Initial Environmental Examination

Project Number: 46391-001

November 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

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LOANS 3161/8286-VIE: HANOI AND HOCHIMINH CITY POWER GRID DEVELOPMENT SECTOR PROJECT

EVN HANOI: 110kV TRANSMISSION LINES TURNED TO 220 kV SON TAY SUBSTATION

Prepared by Ha Noi Power Corporation for the Asian Development Bank

ABBREVIATIONS

ADB:	Asian Development Bank
AH(s):	Affected Household(s)
AP(s):	Affected people(s)
BOD:	Biochemical Oxygen Demand
COD:	Chemical Oxygen Demand
CPC:	Commune People's Committee
CSC:	Construction Supervision Consultant
DARD:	Department of Agriculture and Rural Development
DONRE:	Department of Natural Resources and Environment
EA:	Executing Agency
EIA:	Environmental Impact Assessment
EMP:	Environmental Management Plan
EO:	Environmental Officer (of PMB)
ES:	Environmental Staff (of contractors)
EVN:	Viet Nam Electricity
EVNHANOI:	Ha Noi Power Corporation
EVNHCMC:	Ho Chi Minh City Power Corporation
GRM:	Grievance Redress Mechanism
HCMC:	Ho Chi Minh City
HANOI DPMB:	Hanoi Development Projects Management Board
IA:	Implementation Agency
IEE:	Initial Environmental Examination
MARD:	Ministry of Agriculture and Rural Development
MONRE:	Ministry of Natural Resources and Environment
NPA:	National Protected Area
PCB:	Polychlorinated biphenyls
PCR:	Physical Cultural Resources
PIC:	Project Implementation Consultant
PPC:	Provincial People's Committee
PMB:	Project Management Board
PO	Project Owner
REA:	Rapid Environmental Assessment
ROW:	Right-of-way
RP:	Resettlement Plan
S/S:	Substation
T/L:	Transmission line
TSS:	Total Suspended Solids
UXO:	Unexploded Ordnance

CURRENCY EQUIVALENTS
(As of 15 June 2016)

Currency Unit	-	Vietnam Dong VND
1.00 VND	=	$ 0.000046
$1,00	=	22.400

WEIGHTS AND MEASURES

km: kilometer

kg: kilogram

kV: kilovolt

ha: hectare

mm: millimeter

MV: medium voltage

NOTES

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2. The Initial Environmental Examination (IEE) presented herein addresses the 110 kV transmission line turned to 220kV Son Tay Substation subproject, in Son Tay town, Ha Noi City. It has a length of a 3.925 km long transmission line traversing 2 communes in Son Tay. This represents one of the non- core subprojects that were identified by Electricity of Viet Nam (EVN) for Ha Noi. The IEEs of other non-core subprojects[1] are being prepared separately.

A. Subproject Summary

3. The 110 kV transmission line turned to 220kV Son Tay substation includes: (i) 4-circuit 110 kV connection line from the 220 kV bus-bar of the 220 kV Son Tay SS to 110 kV Son Tay SS and 110 kV Yen Mao SS; (ii) 6-circuit 110 kV connection line from the 220 kV bus-bar of the 220 kV Son Tay SS to 110 kV Phuc Tho SS, 110 kV Xuan Mai SS, 110 kV Thach That SS, and 110 kV Phung Xa SS; (iii) 1-circuit connection line to 110 kV Phuc Tho SS on the 4-circuit tower of the "110 kV Ha Dong-Son Tay connection line" Project (from 173E1.4 to 172E1.7); (iv) separation of the connection line from 173E10.5 Xuan Mai to 220 kV Son Tay SS at the tower numbered 30 to connect to 110 kV Thach That SS; and (v) rehabilitation from the tower 126 to 110 kV Son Tay SS (E1.7). In which, the components (i) and (ii) are new construction that requires land acquisition whereas the component (iii) is stringing on the tower of another project, the components (iv) and (v) are rehabilitation works, which will cause temporary impacts on land.The project will meet the load demand in the area, improve the reliability and flexibility of power supply, and increase the operational safety for Hanoi power grid.

B. Potential Impacts and Mitigation

4. The IEE of the 110 kV transmission line turned to 220kV Son Tay substation indicates that the potential environmental impacts of the subproject will primarily occur during the construction phase of the subproject components. The common construction-related disturbances such as noise, dust, erosion, sedimentation, solid and liquid waste pollution, worker camp issues, damage to existing roads, 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, or protected areas in the subproject sites that are located in suburban Ha Noi.

5. The total affected land area is 151,257 m^2, comprising 4,527.2 m^2 of permanently acquired land, 77,919.8 m^2 of restricted land within ROW, and 68,810 m^2 of temporarily affected land. 455 households will be affected by the subproject, from which, 26 households with 112 persons will be affected by permanent land acquisition. Details of the compensation and ground clearance are shown in the report for compensation and resettlement of the project.

6. There are no expected negative induced, or cumulative environmental impacts associated with the subproject objectives of meeting the load demand in the area, improving the reliability and flexibility of power supply, and increasing the operational safety for Hanoi power grid.

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

7. 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 subproject. The EMP also prescribes an Emergency 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

8. The IEE concludes that the feasibility design of the 110 kV transmission line turned to 220kV Son Tay substation combined with available information on affected environments is sufficient to identify the scope of potential environmental impacts of the subproject. Providing that significant changes to the subproject 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 subproject is not required.

II. INTRODUCTION

A. Background to IEE

1. The goal of the Ha Noi and Ho Chi Minh City Power Grid Development Sector Project is to strengthen the capacity and reliability of the power infrastructure in Ha Noi and Ho Chi Minh City 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.

2. "110kV transmision line turned to 220kV Son Tay substation" subproject will be implemented as part of a 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 projects which are being further detailed and prepared for project implementation.

B. Assessment Context

3. The overall 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 110kV transmision line turned to 220kV Son Tay substation subproject in the feasibility design stage using available data and information on sensitive ecological and cultural receptors that exist for the subproject site.

4. The detailed design for the 110kV transmision line turned to 220kV Son Tay substation subproject will follow subproject approval. The Environmental Management Plan (EMP) that has been prepared for the subproject (Section VI) will need to be updated where necessary to meet the final detailed designs of the 110kV transmision line turned to 220kV Son Tay substation subproject.

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

5. The 110kV transmision line turned to 220kV Son Tay substation subproject will be implemented according to the directives set down for use of Official Development Assistance (ODA) by GoV Decree No.38/2013/ND-CP which was promulgated on April 23, 2013, and in accordance with the provisions of for the parent sector project.

A. Viet Nam Regulatory Framework for Environmental Assessment

6. The Viet Nam Law on Environmental Protection (LEP2014) 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 master plan, strategic environmental assessment (SEA), environmental impact assessment (EIA), and environmental management plan (EMP) in conjunction with Circular 27/2015/TT-BTNMT dated 29 May 2015 on stipulation of specific articles of Decree 18 both elaborate the EA requirements specified by the LEP (2014).

7. The updated screening criteria of Decree 18 distinguish projects that require an Environmental Impact Assessment (EIA) from projects requiring the simpler Environmental Management Plan (EMP). The difference between the two processes reflects the level of assessment, and final review and appraisal that is required. The Decree 18 requires preparation of an EIA for the 110kV transmision line turned to 220kV Son Tay substation subproject.

[2]ADB, 2009. Safeguard Policy Statement, ADB Policy Paper.
[3]ADB, 2012, Environmental Safeguards, A Good Practice Sourcebook, Draft.
[4]Footnote 2, pg 19.

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

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

Environmental Protection regulations

- Law on Environmental Protection by the National Assembly on June 23, 2014 (Law No. 55/2014/QH13);
- Decree No. 38/2015/ND-CP dated April 24, 2015 of the Government on management of waste discarded materials.;
- Decree No.18/2015/ND-CP dated February 14, 2015 on environmental protection masterplan, strategic environmental assessment, environmental impact assessment and environmental management plan.
- Circular No.36/2015/TT-BTNMT dated June 30, 2015 on hazardous waste management;
- Circular No.27/2015/TT-BTNMT dated May 29, 2015 of the Ministry of Natural Resources and Environment on environmental protection masterplan, strategic environmental assessment, environmental impact assessment and environmental management plan

Legal documents on electricity

- Electricity Law No. 28/2004/QH11, issued on 03 December 2004;
- Supplemented Electricity Law No. 24/2012/QH13 by the National Assembly of the Socialist Republic of Vietnam dated November 20, 2012;
- Decree No.14/2014/ND-CP dated February 26, 2014 of the Government detailing the implementation of the Electricity Act on electrical safety;
- 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.

Other relative legal documents:

- Decree No. 45/2013/ND-CP dated May 10th, 2013 of the GOV regarding the detailed regulation on some articles of the Labor Code on working hours, rest hours, occupational safety and occupational hygiene.
- Circular No.22/2010/TT-BXD dated Dec. 3rd, 2010 issued by the Ministry of Construction (MOC) regarding the regulation on labour safety during the project construction process.
- Decision No.3733/2002/QD-BYT issued by the Ministry of Health dated October 10th, 2002 regarding the promulgation of 21 labor hygiene standards, 5 principles and 7 labor hygiene measurements.

Environmental Standards and Regulations

- QCVN 05:2013/BTNMT - National technical regulation on ambient air quality;
- QCVN 26:2010/BTNMT - National technical regulation on noise.
- QCVN 27:2010/BTNMT - National technical regulation on vibration.
- QCVN 08:2015/BTNMT - National technical regulation on surface water quality.
- QCVN 14:2008/BTNMT - National technical regulation on domestic wastewater.
- QCVN 07:2009/BTNMT - National technical regulation on hazardous waste thresholds.

Project related Documents

- Decision No. 4661 / QD - EVN HANOI dated 09.12.2014 of Power Corporation of Hanoi City on approving the design adjustment works for “110kV transmision line turned to 220kV Son Tay substation " .
- Document No. 2516 / QHKT - P7 dated 06.18.2015 of the Department of Hanoi Planning and Architecture on the direction of 110kV transmission lines connected to the 220kV substation in the Son Tay town, Hanoi city.
- Document No. 1683 / SCT dated 02/6/2015 of the Hanoi Department of Industry and Trade of the suitability of “110kV transmision line turned to 220kV Son Tay substation “construction to electric power development plan.

C. ADB Safeguard Policy

9. The ADB Safeguard Policy Statement (ADB SPS, 2009) along with the 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). The Rapid Environmental Assessment (REA) checklist of the subproject is presented in Appendix A.

- 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.

IV. DESCRIPTION OF SUBPROJECT

10. The Subproject comprises the 5 components as follows: (i) 4-circuit 110 kV connection line from the 220 kV bus-bar of the 220 kV Son Tay SS to 110 kV Son Tay SS and 110 kV Yen Mao SS; (ii) 6-circuit 110 kV connection line from the 220 kV bus-bar of the 220 kV Son Tay SS to 110 kV Phuc Tho SS, 110 kV Xuan Mai SS, 110 kV Thach That SS, and 110 kV Phung Xa SS; (iii) 1-circuit connection line to 110 kV Phuc Tho SS on the 4-circuit tower of the “110 kV Ha Dong-Son Tay connection line” Project (from 173E1.4 to 172E1.7); (iv) separation of the connection line from 173E10.5 Xuan Mai to 220 kV Son Tay SS at the tower numbered 30 to connect to 110 kV Thach That SS; and (v) rehabilitation from the tower 126 to 110 kV Son Tay SS (E1.7). In which, the components (i) and (ii) are new construction that requires land acquisition whereas the component (iii) is stringing on the tower of another project, the components (iv) and (v) are rehabilitation works, which will cause temporary impacts on land.

A. Description of the proposed transmission lines

11. The proposed 110 kV connection line will start from the 110 kV bay of the 220 kV Son Tay SS and terminate at the separated connection of the existing 110 kV TLs. The connection line traverses Thanh My and Xuan Son communes of Son Tay Town, and mainly passes through paddy fields, rain-fed crop growing area, and low hills in line with the master plan of the satellite urban area of Son Tay. The connection line will go in parallel with the planned ring road 5 and along the planned road of the Son Tay satellite urban area. The description of each specific transmission line is presented below

Table 1 The detail description of existing environment of transmission line 110 kV Son Tay and Yen Mao SS

Project site	***Length of route (m)***	***Tower No.***	***Existing Environment***
Connection point is placed on the location of 220/110kV Son Tay substation.	79	Departure point - G1	Route cuts through the existing land, G1 location has crop hill
	336.3 m	G1- G2	The route mainly on the crop hill and cut through a path way. G2 on crops hills
	563 m	G2 – G3	The route goes down from the hill to rice fields, cross the pathway 03 times, cross the concrete road once, running through populated areas in Thu Trung Village, Thanh My commune. G3 placed in the rice fields of Xuan Son commune
	165.2 m	G3 – G4	The route runs over rice fields, cross the dirt road once, cross the irrigation ditch 2 times.G4 located in the rice fields .
Xuan Son commune	595 m	G4 – G5	The route runs mainly on rice fields in Xuan Son Commune.
Xuan Son Commune, Son Tay town	225.84	G5 – 126 location of existing 110kV Xuan Mai – Son Tay	The route runs on the rice fields.

1. The 110 kV turned line to 110 kV Son Tay and Yen Mao SS.

12. The construction of the 110 kV connection line has the following features:

- Starting point: from the 110 kV bays No. 179 and 180 of the 220 kV Son Tay SS.
- Ending point: the tower numbered 126 of the existing 110 kV Xuan Mai- Son Tay transmission line.
- Length of the proposed line: 2.049 km.
- Number of circuits: 4, of which:
  - Double circuit line to 110 kV Son Tay SS under the Subproject;
  - One circuit to 110 kV Yen Mao SS financed by the Northern Power Corporation;
  - One circuit for contingency purpose.
- Earth wire: 02 (1 PHLOX-116 wire and 1 OPGW 96/24 wire)
- Conductor: ACSR-400
- Tower: pre-formed steel tower (designed for conductors up to 400 mm^2)
- Insulator: silicon or equivalent.

13. The detail description of existing environment as follows (Table 1):

2. The turned 110kV line to 110kV Phuc Tho, Xuan Mai, Thach That, Phung Xa substations

14. The construction of the 110 kV connection line to Phuc Tho, Xuan Mai, Thach That, and Phung Xa has the following features:

- Starting point: from the 110 kV bays numbered 175, 176, 177, and 178 of the existing 220 kV Son Tay SS.
- Ending point 1: Position 122 of the existing 110 kV Xuan Mai-Son Tay TL.
- Ending point 2: Position 170 of the existing 110 kV Ha Dong-Son Tay TL (the position 171 is the new design of the 110 kV Ha Dong-Son Tay Improvement Project (173E1.4 to 172E1.7).
- Length of the proposed line: 1.954 km.
- Number of circuits: 6, of which:
  - 4 circuits under the Subproject: 1 circuit to 110 kV Phuc Tho SS, 1 circuit to the 110 kV Xuan Mai SS, 1 circuit to the 110 kV Thach That SS, and 1 circuit to the 110 kV Phung Xa SS.
  - One contingent circuit to Ha Dong circuit 2.
  - One contingent circuit to Chem circuit 2.
- Earth wire: 02 (1 PHLOX-116 wire and 1 OPGW 96/24 wire)
- Conductor: ACSR-400
- Tower: pre-formed steel tower (designed for conductors up to 400 mm^2)
- Insulator: silicon or equivalent.

15. The Existing Environment of 110kV line to 110kV Phuc Tho, Xuan Mai, Thach That, Phung Xa substations is described in Table 2

Table 2 Existing Environment of 110kV line to 110kV Phuc Tho, Xuan Mai, Thach That, Phung Xa substations

Project site	***Length of route (m)***	***Tower No.***	***Existing Environment***
Son Tay Town	104.17	Departure point - G1	The connection point No. 1 to G1 whereas the connection point No. 2 to G1 is 73.46m long. The route crosses over the existing earth road to reach the location of G1 on the crop hill and then turns left
Son Tay Town	336.3 m	G1- G2	The route mainly passes through rain-fed crop hill and crosses over a small earth road to G2 which is located on the crop hill. The route then turns left.
Thanh My Commune	563.08m	G2-G2A	The connection line goes down from the hill to the paddy field, crossing over earth roads for 3 times, concrete road for 1 time, and the residential area in Thu Trung Hamlet of Thanh My Commune. G2A is located on the rice field in Xuan Son Commune.
Xuan Son Commune	165.2 m	G2A-G3	The route continues passing through paddy field and crosses over an earth road and then reaches G3 on a rice field in Xuan Son Commune.
Xuan Son Commune	73.75 m	G3 – G4	The connection line mainly traverses the rice fields in Xuan Son Commune, crossing over a 22kV power.
Xuan Son Commune	396.95 m	G4 – G5	The route mainly passes through rice fields in Xuan Son Commune, crossing over a concrete road, and 0.4 kV line 2 times, and some irrigation canals.
Xuan Son Commune	145.71 m	G5 to Position 170 of the existing 110 kV Ha Dong-	The route passes through the rice field in Xuan Son Commune of The route Son Tay Town.

		Son Tay TL	

16. The project crosses roads 14 times, crosses irrigation canals 05 times, runs through the village of Thu Trung, Thanh My commune 2 times. In the process of the construction, project will have the appropriate measures, that are described in detail in the section VI-Potential Environmental Impact and Mitigations to limit the impact on these objects.

3. Stringing of the 110 kV connection line to 110 kV Phuc Tho SS

17. This component aims to string one-circuit line from the Position 145 to Position 170 with the following features:

- Starting point: Position 55 of the connection line to the existing 110 kV Phuc Tho SS.
- Ending point: Position 170 of the existing 110 kV Ha Dong-Son Tay TL (the position 171 is the new design of the 110 kV Ha Dong-Son Tay Improvement Project (173E1.4 to 172E1.7).
- Total length: 7.647 km.
- Number of circuits: 01
- Conductor: ACSR-400
- Insulator: silicon or equivalent.

4. Connection to 110 kV Thach That SS

18. The connection will separate the line from the 173 E10.5 Xuan Mai to the 220 kV Son Tay at the tower 30 to connect to the 110 kV Thach That SS.

5. Improvement of the 110 kV Xuan Mai-Son Tay TL

19. For the 110 kV Xuan Mai-Son Tay TL from the position 126 to the 110 kV Son Tay SS, to be synchronized with the conductors and transmission capacity of the four-circuit connection line to be constructed, it is proposed to replace the conductor ACSR-240 with the ACSR-400. The pressure of the conductor ACSR-400 of the improvement segment will be reduced to ensure capacity of the existing towers and their foundations.

B. Reused and Recycle component

20. The Subproject will dismantle the 110 kV connection line sections as follows:

- The section of the double-circuit 110 kV Xuan Mai-Son Tay TL from position 122 to 126 with the length of 0.885 km.
- The section of the single-circuit 110 kV Xuan Mai-Son Tay TL from position 170 to 176 with the length of 1.840 km.

21. For these two sections, nine (9) tower foundations will be recycled spare parts because their quality not as good to meet the requirement, while three (3) will be reused (Table 3). These 3 towers will be erected at the same positions. Regarding three tower foundations to be reused from the 110 kV Xuan Mai-Son Tay TL and 110 kV Ha Dong-Son Tay TL (Position 170-Son Tay SS), to connect the new connection line to these positions, the EVN Hanoi has conducted survey, review and assessment to ensure that the reuse of these towers meets the standards and have the same quality with the tower foundations of the new connection lines under the Subproject.

22. The subproject components are illustrated in Figure 1

Figure 1 Subproject layout and components

C. Construction work

1. Civil work volume for transmission lines

23. As the TL crosses provincial, district and communal roads 14 times, due attention should be made in order to reduce impacts on traffic safety and disruption. The total excavated soil for tower foundation will be 4,042.654 m^3. The subproject will utilize approximately 2/3 excavated soil volume, estimated at 3,773,144 tons to leveling in the new foundation construction area, the remaining amount is used for leveling the existing pits after conducting demolition. Excess excavated soil will give to people for other purposes (Table 3)

Table 3 **The volume of construction materials for transmission lines**

No.	***Materials***	***Unit***	***Quantity***
1	Excavated soil	m^3	4,042.654
2	Filled back soil	m^3	3,773.144
3	Cement	Ton	499.33
4	Sand	Ton	939.70
5	Macadam	Ton	2097.46
6	Anchor bolts	Ton	180.37
7	Equipment and Accessories	Ton	28.73
8	Insulation Accessories	Ton	4.37
9	Earthing, steel, copper wire	Ton	6.31
10	Wires, lightning protection wire	Ton	4.57
11	Reinforced outsourcing	Ton	50.43
12	Steel column, single column	Ton	442.65
13	Welding rod	Ton	0.038

(Source: Project Justification)

2. Construction transmission line method

24. The transmission line has 19 new towers in total; span distance between towers is 200-250m. The construction activities for the 110kV TL include: i) Tower foundation excavation, ii) Construction of tower foundations, iii) Installation of towers, iv) Wire pull and scatter, and deflection modification. The construction methods used for each implementation step is properly in view of environment to ensure no waste after construction, no pollution in the water, soil environment and does not affect power supply continuously during construction. When the TLs crosses canals, ponds, or other transmission line the most suitable, environmental friendly methods described in detail in Section IV are used. The detail of construction work is described as follows:

a. Tower foundation excavation

25. 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.

26. 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:

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

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.

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

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

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.

b. Construction of tower foundations:

27. 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

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

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).

c. Installation of towers:

28. 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.

d. Wire pull and scatter, and deflection modification:

29. 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.

30. 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 fiber 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.

D. Dismantle and reuse/recycle of transmission lines segments

31. After completion of the turned line to 220kV Son Tay substations, the project will proceed to cut power to connect new transmission lines; simultaneously demolish and salvage 110 kV double circuit Xuan Mai – Son Tay segments from position VT 122 to position VT 126 (03 tower foundations) and 110 kV Ha Dong – Son Tay single circuit segment from position VT170 to VT to 110kV Son Tay substations (06 tower foundations).

