013 /TTr-STNMT-CCMT ngày 24 / 7 /2014,

QUYẾT ĐỊNH:

Điều 1. Phê duyệt báo cáo đánh giá tác động môi trường của dự án: "Xây dựng tuyến đường dây 110kV từ trạm biến áp 500/220kV Thường Tín cấp điện

cho trạm biến áp 110kV Thanh Oai" được lập bởi Tổng công ty điện lực thành phố Hà Nội (sau đây gọi là Chủ dự án) với các nội dung chủ yếu sau đây:

1. Phạm vi, quy mô của Dự án: được nêu trong hồ sơ, báo cáo đầu tư của Dự án.

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

2.1. Quá trình thi công xây dựng và vận hành công trình phải thực hiện đúng quy định về đảm bảo trật tự an toàn và vệ sinh môi trường trong quá trình xây dựng các công trình tại Thành phố Hà Nội ban hành kèm theo Quyết định số 55/2009/QĐ-UBND ngày 17/3/2009 và các biện pháp giảm bụi theo quy định tại Quyết định số 02/2005/QĐ-UB ngày 10/01/2005 của UBND Thành phố Hà Nội và Quyết định số 241/2005/QĐ-UB ngày 30/12/2005 về việc sửa đổi một số điều quy định về việc thực hiện các biện pháp làm giảm bụi trong lĩnh vực xây dựng trên địa bàn Thành phố.

2.2. Tiếng ồn và độ rung trong quá trình thi công xây dựng và vận hành dự án phải có biện pháp giảm thiểu, đảm bảo tuân thủ quy định tại Quy chuẩn Kỹ thuật Quốc gia QCVN 26:2010/BTNMT về tiếng ồn (khu vực thông thường) và QCVN 27:2010/BTNMT (Bảng 2 – Khu vực thông thường) về độ rung.

2.3. Bụi và khí thải phát sinh trong quá trình thi công xây dựng Dự án phải có các biện pháp giảm thiểu, đảm bảo tuân thủ quy định tại Quy chuẩn Kỹ thuật Quốc gia QCVN 05:2013/BTNMT về chất lượng không khí xung quanh.

2.4. Chất thải rắn sinh hoạt phải được thu gom và xử lý theo đúng quy định tại Nghị định 59/2007/NĐ-CP ngày 09/04/2007 của Chính phủ về quản lý chất thải rắn và Quy định quản lý chất thải rắn thông thường trên địa bàn thành phố Hà Nội ban hành theo Quyết định số 16/2013/QĐ-UBND ngày 03/6/2013 của UBND Thành phố Hà Nội.

2.5. Chất thải nguy hại phát sinh trong quá trình thi công xây dựng Dự án phải được phân loại, thu gom, lưu giữ, quản lý và xử lý theo đúng quy định tại Thông tư 12/2011/TT-BTNMT ngày 14/4/2011 của Bộ Tài nguyên và Môi trường quy định về quản lý chất thải nguy hại.

2.6. Toàn bộ nước thải sinh hoạt và nước thải phát sinh trong quá trình đầu tư xây dựng Dự án đều phải được thu gom và xử lý, đảm bảo đạt quy chuẩn Việt Nam QCVN 14:2008/BTNMT (cột B) trước khi thải ra hệ thống thoát nước chung trong khu vực thực hiện Dự án.

3. Các điều kiện kèm theo:

3.1. Chủ Dự án và đơn vị tiếp nhận, quản lý vận hành Dự án phải thực hiện, áp dụng triệt để các biện pháp nhằm giảm thiểu những tác động tiêu cực, xử lý các nguồn thải phát sinh có khả năng gây ảnh hưởng đến đời sống nhân dân xung quanh khu vực Dự án trong quá trình thi công xây dựng và vận hành Dự án.

3.2. Chủ Dự án và đơn vị tiếp nhận, quản lý vận hành Dự án phải thực hiện chương trình giám sát môi trường hàng năm đã nêu trong báo cáo đánh giá tác động môi trường. Kết quả giám sát môi trường định kỳ phải gửi đến Chi cục Bảo vệ Môi trường - Sở Tài nguyên và Môi trường Hà Nội, UBND huyện Thường Tín, UBND huyện Thanh Oai để kiểm tra và giám sát.

3.3. Chủ Dự án và đơn vị tiếp nhận, quản lý vận hành Dự án phải thực hiện các quy định về bảo vệ an toàn công trình lưới điện cao áp theo Nghị định số 14/2014/NĐ-CP ngày 26/02/2014 của Chính phủ Quy định chi tiết thi hành Luật Điện lực về an toàn điện

3.4. Chủ Dự án phải đền bù những thiệt hại môi trường do dự án gây ra theo Luật Bảo vệ Môi trường và Nghị định 179/2013/NĐ-CP ngày 14/11/2013 của Chính phủ về xử lý vi phạm pháp luật trong lĩnh vực Bảo vệ Môi trường.

3.5. Chủ Dự án và đơn vị tiếp nhận, quản lý vận hành Dự án phải đảm bảo nguồn kinh phí đầu tư xây dựng và vận hành các công trình xử lý môi trường đã cam kết trong báo cáo đánh giá tác động 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;

Điều 3. Trong quá trình thực hiện nếu dự án 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 cấp có thẩm quyền.

