Initial Environmental Examination

Project Number: 46391 - 001

August 2017

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

Prepared by Ho Chi Minh City Power Corporation for the Asian Development Bank

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INITIAL ENVIRONMENTAL EXAMINATION

August 2017

Loans 3161/8286-VIE: Ha Noi and Ho Chi Minh City Power Grid Development Sector Project

CAT LAI - TAN CANG 220KV TRANSMISSION LINE

Prepared by Ho Chi Minh City Power Corporation
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ABBREVIATIONS

ADB:	Asian Development Bank
ADB SPS:	The ADB's Safeguard Policy Safeguard Policy Statement (2009)
BOD:	Biochemical Oxygen Demand
CEMP:	Construction/Contractor Environmental Management Plan
CHSP:	Community Health and Safety Plan
CPC:	Ward/Commune People's Committee
CSC:	Construction Supervision Consultant
COD:	Chemical Oxygen Demand
DoCST:	Department of Culture, Sports and Tourism
DoNRE:	Department of Natural Resources and Environment
DPC:	Precinct/District People's Committee
EA/IA:	Executing Agency (EVNHCMC)/Implementation Agency (HCMC-PMB)
EIA:	Environmental Impact Assessment
EMC:	Environmental Monitoring Consultant
EMF:	Electromagnetic Field
EMP:	Environmental Management Plan
ESU:	Environmental and Social Unit of HCMCPMB
EVN:	Vietnam Electricity
EVNHCMC:	Ho Chi Minh City Power Corporation
ENVHANOI:	Ha Noi Power Corporation
HCMC:	Ho Chi Minh City
HCMCPMB:	Ho Chi Minh City Power Projects Management Board
IEE:	Initial Environmental Examination
LEP 2014:	Law on Environmental Protection 2014
MoD	Ministry of Defense
OHSP:	Occupational Health and Safety Plan
OTL:	Overhead transmission line
PCB:	Polychlorinated biphenyls
PCR:	Physical Cultural Resources
PECC2	Power Engineering Consulting Joint Stock Company 2
PIC:	Project Implementation Consultant
PPC:	Provincial People's Committee
PPE:	Personal protective equipment
REA:	Rapid Environmental Assessment
ROW:	Right of Way
TSS:	Total Suspended Solids
UGC:	Underground cable
UXO:	Unexploded Ordnance

CURRENCIES

(rate of exchange of July 2017)

Currency Unit	–	VND
$1,00	=	22,720 VND

Note

In this report, "$" refers to US dollars unless otherwise stated.

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

2. The Initial Environmental Examination (IEE) presented herein is of Cat Lai - Tan Cang 220kV Transmission line subproject in HCMC, which is one of 28 non-core subprojects of the EVN proposed by Hanoi Power Corporation (EVNHANOI) and Ho Chi Minh City Power Corporation (EVNHCMC). These 28 non-core subprojects were classified Category B for environment. The subproject consists of construction of a new Cat Lai - Tan Cang 220kV transmission line, located in district 9; district 2; and Binh Thanh district, Ho Chi Minh city. The IEEs of the other non-core subprojects are prepared separately.

A. Subproject Summary

3. Cat Lai - Tan Cang 220kV transmission line has been designed according to the type of an overhead and underground transmission line with a voltage of 220/110kV and four circuits. The overhead transmission line (OTL) will start in district 9 and end in district 2 of Ho Chi Minh City with total length of 6.48km and the underground cable (UGC) transmission line will start in district 2 and end in Binh Thanh district of Ho Chi Minh City with total length of 5.67km. EVNHCMC is the executing agency and Ho Chi Minh Project management Board (HCMCPMB) is the implementing agency.

4. Objectives of the subproject is to (i) meet the increasing power demand in Ho Chi Minh City, especially in the areas expected to become luxurious urban complexes (zones of Tan Cang and Ba Son); (ii) reduce power losses and improve quality, safety and reliability in power supply for central HCMC as well as regional power grid.

B. Potential Impacts and Mitigation Measures

5. The IEE of Cat Lai - Tan Cang 220kV Transmission line indicates that the potential environmental impacts of the subproject are restricted in the construction phase of the subproject components. The common construction-related disturbances such as noise, dust, erosion, sedimentation, soil and liquid waste pollution, worker camp issues, reduced access, increased vehicles/transportation means and traffic road disruptions, increased risk of worker and resident injury can be managed with standard construction practices and management guidelines (e.g., IFC/World Bank 2007). The subproject does not cross over any National Park, Nature Reserve or area planned for Nature Reserve. There are no rare or endangered wildlife, critical habitats or protected areas in the subproject site.

6. The UGC route goes under the roadways and central reservations of the streets in inner city, so the entire area of land for construction of the UGC is the public traffic land. The land for cable trench construction will be restored to initial status for traffic activities right after completion of the UGC construction. Thus, it does not cause impacts of permanent land acquisition by the project but temporary occupation of some area of roadway during construction of the UGC is unavoidable. Most route of the OTL runs on central reservation of the existing roads. Thus, most land for construction of OTL pole foundations and for OTL Right of Way (ROW) is the public traffic land of road central reservations. Only two short sections with the aggregate length of 744 m are on the outside of traffic land. These sections have three poles and one tower that require the aggregate area of 450 m^2 for construction of their foundations. In addition, the OTL sections outside of traffic land also cause restriction on utilization of land in their ROW because of power safety regulations. However, no house will be dismantled by the subproject land acquisition, so no household will have to relocate due to the subproject implementation. The impacts of the subproject land acquisition is not significant and able to be remedied by compensation and assistance.