32. Power cut, demolition, renovation implementation need to be flexible to reduce the amount of electricity cut time, costs and minimize operational impact on people and the neighboring region.

33. The total number of demolished, salvaged tower foundation is: 09 tower foundations. Recovered wires and component volume will be gathered at the location near the roads to transport the Power Corporation of Hanoi storehouse.

34. Recovery of wires and components: Wires and components are removed from each anchor. Prior to implementation, ensure that the transmission line's power is cut and all phases have earthing system.

35. Recovery of foundations, towers: recover towers and foundation of 2 sections includes the following procedures: Review of design documents of old foundations; Announce specific power cuts plan. Carry out demolition and recovery of the equipment, the usable components; the remaining waste is disposed.

36. Total volume recovery of electric parts estimated at 35,587 tons. The recovered volume of construction part is 41,528. Recovered steel volume (about 21,924 kg) is classified and transported to Hanoi Power Corporation's storehouse. The concrete waste (272.28 m3) will be disposed to the disposal site, which is Xuan Son landfill.

37. After conducting tower foundations demolition, need to backfilling the pits to make the ground area in same level with the current state of the surrounding area. The total volume of soil to backfill is estimated at 898.7 m3, equivalent to 1258.18 tons. This amount will be taken from the excavated soil of new foundations construction of the project.

E. The list of proposed equipment and machinery

3. The machinery and equipment will be used in the subproject sites are listed in the Table 4

Table 4 List of machinery and equipment used in construction

No.	*Machinery and equipment type*	*Status*	*Quantity*
1	15 tons Truck	New 70%	6
2	3 tons electric winch	New 70%	3
3	2 tons electric chain hoist	New 70%	2
4	30 tons crane	New 70%	2
5	Bending mowers	New 70%	5
6	Water pumps	New 90%	2
7	Compressor	New 70%	3
8	Welder	New 80%	3
9	Electric drill	New 90%	4
10	1.8 tons diesel hammer	New 80%	3

(Source: Project Justification)

All construction equipment will be mobilized by the contractor based on the construction plan and approved construction methods to ensure the progress and quality of works. The project will monitor strictly equipment used process and the environmental impact that may arise from the operation of the devices. In addition, the technical accreditation for all equipment and devices to ensure required technical standards will be also strictly monitored.

F. Raw materials, fuels, electricity and water for the subproject

a. Materials

4. The project will be implemented in the city of Hanoi, where almost all of the raw materials needed to implement the project are available. Therefore, the construction materials such as stone, cement, iron and steel ... will be purchased from sellers in Son Tay town and neighboring districts of Hanoi, in particular:

- Iron and steel obtained from local suppliers
- Cement, sand, gravel purchased at local businesses
- Conductors, porcelain, accessories purchased through tender process.

5. Location gathering construction materials to serve the project is arranged along roads in the area near the project implementation. The most suitable material gathering location will be chosen during the construction process to ensure not to affect the production, activities and travel of people in the subproject area, and they must be the agreed by the local government/land users. Some specific materials such as steel, wires, stored in rented houses for workers in the construction project. The volume of materials necessary for construction of the subproject is shown in the Table 5

Table 5 The volume of materials used in construction

No.	Materials	Unit	Amount
1	Cement	Ton	499.33
2	Sand	Ton	939.70
3	Macadam	Ton	2097.46
4	Anchor bolts	Ton	180.37
5	Equipment and Accessories	Ton	28.73
6	Insulation Accessories	Ton	4.37
7	Earthing, steel, copper wire	Ton	6.31
8	Wires, lightning rods	Ton	4.57
9	Reinforced outsourcing	Ton	50.43
10	Steel column, single column	Ton	442,65
11	Welding rod	Ton	0,038
Total		Ton	***4,253.9***

(Source: Project Justification)

b. Transportation of materials

6. Construction materials and equipment will be transported through:

- The long-distance transportation: from the source to the site by truck. Unloaded up and down manually and self-propelled crane.
- Internal construction transport along the route: The transfer of supplies from the warehouse to the staging point along the route on roads with cars.
- The short-distance transport: The transport of supplies and materials for collecting points along the route to the route through the soil, field border manually, semi- manually.

c. Fuels, electricity and water

7. The subproject construction process requires the use of electricity, water, fuel ect.

- For electricity and water: due to the distance from the point to the construction project relatively close to residential areas (10-15m), so in the course of construction project will get electricity and water from the residential areas pulse turning. Power source: prior to

construction, the contractor will deal with local government and the power supply units to connect to the nearest power. In addition, the generators will be use in the absence of a convenient connection to the power source. Water source: The contractor will negotiate the purchase and use of water from the surrounding residential areas to serve the construction process

- For fuels: mainly to cater for construction equipment. Because of long construction process the contractor will not store gasoline in the construction site but buy directly from the stores in the area for equipment. This will limit the impact of fuel causing fire as well as the environmental impact of petroleum storage.

G. Waste treatment

8. 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. Construction contractors will contract with the specialized unit (e.g. Son Tay Urban Environment Co., Ltd.) to disposal and treatment.

9. No disposal site need to be arranged for the subproject because 2/3 excavated soil will be used to refill the foundations, the remained will be used by local people or transported to Xuan Son land field site. Iron, work materials, which can be reused or recycled, will be collected and stored at warehouse of PMB or contractors, then will be sold to recycle units. Other construction waste like cement bags, clouts etc. will be classified to treat as in the Figure 2

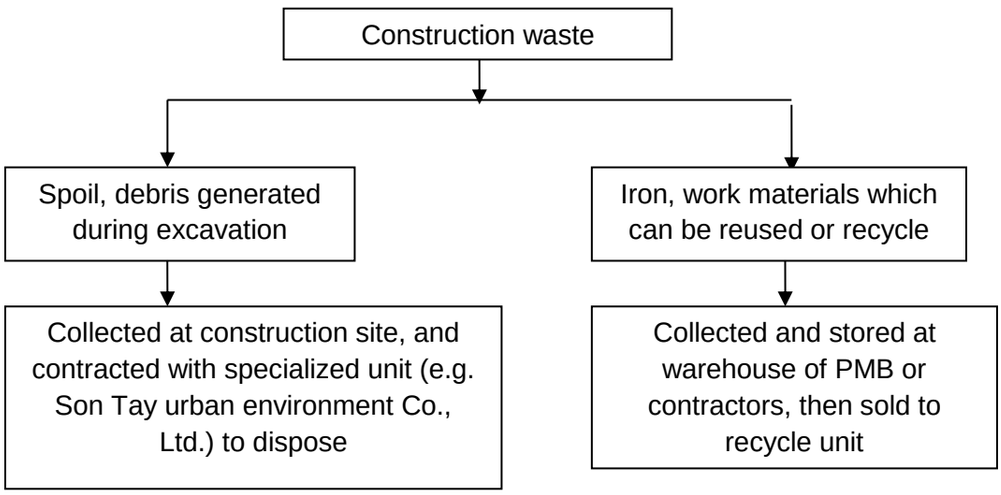

Figure 2. Management of construction waste

7. The project implementation schedule

10. Project construction time is planned in the 10 months. The construction time can be adjusted from 03 to 06 months to suit the actual conditions. Expected project schedule is as follows:

- Preparation of project: August 2015 to April 2016.
- The construction schedule is calculated from the time when the project was approved, as follows:

  + Organize procurement, receiving supplies and equipment: The first and second months.

  + Organize construction activities that include, among others: Preparation of construction site, construction of tower foundation, installation of construction equipment parts, testing, handover, inauguration. This will lasts from third to tenth month.

- Expected time to put into operation: 10th month.

V. DESCRIPTION OF EXISTING ENVIRONMENT

11. The environmental baseline information was obtained primarily from Ha Noi Statistical Yearbooks, state of the environment reports (SoER) prepared by Ha Noi DoNRE, reports from

EVN's technical consultant, and other environmental assessments conducted for the project area. The description of the affected environment focuses on natural features and land use.

A. Physical Environment

1. Geological location, Topography, Geography

a. Geological location

12. The implementation area of the subproject "110kV transmission line turned to 220kV/110kV Son Tay substation" occurs in Thanh My and Xuan Son Commune- Son Tay town, Hanoi city. Son Tay town is the gateway to the west of Hanoi with geographic coordinates latitude 210 North and 1050 East longitude, the center of Hanoi, 42km to the northwest.

b. Topography

13. Son Tay Town area terrain is relatively high and flat. The terrain of two communes Thanh My and Xuan Son of Son Tay town, where the project goes through, is relatively flat. However, the topography of the communes' terrain is higher than surrounding areas for about 4-10 m. Surface slope goes down to the southeast, the average slope is 1-2%.

14. The 110kV transmission line turned to 220kV Son Tay substation goes mostly over rice fields, planting crops with flat terrain. Diverters go through residential areas, communal roads and irrigation canals in Thanh My, Xuan Son communes with a total route length of 3.925 km.

c. Geography:

15. Based on the survey report of the design consultant who is JSC Power Consultants PACIFIC - The geological feature of the subproject consists of the following classes:

- *Class 18a: soft plastic state Clay (edQ).* 18a layer is distributed on the surface with a thickness of 3.0-4.0m. The composition of the soil is mostly clay yellow, blue gray, gray. Land is with status: Slightly tight, soft plastics, saturation.

- *Class 19a: hard plastic state mixed clay (edQ).* The layer 19a usually is distributed beneath 18a layer. The thickness is > 3.2m. The composition of the soil is mostly clay yellow, red spots, gray, mixed with dark brown laterite gravel. Land is with status: Slightly tight, hard plastic, saturation.

- *Class 18: Lightning semi-rigid state (edQ).* Class 18 is usually distributed on the surface with a thickness of 1.0-8.0m. Essential components of clay soil is yellow, red mottled yellow, blue, gray, mixed with dark brown laterite gravel. Land is with status: Tight fit, semi-hard, saturated.

- *Class 19: mixed clay semi-rigid state (edQ).* Grade 19 classes are usually distributed under 18, with a thickness of 6,5-7,0m. The composition of soil is mostly clay yellow, red spot gold, blue, and gray, mixed with dark brown laterite gravel. Land status: Tight fit, semi-hard, saturated (Table 6).

Table 6 Summary of mechanical indicators of the soil

TT	*Criteria*	*Symbol*	*unit*	*Layer 18a*	*Layer 19a*	*Layer 18*	*Layer 19*
1	Specific weight	ς	g/cm^3	2.71	2.73	2.76	2.73
2	Natural weight	γ	g/cm^3	1.75	1.85	1.81	1.86
3	Natural Humidity	w	%	37.0	28.4	27.4	26.9
4	Feel	B		0.53	0.28	0.07	0.18
5	Plasticity index	I_P	%	17.9	16.5	17.8	15.5
6	Saturation degree	G	%	89	86	80	85
7	Empty coefficients	ε		1.124	0.899	0.942	0.862
8	Friction angle	φ	Degree	$10^0$07	$17^0$02	$18^0$40	$20^0$09
9	Adhesive force	c	kG/cm^2	0.10	0.22	0.29	0.20
10	Subsidence compression ratio	a	cm^2/kG	0.047	0.032	0.031	0.031
11	Flow module of BD	E	kG/cm^2	63.6	146.5	153.1	205.8

(Source: Subproject justification document)

2. Climate

16. The climate of project area in Hanoi Capital is under the influence of the Northern region characterized by humid tropical monsoon, that is, hot and rainy summer, and cold and cloudless winter. From May to October, hot and humid climate is dominant with the average temperature of 28.4oC. From November to April of the following year, cold climate is seen with average temperature of 20.1^{o}C

a) Temperature

17. The average air temperature in the subproject area is: 32.4oC. The hottest month is 38,2oC. The coldest month: 16,4oC. Temperature range in about 12 - 13oC. Diurnal temperature ranges of about 6-7oC. The values of the average temperature from 2009 to 2013 are shown in Table 7.

Table 7 The average monthly temperature in Son Tay town during last 5 years (^{0}C)

Month / Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	18.9	18.4	22.2	27.3	31.1	32.5	32.1	32.0	31.5	28.9	24.7	22.2
2012	17.1	18.3	20.4	24.2	26.6	29.8	29.2	29.1	28.3	26.1	23.1	19.3
2013	16.2	14.1	20.2	24.3	27.8	27.8	25.2	23.1	24.3	25.1	23.1	20.3
2014	12.8	17.7	17.1	23.8	27.2	29.5	29.9	28.9	27.5	24.5	23.9	17.4
2015	16.2	16.8	17.5	30.9	36.8	38.2	37.5	34.6	29.6	26.2	24.2	19.5

(Source: Son Tay Hydro-meteorological station, 2015.)

b) Rainfall and Humidity

18. The rainy season in the Hanoi area occurs in the period from May to October. Months with the largest rainfall are usually July or August associated with tropical storm season in the Red River Delta. The smallest monthly rainfall is in February. The average rainfall from year to year is 1.639,9 mm. The largest monthly rainfall is 541.4mm in 2009-2013 periods (appearing in Aug 2013). Monthly and yearly rainfall average is shown in the Table 8.

Table 8 Monthly rainfall in Hanoi (mm)

M / Y	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2009	4.5	6.5	36.5	54.5	234.5	232.5	505.0	95.0	179.5	78.0	0.5	0.0	1427.0
2010	80.9	8.1	5.8	55.6	149.7	175.4	280.4	274.4	171.8	24.9	0.6	11.6	1239.2
2011	9.3	17.5	105.9	42.0	149.0	388.3	255.3	313.2	247.3	177.6	31.8	51.5	1788.7
2012	20.3	16.5	16.9	31.8	386.7	268.9	388.3	487.8	54.7	77.5	34.8	25.7	1809.9
2013	13.9	17.6	46.1	23.3	242.5	216.7	305.9	541.4	374.3	61.2	69.6	22.3	1934.8
Avg.	25.8	13.2	42.2	41.4	232.5	256.4	347.0	342.4	205.5	83.8	27.5	22.2	1639.9

(Source: Hydro-meteorological Documentation Centre - National Hydro-meteorological Center, 2013 and Hanoi Statistical Yearbook, 2013).

19. According to Hydro-meteorological Documentation Centre - National Hydro-meteorological Center, 2013 and Hanoi Statistical Yearbook, 2013, humidity in this area is subjected to seasonal variations; the highest values are in February and March when they can reach 90%. The lowest humidity, from November to January, is from 77% to 81%. The average moisture in the project area during the period from 2009 to 2013 is 79%.

C) Hydrological Regime

20. Project construction areas are affected by hydrological characteristics of the Red River. which has hydrological characteristics are as follows:

21. Red River is 5km from the subproject site on the northeast. River flows from north to south with a total length of 1,149 km, the basin area of about 143,700 km^2, average stream flow is: 2.650m3. The water velocity in flooding season: 400m/s and in dry season is 40m/s. The average high water level: 9,75m. The content of the silt annual deposits: 80-130 million m^3. Red River hydrological regime is divided into 2 seasons: flood season is starting in May to October; accounting for 70-80% of annual flow, the dry season lasts from November to April the following year, when the River has only 20-30% of the total flow rate of the year.

22. There are a few small ponds located around the subproject area about 200-500m. They are 1 pond located near Son Tay substation, 1 pond located at Tay Vi village, Thanh My commune, and 1 pond located at Nhan Ly village, Thanh My commune. In addition, at the subproject area a network of small irrigation canals exists for irrigation to serve the agriculture production and water drainage.

23. Groundwater in the area of project implementation with a depth of 0.0 ÷ 3.5 m. The water levels are relatively stable, erosion is taking weak (Ia).

4. The status of the physical environment in the subproject area

a. Air quality, Noise and Vibration

24. The ambient air quality in the project area and adjacent areas was monitored by the consultant. The air samples were taken one time at 4 locations for average one hour (Table 9).

Table 9 Air environment measurement sampling positions

No.	Symbol	Location	Coordinates
1	KK1	220kV Son Tây substations under construction	N: 21^0 07' 913'' E: $105^0$27'947''
2	KK2	Gate of Mr. Thuong house, Tay Vi Village, Thanh My commune	N: 21^0 07' 792'' E:$105^0$27'755''
3	KK3	End of lines (6 circuit diverter part) connected to the column VT 170 and column VT 122	N: 21^0 07' 208'' E:$105^0$27'815''
4	KK4	In areas when the line turned to 110kV Son Tay substations in Nhan Ly village, Xuan Son commune	N: $21^0$07' 235'' E:$105^0$27'368''

25. Samples are taken at the begging point, endpoint and several locations around the subproject construction in Thanh My and Xuan Son commune. These are the typical locations in air environment in and around the subproject area. From there, the comments and specific assessment of the current state of environmental baseline is assessed to provide measures to minimize the air environmental impact while conducting construction and operation of the Project.

The results of environmental air quality analysis is shown in the Table 10.

Table 10 The results of environmental air quality analysis

TT	***Parameter***	***Unit***	***Results***				***QCVN***
			KK1	***KK2***	***KK3***	***KK4***	
1	Temperature	^{0}C	17.9	18.2	18.7	18.8	**-**
2	Humidity	%	92.3	91.6	90.9	90.2	**-**
3	Wind velocity	m/s	0.3	0.4	0.6	0.4	**-**
4	Wind direction	-	Southeast	Southeast	Southeast	Southeast	**-**
5	Pressure	mmHg	761	762	762	760	**-**
6	Total suspended particle	µg/m^3	246	201	178	199	**300(*)**
7	CO	µg/m^3	9900	7800	6700	7000	**30000(*)**
8	NO_2	µg/m^3	135	128	114	120	**200(*)**
9	SO_2	µg/m^3	174	142	121	133	**350(*)**
10	Noise level	dBA	54.6	53.2	55.8	56.6	**70(**)**
11	Vibration	kV/m	KPH	KPH	0.7	KPH	**-**
12	Electric field	A/m	KPH	KPH	0.13	KPH	**-**

	intensity						

Note: (-) *No regulated level; KPH: Not detected*

- QCVN 05:2013/BTNMT: National technical regulations on ambient air quality (1 hour average)

- (*) QCVN 26:2010/BTNMT: National technical regulations on noise in common area

26. The result of the analysis of environmental air quality in the project area shows that the all concentrations were within the limits allowed by QCVN 05:2013/BTNMT, QCVN 26:2010/BTNMT. Thus, the atmosphere in the project area has no signs of contamination.

27. The implementation area of the subproject "110kV transmission line turned to 220kV/110kV Son Tay substation" belongs to Thanh My and Xuan Son Commune- Son Tay town, Hanoi city. Son Tay town is the gateway to the west of Hanoi with geographic coordinates latitude 210 North and 1050 East longitude, the center of Hanoi, 42 km to the northwest.

b. Soil quality

28. To assess the soil quality in the subproject area, three soil samples at subproject areas are taken (Table 11)

Table 11. Locations for soil sampling

No	***Code***	***Location***	***Coordinates***
1	D1	Agricultural land next to the Son Tay 220kV substations under construction	N: 21^0 $07'$ 911" E:$105^0$27'949"
2	D2	Soil in Mr. Thuong garden Tay Vi village Thanh My commune	N: 21^0 07' 648" E:$105^0$27'670"
3	D3	Soil in the Acacia hills near the end of the project (6 circuits turned line)	N: 21^0 $07'$ 317" E:$105^0$27'819"

29. The analytical results are shown in the Table 12:

Table 12 Analysis of soil quality in the subproject site

TT	***Parameter***	***Unit***	***Result***			***QCVN 03-MT:2015/BTNMT (Agricultural soil)***
			Đ1	**Đ2**	**Đ3**	
1	Zn	mg/kg dry soil	112.6	121.7	111.5	**200**
2	As	mg/kg dry soil	0.88	0.97	0.64	**15**
3	Pb	mg/kg dry soil	8.10	9.02	6.77	**70**
4	Cd	mg/kg dry soil	0.05	0.06	0.04	**1.5**
5	Cu	mg/kg dry soil	13.5	13.9	11.2	**100**
6	Lindane	mg/kg dry soil	KPH	KPH	KPH	**0,01(*)**
7	Aldrin	mg/kg dry soil	KPH	KPH	KPH	**0,01(*)**
8	Dieldrin	mg/kg dry soil	KPH	KPH	KPH	**0,01(*)**
9	DDT	mg/kg dry soil	KPH	KPH	KPH	**0,01(*)**
10	Endrin	mg/kg dry soil	KPH	KPH	KPH	**0,01(*)**
11	Heptaclor	mg/kg dry soil	KPH	KPH	KPH	**0,01(*)**

(Source: Institute of Environmental Science and Engineering (IESE), 2014)

Note:

- KPH: Not detected.
- QCVN03-MT: 2015/BTNMT- National Technical standards on permissible limits of heavy metals in soil.
- (*): QCVN 15:2008/BTNMT: National technical regulation on the pesticide residues in the soils

30. The analyzed results of soil quality in the subproject site in Table 12 show that soil quality at the survey location has no sign of pollution. The heavy metal parameters are within the permitted limits of QCVN 03-MT: 2015/BTNMT.

31. For residues of plant protection chemicals, the analysis showed no pesticide residues detected form Lindane, Aldrin, Dieldrin, DDT, and Heptaclor ENdrin in all 3 analyzed samples.

Thus, soil environmental quality is good in the subproject area, which facilitates the process of construction and operation of the subproject.

4. Surface water/groundwater resources and quality

a. Surface water

32. To evaluate the quality of surface water at the subproject area, 03 samples of surface water in the subproject areas were taken. Sampling locations are shown in the Table 13.