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. Giao Giám đốc 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. Chánh Văn phòng UBND Thành phố; Giám đốc Sở Tài nguyên và Môi trường; Thủ trưởng các sở, ban, ngành liên quan, Chủ tịch UBND huyện Thường Tín, Chủ tịch UBND huyện Thanh Oai, Tổng giám đốc Tổng công ty điện lực thành phố Hà Nội, Giám đốc Ban quản lý dự án Phát triển Điện lực Hà Nội chịu trách nhiệm thi hành Quyết định này./.

Nơi nhận:
- Như điều 6;
- Bộ Tài nguyên và Môi trường (để b/c);
- Chủ tịch UBNDTP (để b/c);
- Phó Chủ tịch T.Trực Vũ Hồng Khanh;
- Chi cục Bảo vệ Môi trường Hà Nội;
- VPUB: PCVP Phạm Chí Công;
- TH, TNMT (b,th);
- Lưu: VT.

M05.13029.CC347(04)

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

Vũ Hồng Khanh

APPENDIX D: EMERGENCY RESPONSE PLAN

1. 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 should 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.

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

Table 23. Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	- 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)	- Solves the emergency/incident
Contractor Resources	- 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.

3. The ERT will be led by the senior Contractor engineer (designated 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.

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

5. 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

6. 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.

7. 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) made arrangements with the EERT;

iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force; v) conducted 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) conducted drills for different possible situations.

8. 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

9. 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 should 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; ii) estimated magnitude of the situation; iii) estimated persons harmed; iv) 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:

(i) The names and contact details of the relevant persons and institutions should 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, SS

(ii) All Subproject sites should have good access to any combination of audible and visual alarms, landline phones, mobile phones and two-way radio communication at all times.

(iii) Contractor's construction vehicles should 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 24. 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

Procedure	Remarks
	injured.

Table 25. Response Procedure During Medical Emergency

Procedure	Remarks
▪ Administer First Aid regardless of severity immediately.	▪ Fundamentals when giving First Aid: - Safety first of both the rescuer and the victim. - Do not move an injured person unless: - 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 nearest hospital.	▪ ERTL/Deputy ERTL or authorized on-site emergency communicator
▪ Facilitate leading the EERT to the emergency site.	▪ ERTL/Deputy ERTL to instruct: - 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 26. Response Procedure in Case of Fire

Procedure	Remarks
▪ Alert a fire situation.	▪ Whoever detects the fire shall immediately: - call the attention of other people in the site, - sound the nearest alarm, and/or - Foreman or any ERT member among

Procedure	Remarks
	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.	▪ 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.	▪ 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.	▪ 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.	▪ ERTL/Deputy ERTL to instruct: - 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.	▪ Follow appropriate evacuation procedure.

APPENDIX D. DECISION OF MINISTRY OF DEFENCE REGARDING UXO CLEARANCE

BỘ TƯ LỆNH THỦ ĐÔ HÀ NỘI
BỘ THAM MƯU

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

Số: 449 /BTM-CôB

Hà Nội, ngày 25 tháng 3 năm 2016

V/v thông báo tình hình bom mìn, vật nổ trên mặt bằng triển khai dự án xây dựng.

Kính gửi: Ban Quản lý dự án Phát triển Điện lực Hà Nội.

Bộ Tham mưu/Bộ Tư lệnh Thủ đô Hà Nội nhận được Công văn số 433/HANOI DPMB-KTGS ngày 16/3/2016 của Ban Quản lý dự án Phát triển Điện lực Hà Nội về việc xin ý kiến tình hình bom mìn, vật nổ tồn dư tại các vị trí các móng cột thực hiện dự án "Xây dựng tuyến đường dây 110kV từ TBA 500/220kV Thường Tín đến TBA 110 kV Thanh Oai".

Sau khi nghiên cứu địa bàn, Bộ Tham mưu/Bộ Tư lệnh Thủ đô Hà Nội có ý kiến như sau:

Trong 02 cuộc kháng chiến chống Pháp và chống Mỹ, Thủ đô Hà Nội là trọng điểm đánh phá của địch, nên các loại bom mìn, vật nổ vẫn còn sót lại sau chiến tranh. Đối với dự án "Xây dựng mới TBA 110kV Ba Vì" đi qua địa phận các xã Văn Bình, Văn Phú, Hòa Bình, Hiền Giang, Tiền Phong huyện Thường Tín và các xã Tam Hưng, Thanh Thủy, thị trấn Kim Bài huyện Thanh Oai, thành phố Hà Nội, Ban Quản lý dự án Phát triển Điện lực Hà Nội cần tiến hành khảo sát, dò tìm, xử lý bom mìn, vật nổ để bảo đảm an toàn cho quá trình thi công và sử dụng công trình sau này./.

KT.THAM MƯU TRƯỞNG
PHÓ THAM MƯU TRƯỞNG

Nơi nhận:
- Như trên;
- Đ/c Tư lệnh; (để báo cáo)
- Đ/c Phó Tư lệnh-TMT;
- Các đ/c Phó TMT;
- Lưu: VT, CôB; H08.

BỘ TƯ LỆNH THỦ ĐÔ HÀ NỘI
BỘ THAM MƯU

Đại tá Kiều Đăng Tuấn