7. The construction-related disturbances to environment and community are mainly the short-term disturbances caused by constructing the new OTL and UGC. No cumulative environmental impacts will occur. Mitigation measures for these impacts are in Part VI of this report.

8. The Environmental Management Plan (EMP) prepared for the subproject comprehensively provides impacts, mitigation measures 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 HCMCPMB's Environmental Officer in environmental management and assessment as focused on the implementation of the EMP.

C. Conclusions

9. The IEE concludes that the feasibility study establishment of the subproject combined with available information on affected environment is sufficient to identify the scope of potential environmental impacts of the subproject. In technical design phase, significant changes to the subproject description do not occur, thus new potential environmental impacts, sensitive cultural issues are not arisen, and further detailed environmental impact assessment (EIA) is not required.

II. INTRODUCTION

A. Background of the IEE

10. Ha Noi and Ho Chi Minh City Power Grid Development Project aims to strengthen the capacity and reliability of the power infrastructure in Ha Noi and Ho Chi Minh City, Viet Nam through the rehabilitation and development of the 220kV and 110kV high-voltage power transmission systems and substations and associate to medium voltage supply for the power distribution system of the two cities. The Project also aims to strengthen the institutional capacity of Ha Noi Power Corporation (EVNHANOI) and Ho Chi Minh City Power Corporation (EVNHCMC).

11. The Project in Ha Noi and Ho Chi Minh City consists of 28 non-core subprojects that were originally defined by the Viet Nam Electricity (EVN).

12. This IEE is prepared for the new-constructed subproject of Cat Lai - Tan Cang 220kV Transmission line, which is expected to be constructed in district 9; district 2; and Binh Thanh district, Ho Chi Minh city. This 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 EVNHCMC as one of the non-core projects which are being further detailed and prepared for project implementation.

B. Assessment Context

13. The subproject was classified Environmental Category B under the ADB's Safeguard Policy Safeguard Policy Statement (2009) (ADB SPS). A category B project will have potential adverse impacts that are less adverse than the impacts of category A project and can be mitigated with an EMP.

14. This IEE is prepared for Cat Lai – Tan Cang 220kV transmission line subproject in the detail design stage and the subproject combined with available data and information on affected environments is sufficient to identify the scope of potential environmental impacts of the subproject. No sensitive environmental or cultural resources are determinate in the subproject area.

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

15. Cat Lai - Tan Cang 220kV Transmission line subproject will be implemented under the directions for use of Official Development Assistance (ODA) of the Government of Viet Nam, Decree No. 16/2016/ND-CP dated March 16, 2016 by the Government on the management and use of Official Development Assistance (ODA) and concessional loans of foreign and in accordance with the provisions of the Project.

A. Viet Nam Legislation, Policies, Decrees and Standards for Environmental Assessment

16. The Law on Environmental Protection of Vietnam (2014) (LEP 2014) prescribes the requirements for environmental assessment for developing domestic projects and considering impacts on natural and social environment. The legal documents on directions for environmental assessment and protection in Viet Nam that are referred on the report are listed as follows:

1. Legal documents on environmental protection

- Environmental Protection Law No.55/2014/QH13 of the 13th National Assembly, the 7th Session, passed on 23 Jun 2014 .
- Decree No.18/2015/ND-CP on environmental protection master plan, strategic environmental assessment (SEA), environmental impact assessment (EIA),
- Decree No. 19/2015/ND-CP dated 14 Feb 2015 of the Government on detailing the implementation of some Articles of the Law on Environmental Protection;
- Decree No. 18/2015/ND-CP dated 14 Feb 2015 of the Government on Regulating Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Plan. Thereon, the Environmental Impact Assessment report of the subproject was prepared and approved by Ho Chi Minh Department of Natural Resources and Environment at the Decision No. 712/QD-STNMT-CCBVMT dated 24 March 2017;
- Decree No.38/2015/ND-CP dated 24 Apr 2015 of the Government on waste managment;
- Circular No.27/2015/TT-BTNMT dated on 29 May 2015 on strategy environmental assessment, environmental impact assessment, and environmental protection plan;
- Circular 27/2015/TT-BTNMT dated 29 May 2015 on stipulation on specific articles of Decree No.18 both elaborate the environmental assessment requirements specified by LEP 2014.
- Circular No.36/2015/TT-BTNMT dated 30 Jun 2015 issued by the MONRE regarding the hazardous wastes management.