Table 13 Water quality sampling location

No	*Code*	*Location*	*Coordinates*
I	**Surface water**		
1	NM1	Pond next to 220kV Son Tây substation, which is under construction	N: 21^0 07'947" E: $105^0$27'054"
2	NM2	Pond in front of Mr. Thuong house at Tay Vi village, Thanh My commune,	N: 21^0 07'627" E:$105^0$27'670"
3	NM3	Pond at Mr. Bay house Nhan Ly village, Thanh My commune	N: 21^0 07'294" E:$105^0$27'391"

33. The analyzed results of 03 samples of surface water are shown in Table 14

Table 14 The results of analysis of environmental quality of surface water

No.	*Parameters*	*Unit*	*Results*			*QCVN 08:2015/BTNMT (column B1)*
			NM1	**NM2**	**NM3**	
1	pH	-	6,9	6,9	6,8	**5,5-9**
2	DO	mg/l	5,0	5,3	5,4	**≥4**
3	TSS	mg/l	48,3	50,7	51	**50**
4	COD	mg/l	25,6	29,1	29,8	**30**
5	BOD_5	mg/l	14,1	15,8	15,4	**15**
6	NH_4^+	mg/l	0,31	0,50	0,46	**0,9**
7	NO_2^-	mg/l	0,01	0,03	0,02	**0,05**
8	NO_3^-	mg/l	3,41	3,51	3,48	**10**
9	Fe	mg/l	0,34	0,38	0,37	**1,5**
10	Zn	mg/l	0,012	0,016	0,015	**1,5**
11	Hg	mg/l	KPH	KPH	KPH	**0,001**
12	Pb	mg/l	KPH	KPH	KPH	**0,05**
13	As	mg/l	0,001	0,002	0,002	**0,05**
14	Total Coliform	MPN/100ml	5600	6900	6400	**7500**
15	Grease and oil	mg/l	18	24	22	**1**

Note: (-) *No regulated level; KPH: Not detected*

QCVN 08:2015/BTNMT: National Technical Regulation on Surface Water Quality

Column B1: For water used for irrigation purposes or other uses that require the same water quality or intended uses as described in B2.

34. Based on the analysis results, it can be assessed that almost all of the analyzed parameters are within the limits permitted by QCVN 08:2015 BTNMT. However BOD5 exceeded the permitted limit from 1.02 to 1.05 times (at NM2, NM3). Grease and oil exceeded the permitted limit from 18 to 24 times (at NM2, NM3). The cause may be due to the pond is a source receiving wastewater and storm water runoff from areas that have not been thoroughly treated.

b. Ground water

35. To evaluate the quality of ground water at the subproject area, 02 samples of ground water in the subproject areas were taken. Sampling locations are shown in the Table 15.

Table 15 Ground Water quality sampling location

No	**Code**	**Location**	**Coordinates**

No	Code	Location	Coordinates
1	NN1	Drilled well of Mr. Thuong house in Tay Vi village, Thanh My commune, under the power grid corridor	N: 21^0 07'647" E: $105^0$27'668"
2	NN2	Drilled well of Mr. Bay house in Nhan Ly village, Thanh My commune, under the power grid corridor	N: 21^0 07'294" E:$105^0$27'391"

36. The results of groundwater quality analysis of 02 samples are shown in Table 16

Table 16 The results of analysis of ground water quality

TT	*Parameters*	*Unit*	*Results*		*QCVN 09:2015/BTNMT*
			NN1	**NN2**	
1	pH	-	5,8	5,7	**5,5-8,5**
2	Hardness	mg/l	260	254	**500**
3	Total solid	mg/l	670	660	**1500**
4	NH_4^+	mg/l	0,08	0,06	**1**
5	NO_3^-	mg/l	6,41	6,32	**15**
6	NO_2^-	mg/l	0,4	0,3	**1,0**
7	Fe	mg/l	5,21	5,10	**5**
8	Mn	mg/l	0,58	0,54	**0,5**
9	As	mg/l	0,04	0,03	**0,05**
10	Zn	mg/l	0,08	0,06	**3,0**
11	Cd	mg/l	KPH	KPH	**0,005**
12	Cu	mg/l	0,80	0,71	**1,0**
13	Pb	mg/l	0,002	0,001	**0,01**
14	Hg	mg/l	KPH	KPH	**0,001**
15	Total Coliform	MPN/100ml	2	1	**3**

Note:*" (-): unregulated, undetected; (KPH): undetected*

QCVN 09:2015/BTNMT-National Technical Regulation on groundwater quality

37. The results show that most of the analyzed parameters are within the permitted limits of QCVN 09:2008/BTNMT. However Fe content exceeds permissible limits from 1.02 to 1.04 times Thus, the appropriate treatment measures should be applied for iron reduction if this ground water is used as raw water for water supply station

B. Biological Environment

1. Vegetation and Land Use

38. Vegetation. Based on actual survey process, the current state of biological resources in the subproject area can be described as follows:

- Terrestrial flora: The flora is typical for plain land, which includes mostly argicultural crops, fruit trees, growing rice and vegetables of the surrounding population. Agricultural crops include: rice and vegetables including corn, potatoes, cassava etc. Households fruit includes banana, sapodilla, jackfruit, longan etc. Forest production species includes acacia, bamboo, eucalyptus etc.
- Terrestrial fauna: Animals in the subproject area are only insects such as worms, butterflies, ... some amphibians such as frogs, clones, toads, and animal farming in the households such as: dogs, cats, pigs, chickens, ducks etc.
- Aquatic ecosystem (include both flora and fauna) in rivers and lakes in the project area include phytoplankton, algae such as diatoms, green algae, duckweed. Also in aquatic ecosystems are submerged trees, phragmites, shrubs around the banks... Aquatic fauna species include fish, shrimp, crabs, snails etc. Zooplankton includes thyroid groups, zoo benthic crabs, snails, clams group as mussels... bivalve mollusks, gastropods, mollusks, crustaceans, shellfish, aquatic insects, fish... Large part of river organisms concentrate on river bed and around banks to have shelter with more mud organic residue and to avoid strong currents.

39. Land use: total natural land area of 2 communes in the subproject is 24.03 km2, which consist of mainly agricultural land. Total land area permanently acquired by the subproject is 4,527.2 m2, and temporarily acquired land for construction is 68,810m2. The permanently acquired land is used for the construction tower foundations, which are primarily agricultural

land, partly fruit garden. The area occupied temporarily and for RoW is agricultural land as well. Land in this area is mainly hilly land, planting rice and vegetables.

2. Wildlife

40. No significant wildlife occurs any longer within the area. There are no animals that could interfere with or have impact on the subproject site.

3. Conservation areas

41. There are no conservation areas within the proximity of the subproject site.

C. Socio-economic conditions

1. Population

42. The subproject site situates in 2 communes Thanh My, Xuan Son of Son Tay town.

43. Thanh My has a total natural land area is 10.7 km^2 with 2,751 households composed of 10,865 persons. Thanh My Commune is divided into nine (09) hamlets and two (02) residential groups. About 65% of the commune population is engaged in farming and livestock husbandry whereas the others are government officials, the retired, and those who are engaged in small business and services.

44. Xuan Son Commune is 4 km to the West from the center of Son Tay Town. The total natural land area of the commune is 13.33 km^2. The commune is divided into 13 hamlets with 1,288 households composed of 6,057 persons. About 80% of the commune population is engaged in agriculture, mainly growing rice and vegetables.

2. Local Economy

45. Thanh My commune: The total income of the commune in 2015 is 312.1 billion dong, including 199.3 billion dong from business, trade and other income sources; followed by 112.8 billion dong from agriculture-forestry-fishery. The annual per capita income is 29.2 million, increasing by 4.4 million dong compared to the income level in 2014. By the end of 2015, the commune has a total 40 households whose incomes are below the poverty line, accounting for 1.45% and 15 households who are classified as near-poor, making up 0.54%.

46. Xuan Son commune: The average revenue of the vegetable planting is 94.5 million per hectare. In 2015, the productivity of agricultural products is estimated at 113.228 tons on the cultivated area of 611.482 ha. The contribution to the state budget in the first 10 months of 2015 is 8,461,174,407 dong, which assures adequate spending on salaries and regular activities of the commune. The per capita income is 25.5 million, increasing by 2 million compared to the income level in 2014. By the end of 2015, the commune has a total 26 poor households (2.01%).

3. Social Infrastructure

a. Public Health and Sanitation

47. The subproject site is located in Son Tay town, a distance of 43 km to the central area of Hanoi. It means that good access to social services from local to central level is secured. In the subproject area, each commune has one clinic with one doctor and five nurses As reported by the CPCs, the health facilities are guaranteed for the prevention and primary health care for local residents.

48. Statistical results of the Xuan Son and Thanh My commune show that in recent years, investment by the state of medical equipment, the proportion of people to health care at the health station has been increased. However, the medical work is mostly for some common diseases such as flu, fever, sore throat, etc. The seriously ill patients are transferred to the upline Son Tay hospital or several central hospitals in Hanoi.

49. Due to good disease prevention, no epidemic disease has been occurred in recent years

50. Environmental hygiene has always been paid a great attention in these two communes: Thanh My commune and Xuan Son have established teams of garbage collection in the village. Garbage collected by the Urban Environment Company is transported daily to landfill site.

b. Education

51. There are one nursery school, one primary and secondary school in each commune of Xuan Son and Thanh My. The universal primary education was completed long ago, the commune is currently working towards universal secondary education for pupils in the commune

52. A survey conducted by social team regarding education level of affected household revealed that the majority of the household heads are secondary school graduates, representing 74% of the surveyed. By sex, 72.9% of the male household heads and 77.8% of the female heads finished secondary school. The household heads with primary education represent 13%.

The percentage of household heads with high school education is small, only accounting for 13% of the respondents. No household head had university level.

c. Communications

53. The subproject area is covered by post stations; many telephone networks as Viettel and VNPT telecommunications, and a number of other telecommunications companies. Internet services are very common and convenient in the area.

d. Water supply, electricity and transport

54. Water supply. Households in the subproject area get water from two main sources: well water and rain water. Drilled well water is still a fairly common supply for production and animal husbandry. About 93.5% (43 households) of the affected households in the subproject communes draw water from wells while 6.5% (3 households) use tap water for cooking and drinking purposes. Currently in the project area and the surrounding areas have mains water supply from Son Tay water plant with capacity of 20,000 m^3/day. This is main source of water supply in the region is, but there are still some households use self-purified water wells. The simple treatment does not ensure water quality according the Ministry of Health Standards

55. Drainage. In the subproject area, drainage system has been fully constructed; fully meet the demand for water drainage and nearby areas. Storm water drainage systems naturally follow to the irrigation canals and some of the local's pond.

56. Power supply. Ha Noi currently has 7 electric stations and 200kV and 500kV lines, 23 10-kV electric downloading stations. Levels of 35, 10, and 6kV are gradually shrunk, and levels of 22kV/ 0.4kV are retained. A 22kV line in urban and neighboring areas is designed. The subproject area has been supplied electricity from 110 KV Son Tay substation.

57. Transport. Existing transport network in the subproject area is mainly rural roads, inter-communal and some earth roads and canal road. The inter-village has been concreted, approximately 2.55 m wide road surface, good quality roads. No technical infrastructure is present the on route. Parallel to the subproject area is planned Ring Road 5 (running parallel to the start line from Son Tay to 220kV points A2, B2), Provincial Highway 413 runs through Xuan Son, Thanh My communal and district roads create favorable conditions in the process of project implementation.

e. Cultural and Heritage Sites.

58. The subproject belongs to the former Ha Tay province, which is a region rich in cultural history and scenery. Some famous sites include Perfume Pagoda, Thay Pagoda, Dau Pagoda, Tay Phuong Pagoda, Tram Gian Pagoda, Ba Vi National Park, scenic spots such as Suoi Tien, Suoi Mo, Ao Vua – Khoang Xanh, Suoi Hai, Dong Mo,etc.

59. Around the subproject area are: (i) Three Trees Temple in Yen My village-Thanh My commune located approximately 400m to the north from the subproject beginning (220kV Son Tay substation); (ii) Linh Son Tu Temple in Tay Vi village-Thanh My commune located about 200 meters and the Linh Son Pagoda in Nhan Ly village- Xuan Son commune located about 300m from the subproject construction site. These are sensitive subjects may be affected directly and indirectly from the subproject construction. However, given the fact that the transmission line traverses mostly agricultural land. It is confirmed that the project implementation will not have any impact on these sites.

60. A list Cultural and Heritage Sites and sensitive infrastructures of nearby sites are presented in Table 17.

Table 17 Sensitive receptors surveyed around the subproject site

No	***Sites***	***Distance to the subproject area***
1	Three Trees Temple at Yen My village-Thanh My commune	400m
2	Linh Son Tu Temple at Tay Vi village-Thanh My commune	200m
3	Linh Son Pagoda at Nhan Ly village- Xuan Son commune	300m
4	Primary school, pre-schools Thanh My commune	1200m
5	Thanh My commune health station	1200m
6	My Thanh Secondary School of Thanh My commune	6500m
7	Vietnam - Hugaria Industrial University	7000m

(*Source: Subproject IEA, 2015*).

4. UXO Clearance

61. After decades of war, the UXO is considered as a significant issue in Vietnam, as well as in Hanoi. To identify the need to conduct UXO removal requirement, HANOI DPMB has sent the official letter to Hanoi Capital City Commander regarding the need of UXO clearance. The Hanoi Capital Commander has sent the Decision No. 1077/QD-BTL dated 19 May 2016 regarding UXO requirement for an area of 2 ha of the subproject area.

5. Subproject affected people

a. Affected households

62. The subproject is to be implemented over a relatively wide area. The total affected land area is 151,257 m^2, comprising 4,527.2 m^2 of permanently acquired land, 77,919.8 m^2 of restricted land within ROW, and 68,810 m2 of temporarily affected land.

63. 55 households will be affected by the subproject; out of which, 26 households with 112 persons will be affected by permanent land acquisition. Details of affected households (AH) by category are summarized in the following Table 18.

Table 18 Number of subproject affected households by category

No	*Type of impact*	*AHs*	*AHs losing 10%*	*Relocated AHs*	*Business AHs*	*EM AHs*	*Vulnerable AHs*	*Total AHs*	*Total APs*
I	**Construction of new connection line**								
1	Permanent	26	0	0	0	0	5		112
2	Temporary	285	0	0	0	0	0		1,197
3	Restriction	144	0	0	0	0	0		642
II	**110 kV connection line to 110 kV Phuc Tho SS**								
1	Temporary	176	0	0	0	0	0		757
III	**Acquisition of some towers and 110 kV Xuan Mai-Son Tay TL**								
1	Temporary	53	0	0	0	0	0		223
	Total	***455***	***0***	***0***	***0***	***0***	***5***	***0***	***1,951***

(Source: IOL and SES data -Feb 2016);

b. Permanent land acquisition

64. The tower foundations of the connection lines connecting to 220 kV Son Tay SS shall acquire 4,527.2 m^2 of land located in two (2) communes, affecting a total of 26 households. By land classification, 444.5 m^2 are residential land (9.8%) and 4,082.7 m^2 are agricultural land (90,2%). Of the total 4,082.7 m^2 of agricultural land, 2,624 m^2 is rice growing area and 1,458.7m^2 is annual crop land (Table 19)

Table 19 Use of Permanently Acquired Land for Tower Foundations

No.	**Commune**	**Permanent land acquisition (m^2)**									
		Total		**Residential land (m^2)**		**Agricultural land (m^2)**					
						Total acquired agricultural land		**Rice growing land (m^2)**		**Other annual croplands (m^2)**	
		HH	Area	HH	Area	HH	Area	HH	Area	HH	Area
1	Thanh My	16	2,661.2	3	444.5	13	2,216.7	3	758.0	10	1,458.7
2	Xuan Son	10	1,866.0	-	-	10	1,866.0	10	1,866.0	-	-
Total		***26***	***4,527.2***	***3***	***444.5***	***23***	***4,082.7***	***13***	***2,624.0***	***10***	***1,458.7***

(*Source: IOL data (Feb 2016))*

c. Temporary land acquisition

65. The temporary land acquisition occurs during subproject implementation due to the requirement for temporary access of vehicles that will deliver pre-fabricated steels, equipment, cables, utilities, etc. during the construction of the substation and during the construction and stringing of the towers. According to the Impact of Lost survey results, a total 68,810 m^2 belonging to 285 households shall be affected temporarily due to construction activities. Of the total, two new construction components will cause temporary impacts on 30,562 m^2 of 56 households; the stringing on the existing towers will cause impacts on 30,588 m^2 of rice-growing

land belonging to 176 households whereas the acquisition of towers for the 110 kV connection line to Xuan Mai will cause temporary impacts on 5,660 m^2 of 53 households in Xuan Son Commune. The details of temporary impacts on land are presented in the Table 20.

Table 20 Temporary Impacts on Land by component

No.	***Commune***	***Temporary impacts during construction***					
		Total		***Rice growing land (m^2)***		***Other annual croplands (m^2)***	
		HH	Area	HH	Area	HH	Area
I	**Construction of new connection lines**						
1	Thanh My	39	21,546.2	21	12,034.2	18	9,512.0
2	Xuan Son	17	9,015.8	17	9,015.8	-	-
II	**Stringing of the 110kV connection line to 110 kV Phuc Tho SS**						
1	7 communes/ward	176	30,588.0	176	30,588.0	-	-
III	**Acquisition of some towers and 110 kV Xuan Mai-Son Tay TL**						
1	Xuan Son	53	7,660.0	53	7,660.0		
Total		***285***	***68,810.0***	***267***	***59,298.0***	***18***	***9,512.0***

(*Source: IOL data Feb 2016)*)

66. A big percentage of temporarily affected area is annual crop land, accounting for 30,562.0 m^2, followed by lands for growing perennial crops is 9,512 m^2 of 18 HHs and paddy lands 21,050 m^2 of 38 HHs. The civil contractors will pay for any damaged crops or income loss arising from the inability of AHs to plant their crops during the temporary use of their lands. In addition constructors will restore those temporarily affected lands to the original conditions before returning to the landowners. EVN HANOI will ensure that this condition is stipulated in the working contract of the civil works with contractors.

6. Additional features of 110 kV Transmission line turned to 220 Son Tay substation

67. 110 kV Transmission line turned to 220 Son Tay substation will be constructed mainly in agricultural land agricultural land for rice and vegetation crops and far from residential areas (Figure 3).

220kV Son Tay substation under construction

220kV Son Tay substation under construction

Contiguous area between 220kV substation and location of the first 110kV tower of the sub project

The agricultural land under ROW

The existing 220kV line, which the newly built 110kV transmission will runs parallel with in a distance of about 100m

The agricultural land under ROW

Field visit to assess the line direction

The road to the construction site of feeder column from 220kV substation

Figure 3. Views of subproject area

VI. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATIONS

68. The assessment of potential impacts of the subproject is structured by the three development phases of the subproject defined by: pre-construction; construction; and operational phase. The potential impacts and mitigation measures of the each phase is discussed separately. This structure carried forward and also used to structure the EMP for the subproject.

A. Subproject Benefits

69. The primary targeted benefits of the subproject 110 kV transmission line turned to 220kV Son Tay substation'' be made to the following objectives:

- Improving the electricity grid development planning of Hanoi in 2011-2015 with a vision to 2020";
- Supplying Power for the entire town of Son Tay, the industrial zones along the Lang - Hoa Lac, the Ba Vi, Thach That , Phuc Tho, Hoai Duc, part Xuan Mai town, in addition to support for the province Phu-Tho.
- Ensuring power supply long-term stability and reliability for social-economic development of Son Tay town- Hanoi city and surrounding provinces.
- In accordance with the planning and economic efficiency in investments and operational grid for the entire region.
- Enhance the stability and safe operation of the grid.

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

70. The main impacts of this phase are incurred from permeant and temporary land acquisition; vegetation cover clearance where needed along TL and at SS site and ground clearance. The potential impacts include dust, noise, emissions, biomass from the vegetation clearance activities and domestic and construction waste. Other indirect impacts include increased traffic vehicles, the residence of workers; labor safety incidents and community safety.

1. Land acquisition and compensation

71. Impacts

According to social survey, the tower foundations of the transmission lines turned to 220 kV Son Tay SS will acquire 4,527.2 m^2 of land located in two (2) communes, affecting a total of 26 households. In addition, about 77,919.8 m² of land belonging to 144 affected households (PAHs) in the ROW are impacted by safety restriction imposed on their continued use. All of these lands are residential land and annual croplands. Regarding temporary impacts, according to the Inventory of Lost results, a total 68,810 m^2 belonging to 285 households shall be affected temporarily due to construction activities.

The permanently and temporarily acquired land for construction on two new transmission lines is presented in Table 21

Table 21 The permanently and temporarily acquired land for construction on two new transmission lines

No	***Commune***	***Permanently acquired land (m^2)***		***Temporarily acquired land for construction (m^2)***		***Land type***
1		Households	Area	Households	Area	
2	Thanh My	16	2,661.2	39	21,546.2	Residential land and agricultural land
3	Xuan Son	10	1,866.0	17	9,015.8	Agricultural land
5	**Total**	***26***	***4,527.2***	**56**	***30.562.0***	

The permanently and temporarily acquired lands are mainly agricultural land. This would affect the agricultural production and income of affected households, especially for households with permanently acquired land. However, the average permanent land lost of one household is only about 170 m^2. Given the fact that these two communes are located in the area where the average land area of each household is quite big i.e 3889 m^2 in Thanh My (10.7 km^2/2751 HH) and 10349 m^2 in Xuan Sown (13.33 km^2/1288 HH), the impact of land lost area would be small. The social and economic loses/impacts from land acquisition has been analyzed in detail in the Resettlement Plan prepared separately for this subproject.

Temporary land acquisition for stringing of the 110kV connection line to 110 kV Phuc Tho SS and for some towers of 110 kV Xuan Mai-Son Tay TL is presented in Table 22.