2. Legal Documents on Electricity

- Electricity law No. 28/2004/QH11 dated 3 Dec 2004.
- Law on modification, supplementation on some articles of the Electricity Law No. 24/2012/QH13 issued by the National Assembly of the Socialist Republic of Vietnam, dated 20 Nov 2012;
- Decree No.14/2014/ND-CP dated 26 Feb 2014 promulgated by the Government of Viet Nam regarding the detailed regulation on the implementation of the Electricity Law on electric safety, put into force from 15 Apr 2014;
- Circular No.31/2014/TT-BCT dated 2 Oct 2014 issued by the Ministry of Industry and Trade (MOIT) regarding the detailed regulation on some contents of electrical safety.

3. Other Related Legal Documents:

- Decree No. 45/2013/ND-CP dated 10 May 2013 of the Government 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 3 Dec 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 10 Oct 2002 regarding the promulgation of 21 labour hygiene standards, 5 principles and 7 labour hygiene measurements.

4. Environment 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-MT:2015/BTNMT - National technical regulation on surface water quality;
- QCVN 14:2008/BTNMT - National technical regulation on domestic wastewater;
- QCVN QTD-5: 2009/BCT - National technical regulation on electrical engineering - electrical equipment verification of the system;
- QCVN QTD-6: 2009/BCT - National technical regulation on electrical engineering - electrical equipment maintenance, repair and operation of the system;
- QCVN QTD-7: 2009/BCT - National technical regulation on electrical engineering - Power project construction;
- QCVN 07:2009/BTNMT - National technical regulation on hazardous waste thresholds.

5. *Directions of Electricity Industry and Information for Cat Lai - Tan Cang 220kV* Transmission line

- Decision No.1208/QD-TTg dated 21 Jul 2011 of the Prime Minister of the Government approving the National Master Plan for power development for the 2011-2020 period with the vision to 2030;
- Decision No.428/QĐ-TTg dated 18 Mar 2016 of the Prime Minister of the Government approving the adjusted master plan on national electricity development in the 2011-2020 period with the considerations up to 2030;
- Decision No.2631/QD-TTg dated 31 Dec 2013 of the Prime Minister of the Government approving the Master Plan on socio-economic development of Ho Chi Minh city through 2020 with the vision toward 2025;
- Decision No.6493/QD-BCT dated 9 Dec 2010 of Minister of Trade and Industry approving the plan for power development of Ho Chi Minh city for the 2011-2015 period with the vision toward 2020;
- Decision No.3344/QD-BCT dated 7 Apr 2015 of the Ministry of Trade and Industry regarding on adjustment and supplement of power development plan of Ho Chi Minh city for the 20111-2015 period with the vision to 2020;
- Letter No.1389/UBND-KT dated 23 Aug 2012 of People's Committee of District 9 regarding the agreement on the direction of mixture transmission line of Cat Lai – Tan Cang 220kV and Cat Lai – An Khanh 110kV;
- Letter No.4792/UBND-QLĐT dated 23 Dec 2013 of People's Committee of District 2 regarding the agreement on the directions of Cat Lai – Tan Cang 220kV and Cat Lai – An Khanh 110kV transmission lines;
- Letter No.505/TTQLĐHSSG-QLHTDT dated 28 Nov 2014 of Management Center of Sai Gon River Tunnel regarding the agreement on the direction of mixture transmission line of Cat Lai – Tan Cang 220kV and Cat Lai – An Khanh 110kV running along Mai Chi Tho road;
- Letter No.2520/UBND-QLĐT dated 16 Jun 2015 of People's Committee of District 2 regarding the agreement on the direction of mixture transmission line of Cat Lai – Tan Cang 220kV and Cat Lai – An Khanh 110kV;
- Letter No.286/KQL2-QLDA2 dated March 4, 2014 of Khu so 2 Urban Traffic Management regarding the agreement on the direction of Cat Lai – Tan Cang 220kV and Cat Lai – An Khanh 110kV transmission lines on Luong Dinh Cua road belonging to the Luong Dinh Cua road renovation project (section from Tran Nao street to Nguyen Thi Dinh street) in District 2, HCMC;

- Letter No.286/KQL2-QLDA2 dated 21 Feb 2014 of Khu so 2 Urban Traffic Management regarding the agreement on the directions of Cat Lai – Tan Cang 220kV and Cat Lai – An Khanh 110kV transmission lines on Tran Nao street belonging to the Tran Nao street expansion and renovation project in District 2, HCMC;
- Letter No.1554/KQL2-QLDA1 dated 11 Oct 2013 of Khu so 2 Urban Traffic Management regarding the agreement on the direction of Cat Lai – Tan Cang 220kV transmission line running in the area of the construction project of connection road from Nguyen Van Huong street to Ha Noi highway;
- Letter No.6989/SGTVT-KT dated 23 Jul 2015 of Ho Chi Minh City Department of Transport regarding the agreement on the direction of Cat Lai – Tan Cang 220kV transmission line running along Tran Nao street and the connection road from Nguyen Van Huong street to Ha Noi highway;
- Letter No.3605/SQHKT-HTKT dated 1 Oct 2015 of Ho Chi Minh City Department Of Planning and Architecture regarding the comments on the directions of Cat Lai – Tan Cang 220kV and Cat Lai – An Khanh 110kV transmission lines.

B. ADB Safeguard Policy

17. The ADB SPS along with the ADB Environmental Safeguards, A Good Practice Sourcebook, 2012 clarifies the rationale, scope and content of an environmental assessment and supported by technical guidelines (e.g., Environmental Assessment Guidelines, 2003). Projects are initially screened to determine the level of assessment that is required according to the following three environmental categories (A, B, or C).

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

18. Cat Lai - Tan Cang 220kV Transmission line subproject is assessed as category B that is necessary to prepare an IEE. Appendix A presents the Rapid Environmental Assessment (REA) of the subproject.

IV. DESCRIPTION OF SUBPROJECT

19. Cat Lai - Tan Cang 220kV transmission line will be designed according to the type of an overhead and underground transmission line with a voltage of 220/110kV and four circuits. The OTL will start in district 9 and end in district 2 of Ho Chi Minh City in with total length of 6.48km and the underground transmission line will start in district 2 and end in Binh Thanh district of Ho Chi Minh City with total length of 5.67km. Map of the subproject's route is in Figure 1.

A. Scope of the Subproject

(i) Construct a 220kV transmission line (included overhead and underground line) starting from the current Cat Lai 220kV substation to Tan Cang 220kV substation (to be constructed in future) with total length of 12.25 km.

(ii) Construct a 110kV cable trench of double circuit for a Cat Lai – An Khanh 110kV transmission line (to be constructed in future) to connect 220kV cable trench from position G3A to G7A with total length of 2.26 km.

(iii) Construct a 110kV cable trench of double circuit for 110kV connection project of Tan Cang 220kV substation and Thu Thiem 220kV substation (in period of 2020-2025) and Tan Cang 220kV substation to JP1.6 cable ditch with total length of 3.13 km.

(iv) Rehabilitate the D11 and D12 bays at the current Cat Lai 220kV substation to connect to Tan Cang 220kV substation.

(v) Install completely a 220kV UGC for Cat Lai – Thu Duc 220kV transmission line with total length of 454 m.

B. Main Technical Specification and Scale of the Subproject

1. The Overhead Transmission Line (OTL)

20. The OTL has a voltage of 220/110kV, four circuits (including 02 circuits of 220kV to be connected to Tan Cang 220kV substation as a complete investment and 02 circuits to be connected to An Khanh 110kV substation as a combination of foundation and tower). The transmission line will start at D11, D12 bay of the current Cat Lai 220kV substation in district 9 of Ho Chi Minh City and end at G3A UGC foundation of T41, T42 (to be constructed), its location is in district 2 of Ho Chi Minh City. It will use a bundle conductor and ACSR 330/43; lightning is a PASTEL 147.1 and OPGW 120, composite insulator, tension and suspension tower, reinforcement concrete foundation and the earthing will be a galvanized ray-system. Length of OTL will be 6.48km, in which 1.46km is used for the current 220kV-110kV Cat Lai – Thu Duc transmission line.

2. The Underground Cable (UGC)

21. The UGC has a voltage of 220kV/110kV, four circuits (including 02 circuits of 220kV connected to Tan Cang 220kV substation as a complete investment and 02 circuits of 110kV connected to An Khanh 110kV substation as a combination of cable ditch). The route starts at G3A connection tower of T41, T42 UGC in district 2 of Ho Chi Minh City and ends at Tan Cang 220kV substation in Binh Thanh district of Ho Chi Minh City. Cable wire uses a dry cable, copper core, XLPE insulator, area of 1,600mm^2. The cable will be installed in HDPE pipe, directly buried at depth of 1.5-2m from the current road surface. The cable route will be protected by concrete slad and cable underground signal tape and provided the 192kV arrestor. Length of UGC is 5.77km.

3. Section of The Reused Transmission Line

22. The voltage of this reused transmission line is 220kV/110kV. It has two circuits of 220kV and 110kV, bundle conductor. It starts at gate tower of the current D11, D12 bay of Cat Lai 220kV substation and ends at the current tension tower (T6). Length of this cable is 1.46km.

4. Rehabilitation of 220kV Bay at Cat Lai 220kV Substation

- Supersede the measurement equipment at the current Thu Duc bay (D11, D12);
- Supplement an energy meter for measurement system to connect to the current data reading system; and
- Supplement a foundation for the new 220kV CVT.

5. Underground Cable Section to Re-connect for Cat Lai – Thu Duc 220kV Transmission Line

23. UGC section will be connected from two 220kV bay (new construction) to 220kV cable connection tower (position F of 220kV connection line to Cong Nghe Cao 220kV substation, it is designed two circuits of 220kV for standby to connect to Thu Duc 220kV substation). The UGC line has a voltage of 220kV, 220kV double circuit; it starts at D05 bay of Cat Lai 220kV substation and ends at 220kV UGC connection tower (position F).