Table 22 Temporary land acquisition for stringing of the 110kV connection line to 110 kV Phuc Tho SS and some towers of 110 kV Xuan Mai-Son Tay TL

		Total Rice growing land (m^2)	
		Households	Area
I	**Stringing of the 110kV connection line to 110 kV Phuc Tho SS**		
1	7 communes/ward	176	30,588.0

II	**Acquisition of some towers and 110 kV Xuan Mai-Son Tay TL**		
1	Xuan Son	53	7,660.0
Total		***229***	***38,248.0***

(Source: Subproject Resettlement Plan, 2016)

The main-structures and sub-structures within the safety corridor with limited utility are listed in Table 23.

Table 23 The main-structures and sub-structures within the safety corridor

Main-structures within the safety corridor with limited utility					
No.	***Commune***	***Infrastructural types***	***Unit***	***Household***	***Area***
1	Thanh My	2-storey solid house	m^2	3.0	502.0
2		1-storey solid house	m^2	3.0	173.0
3		Grade 4 house	m^2	13.0	722.0
Total				***19.0***	***1,397.0***
Sub-structures within the safety corridor with limited utility					
1	Thanh My	Kitchen	m^2	15.0	750.0
2		Pig stand	m^2	12.0	338.0
3		Warehouse-workshop	m^2	3.0	145.0
Total				***30.0***	***1,233.0***

(Source: Subproject Resettlement Plan, 2016)

72. 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;

- The project owner (Hanoi EVN) should inform affected persons ahead on the subproject implementation and participated in acquisition and inventory of land, consulted in compensation assistance
- The project owner (Hanoi EVN) should 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.
- The project owner (Hanoi EVN) should comply with the regulations of the Electricity Law, the Decree No. 14/2014/ND-CP and relevant regulations.
- The project owner (Hanoi EVN) should 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.
- The design consultant should design of tower height to minimize impacts due to crops and trees clearance.
- Constructor should construct completely each work item to minimize the duration of temporary land use for the project construction.
- The project owner (Hanoi EVN and CPC coordinate to address people's claims/grievances relating to compensation.
- Project owner/constructor should inform local people the date to take agricultural land over, so that they arrange harvesting their crops.
- Constructor should protect trees and vegetation during land clearance process, only cut tree within designated area.

2. High risk of negative impacts due to inappropriate construction site arrangement

73. Impact: The construction site arrangement is very important regarding environmental impact reduction. The inadequate site arrangement can affect surrounding natural and social environment. There are several impact sources such as:

- Temporary storage of construction material and waste;

- The arrangement of material transportation and storage facilities.
- Stockpile and material gathering at the site can cause temporary acquired land and affect people living near the site because of the movement of vehicles in and out the stockpile, and dust around the gathering site.

74. Mitigation measures: Construction site arrangement includes,

- Before starting the civil work, the contractors need to prepare SEMP which will detail the mitigation measures on the site and be approved by Hanoi DPMB;
- Selection of disposal site: The HANOI DPMB will require civil contractor to prepare a disposal plan. Based on this disposal plan, civil contractor will be responsible for contracting with specialized unit (e.g. Hanoi Urban Environment Company Limited) to collect, transport and dispose the refused excavated materials to the permitted disposal site. The proposed disposal site for construction material (272.28 m^3, equivalent 435.648 tons) and domestic solid waste is Xuan Son landfill in Son Tay Town
- Selection of transportation route: The Contractor will consult with local authorities and design engineers in preparing Transport Management Plan, and selection of the most appropriate transportation route for transportation of equipment and materials to reduce negative impacts.
- The 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, potential air and water pollution.
- Contractors will obtain the license for safety and environmental requirements of mobilized machines and vehicles.

3. UXO Clearance

75. Impacts: According to the confirmation letter of the Hanoi Capital Commander No. 1077/QD-BTL dated 19 May 2016 regarding UXO requirement for an area of 2 ha. It means that in the project area, UXO may still exist. Thus, if not implement UXO clearance, it may cause risks of worker's and people's life when conducting the project construction. The expected time for UXO clearance is the third quarter 2016 (Appendix C)

76. Mitigation measure: The proposed guidance for UXO clearance is as follows:

- Engage an authorized UXO clearing contractor, 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 0.3m
  + 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 is 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
- Ensure that the contractors shall only commence site works after the UXO clearing agency has certified that the project areas are already been cleared.

C. Potential Impacts and Mitigation Measures during Construction phase

77. The potential environmental impacts of the subproject are associated primarily with the construction phase of the subproject. These impacts and mitigation measures on the different environmental aspects are described bellows:

1. Potential impact of construction activities

a. Tree cutting and site clearance

78. Impacts: In the transmission lines project, the tree with the height over 4m must be felled down and replaced by the ones with a smaller height. Also, in the acquired land area, the whole system of vegetation (mainly rice and vegetables and some other agricultural crops) will be cleared to serve the project construction process.

According to initial calculations, the total volume of biomass plants needed to be clearance is about 469.91 tons. This type of solid waste with biodegradable characteristics should be collected and processed, otherwise it will be sources of pollution of land, water and air, especially can be sources of microorganisms pathogens by the decomposition of organic matter created.

79. Mitigation measures

- Constructor will 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.
- Constructor will arrange construction after harvest to reduce impact on people's production and reduce temporary acquisition time.
- The PO in coordination with the local authorities to monitoring the tree cut down and clearance for subproject construction. Constructor can only cut down the tree or clearance of vegetation within the ROW, tower foundation and trees that would affect wire puling process
- Cut trees will be collected by Thanh My and Xuan Son environmental sanitary team and transported to a regulated location

b. Air quality and noise

80. Impacts: Dust, exhausts and noise generated by machines', equipment's and transportation means' activities; soil excavation of tower foundation pits of the overhead TL section, uninstallation of old transmission line section will impact on ambient air environment. The receiving objects are rural scattered residential areas and agricultural fields of Thanh My and Xuan Son communes. However, do to spread-over construction activities implemented in large rural area, these impacts are small, temporary and short-term. The sources and magnitudes of impacts are describes as follow:

- Dust generated by soil excavation of tower foundation pits of the overhead TL section, uninstallation of old transmission line and transportation of construction materials and waste.

The calculation from EIA report showed that:

Dust generated from newly tower foundation excavation. Total volume excavated soil generated during project construction for 19 pole foundations is 4,042.654 m^3. The locations of 19 poles are situated on agricultural land. Thus, the vegetation cover and soil amount excavation as well as environmental impact are the similar. The majority of excavated soil will be reused for leveling construction site. Total dust emission has been calculated about 2.22 kg. Based on construction activities time of the project, the amount of dust generated by this process has an average of 0.074 kg / day (as the 8-hour / day).

Dust generated from uninstallation of old transmission line. Total volumes of concrete, steel arise during demolition of 9 old pole foundations are: 272.28 m^3 of concrete and 21 924 kg steel. The amount of dust generated during demolition of 0.07 kg / day, Total volume of soil to use for back-filling 09 pole foundations after demolishing the old poles is 898,7m^3, Dust emission is about 0:05 kg / day.

Dust generated from transportation of construction materials and waste. The volume of raw materials and equipment to be transported around 4253.9 tons. The volume of concrete from demolition of pole foundations is transported to Xuan Son landfills is: 272.28 m^3, equivalent 435.648 tons (specific weight of concrete is 1.6 tons/m^3). During the transport of construction materials from the supplier to the construction and transportation of waste to the dump site area Xuan Son Commune, Son Tay town generated dust can cause impact on the environment and

public health. Calculation results of the EIA report showed that the total volume of dust generated in the process at about 0.744 kg of dust / day.

If the calculated dust emission released into the environment, it will affect the environment around the project construction area as well as along the transport route from the Son Tay town to the construction site and from the site to Xuan Son landfill. The impact will also directly affect the 20 construction workers involved in construction activities, and indirectly affect residential areas of Thanh My Xuan Son as well as a number of sensitive areas near the subproject (Linh Son Tu Temple, Ba Cay Temple etc.)

Dust affects humans and animals mainly through the respiratory tract, such as pneumonia, asthma, tuberculosis; and affects plants by reducing the ability of photosynthesis and growth and development. However, the actual dust generated in this process is often large size which cannot spread widely. Besides, the roads have been concreted, transportation of materials should be shielded dust incurred are reduced. Therefore the scope of influence is not large.

Exhausts such as NOx, SO_2, CO generated by transportation means' activities and construction machines' and equipment's,

The level of emissions during this period is subject to high fluctuated; it depends on the speed of vehicles, construction activity intensity, temperature, wind direction and speed in the region, soil moisture and air temperature during the day.

The transportation means use mainly gasoline and diesel oil. During the operation, the fuel is burned and it will emit fumes sizeable amount contained air pollutants such as TSP, CO, CO_2, SO_2, NO_x, VOC to the surrounding environment. Vehicles used in the transportation of construction materials are diesel engine truck from 3.5 to 16 tons. Based on calculation of EIA report, the calcuated concentrations of pollutants of transportation means at different distance, show that the concentration of pollutants decreases with distance (with any wind speed does), the highest in a generation sources 10 - 50m, concentrations of SO2, dust , CO approximate allowable limit of QCVN 05: 2013 / BTNMT. However, the concentration of NOx at a distance of 10 - 50 meters, the wind speed u = 1.7 m / s exceeded the allowed limit of about 1.031 to 1.072 times. This may caused by the operation of many machineries at the same time or machineries with high exhausted gases. Nevertheless, the within the distance from 10-50 m of construction sites are mainly agricultural lands, therefore the impact of gasses on the residential area is negligible. The concentration of pollutants in the distance from 100 - 500m are small more than the allowed limit of QCVN 05: 2013 / BTNMT. Therefore, exhausted gases from transportation of construction of material and waste will not severely affect to air environmental quality at distance from 100-500 m.

Noise generated by construction and transportation activities:

Noise will be generated by activities of machines, equipment and means such as truck, bulldozer, excavator, etc. According to calculation results, noise generated by these machines, equipment and means will reduce lower than the allowable limit (70dB) at the distance of above 200m. The subproject area is almost far from the crowded residential areas. In addition the machines, equipment and means will be only operated in the day time, to avoid disturbing rest time of local people at night. Thus, noise impact is insignificant and short term. It impacts only on some households living along transport roads and near the construction site within the distance of 200m.

Attention should be made at Thu Trung village –Thanh My commune, where the nearest residential area is approximately 5 - 10 meters from the construction site. Thus, the noise component would affect residential areas. However, during the construction, all machinery and equipment would not work at the same time; the noise level generated is less than calculated. Therefore, the impact on the surrounding residential area is somewhat mitigated.

81. Mitigation measures

- Water need to be sprayed at the construction sites located along the transport roads crossing residential areas of Thanh My and Xuan Son communes to minimize dust when/where dust is visible. Constructor shall not need to spray water at poles located at agricultural land or far from residential area. However, constructor still must obey other mitigation measures for dust prevention especially during transportation process.
- All vehicles used for construction, and equipment and machines emitting noise, exhausts, fume need to be maintained properly to minimize emission, and not allowed to be operated at night in the construction sites and along transmission line to minimize noise.
- Contractors will ensure that transportation means, machines and equipment must have effective certificate of environmental standards achievement (QCVN 04: 2009/BGTVT and

QCVN 05: 2009/BGTVT) issued by the register department before using for the subproject construction.

- The trucks transporting demolition waste, excavated soil as well as construction materials (e.g., sand, gravel, and stone) must be covered by canvas
- Temporary stockpiles/storage yards of sand, macadam at tower locations must be covered, and make embankment surrounding the pile foot to prevent dust and erosion.
- According to the technical document and Vietnamese EIA, Temporary dump is ≤ 1.5m in height convenient for shielding, avoiding erosion when rain, causing congestion and pollution of surface area. The most feasibbe mitigation measue is that the dump is surrounded by geotextile, buried deep into the ground about 15-20 cm and supported by pile's pins.
- Reduce excavation and filling duration time by concentrating workers working at one location. When finish excavation and construction, and excavated soil will be used to fill as soon as possible to reduce dust emission.
- Only operate equipment, machines and vehicles causing large noise at day time.

c. Water quality

82. Impacts: The water pollution sources causing impacts on water environment include i) discharged wastewater from workers' camps; and ii) wastewater from maintenance activities of construction machinery and iii) Oil, grease and solid waste. The water bodies are scatter located along the transmission line that include small pond, irrigation canals as well as rice fields. Those water sources are served only for irrigation or aquaculture purposes, but not used as raw water for water supply or human daily activities, therefore the required water quality is not high (QCVN 08/BTNMT/2015 column C)

Domestic wastewater

Domestic wastewater is generated by worker's life activities. During the construction phase, the subproject employs about 20 technicians and workers, with the water level at this stage is 60 liters / person / day (Source: Section a, Clause 1, Article 39 Decree 80/2014 / ND-CP). The workers do not live and eat in the camps, the amount of water for domestic supply in the construction sites is mainly used for sanitary purposes.

Total flow water supply: 20 x 60 = 1,200 liters / day. The wastewater is counted for 100% of water supply, the wastewater volume is: 1,200 x 100% = 1,200 liters / day = 1.2 m^3 / day.

From the ratio of pollutants in wastewater and the wastewater flow we can calculate the concentration of pollutants in the waste water proposed to be collected from workers' camp in the construction phase. The resultsare shown in the Table 25:

Table 24 Domestic wastewater pollution in the Subproject area

Pollutants	***Pollutant load (g/day)***	***Discharge volume (l/day)***	***Average concentration (mg/l)***	***QCVN 14:2008/BTNMT (Column B)***
BOD_5	450 – 540	1200	375 – 450	50
COD	720 – 1030		600 – 858,3	-
TSS	700 – 1.450		583 – 1.208,3	100
NO_3^- (Nitrate)	60 – 120		50 – 100	50
PO_4^{3-}(Phosphate)	6 – 45		5 – 37,5	10
Ammoniac	36 – 72		30 – 60	10

(Source: Project's EIA report)

The results of the above table show that the pollution parameters exceeded the allowed limit of QCVN 14:2008 / BTNMT (column B). The indicators have reached the highest levels since BOD_5 exceeded 7.5 to 9 times, TSS exceeded from 5.83 to 12.08 times, ammonia exceeded from 3-6 times, PO_4^{3-} exceeded 3.75 times, and NO_3 exceeded 2 times.

Domestic wastewater with high levels of impurities, many pathogenic microorganisms, if not treated when discharged into the drainage pond/canal running through the lines can cause water pollution, algae bloom (eutrophication), reduces the oxygen in the water leads to less diversity of aquatic organisms.

Construction Wastewater

Construction process of new transmission lines will generate construction waste water mainly from the excavated pits. The source of the water from the bottom of the foundation depends on the characteristics of hydrogeology (groundwater) and rain water, which will be generated during the implementation of the pit dug. The amount of water can generate high levels of suspended solids, so that it should be settled in before pumping out. Estimated that every dug pit contains approximately 0.1m^3 / 1 pit of water; Overall construction wastewater (19 pits) arise about 1.9 m^3 / day. Due to typical construction works of the subproject is stretched along lines, therefore, the pollutants in the wastewater does not distribute in a one single area. This kind of wastewater contains high concentration of suspend solid if it is discharged without treatment into the receiving water, it can block/fill up canals system and drainage areas. However, due to small amount of wastewater, not concentrated at one location, but over 19 pits located about 120 m from each other, the impact is negligible and mitigatable.

Oil, grease and solid waste;

Clouts with oil, grease, lubricant; waste sewage from washing machines, 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 the Military Science and Technology Center – Ministry of National Defense in 2002, the average volume of oil, lubricant refused from construction machines and vehicles is 7 liters for every changing time. Period for changing lubricant and maintenance is 3÷6 months depending on machines' and vehicles' intensity of activity. With about 11 types of machines and vehicles, construction duration of 6 months, volume of refused oil and lubricant is about 77 liters.

If the wastewater contain grease and oil is not collected by the drainage system and treated in the wastewater treatment system of the City, it will affect surface water quality by reducing dissolved oxygen, increase water temperature, affect aquatic organisms and reduce underground water quality via percolation into the soil layers

Domestic and construction solid waste may cause water pollution of surrounding water bodies if they are not properly collected. It is estimated that about 10 kg/day of domestic solid waste will be generated daily which includes organic matter, pathogenic bacteria/viruses. The construction waste volume of concrete from demolition of pole foundations is 272.28 m^3 and the remained excavated soil (to be disposed) after using apart for filling back is 269.510 m^3 (data from Table 3) . If this kind of waste is not managed properly, it can cause high turbidity of water through soil run-off.

However, the impacts is considered as minor due to: i) The oil and grease waste is small amount, which is collected and treated separately (ii) very small amount of domestic solid waste from worker camp is collected and disposed at Xuan Son landfilled site , iii) hazardous waste is collected and treated by Sown Tay URENCO, vi) concrete from demolition of pole foundations and refused soil will be transported to Xuan Son landfill site

83. Mitigation measures

For domestic wastewater: During construction phase, the subproject has about 20 workers working at the site, the constructor need to arrange installation of two mobile toilets. The hired mobile toilet (type used for civil works) with collected and treated tanks with three sections such as containing, depositing and filtering ones. Dimension of the collected and treated tank can be 4.2 m^3 in totally, with containing section – 2.1 m^3, deposited section – 1.4 m^3, and filtering section – 0.7 m^3. Installation locations are arranged along each power line and put beside the worker's camp to workers use conveniently. Based on construction progress,the mobile toilets are moved accordingly. The distance is about 300m appart. The waste from portable toilets is collected and treated 1 time / week by the the regulated environment unit in the subproject area.

For construction wastewater:

- Construction of wastewater during construction of new transmission lines consists of mainly rainwater runoff into the pit carrying the contaminants. Mitigation measures before installing tower foudation, casting foudation or backfilled pit bottom is to arrange construction sewage collection holes for depositing SS before wastewater flows into the drainage system. The common dimensions can be 0.5mx0.5mx0.4m (height x wide x deep) to store 0.1 m^3 of wastewater generated for each pit. The amount of water stored in the period from 12 - 24 hours, then pumping the water into surouding canals or rice field.
- After the end of the construction lines process, utilizing soil excavation of tower foundation to backfill sediment deposition pit.

- For 09 pole foundations after conducting demolition will be leveled immediately to restore the ground, while minimizing the impact of construction wastewater generated.
- All the repair and maintenance of machines, equipment and transportation means will be implemented at garages outside the construction sites. In addition, the constructors should follow strictly construction schedule; require workers to use water for proper purposes, avoiding wasteful use; no arrangement to gather materials near water.
- To minimize the impact of storm water runoff to the receiving water body and of drainage canal along the transmission line construction area the constructors will implement measures to:
    - Exploit available sewer drainage/irrigation canal or rice fiels, to be use as receiving construction water after preliminary treatment
    - Create smallearth embankment around the pit area to collect wastewater and lead to the drainage system of the area.

For oil, grease and solid waste

- All the reparation and, maintenance of machines, equipment and transportation means need to be implemented at garages which will not be allowed in the construction sites. Spent oil and grease, waste sewage from washing machines, equipment and means, clouts with oil, grease will be collected and treated at these garages as stipulated.
- Store domestic solid waste in a dust bins then hire the Son Tay urban environmental company to collect and dispose in regulated landfill site
- Reuse/recycle as much as possible construction solid waste such as empty cement sacks, wooden barrel, plastic, foam, cardboard boxes etc. The things that cannot be reused, disposed properly to avoid falling to the water bodies.
- Use or transport excavated soil immediately to reduce the amount of storage on the construction site;

d. Soil environment

84. Impacts: Land area along the transmission line is mainly agricultural land and garden. The soil quality of those area of Thanh My and Xuan Son could be affected by construction activities. The main impacts could be listed as scattered raw material/excavated soils, concrete demolition and spill of oil/fuel into the surrounding area and discarded waste water without any pre-treatment as well as dumping the solid waste in the agricultural land. The construction activities could lead to increase content of solid/suspended solid, organic matters, bacteria/viruses, oil, grease and other hazardous substances including heavy metals. As consequences, soil porosity could be reduced, water absorption into the soil layers is prevented. High content of metals and hazardous substances may effect the growth of plant and soil aminal. However, the impact will be quite minor due to: i) very limite of domestic waste will be generated (10 kg/day); ii) the construction activities will not involve much in hazardous substance; iii) construction of tower foundation occupies only small land area of agricultural areas and most activities will be implemented within ROW of subproject; iii) almost excavated soil will be used for back filling of tower foundation; iv) no operation of heavy equipment on the site; v) main excavation activities will be schedule to implement during dry period. However, to minimize impact and ensure sanitation condition, the set of mitigation measures need to be implemented on the site.

85. Mitigation measures

For construction materials: All activities of constructor only allow within the acquired land areas and no construction materials allow to be placed in agricultural land to avoid compacting soil and reducing the area for cultivation activities of local people.

For domestic solid waste

- Establish regulation, education and training of workers with hygiene awareness in the field.
- No organized food for workers at the site, contractors will be required to rent local house for workers to ensuring hygienic condition, and easy to collect and manage generated waste.
- In areas at workers' houses and construction sites, the contractors will have to arrange two trashes to collect of solid waste
- The contractor will hire garbage collection team in the village of Thanh My and Xuan Son to collect household waste daily in workers house and construction site: 1 day / time.

. *For construction solid waste*

- Utilize salvage excavated soil, rock for filling, consolidating tower foundations according to excavation and filling balance method. For 269.510 m3 excavated soil which cannot be reused, it will be collected and transported to the disposal site agreed by the local authorities through consultation with them.
- Reuse/recycle as much as possible construction solid waste such as empty cement sacks, wooden barrel, plastic, foam, cardboard boxes etc. The things that cannot be reused, disposed properly but not to leave them over soil surface.
- Compact at places with soil filling and excavation activity to mitigate soil erosion and washing. Disposal of solid wastes into canals, stream, other watercourses, agricultural field and public areas shall be prohibited
- Completely finish each work item before start other one. Conduct site cleaning, leveling and compaction after construction completion to return the ground for local people to continue their production or grow trees on the site.