24. The existing environment, land use and location of the subproject is described in Table 1.

Table 1. The existing environment, land use and location of the Cat Lai – Tan Cang 220kV transmission line

No.	Subproject component	Location	Description of Subproject component/route	Land Use
A	***The overhead transmission line (OTL)***			
1	From Cat Lai 220kV Substation to G1A	Phu Huu ward of district 9	The route uses the current 220kV-110kV Cat Lai – Thu Duc transmission line with length of 1.462m. The alignment of this reused OTL section runs along the side of Ba Cua arroyo.	The area in ROW of this section is vacant land currently. According to the land use planning in district 9, the area in the ROW of the reused transmission line section is mainly greenery land of arroyo corridor.
2	From G1A to G1B	Phu Huu ward of district 9.	At G1A, the route turns left on T19°00'00", crossing vacant land area to G1B in Ring Road No.2 of Phu Huu ward, district 9. Its length is 151m.	The area in ROW is vacant land.
3	From G1B – G1C	Phu Huu ward of district 9 and Binh Trung Dong ward of distric 2.	At G1B, The route turns left on T38°58'45", crossing over Ba Cua arroyo to G1C. G1C is defined to locate on the corridor of Ba Cua arroyo. This section is 123 m in length.	The land use in ROW of this section is vacant land and Ba Cua arroyo corridor land.
4	From G1C – G1D	Binh Trung Dong ward of district 2	At G1C, the route runs straight and crosses over the Ring Road No.2 to G1D. G1D is defined to be in the median reservation area of Ring road No.2. This section has the Length of 160m.	The land use in ROW of this section is vacant land and traffic land.
5	From G1D to G2	Binh Trung Dong ward and Cat Lai ward of district 2	From G1C to G2, the route runs in the median reservation area of Ring road No.2 with the length is 1.025m.	The land use in ROW of this section is the public traffic land. Specifically, it is greenery land in the median reservation area of Ring road No.2.
6	From G2 to G2A	Cat Lai ward of district 2	At G2, the route turns right on P16°21'00" and crosses over the Ring Road No.2 to G2A. G2A is defined to be on the side of Ring road No.2. This section has the Length of 135 m.	The land use in ROW of this section includes public traffic land and vacant land.
7	From G2A to G2B	Cat Lai ward of district 2	At G24, the route turns left on T12°55'57" and crosses over the Ky Ha arroyo to G2B. G2B is in the garden of local people currently. The location of G2B is in the planned greenery land area	The land use in ROW of this section includes public traffic land, river land and agricultural land. This agricultural land belongs to the planning land of My Thuy

No.	Subproject component	Location	Description of Subproject component/route	Land Use
			of My Thuy interchange according to land use planning in district 2. The length of this section is 147 m.	interchange.
8	From G2B to G2C	Cat Lai ward of district 2	At G2B, the route turns right on P30°27'21" and crosses over the existing residential area to G2C. G2C is defined to be in the house yard of local people. The length of this section is 144 m.	The land use in ROW of this section includes agricultural land and residential land. These lands belong to the planning land of My Thuy interchange.
9	From G2C to G2D	Cat Lai ward and Thanh My Loi ward of district 2	At G2C, the route turns right on P26°02'27" and crosses over My Thuy canal and Dong Van Cong street to G2D. G2D is defined to locate in the median reservation area of Dong Van Cong road. The length of this section is 168m.	The land use in ROW of this section includes public traffic land, river land, and agricultural land. This agricultural land belongs to the planning land of My Thuy interchange.
10	From G2D to G3A	Wards of Thanh My Loi, Binh Trung tay and An Phu of district 2	A G2D, the route turns right on P26°24'00" an runs completely in the median reservation area of Dong Van Cong road to G3A. In this section, the route crosses over Giong Ong To river. The length of this section is 2.960m.	The land use in ROW of this section is the public traffic land. Specifically, it is greenery land in the median reservation area of Dong Van Cong road.
B	***Underground cable route***			
1	From G3A to G4	An Phu ward of district 2	From G3A, the route runs along the median reservation area of Dong Van Cong street to G3B. From G3B, the route turns right connecting into median reservation area of Mai Chi Tho street to G4 (G4 locates into intersection of An Phu). The length of this section is 900m.	This section runs underground in the public traffic land (greenery land in the median reservation areas of Dong Van Cong road and Mai Chi Tho avenue).
2	From G4 to G7	Wards of An Phu, Binh An and Binh Khanh of district 2.	At G4, the route turns left connecting into Luong Dinh Cua street (on the right side of Luong Dinh Cua street) to G7 (G7 locates into Tran Nao street, near to intersection of Luong Dinh Cua and Tran Nao streets). The length of this section is 2.906 m.	This section runs underground in the public traffic land. It is beneath the roadway of Luong Dinh Cua street.
3	From G7 to G8	Binh An ward of district 2	From G7, the route runs along Tran Nao street (on the left side of Tran Nao) to G8 (G8 locates into Tran Nao street, near to traffic intersection of Tran Nao and Nguyen Van Huong streets). Its length is 1.311m.	This section runs underground in the public traffic land. It is beneath the roadway of Tran nao street.
4	From G8 to G9:	Binh An ward of district 2	From G8, the route runs along Tran Nao street about 50m in length, and then turns left on median reservation area of Nguyen Van Huong to G9 (G9 locates into an empty land area uder the Sai Gon 2 Bridge). Length of this section is 325m.	This section runs underground in the public traffic land. It is beneath roadway of Tran Nao street and the median reservation area of Nguyen Van Huong street.
5	From G9 to G10	Binh An ward of district 2 and ward 22 of Binh Thanh district.	At G9 in district 2, the route crosses over Sai Gon river (running along the available bridge beam of Sai Gon 2 bridge) to G10. G10 locates into an empty land area under the Sai Gon 2 bridge in Binh Thanh district. Its length is 434m.	The route goes beneath Sai Gon bridhe crossing over Sai Gon river, so land use along this section is the land of river and river corridor.