For hazadous waste

- Classification of waste in accordance with regulations on hazardous waste management.
- Hazardous waste generated will be managed in accordance with Circular No. 36: 2015 / TT - BTNMT dated 04/24/2015 on the management of hazardous waste.
- Machines, construction equipment repair and maintenance should not be in the construction area.
- Arrangement of 01 containers of hazardous waste prevention; 24 liter capacity, with lids, label.
- Do not conduct burning garbage, oil soaked rags, sludge, oil contaminating waste in the sub-project site to avoid causing a fire risk.
- Hazardous wastes such as paint containing can, clouts with oil and grease, failed fluorescent lamp, etc. must be collected into tanks and kept temporarily at the construction site, then hiring competent unit for transporting to treat in accordance with current regulations.
- Periodically gathering station for storage of hazardous waste (Son Tay 220kV substations).
- Organize collection and transport of all kind of solid wastes periodically in order to minimize the impact on the environment.

e. Impacts on Local Traffic

86. Impacts: During the construction, the transport activities of materials for the construction will increase the volume of traffic in provincial roads 413 and 414 in Son Tay and inter-village/communes roads passing the project area. A number of 30 times of trucks per day is projected for the construction Son Tay transmission lines. This may probably contribute to more traffic jams during peak hours, increase traffic accidents, and affect the quality of local roads. Dropping out of transported materials will also increase dust and traffic accident risks.

In addition local traffic could be impacted during wire scattering and pulling of the section where overhead TL crossover other roads. Particularly, the overhead TL section crosses over roads 14 times as follows:

The overhead TL section crosses over roads 14 times. specifically as follows:

- The Starting point -G1: 02 times crossings over earth road;
- The G1-G2: 02 times crossings over small earth road segment;
- The G2-G3 +: crossing 06 times over earth road and 01 times over the concrete road;
- The G3-G4 +: crossing 02 times over the earth road;
- The G5-G6 +: crossing 01 times through the concrete;

When carrying out the demolition and recovery process, the lines intersect 03 times with communal roads intersect, and one time with Provincial Road 413. Therefore, wire scattering and pulling of the overhead TL section can cause existing road surface and foundation collapse, increase in the quantity of transportation means on roads, increase in traffic jam and increase in risk of traffic accidents.

However, there will small impact on residential area since i) transportation of construction material and waste does not concentrate on one road but goes through provincial roads 413 and 414 in Son Tay and inter-village/communes roads passing the project area; ii) wire scattering

and pulling of the overhead TL sections that crossing earth/ concrete roads will be implemented at night time iii) only several heavy equipment will be transported to the construction sites. However, to minimize the negative impacts, appropriate mitigation measures need to be implemented.

87. Mitigation measures

- Prepare suitable implementation method for the TL at every inter-cross location as mentioned in the impact section. This includes the appropriate time and work type to be conducted at each specific road sections
- Contact with management unit of the roads which is Son Tay town Transportation Division for coordination to ensure construction safety and uninterrupted traffic activities.
- Obtain the agreement with local authorities in using the transport routes and record the status of the existing roads before construction and make proper compensation for the damages if any
- At the locations where the overhead TL section crossing over the roads, it need to set up scaffolding during wire scatter and pull process.
- Set up signal light when constructing at night, particularly in the road section No. 413
- Put up warning boards at dangerous road sections that are 3 intercommunal roads and road section No 413 where traffic accidents can occur.
- Trucks transporting construction material and waste serving the subproject implementation need to obey speed limits stipulated by the Government
- Limit transportation of materials in rush-hours (during 6 to 8 am and during 4 to 6 pm) to avoid traffic jam.
- Transport materials with the allowable load. Not expand trucks' body.
- Set up construction site regulation for truck drive and provide training for them to increase responsibilities during driving the vehicles;
- Clean soil and construction materials on road surface; level, compact, recover and return the initial status of the earth roads if being damaged by the project activities just after completing the construction.
- In the process of using a dedicated car drag line, especially over roads will install speed limit signs or barriers limiting the accidents that may occur.

g. Impact on other TLs , communication lines and canals

88. Impacts: According to survey, the TL will not cross over any communication lines, thus there is no impact. The 110kV line to 110kV Phuc Tho, Xuan Mai, Thach That, Phung Xa substations will cross over low, medium TLs 3 times. The service areas of these low and medium TLs are Xuan Son commune (from G3 to G5). At the section G3 to G4 it crosses over a 22kV power line. At G4 – G5, it cross over 0.4 kV lines 2 times. Thus, wire pull and scatter at locations where this TL crosses over other TLs, power of those TLs may be cut off. However, time for wire pull and scatter is short and only during the day, and power will be only cut off in each local area at specific time. In addition the local economy of Xuan Son commune is mainly based on agricultural activities, no industrial activities that use electricity continually to operate machines, that the impact is assessed to be short-term and negligible

New power line construction project intersect 5 times with irrigation canals, specifically:

- The G3-G4: crossing 04 times at rice fields in Xuan Son commune;
- The G5-G6: crossing 01 times at rice fields in Xuan Son commune;

Tower foundation construction process can bring rock, mud and sediments into canals through the rain water. During wire dragging process the workers may wade back and forth across the canals making water turbid. These will increase the risk of landslides of canals' shores, obstruct the flow, affect the agricultural irrigation activities of local people in Xuan Son commune, and cause water pollution affecting the growth and development of aquatic ecosystems.

89. Mitigation measures:

- Coordinate with Son Tay town electricity company, the management unit of the TLs to cut off power to ensure safety during wire pull and scatter process at the inter-cross locations if any.
- Construct line segment by segment one time to make the smallest time with power cuts.
- Inform people in Thanh My, Xuan Son communes for their life and production arrangement before cut-off power.
- Having a plan to implement appropriate drag line, limiting the minimum the impact on crops, rice land. Particularly, only drag line at the rice filed after harvesting. If it needs to do it before harvesting, try to make a line not touching the crop.
- Put up scaffolding during wire scatter and pull process. Put warning boards. Have protection measures to prevent impact on other TLs. Ensure safety distance to those TLs.

h. Occupational health and safety of workers

90. Impacts: Construction activities may cause health harm and danger of the 20 workers' lives, if contractors do not fully apply the mitigation measures as stated. Specific impacts include:

- Impacts by dust, exhaust and noise due to the operation of construction equipment
- The risk of unsafety if workers are not equipped with adequate knowledge and skills to work as well as fully equipped labor protection devices during working process
- Effect on health when living conditions and hygiene in the camps (or rented houses) and construction sites cannot be guaranteed
- The construction equipment, if not maintained, operated in accordance with regulations, the risk of occupational accidents during work easily occur
- All these impacts are causing a major impact on health impairment of working capacity of workers.

91. Mitigation measures: The constructor must ensure all environmental mitigation measures should be implemented strictly

All workers will be provided sufficiently labor protection tools such as hard hats, safety gloves, safety belt, ear protection etc. at no cost to the employee and force them to use;

- A first aid kit will be provided at each construction site to ensure patients can receive first aid timely before transporting them to the medical station/hospital
- Contractors ensure to provide safe drinking water to workers for daily uses
- All construction equipment, tools will be carefully examined for quality and quantity before used.
- For people working at height, the suspending cables will be carefully checked before climbing on the tower; no work at height will be permitted when it is going dark; it has fogs; it has strong wind with above class V. Workers who climbs on towers must have Safety Certificate of Class 3 or above, and sufficient conditions for working at height. Safety belts will be attained use 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.
- For tower foundation excavation:
    - Strictly implement safety measures while excavating tower foundation pits.
    - Apply measures to consolidate the slope of tower foundation pits in dangerous positions during construction;
- Workers conducting transport and installation of electrical equipment must understand regulations on installation and transport safety of electrical equipment as well as stated in Decree No.14/2014/ND-CP dated February 26, 2014 of the Government detailing the implementation of the Electricity Act on electrical safety for installation of electrical equipment and relative regulations.
- Working hours of workers are made to ensure that each worker does not work more than 8 hours / day in normal working conditions, and no more than 2 consecutive hours in conditions exposed to noise devices for construction
- Contractors will prepare emergency measures on 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.

i. Community health and safety

92. Impacts: Impacts on health and safety of local people, especially of 82 households living closed to the transmission lines, may be included:

- Dust and noise generated due to increased traffic activities from the transport of materials, concentrating in several inter-commune roads at Thanh My, Xuan Son commune and road 413 at Son Tay town;
- Traffic accident may occur during transportation of construction material and waste to and from the construction site
- Fires, emergency spills of materials, especially in temporary storages of fuel and inflammable material (paint, gas, DO, FO etc.);
- Accidents of residents if they enter into work areas without permission, for example, falling into holes, electric shock during testing electric, running generators etc.
- However, these impacts are considered as minors since: i) the construction scale is small, which is concentrating on tower foundation excavation and construction at agricultural land mainly; ii) construction activities will be very short time and within the ROW;

93. Mitigation measures: To mitigate these potential impacts, the civil contractor will develop a community health and safety plan (CHSP) that incorporates good international best practice and recognized standards. The CHSP should include:

- Specific emergency response procedures for traffic accident, electrocution, oil spill. The detail guidance is described in the emergency response plan (Appendix C)
- Communication systems and protocols, interaction with local and regional emergency and health authorities;
- Install barriers (temporary fence) at construction areas to deter people access to the site;
- The local people shall not be allowed in high-risk areas (excavation sites and areas where heavy equipment is in operation);
- Provide warning signs as noted in impacts on local traffic section;
- When fire occurs due to electricity, first notice immediately to authorized unit to cut off power, then comply with the procedures of firefighting.

k. Social disturbance

94. Impacts: It is estimated that 20 workers will be mobilized on the construction site, and concentration of workers and poor housekeeping by contractors at work sites could lead to several social problems on the sites such as:

- Social evils and diseases transmission could negatively affect local residents as well as workers due to low living condition of workers which could lead to the appearance of eye disease, skin disease, and respiration cases in worker camp and then it would be spread out in the local communities.
- Conflict between workers and local people;
- Traffic safety in the main intersections as defined in Impacts on Local Traffic item. Uncontrolled and poor construction schedule could lead to high risks of traffic accident, especially during rush hours.

However, these impacts, will occur only during the construction phase along 3.925 km of TL within a small area in 2 communes of Son Tay town. The impacts are negligible, short-term, could be controlled through appropriate mitigation measures.

95. Mitigation measures

- Manage and educate workers to enhance their awareness of environmental sanitation and health protection.
- In order to minimize the risk of injury to the local residents and the workers, it needs to comply with the GOV's regulations on Occupation, Safety, and public health, or the World Bank's Environment, Health, and Safety Guidelines (2007) (http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES) that govern the safe and orderly operation of civil works should be followed.
- 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.
- Establish rules in camp. Propagandize, educate workers and create good relations with local people in order to avoid conflicts arising. HIV/AIDS education should be given to workers.
- 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.

l. Impacts on other public facilitate and cultivation activities

96. Impacts: Impact on other public facilities and cultivation activities of the subproject activities may include:

- A temporary interruption of power supply, communication operations in a small residential area while wire pulling is conducting through the intersection with transmission and communication lines. However, this effect only occurs in a short time and the scope of the impact is not large, since it occurs only with some households using infrastructure that was cut temporarily.
- Farming activities of the local people can be affected during the construction period, especially when the construction of electric pole and wire dragging are taking place.
- Some regional roads, especially the provincial road 413, 414 and a number of inter-village and commune roads of Thanh My and Xuan Son may be degraded and damaged by the means of transport pass by
- As described in the current status of the project area, the project area has a number of architectural and cultural works such as schools, health centers, at Thanh My and Xuan Son communes. These works are far from the project construction area so the impact of the construction process of this project to them is negligible

97. Mitigation measures:

- Prior to the construction at the intersection of power transmission lines and communication system, the project will work with communication providers to develop a specific plan to cut and open a system. Users will also be notified in advance plans to minimize damage of the people to the lowest level. Power and communications cuts are guaranteed in accordance with the principle of rotating cutting across regions
- All waste generated during the construction process will be collected and treated to ensure no harm to the farming sector of the population. After the end of construction at each position, the irrigation canals will be dredged, widened to ensure the flow, do not affect the drainage area.
- If the regional infrastructure is degraded by the project, the project will carry out the compensation or repair and renovation before the end of the project

2. Repair, restore, and return the ground after construction completion

98. Repair, restore, and return the ground after construction completion need to implement to mitigate impacts on environment after construction. The activities and measures are:

- Repair, recover, and return the road sections, and public infrastructures damaged by the subproject construction.
- Clear, level and restore the ground after construction completion.
- Collect and transport of all remained construction supplies, material from the vicinity of the subproject area
- Clean completely gathering material area and temporarily borrowed area for wire string to avoid causing damage to crops (crop-growing areas, rice paddy land).
- The wastewater and rain water temporary drainage systems made during construction phase will be filled up and restored to the original state ensuring no impact on the existing drainage system of the area where construction was taken place

D. Potential Impacts and Mitigation Measures during Operation phase

99. The potential impacts of the operation of the 110kV transmission line turned to 220kV Son Tay substation subproject and mitigation measures for the impacts are described as follows:

a. Ecological environment

100. Impacts: During the operation phase, the process of periodic maintenance and repair of the TL, branches and tops of the trees violating the TL 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. However, these impacts will have small impact on biological environment. Since (i) According to the survey result, the transmission line mainly crosses over paddy and crops land. (ii) After the construction is completed, and the TL is come into operation, people are allowed to cultivate again within the ROW area, but to a limited extent under the Electricity Law, Decree 14/2014/ND-CP to ensure safe operation of the transmission line.

101. Mitigation measures: Cut down only trees and branches which will get risk of the safety of the transmission line as specified in the Decree No. 14/2014/ND-CP of the Government dated February 26th, 2014. Taking care activities 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 height of the lowest conductor of 110kV transmission line while in maximum deflection state must not be less than 3 m.

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 voltage level. However, the transmission line is constructed at the agricultural area, where the vegetation outside the ROW is mainly anual crops that the height of plants is alway within the safety limit.

Recommend local people to grow trees that their height meets the requirements of height as stipulated. Local people will not be allowed to grow valuable trees growing rapidly and their height might exceed the allowable limits, affect to the safety of the TL.

Propagandize, train operation workers on prevention fire; Strictly control fire use of operation workers during the TL maintainenance and repair process to avoid fire occurence. 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*:**

102. Impacts: The occupational health and safety issues during the operation of high voltage TL include electrocution risk due to exposure to high voltage systems when maintaining and repairing the TL or living under the ROW; accident risk due to working in heights; potential exposure to electric and magnetic fields when maintaining and repairing the TL 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 facilities 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. 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): As assessed in the EIA report, the magnetic field is determined by the project does not affect the surrounding environment. So that the effects of the magnetic field surrounding the people is negligible. However, the workers directly involved in the maintenance and repair of the line, when the worker climes up to power poles to maintain and repair, the magnetic field may cause an impact on the health of workers. Worker exposure to magnetic fields for extended periods can cause neurasthenia, fatigue. The EMF intensity and allowable limits of working time during one day for operators when conducting the overhead TL maintenance and repair is presented in Table 26:

Table 25 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	Not limited	480	255	180	130	80	48	30	10	0

(minutes)											

103. Mitigation measures: The Operator of the TL will follow the IFC (2007) and EVN guidelines when carrying out maintenance of the transmission line. Some of prevention and control measures when working with electrical systems are:

- 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.
- Adherence to electrical safety standards.
- Proper grounding transmission line.
- 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.

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

- All workers will be examined health for working at height, equipped sufficiently labor 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.
- Post safety signs and warning signs.

In addition, in the operation phase, training for workers will be conduct so that workers 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.

c. Community Health and Safety

104. Impacts: Impacts on health and safety of local people at Thanh My and Xuan Son communes and Son Tay Town, especially of 82 households living closed to the transmission lines during operation of the TLs, may be included:

- Electric shock risk: the community can be exposed to electric shock hazards as a result of direct contact with high voltage electricity or from contact with tools, vehicles, or other devices that come in contact with high-voltage electricity.
- Exposure to Electromagnetic Field (EMF): The transmission frequency commonly used in transmission systems ranges from 50 Hz - 60Hz which is considered to be an extremely low frequency (IFC, 2007). Effects are reduced with distance and electric fields also become shielded by trees, buildings, and other materials that conduct electricity. In general electric fields are the strongest close to the source and diminish with distance.

The subproject will be designed and constructed in compliance with regulations on technique and high voltage network, EMF must be ensured ≤ 5kV/m at any point outside the houses at the height of 1m from the ground and ≤ 1kV/m at any point inside the houses at the height of 1m from the ground. Furthermore EMF intensity in 6 points along Son Tay TL is undetected. Therefore, impact on local people caused by forcasted EMF of this subproject will be negligible.

105. Mitigation measures: To prevent electrocution risk, the followings must be implemented:

- Conduct earthing for the TL, especially all towers.

- To ensure absolute safety, operators must comply with operation procedures and safety requirements;
- Provision of warning signs and anti-climbing devices on all towers.
- 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.
- Check earthing system of buildings under the ROW as stipulated. Ensure that any new buildings within the 72 m-wide earthing zone are earthed.
- Observe/Test EMF at resident's buildings for treating appropriately if any complaint.
- 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.

106. Climate Change. Regional Global Circulation modeling project greenhouse –climate change induced changes to the frequency and severity of rainfall events in the subproject area. However, there are no records of flooding in the area of the 110kV transmission line turned to 220kV Son Tay substation subproject. However, short time flooding may occur due to low discharge rate of irrigation system. It is concluded that impacts from climate change may not impose long term risks for the whole substation area.

VII. PUBLIC GRIEVANCE REDRESS MECHANISM

107. 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 subproject information booklet (PIB) that will be distributed to affected commune. Affected people can have this information from commune office.

108. 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.

109. The designated unit who is responsible for handling complaints shall exercise all efforts to settle APs issues at the ward level through appropriate community consultation. All meetings shall be recorded and copies shall be provided to APs. A copy of the minutes of meetings and actions undertaken shall be provided to the EA/IA and ADB upon request.

110. The procedures for grievance redress is defined and summarized in Figure 4. The procedure described below should be applied easily to both social and environmental issues and be consistent with the legal process for resolution of disputes in Viet Nam.

i) Stage 1: Complaints from APs for the first time shall be lodged verbally or in written form to the Contractor. The complaints shall be received by the Contractor and discussed with the APs to seek possible solutions.

ii) Stage 2: If no understanding or amicable solution can be reached or if no response is received from the Contractor, the APs can elevate the case to the Project Owner. The Project Owner is responsible to work with the Contractor for resolutions.

iii) Stage 3: If no understanding or amicable solution can be reached again, the APs can appeal to Commune People's Committee. The CPC will review and issue a decision on the appeal within 15 days from the day the complaint is received. All meetings shall be recorded and copies of the minutes of meetings will be provided to APs.

iv) Stage 4: If no understanding or amicable solution can be reached or if no response is received from the CPC within 15 days from the day the complaint is received, APs can elevate the case to the District People's Committee. The District People's Committee is expected to respond within 15 days upon receiving the APs appeal.

v) Stage 5: If the AP is not satisfied with the decision of the District Office, or in the absence of any response, the APs can appeal to the Hanoi Municipal People's Committee (MPC). The MPC will review and issue a decision on the appeal within 30 days from the day the complaint is received.

vi) Stage 6: 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).

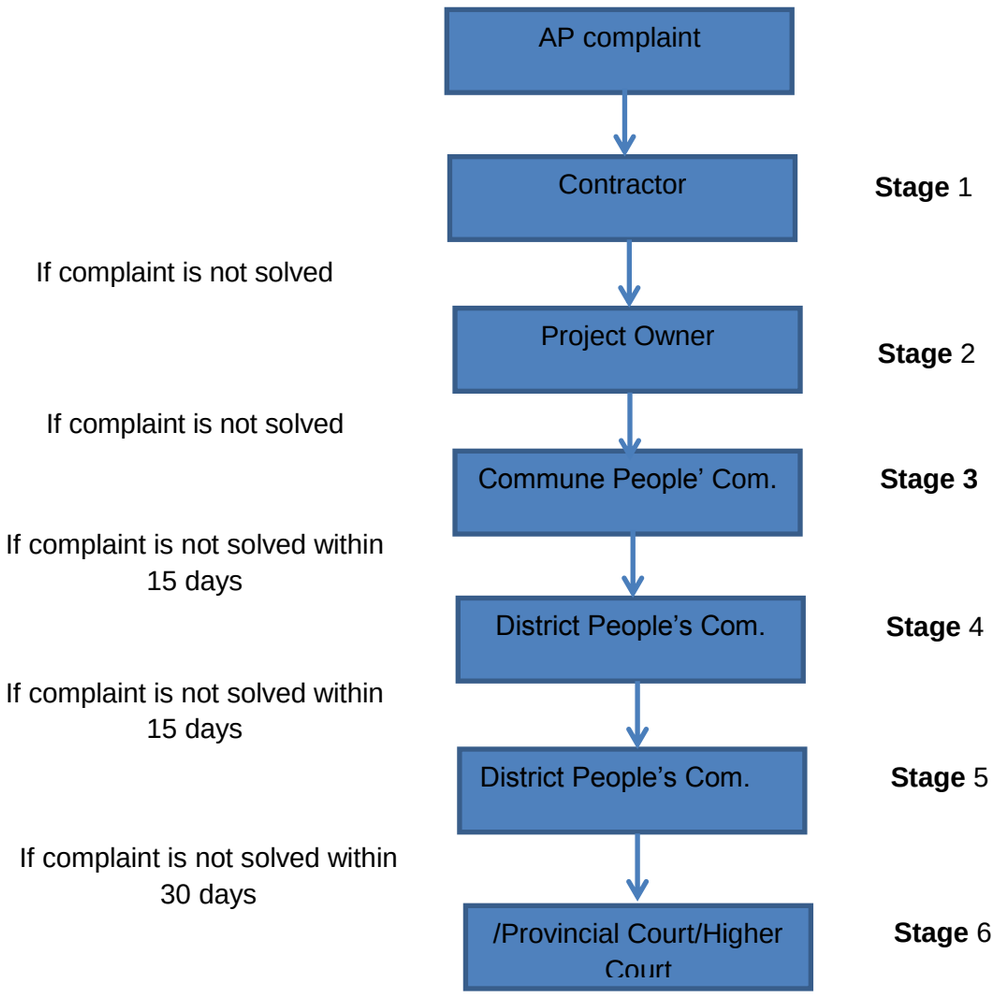

Figure 4. Summary of GRM

111. 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 be taken to redress unresolved grievances. The environmental specialists will provide the necessary training to improve grievance procedures and strategy for People's Committees when required.

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

113. If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, APs have the right to directly discuss their concerns or problems with the ADB Southeast Asia Department through the ADB Viet Nam Resident Mission (VRM). If APs are still not satisfied with the responses of VRM, they can directly contact the ADB Office of the Special Project Facilitator (OSPF).

VIII. ENVIRONMENTALMANAGEMENT PLAN

114. An EMP prepared for the subproject "110kV transmission line turned to 220kV Son Tay substation" with the purpose of integrating the results of the IEE into a formal management plan

that is implemented parallel with the subproject to prevent or minimize potential environmental impacts and issues that were identified by the IEE.

115. The EMP consists of an impacts mitigation plan, a monitoring plan, and an emergency response plan. EMP also prescribes the institutional responsibilities for the implementation of the EMP. EMP is a management tool that provides a set of directives and guidelines that the subproject owner follows to prevent or minimize unnecessary environmental impacts of the subproject.

116. Environmental impact mitigation plan has been developed based on each subproject activities with respective impact and mitigation measure. Also, the plan identifies the reports, responsibility of subproject's stakeholders as well as estimated cost for implementing mitigation measures. Detailed contents are shown in Table 27.

Table 26 . Environnemental Impact Mitigation Plan

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Pre-Construction phase								
Land acquisition and compensation	Impacts on local people's life and economy. 4,527.2 m^2 of land located in two (2) communes is permanently acquired, affecting a total of 26 households temporary impacts, according to the Inventory of Lost results, a total 68,810 m2 belonging to 285 households shall be affected temporarily due to construction activities.	1. The project owner (Hanoi EVN) should inform affected persons ahead on the subproject implementation and participated in acquisition and inventory of land, consulted in compensation assistance 2. The project owner (Hanoi EVN) should 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. The project owner (Hanoi EVN) should comply with the regulations of the Electricity Law, the Decree No. 14/2014/ND-CP and relevant regulations. 4. The project owner (Hanoi EVN) should 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. 5. Budget for compensation payment will be enough and available. 6. The design consultant should design of tower height to minimize impacts due to crops and trees clearance. 7. Constructor should construct completely each work item to minimize the duration of temporary land use for the project construction. 8. The project owner (Hanoi EVN and CPC coordinate to address people's claims/grievances relating to compensation. 9. Project owner/constructor should inform local people the date to take agricultural land over, so that they arrange harvesting their crops. 10. Constructor should protect trees and vegetation during land clearance process, only cut tree within designated area.	All affected persons in the subproject areas	Before implementing the subproject	See resettlement plan	See resettlement plan	Project Owner (PO)	Compensation and resettlement committee

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

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Construction site arrangement	No impact. This activity help to prevent or avoid impacts by disposal and civil works	11. The PMB requires 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. PMB is responsible for supervision and include this content in civil work contracts 12. Constructor develops transportation plan for equipment and materials to reduce negative impacts. 13. Constructor will arrange the temporary yards for stockpile and material gathering site within the tower foundation area or the ROW. The proposed disposal site for construction material and domestic solid waste is Xuan Son landfill in Son Tay Town 14. Contractors must have the license for safety and environmental requirements of mobilized machines and vehicles.	Subproject site	Before construction begins	01 time Before construction begins	No marginal cost	PO/ PIC/ construction supersison Consultant/	Contractors
UXO clearance (bombs, mines and other explosives)	Impact on people's and worker's safety	15. Engage an authorized UXO clearing contractor, the 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 0.3m + 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 16. Collecting, sorting, transportation management and destruction of mines and explosives are under strict safety standards for preservation, transport and use of explosives in QCVN 02:2008/BCT on National technical regulation on safety in the storage, transportation, use and disposal of industrial explosive materials, and the other current regulations. 17. Ensure that the contractors shall only commence site works after the UXO clearing agency has certified that the project areas are already been cleared	All construction sites	At the beginning of the subproject construction	Once	To be indentified	PO/ PIC/ construction supervision Consultant	Minitary Unit
Construction Phase of 110 kV transmission line turned to 220kV Son Tay Substation								

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Tree cutting and site clearance	Cause the loss of vegetation and landscape deformation	18. Constructor will 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. 19. Constructor will arrange construction after harvest to reduce impact on people's production and reduce temporary acquisition time. 20. The PO in coordination with the local authorities to monitoring the tree cut down and clearance for subproject construction. Constructor can only cut down the tree or clearance of vegetation within the ROW, tower foundation and trees that would affect wire puling process 21. Cut trees will be collected by Thanh My and Xuan Son environmental sanitary team and transported to a regulated location	All construction sites	From the beginning to completing the subproject construction	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor
Concentration of workers and domestic wastes generated	Generate domestic solid wastes and waste water causing water and soil polution pollution;	22. Hire residents' houses for workers' staying. Only construct camps for the TL sections away from the residential areas 23. Establish regulation, education and training of workers with hygiene awareness in the field. 24. Arrangement 2 bins with capacity of 60 liters, with a lid and wheels to easily move,. Then hiring Son Tay Urban Environment Company to collect, transport to the Xuan Son landfill site	All worker camps	Throughout construction phase	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor
Excavation for tower foundation, usage of fuel and hazardous substance, installation of, equipment, devices, machines	Generation of construction waste water, solid waste, and hazardous wastes causing water and soil pollution,	*For construction wastewater*: 25. Arrange construction sewage collection holes for depositing SS before wastewater flows into the drainage system. The common dimensions can be 0.5mx0.5mx0.4m (height x wide x deep) to store 0.1 m^3 of wastewater generated for each pit. The amount of water stored in the period from 12 - 24 hours, then pumping the water into surouding canals or rice field. 26. After the end of the construction lines process, utilizing soil excavation of tower foundation to backfill sediment deposition pit. 27. For 09 pole foundations after conducting demolition will be leveled immediately to restore the ground, while minimizing the impact of construction wastewater generated. *28.* All the repair and maintenance of machines, equipment and transportation means will be implemented at garages outside the construction sites. Spent oil and grease, waste sewage from washing machines, equipment and means, clouts with oil, grease will be collected	All construction sites	Throughout construction phase	Monthly	No marginal cost)	PO/ PIC/ construction supervision Consultant	Contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
		and treated at these garages as stipulated. 29. In addition, the constructors should follow strictly construction schedule; require workers to use water for proper purposes, avoiding wasteful use; no arrangement to gather materials near water. 30. After the end of the construction lines process, utilizing soil excavation of tower foundation to backfill sediment deposition pit. 31. To minimize the impact of storm water runoff to the receiving water body and of drainage system along the transmission line construction area the constructors will implement measures to: 32. Exploit available dranage/ irrigation canal or rice fiels, to be use as receiving construction water after preliminary treatment,. 33. Create small earth embankment around the pit area to collect wastewater and lead to the drainage system of the area. For construction solid waste 34. Max. salvage excavated soil, rock for filling, solidating tower foundations according to excavation and filling balance method. 35. For 269.510 m^3 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. 36. Reuse/recycle as much as possible construction solid waste such as empty cement sacks, wooden barrel, plastic, foam, cardboard boxes etc. The things that cannot be reused, disposed properly but not to leave them over soil surface. 37. Compact at places with soil filling and excavation activity to mitigate soil erosion and washing. Disposal of solid wastes into canals, stream, other watercourses, agricultural field and public areas shall be prohibited 38. If excavated soil is suspected contamination, it must be tested, and disposed in designated sites and identified as per local regulations. All activities of constructor only allow within the acquired land areas and no construction materials allow to be placed in agricultural land to avoid compacting soil and reducing the area for cultivation activities of local people *For Hazardous waste* 39. All the reparation and, maintenance of machines, equipment and transportation means will be implemented at garages not in the construction sites. Spent oil and grease, waste sewage from washing machines,						

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
		equipment and means, clouts with oil, grease will be collected and treated at these garages as stipulated. 40. Other wastes such as paint containing can; clouts with oil, grease; failed fluorescent lamp etc. must be collected into tanks and kept temporarily at the construction site, then hiring competent unit for transporting to treat in accordance with current regulations.						
Construction activities and transportation of materials, demolition of old lines	Noise, dust and exhausts impact on ambient air environment quality	41. Water need to be sprayed at the construction sites and along the transport roads crossing residential areas of Thanh My and Xuan Son communes when the dust is visible to minimize dust. During the dry and hot days, spray minimum twice a day (6-7 am and 13-14pm) with specialized water tankers of 4.5m^3. 42. All vehicles used for construction, and equipment and machines emitting noise, exhausts, fume need to be maintained properly to minimize emission, and not allowed to be operated at night in the construction sites and along transmission line to minimize noise. 43. Contractors will ensure that transportation means, machines and equipment must have effective certificate of environmental standards achievement (QCVN 04: 2009/BGTVT and QCVN 05: 2009/BGTVT) issued by the register department before using for the subproject construction. 44. The trucks transporting demolition waste, excavated soil as well as construction materials (e.g., sand, gravel, and stone) should be covered by canvas 45. Temporary stockpiles/storage yards should be covered, or sprayed regularly to prevent dust and erosion. 46. Temporary dump areas are located in near the excavation area to facilitate the process of filling the pit after conducting demolition foundation poles at the section line 47. Temporary dump is ≤ 1.5m in height convenient for shielding, avoiding erosion when rain, causing congestion and pollution of surface area. This dump is surrounded by geotextile, buried deep into the ground about 15-20cm and supported by pile's pins. 48. Reduce excavation and filling duration, and excavated soil will be used to fill as soon as possible to reduce dust emission. 49. Only operate equipment, machines and vehicles causing large noise at day time.	All construction sites	Beginning of construction (for license of equipment, machines and means) and throughout construction phase	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Construction materials transportation, and storage	Traffic accidents, increase in traffic activities, damage to roads, traffic disruption in provincial roads 413 and 414 in Son Tay and inter-village/communes roads passing the project area; Impact on other TLs, communication and canals	50. Prepare implementation alternative for the TL at every inter-cross location. This includes the appropriate time and work type to be conducted at each specific road sections 51. Contact with management unit of the roads, the Son Tay transportation Division for coordination to ensure construction safety and uninterrupted traffic activities. 52. Obtain the agreement with local authorities in using the transport routes and record the status of the existing roads before construction and make proper compensation for the damages if any 53. At the locations crossing over the roads, it needs to set up scaffolding during wire scatter and pull process. 54. Put up warning boards at dangerous road sections that are 3 intercommunal roads and road section No 413 where traffic accidents can occur. 55. Speed limits should be posted and adhered to by transportation means. 56. Limit transportation of materials in rush-hours. 57. Transport materials with the allowable load. Not expand trucks' body. 58. For oversize and/or overweight materials and equipment, it must have special purpose transport means. 59. Set up construction site regulation for truck drive and provide training for them to increase responsibilities during driving the vehicles; 60. Conduct road upgrading or repair if collapse occurrence due to the subproject construction. 61. Clear soil and construction materials on road surface; level, compact, recover and return the initial status of the roads just after completing the construction.	All construction sites.	Throughout construction phase	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor
Tower excavation, installation; wire pulling	Impact on other transmission lines, communication lines and canals	62. Coordinate with Son Tay town electricity company, the management unit of the TLs to cut off power to ensure safety during wire pull and scatter process at the inter-cross locations if any. 63. Construct line segment by segment one time to make the smallest time with power cuts. 64. Inform people in Thanh My, Xuan Son communes for their life and production arrangement before cut-off power. 65. Having a plan to implement appropriate drag line, limiting the minimum the impact on crops, rice land. Particularly, only drag line at the rice filed after	All construction sites.	Throughout construction phase (fulltime)	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
		harvesting. If it needs to do it before harvesting, try to make a line not touching the crop. 66. Put up scaffolding during wire scatter and pull process. Put warning boards. Have protection measures to prevent impact on other TLs. Ensure safety distance to those TLs.						
Excavation and construction of tower, wire stringing, Transportation and installation of equipment	Occupational health and safety of workers. Worker injury and health	67. All workers will be provided sufficiently labor protection tools such as hard hats, safety gloves, safety belt, ear protection etc at no cost to the employee and force them to use; 68. A first aid kit will be provided at each construction site to ensure patients can receive first aid timely before transporting them to the medical station/hospital 69. Contractors ensure to provide safe drinking water to workers for daily uses 70. All construction equipment, tools should be carefully examined for quality and quantity before used. 71. 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. For tower foundation excavation: (i) Strictly implement safety measures while excavating tower foundation pits. (ii) There are measures to consolidate the slope of tower foundation pits in dangerous positions during construction; 73. Use suitable means of transport. Check the load of the vehicles before use, fasten and comply with safety regulations on transportation. 74. Workers conducting transport and installation of electrical equipment must understand regulations on installation and transport safety of electrical equipment as well as as stated in Decree No.14/2014/ND-CP dated February 26, 2014 of the Government detailing the implementation of the Electricity Act on electrical safety for installation of electrical equipment and relative regulations. 75. Working hours of workers are made to ensure that each worker does not work more than 8 hours / day in normal working conditions, and no more than 2	All construction sites.	Throughout construction phase (fulltime)	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
		consecutive hours in conditions exposed to noise devices for construction 76. 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. 77. 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. 78. 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..						
During transportation of construction material; installation of equipment and construction activities	Community health and safety is impacted. Local people injury and health	79. Civil contractor will be required to develop a community health and safety plan, which includes: - Specific emergency response procedures for traffic accident, electrocution, oil spill. The detail guidance is described in the emergency response plan (Appendix C) - Communication systems and protocols, interaction with local and regional emergency and health authorities; - Install barriers (temporary fence) at construction areas to deter people access to the site; - The local people shall not be allowed in high-risk areas (excavation sites and areas where heavy equipment is in operation); - Provide warning signs as noted in impacts on local traffic section; - 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 in the substation - Installation of lightning protection systems in all towers as stipulated. Paint color (as defined) on tower with the height of 50m and above. - When fire occurs due to electricity, first notice immediately to authorized unit to cut off power, then comply with the procedures of firefighting. - Check periodically trees outside the ROW which may potentially affect to the safety of the tower - Coordinate with the local government of district and commune to propaganda and disseminate knowledge about safety of the ROW to	All construction sites.	Throughout construction phase (fulltime)	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
		communities living near areas where the TL crosses over.						
Concentration of workers and Social disturbance	Concentration of workers (20 people) in the subproject site may cause disorder, insecurity and disturbance in the locality due to conflicts between workers and local people, social evils; increase possible infectious diseases generation etc. However, these impacts are insignificant, short-term, only occur in the construction phase along 3.925 km of TL and within a small area in 2 communes of Son Tay town and will stop when the project construction finishes.	80. Manage and educate workers to enhance their awareness of environmental sanitation and health protection. 81. In order to minimize the risk of injury to the local residents and the workers, it needs to comply with the GOV's regulations on Occupation, Safety, and public health, or the World Bank's Environment, Health, and Safety Guidelines (2007) (http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES) that govern the safe and orderly operation of civil works should be followed. 82. 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. 83. Require workers not to take part in or cause social evils; any contravener shall be strictly treated in accordance with laws. 84. Establish rules in camp. Propagandize, educate workers and create good relations with local people in order to avoid conflicts arising. HIV/AIDS education should be given to workers. 85. 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.	All construction sites.	Throughout construction phase (fulltime)	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor
Repair, restore, return the ground after construction completion	Mitigate impacts on environment after construction	86. Repair, recover, and return the road sections, culverts, drainage system and public infrastructures damaged by TL construction. 87. Clear, level and restore the ground after construction completion. 88. Grow trees in temporarily acquired areas.	All construction sites.	throughout construction phase until the project is put into operation.	Monthly	No marginal cost	PO/ PIC/ construction supervision Consultant	Contractor
Operation of 110 kV transmission line turned to 220kV Son Tay Substation								

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
Cut trees and branches violating the ROW	Reduce vegetation cover, lost of biological environment	89. Cut down only trees and branches which will get risk of the safety of the transmission line as specified. 90. 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. 91. 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. 92. Recommend local people to grow trees whose height meets the requirements of height as stipulated. 93. Propagandize, train operation workers on prevention measures from fire; Strictly control fire use of operation workers during the TL maintenance and repair process to avoid fire occurrence.	ROW	Fulltime	Biannual	O and M	The high voltage grid management of Ha Noi City	
TL periodic maintenance process	Affect workers' health and safety	94. 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. (ii) Adherence to electrical safety standards. (iii) Proper grounding transmission line. (iv) 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. 95. 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 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	ROW	Fulltime	Biannual	O and M	The high voltage grid management of Ha Noi City	

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
		strong wind with above class V. 96. 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) Post safety signs and warning signs. 97. In addition, in the operation phase, conduct training for workers in order that they can respond to risks/failures 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 e.g. risks of electric shock, fire, explosion, tower collapse..						
Operation of the transmission lines	Community Health and Safety may be affected by: Electric shock risk and Exposure to Electromagnetic Field (EMF):	98. To prevent electrocution risk, , the TL Operator will implement the following: - Conduct earthing for the TL, especially all towers. - To ensure absolute safety, operators must comply with operation procedures and safety requirements; - Provision of warning signs and anti-climbing devices on all towers. - 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. - Check earthing system of buildings under the ROW as stipulated. Ensure that any new buildings within the 72 m-wide earthing zone are earthed. - Observe/Test EMF at resident's buildings for treating appropriately if any complaint. - 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 99. To prevent impacts of EMF: the community should be warned about the safety distances from the transmission system and power lines through	ROW	Fulltime	Biannual	O and M	The high voltage grid management of Ha Noi City	

Subproject Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[5] (USD)	Responsibility	
							Supervision	Implementation
		warning signs and the restrictions on erecting any houses or buildings within the ROW and earth zone are to be enforced by operation unit.						

A. Institutional arrangements and responsibilities

117. Responsibilities for implementing the EMP shall be borne by all stakeholders in the project implementation process, including:

- Electricity of Vietnam is the Executive Agency responsible for implementing the entire project and implementation of the EMP and in the case of necessity will review and adjust the EMP accordingly. Hanoi Power Management Board representative of the Contractor will directly implement all related content, including direct responsibility for the management, implementation, support and supervision of compliance of contractors; evaluate EMP performance and report to EVN and ADB upon request.
- The Contractor will make plans necessary for the implementation of the EMP as required and ensure strict implementation of the mitigation measures outlined in the EMP.
- The Environmental Supervisor of the Contractor supervise the Contractor's compliance with the EMP, environmental monitoring in the field. Local governments and communities are responsible for monitoring the implementation of the EMP as brought forward in the commitment of the Contractor.
- The Department of Natural Resources and Environment (DoNRE) is the provincial agency which oversees environmental management of Ha Noi. The DoNRE with District staff provides direction and support for environmental protection-related matters including application of the Law on Environmental Protection (2014), EIA, and environmental standards.
- ADB provides guiding documentation for EVN or PMU on issues related to EMP, and evaluate the periodic reports on activities of EMP submitted.

118. The specific responsibilities of the parties concerned are indicated in the Table 28:

Table 27 Stakeholder's responsibilities

Stakeholder	Responsibilities
Electricity of Vietnam	• General oversight role in the construction phase • Overall responsibility for the implementation of the EMP during operational phase
Hanoi Power Management Board	• Establish an Environment Unit led by an Environmental Staff to implement EMP tasks
	• Manage, implement and supervise the compliance of the EMP and any conditions for approval, including the supervision of construction and operation of all Board staff and Contractor
	• Evaluate the performance of EMP and conduct revisions, or suspension of operations in cases of violating the conditions of the EMP, which can cause serious impacts on the local community.
	• Ensure the effective communication and dissemination of content and requirements in EMP to the Contractor.
	• Assist the Contractor in implementing environmental mitigation measures
	• Supervise EMP performance
	• Report EMP performance to EVN, ADB
	• Prepare summary reports on Project's environmental activities upon request
	• Brief the Project's information in community meetings
	• Ensure continuing communication with local communities and

Stakeholder	Responsibilities
	fulfill commitments to facilitate for community consultations during project life.
Construction Supervision Consultant	• Prepare and implement Environmental Supervision Plan during construction phase
	• Prepare and implement Environmental Monitoring Plan during construction phase
	• Report on any incidents or non-compliances of EMP to PPMB
	• Provide recommendations on EMP performance to PMB
	• Assist EVN/PMB in incorporating environmental management plan into bidding contracts
Project Implementation Consultant (PIC)	• Assist EVN/PMB for monitoring and evaluation of safeguards compliance
	• Maintain close coordination with the safeguard team throughout the project life.
	• Work with ESU to provide education and training for awareness building on safeguards issues
	• Work with ESU to update EMP as necessary
	• Review the Site Environmental Management Plan (SEMP). Supervise/monitor the implementation the SEMP of constructor and all mitigation measures mentioned in EMP for the construction phase of the subproject; • Assist Hanoi PMB to prepare semi annual environmental monitoring reports
Safeguard Officer of Constructer/Contractor	• Prepare the Site Environmental Management Plan (SEMP) which need to be submit to Hanoi PMB for approval before starting civil works on the sites. • Prepare constructor project implementation progress/environmental report to submit to construction supervision consultant
	• Ensure that workers are informed of purposes of EMP and aware of necessary measures to implement EMP
	• Implement all environmental mitigation measures and requirements stated in EMP
Local authorities and community	• Participate in monitoring EMP implementation of constructor • Request constructors obey a social requirement at locality (registration of workers' registration) • Raise environmental and social issues cause by constructors to commune/ward authorities and project owner.