No.	Subproject component	Location	Description of Subproject component/route	Land Use
6	From G10 to Tan Cang 220kV Substation	ward 22 of Binh Thanh district.	At G10, the route turns left at an empty land area under the Sai Gon 2 bridge and then connects into the available 220kV cable ditch of Tan Cang 220kV substation. At here, it will connect into GIS bay of 220kV Tan Cang substation. Length is 92m.	This section runs underground in the public traffic land. Specifically, it is vacant land in the corridor of Sai Gon bridge.
C	**Section of the reused transmission line**			
	From 220kV Cat Lai substation to G1A	Phu Huu ward, district 9.	At the current two bays (being used to connect into 220kV Thu Duc substation) to G1A; the route reuses the current 220kV Cat Lai – Thu Duc transmission line, total length is 1.46km. The section of the reused transmission line will not rehabilitate the current wire, tower and foundation.	Operation of the current transmission line is safety. The transmission line goes on the vacant land without house and structure.
D	**Rehabilitation of 220kV bay at Cat Lai 220kV substation**			
	At D11 and 12 bays of the current 220kV Cat Lai substation.	Phu Huu ward, district 9.	Bays are being operated safety in the area of the current 220kV Cat Lai substation.	Land was in the area of the current 220kV Cat Lai substation and managed by operation unit. All equipment will not rehabiitate or replace.
E	**Underground cable section to re-connect for Cat Lai – Thu Duc 220kV transmission line**			
	From bay D8 of the current 220kV Cai Lai substation to connection tower of underground cable section (location F) of the current Cat Lai – Cong Nghe Cao transmission line)	Phu Huu ward, district 9.	Construct an underground cable route along the current 220kV Cat Lai substation fence (to be constructed inside the fence) and then this cable route arranges towards the available six-circuit cable trench and connect into the availale location F of the current Cat Lai – Cong Nghe Cao TL. At the location F will connect into 220kV Thu Duc substation.	The underground cable route will be constructed inside the current 220kV Cat Lai substation fence so land was compensated.