B. Monitoring Plan

119. The environmental monitoring plan for the EMP is provided in Table 29. The monitoring plan focuses on all three phases (pre-construction, construction, post-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

120. The Constructor, particularly Environmental Safeguard officer of the Constructor will be responsible for the implementation of the environmental monitoring program. The ESU and

EO will coordinate with the constructor. The PIC/PIU will provide logistical support to the Constructor where necessary for the implementation of environmental monitoring plan.

121. The standards for environmental quality 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.

122. After construction is completed the potential impacts of the operation of the new 110kV transmission line turned to 220kV Son Tay substation subproject will be monitored by EVNHANOI.

C. Performance Monitoring

123. Performance monitoring is required to assess the overall performance of the EMP. A performance monitoring system is normally developed by the EA for the subproject. Select indicators of major components of the environment that will be affected primarily by the construction phase are drawn from the mitigation and monitoring plans and summarized in Table 30.

Table 28 Environmental Monitoring Plan

ENVIRONMENTAL EFFECTS MONITORING							
Environmental Indicators	**Location**	**Monitoring Methods**	**Frequency**	**Reporting**	**Responsibility**		**Estimated Cost (USD)**
					Supervision	**Implementation**	
Pre-construction Phase							
A) Air quality and microclimate: dust, CO, NOx, SO2, -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	EIA preparation consultant	Included in EIA preparation cost
Construction Phase of 110 kV transmission line turned to 220kV Son Tay Substation							
A) Air quality and microclimate: dust, - Noise B) Domestic (worker) and construction solid waste inside and outside construction sites including worker camps. C) Public comments and complaints D) Incidence of worker or public accident or injury	A): Baseline sites of pre-construction phase. B) All construction sites and worker camps C) Using hotline number placed at construction areas D) At all construction areas	A) Using visual observations of dust and noise from contractor and public reports. B) Visual observation C) Information transferred by telephone hotline number posted at all construction sites. D) regular reporting by contractors/ESU	(A): Quarterly during construction periods Daily visual records B) Monthly C) Continuous public input D) Continuous	Monthly	(A - B):		A Include in the construction cost B,C, D: no marginal cost
					ESU	Safeguard Officer of Constructor	
					(C and D) and daily observations:		
					EA/ESU	contractor	
Operation of 110kV transmision line turned to 220kV Son Tay substation subproject							
Incidence of worker accidents, or spills on hazardous materials, noise and EMF	At substation	Regular documentation and reporting	Continuous		EVNHANOI /PPMB		O and M

Table 29 Performance Monitoring Indicators for Subproject

Activities of subproject	Mitigation activities	Key Indicator	Performance Objective	Data Source
Pre-construction Phase				
Land acquisition and compensation	Mentioned in Table 28	Mentioned in RP	Mentioned in RP	Resettlement Plan
Construction site arrangement	Mentioned in Table 28	- 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/PMB
UXO clearance	Mentioned in Table 28	UXO disarmament	No risk of life safety of workers and people	Monitoring by PIC/PMB
Construction Phase				
Tree cutting and site clearance	Mentioned in Table 28	Important habitat, rare or endangered species if presenting during tree cutting and site clearance	All present critical habitat and rare and endangered species if unchanged, and unharmed	Monitoring by constructor
Concentration of workers and domestic wastes generated	Mentioned in Table 28	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	Contractor monitoring reports
Excavation for tower foundation, usage of fuel and hazardous substance, installation of, equipment, devices, machines	Mentioned in Table 28	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.	Contractor monitoring reports,
Construction activities and transportation of materials, demolition of old lines	Mentioned in Table 28	Dust, noise levels meet Vietnamese standards	The content must not exceed the level at pre-subproject. Complying with mitigation measures for water quality	Monitoring report of contractors
Construction materials transportation,	Mentioned in Table 28	Frequency of disruptions and blocked roadways is reduced	Disruptions, stoppages, or detours are managed to	Public input, contractor

Activities of subproject	Mitigation activities	Key Indicator	Performance Objective	Data Source
and storage		Maintenance and operation method of equipment, machines, and vehicles	absolute minimum.	reports, constructor reports
Tower excavation, installation; wire pulling and the TL connection to the national grid system	Mentioned in Table 28	Timing of power cut Methods of pulling wire at section crossing over existing TLs, communication lines and canals	Minimized time of power cut, effect on existing Tls, communication lines and canals.	Construction Supervision Consultant and monitoring report of contractors
Excavation and construction of tower, wire stringing, Transportation and installation of equipment	Mentioned in Table 28	Occupational health and safety of workers. Frequency of injuries are reduced	Adherence to GoV occupational health and Safety regulations	Contractor reports
During transportation of construction material; installation of equipment and construction activities	Mentioned in Table 28	Community health and safety is enhanced. Local people injuries are reduced	Adherence to GoV Safety regulations	Contractor reports
Concentration of workers and Social disturbance	Mentioned in Table 28	disorder, insecurity and disturbance in the locality due to conflicts between workers and local people are reduced social evils; possible infectious diseases generation are reduced	Compliance with the GOV's regulations on Occupation, Safety, and public health, or the World Bank's Environment, Health, and Safety Guidelines	Contractor reports
Repair, restore, return the ground after construction completion	Mentioned in Table 28	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 monitoring reports
Operation phase of transmission line				
Cut trees and branches violating the ROW	Mentioned in Table 28	Vegetation cover, biological environment are protected	Low percentage of vegetation cover clearance; rare and dangerous species are conserved	EVNHANOI
Operation of the transmission lines	Mentioned in Table 28	Frequency of accidents, Worker and community Safety; Electromagnetic field monitoring	No increase in accidents, Worker and community Safety is protected; Electromagnetic field meets safety standard	EVNHANOI

D. Reporting

124. Regular reporting on the implementation of mitigation measures and on monitoring activities during construction phase of the subproject is required. The mitigation and monitoring plans (Tables 27 and 29) summarize proposed timing of reporting which is on monthly basis. The constructor/construction supervision consultant have to submit monthly report to the Project owner

125. Project owner with assistance of PIC compile monthly reports provided by the contractor to prepare semiannual environmental report to submit to ADB.

IX. ESTIMATED COST OF EMP

126. 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 28 the preliminary cost for the implementation of the EMP for the subproject is summarized in Table 31.

Table 30 Estimated costs for Environmental Monitoring Plan of EMP

Activity Type	**Estimated Cost (USD)**
Pre-construction Phase	
Environmental quality base line monitoring	Included in the EIA cost
Construction Phase	
Monitoring Environmental quality	No marginal cost. It is included in the construction contract of constructor
Inspecting environmental compliance	No marginal cost It is included in the construction supervision Consultant's contract
Operation Phase	
Monitoring environmental quality (electromagnetic measurement)	No marginal cost It is included in the operation budget of the substation
Public input	No cost

127. Thus, the cost for EMP is included in working contracts of all units

X. INFORMATION DISCLOSURE AND PUBLIC CONSULTATION

A. Public Consultation

128. The stakeholder consultation strategy was developed to meet the requirements of meaningful consultation as stipulated by the ADB SPS (2009) as well as Vietnam Law on Environmental Protection (2014). The strategy embodied the principles of meaningful engagement, transparency, participation, and inclusiveness to ensure that affected and marginalized groups such as women, and the poor, were given equal opportunities to participate in the design of the subproject.

1. Identification of Stakeholders

129. Stakeholders were identified and participated in consultation. Communication with stakeholders focused on the affected organizations and communities, and persons directly affected by the proposed subproject. The stakeholders of the subproject include:

- Institutional stakeholders such as: (i) Communal People's Committee, People's Commission, (ii) Project EA,(iii) PMU;
- 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.

130. Formal community consultation meetings were held to discuss the location and potential environmental and social impact of the substation. Two public consultations were held in 02 communes on 11 and 12 March 2016; Total 39 persons (31 males and 8 females) participated in the meetings. The details of meetings are presented in Table 32.

Table 31 Time and venue of public consultation meetings

No	***Commune***	***Time***	***Venue***	***No.of participants***
1	Xuan Son	11 March 2016	CPC Office	23
2	Thanh My	12 March 2016	CPC Office	16
3	**Total**			39

131. Public consultation meetings consisted of the following procedures:

- Engineering consultant introduced the subproject "110kV transmission line turned to 220kV Son Tay Substation" and the length/technical features of the transmission line that will cross over the 2 communes.
- Environmental consultant presented environmental policy, safety regulations of the ADB and the Vietnam power sector, anticipated environmental impacts and respective mitigation measures (to be developed in the IEE), grievance redress mechanism for environmental and resettlement problems;

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

2. **Results of Public Consultation**

132. The main comments of communal authorities are as follows:

- Measures to be implemented strictly and effectively.
- The Contractor should take required measures to rehabilitate the area, ensuring the re-cultivation, while avoiding conflicts and grievances as many as possible.
- It is recommend focusing on safety measures during the operation of the transmission line, to ensure the safety conditions, health for working farmers in the field and avoid any incidents.
- The project owner and design consultant needs to review the survey and design so that the column position is the most logical place, to avoid affecting the production, cultivation on the remaining area

133. The summary of comments/questions from local authorities/people and answers of project owners and consultants are summarized in Table 33. Required input from stakeholders and response from project owners will occur through the Grievance Redress Mechanism.

Table 32. Discussion summary of public consultation

No	*Comments*	*Response of consultant*	*Response from Project Owner*
I	**Xuan Son Commune**		
1	The commune People Committee and the people agree with the implementation of the project; however, the following steps should be conducted: - Returning to the original surface as people continue to facilitate cultivation. - Avoiding the occurrence of the puzzling situation, claims or causes damage to the community. - When there are certain problems, investors and contractors should actively perform their responsibilities; contact with the community and residents to resolve satisfactorily, avoid repudiation, avoiding damage to community road - The project owner and design consultant needs to review the survey and design so that the tower position is placed at the most suitable location, to avoid affecting the production, cultivation on the remaining area	Contractor will take measures as outlined to mitigate impacts. In case of any incident affecting people's equipment and structures the Contractor will have the timely corrective plan, as prescribed by law.	Mitigation measures are presented in Section VIII. Environmental Management Plan
II	**Thanh My Commune**		
2	- The project owner and design consultant needs to review the survey and design to move the poles toward the field in order to reduce long-term effects on the health and production of household. - If the design does not commit to ensure the absolute safety of the grid corridor local people will not unanimous. - Construction contractor must rehabilitate the damage road, return temporary acquisition land, grow tree when construction finishes - Constructor and Project owner should commit to compensate/mitigate all impacts caused by construction activities - Currently, there is a plinth lying on the infield road. Design consultant should adjust the design proposal.	Noted. The design, construction and operation of the TL is subjected to safety regulations to avoid potential risks	Potential Impacts and Mitigation Measures are presented in Section VIII. Environmental Management Plan
	Conclusion: The CPC of Thanh My and Xuan Son and affected people agree and will support the construction of "110kV transmission lines turned to 220kV Son Tay substation" subproject		

134. In short, the local people agree with the implementation of the subproject; concerns were primarily on ensuring mitigation measures of the contractor, as well as the

responsibilities of involved parties in cases of incidents and damage to property and threatening people's safety. After the explanation and clarification of missing information by the consultant, local community and authorities agreed completely with the project.

135. Before commencing the construction, the project owner shall notify the CPCs on the progress of construction, publicize approved IEE, EMP and EIA in Vietnamese in CPC offices. Subsequent public consultation meetings are not required any further.

B. Information disclosure

136. Formal information disclosure to the affected persons and stakeholders of "110kV transmission lines turned to 220kV Son Tay substation" subproject that presented in the IEE aims to the beginning of continued information disclosure and participation of relevant parties as the subproject is implemented. As part of the communication strategy for the relevant parties (stakeholders), regular information exchange meetings with stakeholders are strongly encouraged throughout the implementation of the subproject.

137. IEE must be easily to understand in order that the stakeholders can comment in written and verbal form in local language of Vietnamese. At a minimum, Executive Summary of the IEE should be written in Vietnamese and distributed to all PAPs. IEE should be available on the EVNHN website, at the EVNHN office in Hanoi City, and at the subproject localities. Similarly, all reports on public consultation with the stakeholders, environmental monitoring, and EMP implementation prepared by the EA/IA should be available at the above websites, offices and localities. IEE will be available on the ADB website as well as EMP report that is prepared by the EA/IA after implementation begins.

XI. EMERGENCY RESPONSE PLAN

138. The Contractor must develop emergency or incident response procedures during construction and operation phases of the "110kV transmission lines turned to 220kV Son Tay substation" 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. The detailed requirements for the ERP are described in Appendix D.

XII. INSTITUTIONAL CAPACITY REVIEW AND NEEDS

139. Currently there is insufficient experience and capacity for environmental assessment and management in EVNHANOI for the implementation of the EMP, and to develop future safeguards for the non-core subprojects. The PIC with assistance from the ESU/IA of the subproject has been developed and delivered 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 subproject owner including the ESU to oversee implementation of the EMP by construction contractors, and EMC. Cost for training has been included with costs of PIC consultation service.

140. Training on the implementation of an EMP has addressed two thematic areas. The first area should be principles environmental assessment and management focused on the potential impacts of subproject 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

141. The initial examination of 110kV transmission lines turned to 220kV Son Tay substation in Ha Noi indicates that potential environmental impacts are largely construction-related impacts and disturbances that can be mitigated and managed.

142. The civil construction impacts of elevated dust, noise, traffic disruptions and sedimentation, and public and worker safety are assessed as medium and can be managed effectively with standard construction practices.

143. The public consultation meetings underscored the need for effective management of construction impacts such as noise, dust, traffic disruptions, and public safety as indicated in EMP. Especially, the public concerns were raised on ensuring mitigation measures of the contractor, as well as the responsibilities of involved parties in cases of incidents and damage to property and threatening people's safety; rehabilitation of the area should be made in due time so that farmers can resume farming . The safe operation of the substation and transmission line was significantly focused by local residents.

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

XIV. REFERENCE CITED

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APPENDICES

- **A. Rapid Environmental Assessment (REA) Checklist**
- **B. Minutes of Public Consultation Meetings, Ha Noi**
- **C. UXO Clearance Decision**
- **D. Emergency Response Plan**

APPENDIX A : Rapid Environmental Assessment (REA) 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:	**Ha Noi and Ho Chi Minh City Power Grid Development Sector Project- Loan 3161/8286-VIE**
Sector Division:	**110kV transmission lines turned to 220kV Son Tay 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	
Mangrove		X	
Estuarine		X	
Buffer zone of protected area		X	
Special area for protecting biodiversity		X	
B. Potential Environmental Impacts Will the Project cause…			
▪ Encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?		x	
▪ Encroachment on precious ecosystem (e.g. sensitive or protected areas)?		x	
▪ alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?		x	

Screening Questions	Yes	No	Remarks
▪ damage to sensitive coastal/marine habitats by construction of submarine cables?		x	There are no submarine cables to be installed by the project.
▪ 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. 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 is no rock crushing, cutting in the project. The mitigation measures will be implemented to reduce air pollution
▪ 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	No blasting. Medium impact level due to noise and vibration occurred during road cutting and movement of construction vehicles along access road in construction phase. Mitigations for noise and vibration caused by construction-related activities are specified by the EMP for the subproject**.**
▪ dislocation or involuntary resettlement of people?		x	The project affects farming land for rice, tea and aquaculture without houses/accommodations. Required compensation for land loss is addressed by RDDD for subproject.
▪ dis-proportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		x	No ethnic minority groups in the subproject area
▪ social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?		x	Small impacts. Noise and dust from excavation and construction works will have insignificant impacts on household who are living nearby as this is rural area and transmission line does not traverse urban area. However, the Project owner, contractors will implement the proposed mitigation measures such as: no transport in rush hours, repair damaged road after the construction etc.

Screening Questions	Yes	No	Remarks
▪ hazardous driving conditions where construction interferes with pre-existing roads?	x		Small impact. The digging cable ditches on road ways and increase of project heavy trucks can cause risk in traffic accident. However, mitigation measures, and ensuring safety will be taken strictly, assailing, set the speed control signs, traffic regulation etc.
▪ 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	No displacement due to construction of TL
▪ 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	No protected areas within 10 km of the project area
▪ 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		Small impact. Potential local social issues with construction worker population are identified in the IEE and are addressed by the Mitigation Plan of IEE.
▪ social conflicts if workers from other regions or countries are hired?		x	No impact. All workers are Vietnamese. Workers from other regions or countries are not hired
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?	x		Small impact. Since the number of workers is small, no worker camps are built but hired local houses. 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		

Screening Questions	Yes	No	Remarks
▪ community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?		x	Minor impact. No land subsidence, lowered groundwater table, and salinization would be happed. Electromagnetic fields occur in operation phase- Electromagnetic field of the substation will not affected surrounding communities.
▪ 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		Low risk level. There is no transmission line. Also, in the process of maintenance, the operate 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	The project areais located in an elevated area which is 0.4m higher than ground and the risk of flooding is minimal. The transmission line construction will be affected by temporary flooding. No impact in operation of TL.
▪ 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	

APPENDIX B:MINUTES OF PUBLIC CONSULTATION MEETINGS

a. List of participants

TT	Name	Male	Female	Position	Address
1	Vu Xuan Thao	x		Party Secretary	Xuan Son commune, Son Tay town
2	Cao Van Binh	x		Deputy Head of CPC	Xuan Son commune, Son Tay town
3	Dang Van Truong	x		Head of Mass Frontier	Xuan Son commune, Son Tay town
4	Le Dac Binh	x		Village Party Secretary	Nhan Ly village, Xuan Son commune, Son Tay town
5	Truong Cong Bang	x		Village officer	Nhan Ly village, Xuan Son commune, Son Tay town
6	Le Manh Chien	x			Nhan Ly village, Xuan Son commune, Son Tay town
7	Truong Van Dieu	x			Nhan Ly village, Xuan Son commune, Son Tay town
8	Truong Quoc Phan	x			Nhan Ly village, Xuan Son commune, Son Tay town
9	Truong Van Thinh	x			Nhan Ly village, Xuan Son commune, Son Tay town
10	Truong Van Ngu	x			Nhan Ly village, Xuan Son commune, Son Tay town
11	Nguyen Thi Hien		x		Nhan Ly village, Xuan Son commune, Son Tay town
12	Truong Van Long	x			Nhan Ly village, Xuan Son commune, Son Tay town
13	Tran Xuan Huong		x		Nhan Ly village, Xuan Son commune, Son Tay town
14	Le Hung Son	x		CPC officer	Xuan Son commune, Son Tay town
15	Le Van Chuyen	x		CPC officer	Xuan Son commune, Son Tay town
16	Le Ngoc Bich		x	CPC officer	Xuan Son commune, Son Tay town
17	Phung Trong Dung	x		Deputy Head of CPC	Thanh My commune, Son Tay town
18	Kieu Quang Phat	x		Head of Mass Frontier	Thanh My commune, Son Tay town
19	Nguyen Dinh Vinh	x		Land Surveyor officer	Thanh My commune, Son Tay town
20	Bui Van Luy	x		Village Head	Tay Vi village, Thanh My commune, Son Tay town
21	Phung Dinh Dien	x		Mass Frontier	Yen My village, Thanh My commune, Son Tay town
22	Le Van Hieu	x			Tay Vi village, Thanh My commune, Son Tay town
23	Le Van Tap	x			Tay Vi village, Thanh My commune, Son Tay town
24	Bui Van Anh	x			Tay Vi village, Thanh My commune, Son Tay town
25	Nguyen Van Nho	x			Tay Vi village, Thanh My commune, Son Tay town
26	Le Chi Duoc	x			Tay Vi village, Thanh My commune, Son Tay town
27	Nguyen Van Huong	x			Tay Vi village, Thanh My commune, Son Tay town
28	Le Van Dung	x			Tay Vi village, Thanh My

					commune, Son Tay town
29	Tran Thi Mat		x		Tay Vi village, Thanh My commune, Son Tay town
30	Le Thi Dung		x		Tay Vi village, Thanh My commune, Son Tay town
31	Nguyen Thi Tu		x		Tay Vi village, Thanh My commune, Son Tay town
32	Le Thi Tho		x		Tay Vi village, Thanh My commune, Son Tay town
33	Nguyen Van Hoi	x			Tay Vi village, Thanh My commune, Son Tay town
34	Ta Thi Sinh		x		Tay Vi village, Thanh My commune, Son Tay town
35	Le Thi Duc		x		Tay Vi village, Thanh My commune, Son Tay town
36	Le Van Tu	x		National Frontier	Tay Vi village, Thanh My commune, Son Tay town
37	Nguyen Trung Kien	x		Party Secretary	Tay Vi village, Thanh My commune, Son Tay town
38	Kieu Van Ho	x			Yen My village, Thanh My commune, Son Tay town
39	Nguyen Van An	x		Village Deputy Head	Yen My village, Thanh My commune, Son Tay town