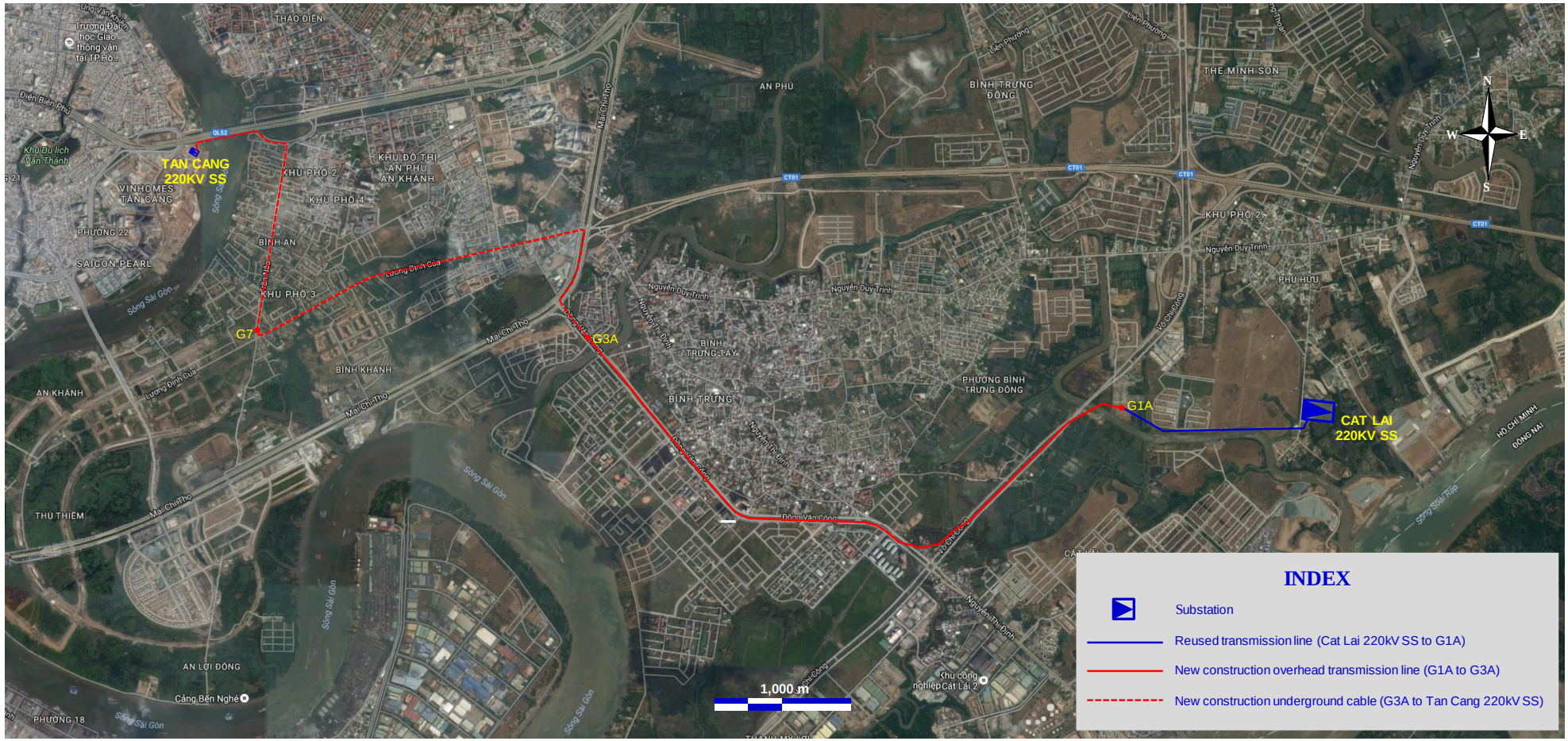

Figure 1. Cat Lai - Tan Cang 220kV transmission line layout

Civil Works

a) Quantity of Civil Works

25. Civil work quantity of Cat Lai - Tan Cang 220kV transmission line is carried out two components including OTL and UGC. They are described in Table 2 and 3:

Table 2. Quantity of civil works for the overhead transmission line

No.	Content of Civil works	Unit	Quantity	Construction Method
I.	**Preparing for construction**			
1	Leveling	m^2	3.076,47	Manually + Machinery
II.	**Excavation and backfill**			
1	Foundation excavation	m^3	6.666,52	Manually + Machinery
	- First - grade ground:	-		
	- Second –grade ground:	m^3	6.666,52	
2	Foundation backfill	-	2.651,06	Manually
3	Anti-landslide by sheeting pile	pile	3.209	Sheeting pile F80, density of 3 pile per each meter, length of 2m
4	Anti-landslide by bamboo screen	m^2	1.283,52	Height of screen of 1m
III.	**Concrete foundation**			
1	Concrete M100	m^3	171,74	Machinery + Manually
2	Concrete M250	-	3.843,72	Machinery + Manually
3	Concrete M300	-	1.157,60	Machinery + Manually
4	Concrete M350	-	2.154,54	Machinery + Manually
IV.	**Reinforcement foundation**			
1	Manufactured reinforcement	ton	873.414,12	Manufactured at factory
2	Manufactured anchored bolt	ton	1.854,40	Manufactured at factory
3	Grounding	-	1.156,68	Manufactured at factory
V.	**Tower erection**			
1	Galvanized steel tower	ton	51,33	Manually
2	Galvanized steel pole	ton	1.243,19	Manually + Machinery

Table 3. Quantity of civil works for the underground cable

No.	Content of Civil works	*Unit*	*Quantity*	*Construction Method*
I	**Cable trench**	**Lump sum**	**1,00**	
1	*Cable construction*			
-	Excavation	m^3	11,493.93	
2	*Anti-landslide method of cable trench*		-	
-	Sheeting piling, L=6m	m	21,120.00	Machinery + Manually
-	Pulling out the sheeting pile	m	21,120.00	
-	Tole for holding ground	m^2	7,493.20	
3	*Sand backfill for heat stability and road surface restoration*			
-	Spreading the engineer fabric	m^2	11,588.40	Machinery + Manually
-	Sand for anti-settlement	m^3	1,341.00	
-	Sand backfill for heat stability, thickness of 0,95m, K=0,95	m^3	4,180.46	
-	Ground backfill	m^3	5,335.92	
4	*HDPE pipe and fittings*		-	

No.	**Content of Civil works**	*Unit*	*Quantity*	*Construction Method*
-	HDPE pipe of D225 - PN10	m	7,988.00	Machinery + Manually
-	HDPE pipe of D63 - PN10	m	2,598.00	
-	Plastic tape for alarming the cable route	m	10,308.00	
-	Marking the cable route on greenery land (reinforcement pile)	set	150.00	
II	**Cable cellar**	**Lump sum**	**1.00**	
1	***Construction of cable cellar***			
-	Excavation	m^3	653.35	
-	Ground backfill	m^3	83.73	
2	***Anti-landslide of cable foundation***		-	
-	Sheet piling, L=6m surrounding the cable cellar	m	1,467.00	Machinery
-	Pulling out the sheeting pile	m	1,467.00	

b) Construction Method

26. Main construction method will include two components (the UGC and OTL) as follows:

Construction of the underground cable (UGC):

27. Construction of cable trench is implemented according to the following order:

- Cut asphalt of road surface, its size must follow cable trench's size.
- Use excavators to excavate cable trench up to the stipulated depth (wheel excavator 0.3m^3). Where excavators cannot be used, digging by hand is applied.
- Use partition wall to avoid collapse and not to create vaulted entrance in roadbed where it is necessary.
- Build up concrete cable trench and install pipe and backfill as the design drawing.
- After installing pipe, cable trench will be filled up by leveling sand.
- Return road surface to ensure traffic circulation. Mark the cable route's centre line.