b. Scanned copies of minutes and list of participants

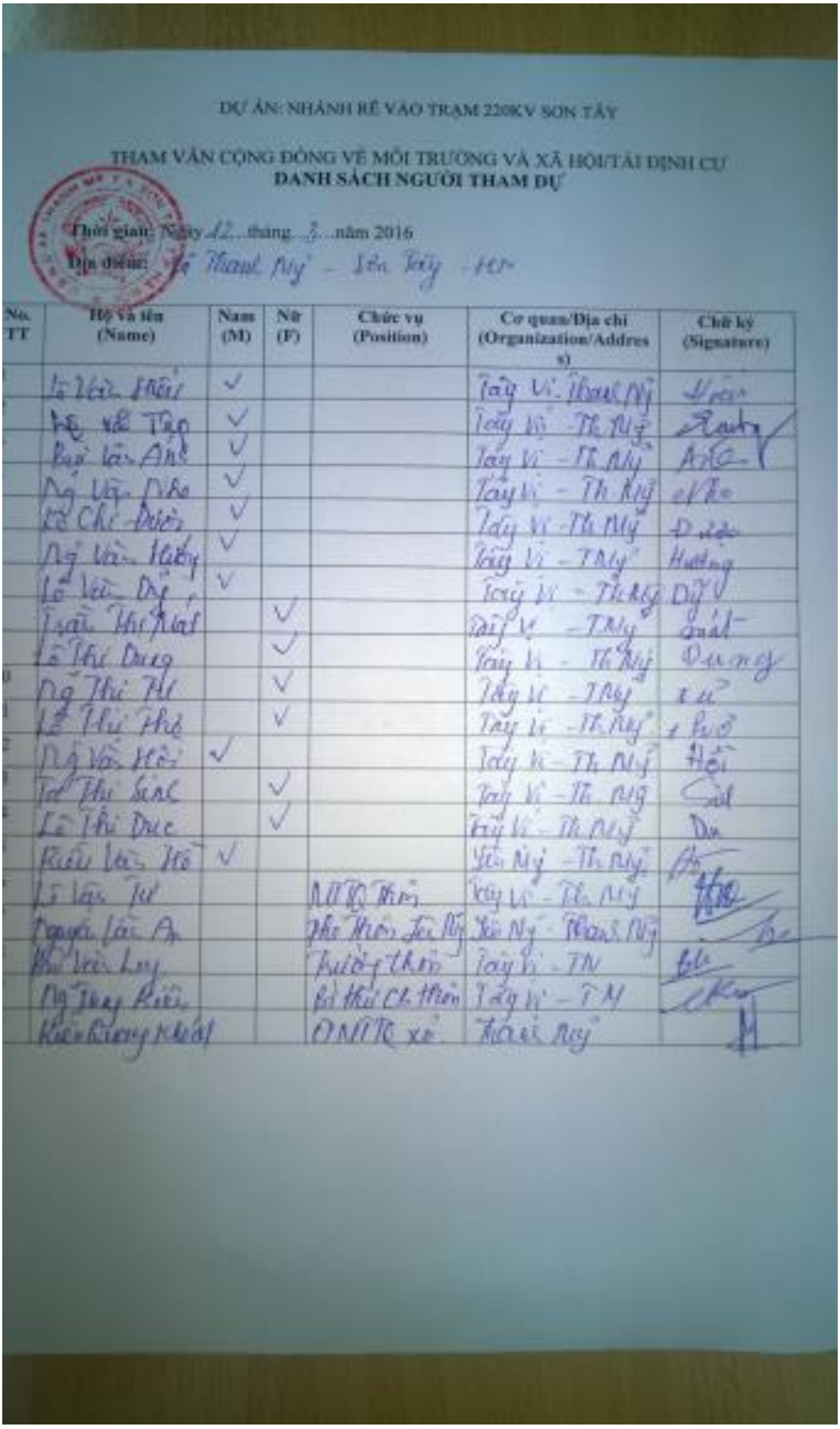
DỰ ÁN: NHÁNH RẼ VÀO TRẠM 220KV SƠN TÂY

THAM VẤN CỘNG ĐỒNG VỀ MÔI TRƯỜNG VÀ XÃ HỘI/TÁI ĐỊNH CƯ
DANH SÁCH NGƯỜI THAM DỰ

Thời gian: Ngày ..11.. tháng ..3.. năm 2016

Địa điểm: Xã Xuân Sơn - Sơn Tây - Hà Nội

No. TT	Họ và tên (Name)	Nam (M)	Nữ (F)	Chức vụ (Position)	Cơ quan/Địa chỉ (Organization/Address)	Chữ ký (Signature)
1	Lê Văn Bình	V		Bí Thư	Thôn Lý - X. Sơn	
2	Trần Công Bằng			Chủ tịch	Thôn Lý - X. Sơn	
3	Đặng Văn Thắng			CT. MTTQ		
4	Lê Xuân Thắc			Bí thư xã		
5	Lê Nam Châu				Thôn Lý - X Sơn	
6	Trương Văn Đức				Thôn Lý - Xã Sơn	
7	Trương Quốc Phấn				Thôn Lý - X Sơn	
8	Trần Văn Thiệt				Th. Lý - X. Sơn	
9	Trần Văn Ngữ				Th. Lý - X. Sơn	
10	Ng Thị Hồng				Thôn Lý X. Sơn	
11	Phùng Văn Long				Thôn Lý - X Sơn	
12	Trần Xuân Hạnh				Th. Lý - x Sơn	
13	Lê Hùng Sơn			Uỷ viên		
14	Lê Văn Chuyên			Uỷ viên		
15	Lê Ngọc Anh			Uỷ viên		
16						
17						
18						
19						
20						



DỰ ÁN: NHÁNH RẼ VÀO TRẠM 220KV SƠN TÂY

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

DANH SÁCH NGƯỜI THAM DỰ

Thời gian: Ngày 12 tháng 3 năm 2016

Địa điểm: xã Thanh Mỹ – Sơn Tây – HN

No. TT	Họ và tên (Name)	Nam (M)	Nữ (F)	Chức vụ (Position)	Cơ quan/Địa chỉ (Organization/Address)	Chữ ký (Signature)
	Lê Văn Khải	✓			Tây Vi - Thanh Mỹ	
	Hồ Văn Tập	✓			Tây Vi - Th Mỹ	
	Bùi Văn Anh	✓			Tây Vi - Th Mỹ	
	Ng Văn Nho	✓			Tây Vi - Th Mỹ	
	Lê Chí Dười	✓			Tây Vi - Th Mỹ	
	Ng Văn Hưởng	✓			Tây Vi - T Mỹ	
	Lê Văn Dự	✓			Tây Vi - Th Mỹ	
	Trần Thị Nhất		✓		Tây Vi - T Mỹ	
	Lê Thị Dung		✓		Tây Vi - Th Mỹ	
	Ng Thị Tư		✓		Tây Vi - T Mỹ	
	Lê Thị Phổ		✓		Tây Vi - Th Mỹ	
	Ng Văn Hồi	✓			Tây Vi - Th Mỹ	
	Tô Thị Sinh		✓		Tây Vi - Th Mỹ	
	Lê Thị Đức		✓		Tây Vi - Th Mỹ	
	Kiều Văn Hồ	✓			Tân Mỹ - Th Mỹ	
	Lê Văn Tư			MTTQ thôn	Tây Vi - Th Mỹ	
	Nguyễn Văn An			Phó thôn Tân Mỹ	Tân Mỹ - Thanh Mỹ	
	Phí Văn Long			Trưởng thôn	Tây Vi - TN	
	Ng Trung Kiên			Bí thư Ch thôn	Tây Vi - TM	
	Kiều Quang Khải			CNMTTQ xã	Thanh Mỹ	

DỰ ÁN: NHÁNH RẼ VÀO TRẠM 220KV SƠN TÂY

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự Do - Hạnh phúc
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....., Ngày 11 tháng 3 năm 2016

BIÊN BẢN HỌP THAM VẤN CỘNG ĐỒNG
VỀ ĐÁNH GIÁ MÔI TRƯỜNG VÀ XÃ HỘI/TÁI ĐỊNH CƯ

Phường/Xã Xuân Sơn, Quận/Huyện Sơn Tây Thành phố Hà Nội

1. Thành phần tham dự

Ông/Bà Vũ Xuân Thao Chức vụ Bí Thư Đảng Ủy
Ông/Bà Cao Văn Bình Chức vụ P. Chủ tịch
Ông/Bà Hoàng Văn Tường Chức vụ CT MTTS
Ông/Bà ..... Chức vụ .....
Ông/Bà ..... Chức vụ .....

Đại diện những người bị ảnh hưởng: .....người (*chi tiết xem danh sách đính kèm*)

2. Nội dung tham vấn

Tư vấn giới thiệu về: mục tiêu, quy mô, vị trí xây dựng, các hạng mục đầu tư lắp đặt, xây dựng của Dự án đầu tư nhánh rẽ vào trạm 220kV Sơn Tây;

Tư vấn môi trường trình bày về: Chính sách môi trường của ADB; Các quy định về môi trường trong ngành điện của chính phủ Việt Nam; Các tác động về môi trường và các biện pháp giảm thiểu tương ứng (như trong IEE); Cơ chế khiếu nại khi có các vấn đề môi trường xảy ra.

Tư vấn xã hội/tái định cư trình bày về: Kế hoạch tái định cư của ADB; Những tác động khi thu hồi đất và các tài sản trên đất; Những chính sách của Chính phủ nước Cộng hoà xã hội chủ nghĩa Việt Nam và địa phương, chính sách của dự án trong vấn đề bồi thường thiệt hại khi Nhà nước thu hồi đất đai và các tài sản trên đất; Các tác động thu hồi đất/tái định cư dự kiến trên địa bàn; Các phương án bồi thường đề xuất (*theo Khung chính sách của dự án đã được phê duyệt*).

DỰ ÁN: NHÁNH RẼ VÀO TRẠM 220KV SƠN TÂY

3. Ý kiến thảo luận

3.1 Về các tác động môi trường tiêu cực và biện pháp giảm thiểu

- Chính quyền và người dân đồng ý về chủ trương TXD dự án; tuy vậy trong khi t/h cần lưu ý tới các việc sau:
+ Khoanh trả mặt bằng như ban đầu để người dân tiếp tục canh tác thuận lợi
+ Việc thực hiện nghiêm túc trách nhiệm của nhà thầu và chủ đầu tư là quan trọng tránh để xảy ra các tình trạng khúc mắc khiếu kiện, hay gây thiệt hại cho cộng đồng
+ Khi có vấn đề phát sinh, đề nghị CĐT & nhà thầu chủ động t/h trách nhiệm của mình; liên hệ với cq đ/p và người dân để giải quyết thỏa đáng, tránh trường hợp thoái thác, né tránh gây thiệt hại cho cộng đồng

3.2 Về các vấn đề thu hồi đất và các tài sản trên đất và các chính sách

- Đề nghị xem xét lại việc khảo sát thiết kế sao cho các vị trí cột được đặt hợp lý nhất, ko ảnh hưởng đến sản xuất, canh tác trên các diện tích còn lại.
- Đề nghị dự án cung cấp 1 bộ hồ sơ, căn cứ pháp lý đầy đủ để người dân có căn cứ để giải đáp các thắc mắc của dân địa sau này
- Đơn giá bồi thường cho lúa & hoa màu là thấp, đề nghị xem xét lại, tăng thiết thực cho người dân.
- Các phần ruộng còn lại quá nhỏ, đề nghị dự án cũng thu hồi nốt vì khó canh tác tiếp

4. Kết luận

Tư vấn tiếp thu tất cả các ý kiến.

Đại diện chủ đầu tư	Đại diện cộng đồng	Đại diện tư vấn	Đại diện UBND Phường
			PHÓ CHỦ TỊCH Cao Văn Bình

DỰ ÁN: NHÁNH RẼ VÀO TRẠM 220KV SƠN TÂY

CỘNG HOÀ XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự Do - Hạnh phúc
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....., Ngày.....tháng.....năm 2016

BIÊN BẢN HỌP THAM VẤN CỘNG ĐỒNG
VỀ ĐÁNH GIÁ MÔI TRƯỜNG VÀ XÃ HỘI/TÁI ĐỊNH CƯ

Phường/Xã Thanh Mỹ....., Quận/Huyện Sơn Tây...Thành phố .....

1. Thành phần tham dự

Ông/Bà Phùng Trọng Dung.....Chức vụ UBND xã....
Ông/Bà Kiều Quang Phát.....Chức vụ CT. MTTQ xã....
Ông/Bà Nguyễn Đình Vinh.....Chức vụ CB địa chính....
Ông/Bà Bùi Văn Luy.....Chức vụ Trưởng thôn Tây L...
Ông/Bà Phùng Đình Diễn.....Chức vụ MTTQ thôn Yên Mỹ

Đại diện những người bị ảnh hưởng: .....người (*chi tiết xem danh sách đính kèm*)

2. Nội dung tham vấn

Tư vấn giới thiệu về: mục tiêu, quy mô, vị trí xây dựng, các hạng mục đầu tư lắp đặt, xây dựng của Dự án đầu tư nhánh rẽ vào trạm 220kV Sơn Tây;

Tư vấn môi trường trình bày về: Chính sách môi trường của ADB; Các quy định về môi trường trong ngành điện của chính phủ Việt Nam; Các tác động về môi trường và các biện pháp giảm thiểu tương ứng (như trong IEE); Cơ chế khiếu nại khi có các vấn đề môi trường xảy ra.

Tư vấn xã hội/tái định cư trình bày về: Kế hoạch tái định cư của ADB; Những tác động khi thu hồi đất và các tài sản trên đất; Những chính sách của Chính phủ nước Cộng hoà xã hội chủ nghĩa Việt Nam và địa phương, chính sách của dự án trong vấn đề bồi thường thiệt hại khi Nhà nước thu hồi đất đai và các tài sản trên đất; Các tác động thu hồi đất/tái định cư dự kiến trên địa bàn; Các phương án bồi thường đề xuất (*theo Khung chính sách của dự án đã được phê duyệt*).

DỰ ÁN: NHÁNH RẼ VÀO TRẠM 220KV SƠN TÂY

3. Ý kiến thảo luận

3.1 Về các tác động môi trường tiêu cực và biện pháp giảm thiểu

- Các hộ dân có đường dây chạy qua trên đất ở đề nghị xem xét lại thiết kế, chuyển các cột ra phía cánh đồng nhằm giảm ảnh hưởng lâu dài đến sức khỏe và sản xuất của họ.
- Nếu thiết kế không đổi thì bồi thường như thế nào, có cam kết đảm bảo an toàn tuyệt đối và sự cố an toàn được không? Nếu không, người dân không nhất trí.
- Khi thi công đề nghị nhà thầu hoàn thành [illegible] nhanh của mình, vì đường xá, ruộng đất, cầu cống nếu ảnh hưởng sẽ phải hoàn trả.

3.2 Về các vấn đề thu hồi đất và các tài sản trên đất và các chính sách

- Nếu đã điều chỉnh thiết kế tránh khu dân cư, nếu không thể phải thực hiện TĐC cho các hộ BAH. Đa số các hộ tham dự họp đều nhất trí đề nghị dịch chuyển đường dây ra khỏi KDC.
- Giá bồi thường đất trồng cây lâu năm, hoa màu tại giá thị trường có sự cố bồi thường hợp lý.
- Đất ở trong hành lang thì bồi thường xứng.
- Thi công gây ảnh hưởng thì ai giải quyết, có bồi thường không, cần thiết phải có sự cam kết thi CĐT.
- Hiện tại có 1 số chân cột nằm trên đường nội đồng, đề nghị điều chỉnh thiết kế.

4. Kết luận

Đơn vị tư vấn tiếp thu các ý kiến góp ý và trình các cấp liên quan xem xét giải quyết.

Đại diện chủ đầu tư	**Đại diện cộng đồng**	**Đại diện tư vấn**	**Đại diện UBND Phường/Xã**
	Bùi Văn Huy		PHÓ CHỦ TỊCH Phùng Trọng Dũng

APPENDIX C: UXO CLEARANCE DECISION

BỘ QUỐC PHÒNG
BỘ TƯ LỆNH THỦ ĐÔ HÀ NỘI

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

Số: 1077/QĐ-BTL

Hà Nội, ngày 19 tháng 5 năm 2016

QUYẾT ĐỊNH
Về việc tổ chức thực hiện công tác rà phá bom mìn, vật nổ dự án Nhánh rẽ vào trạm 220kV Sơn Tây

BAN QUẢN LÝ DỰ ÁN PHÁT TRIỂN ĐIỆN LỰC HÀ NỘI
CÔNG VĂN ĐẾN
Số: 1091
Ngày 30 tháng 5 năm 2016

TƯ LỆNH BỘ TƯ LỆNH THỦ ĐÔ HÀ NỘI

Căn cứ Quyết định số 96/2006/QĐ-TTg ngày 04/5/2006 của Thủ tướng Chính phủ về việc quản lý và thực hiện công tác rà phá bom mìn, vật nổ;

Căn cứ Thông tư số 146/2007/TT-BQP ngày 11/9/2007 của Bộ Quốc phòng hướng dẫn thực hiện Quyết định số 96/2006/QĐ-TTg;

Căn cứ Công văn số 866/HANOI DPMB-KTGS ngày 05/5/2016 của Ban quản lý dự án Phát triển Điện lực Hà Nội/Tổng Công ty Điện lực thành phố Hà Nội về việc đề nghị rà phá bom mìn, vật nổ dự án Nhánh rẽ vào trạm 220kV Sơn Tây;

Xét đề nghị của Tham mưu trưởng Bộ Tư lệnh Thủ đô Hà Nội,

QUYẾT ĐỊNH:

Điều 1. Tổ chức thực hiện công tác rà phá bom mìn, vật nổ dự án Nhánh rẽ vào trạm 220kV Sơn Tây với những nội dung chủ yếu sau:

1. Địa điểm thực hiện: Xã Thanh Mỹ và Xuân Sơn, thị trấn Sơn Tây, thành phố Hà Nội.

2. 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.

3. Diện tích rà phá bom mìn, vật nổ (khoảng): 2,0 ha.

4. Nguồn vốn: Vốn vay ADB và vốn đối ứng EVN HANOI.

5. Đơn vị tổ chức thực hiện:

- Khảo sát, lập phương án kỹ thuật thi công và dự toán: Công ty Trách nhiệm hữu hạn một thành viên xử lý bom mìn, vật nổ 319.

- Thi công rà phá bom mìn, vật nổ: Tổng Công ty 319/Bộ Quốc Phòng.

6. Thời gian thực hiện: Quý III năm 2016.

Điều 2. Nhiệm vụ của các đơn vị:

1. Công ty Trách nhiệm hữu hạn một thành viên xử lý bom mìn, vật nổ 319: Tổ chức khảo sát xác định thực trạng, mật độ bom mìn, vật nổ, diện tích

mặt bằng trong phạm vi dự án Chủ đầu tư bàn giao tại thực địa; lập phương án kỹ thuật thi công, dự toán rà phá bom mìn, vật nổ theo kết quả khảo sát và yêu cầu tiến độ của Chủ đầu tư; báo cáo Bộ Tư lệnh Thủ đô Hà Nội thẩm định, phê duyệt làm cơ sở cho các cơ quan liên quan kiểm tra, giám sát thực hiện.

2. Tổng Công ty 319/Bộ Quốc phòng: Triển khai thi công rà phá bom mìn, vật nổ theo phương án được phê duyệt để đảm bảo an toàn về mặt bom mìn, vật nổ cho quá trình thi công cũng như đưa công trình vào khai thác sử dụng theo đúng yêu cầu tiến độ của dự án; phối hợp chặt chẽ với Chủ đầu tư, các cơ quan, đơn vị liên quan để giám sát thi công và quản lý chặt chẽ địa bàn. Quá trình thực hiện, chấp hành đúng các quy định hiện hành của Nhà nước và Bộ Quốc phòng về công tác rà phá bom mìn, vật nổ.

Điều 3. Quyết định này có hiệu lực kể từ ngày ký. Tham mưu trưởng Bộ Tư lệnh Thủ đô Hà Nội, Giám đốc Ban quản lý dự án Phát triển Điện lực Hà Nội, Tổng giám đốc Tổng Công ty 319/Bộ Quốc phòng, Giám đốc Công ty Trách nhiệm hữu hạn một thành viên xử lý bom mìn, vật nổ 319 và thủ trưởng các cơ quan, đơn vị có liên quan chịu trách nhiệm thi hành Quyết định này./.

Nơi nhận:
- Như điều 3;
- Đ/c Tư lệnh; (để b/c)
- Bộ Tham mưu/BTL Thủ đô Hà Nội;
- Ban QLDA Phát triển Điện lực Hà Nội;
- Tổng Công ty 319/BQP;
- C.ty TNHH MTV Xử lý BMVN 319;
- Ban CHQS thị xã Sơn Tây;
- Lưu: VT, CôB; H10.

KT.TƯ LỆNH
PHÓ TƯ LỆNH

BỘ QUỐC PHÒNG * BỘ TƯ LỆNH THỦ ĐÔ HÀ NỘI *

Đại tá Bùi Trọng Quỳnh

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:

- Emergency Response Team (ERT) of the Contractor as initial responder;
- 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 technical requirements, human and financial resources for quick response during construction.

Table 1: Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (CERT)	- 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 CERT 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 CERT.

4. The Contractor will ensure that CERT 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 PO/PMB, 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;

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 CERT;

ii) Set up all support equipment and facilities in working condition

iii) made arrangements with the EERT;

iv) conduct proper training of CERT members, and encouraged trained volunteers from the labour force;

v) conduct orientation to all construction workers on the emergency response procedures at grassroots level, particularly evacuation procedures, evacuation routes, among others; and

vi) conduct 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 CERT

(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.
- PMB 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 2: 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 CERT
Evacuate through the directed evacuation route	The evacuation route shall have been determined fast by the ERTL/Deputy ERTL and immediately communicated to CERT 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 CERT.
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 CERT first-aiders or EERT medical group	CERT must manage injured persons to ensure proper handling.
If injury warrants special care, DO NOT MOVE them, unless necessary and instructed/directed by the EERT	ERTL/Deputy ERTL communicates with EERT to get instructions/directions in handling the injured.

Table 3: 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 CERT 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 CERT 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 4: 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, - any CERT member among the construction sub-group contacts the fire department (in this case it should be agreed on that it is alright for any CERT 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 evacuating	All (non-CERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure
Activate CERT to control fire from spreading	Guided by the training they undertook, CERT 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, if applicable	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 CERT 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 CERT members to control the traffic in the access road to facilitate passage of the EERT in location.
CERT evacuate the site as soon as, if applicable	Follow appropriate evacuation procedure