Construction of the overhead transmission line (OTL):

28. Construction of the OTL will be implemented with main work items as follows:

- Construction of precast pile or auger-cast pile: According to design drawings, precast pile or auger-cast pile will be used. For precast pile, it will be driven by pile driver at the defined location until reaching stability. For auger-cast pile, it will be conducted by small-typed boring machine and casted with concrete M350 stone 1x2, low-slump 16±2.
- Excavation of foundations: The foundations will be excavated to design elevation and then beat the top of the piles. Talus range and earth and rosk depth will be determined by records of geological boreholes.
- 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.
- Concrete of foundation: Use Concrete B15 (M200), rock 2x4. The interval between the concrete plate and foundation framework during gabarit and bolts alignment will not exceed 24 hours to avoid concrete segregation. 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.
- Backfilling of foundations. 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.

- Installation of tower/poles: For single-tubular steel pole, pole 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.
- Wire pull and scatter, and deflection modification: 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.

c) Demand and Supply Source of Raw Materials

29. The supply source of materials and equipment for the subproject consists of two categories: local/domestic and abroad supply source as follows:

- Electrical equipment such as cable wire, accessories are not domestically manufactured, so the Employer shall prepare bidding document and organize bidding to select a foreign supplier. The equipment and fittings will be imported to Saigon port, are stored in the HCMCPMB's storage at Vinh Loc industrial zone and will be transported to the site as the implementation schedule. The electrical equipment, fittings and materials will be supplied through contracts signed between Employer and Suppliers who has awarded contract for supply of equipment and materials in bidding phase.
- Sand will be purchased from selling agents of construction materials in the area of Bien Hoa City and Dong Nai and gravel, cement, brick, woods etc. will be purchased from selling agents in the area of Ho Chi Minh City. These agents must be in legal operation and have an environmental business license.
- Galvanized steel and bolts are taken from processing factory in Ho Chi Minh City or Ba Ria Vung Tau province and then they will be transported to the construction site. The processing factory, that has a business license, is suitable for the subproject, and can offer a reasonable price and the lowest contract value, will be chosen by the construction contractor in the bidding phase.

30. Supply source of materials is summaried in the following table 4

Table 4. Supply source of materials

No.	Materials	Supply source	Delivery	Transportation means	Distance of transportation
1	Sand	Bien Hoa city	Site	Truck	40km
2	Cement	Ho Chi Minh city	Site and workshop	Truck	12km
3	Gravel, rock	Bien Hoa city	Site	"	40km
4	Coarse rock	Bien Hoa city	Site	"	"
5	110kV cable and optical cable	Saigon port	"	Barge, truck	4 km
6	Accessory	Saigon port	Site	Truck	4 km
7	Steel	Ho Chi Minh city	Site and workshop	"	3 km

d) Waste Treatment

31. *Domestic wastewater* is generated by worker's life activities. Number of construction workers at the site is about 80 people. The volume of domestic wastewater at the worker camp of the construction contractor is around 6.4 m^3/day. The subproject location is in the Ho Chi Minh city where is profuse in both skilled and unskilled labour, so use of local labour is encouraged to reduce amount of worker staying in the hired houses for workers' stay. The number of local labour accounted for 30% of total construction workers, so the volume of domestic water is actually less than the calculating output. The construction contractor/s will rent residents' houses with adequate sanitation facilities for workers' stay.

32. *Construction wastewater* includes mainly water pumped from the cable trenches and pole foundation pits, abundant water from concrete maintenance. Components of the wastewater are mainly SS originated from soil and sand. To minimize effects of the

construction process to environment, the HCMCPMB will request the contractors to apply the preliminary sedimentation measure before discharging wastewater into the existing drainage system of the district 9 and district 2.

33. *Domestic solid waste* generated by workers (about 48 kg/day), during the construction period of the subproject is mainly food waste, packing materials etc. with nontoxic components. They will be stored in dustbins, then it is transported and disposed at the local stipulated disposal site.

34. *Excavated soil* is estimated about 18,813.8 m^3. This excavated soil will be used to backfill the foundation pits, cable trenches and ground restoration. Quantity of reused soil of the subproject is about 8,070.7 m^3. The quantity of remaining excavated soil will be collected by civil contractor, who will be responsible for signing a contract with specialized unit to collect and transport to the permitted disposal sites and treated according to regulations at Decision No. 44/2015/QĐ-UBND dated 9 September 2015 of Ho Chi Minh City People's Committee Promulgating regulations on management of sludge in Ho Chi Minh City.

35. *Construction solid waste* generated during the construction period of the subproject are mainly debris, broken concrete, damaged wire and electrical equipment, broken steel, cement packing etc. It will be collected daily. The waste, which can be reused, will be collected separately to use for other purpose or sell. The waste, which cannot be reused, will be collected and transported to the treatment site.

36. Construction waste will be treated as the following diagram (Figure 2).

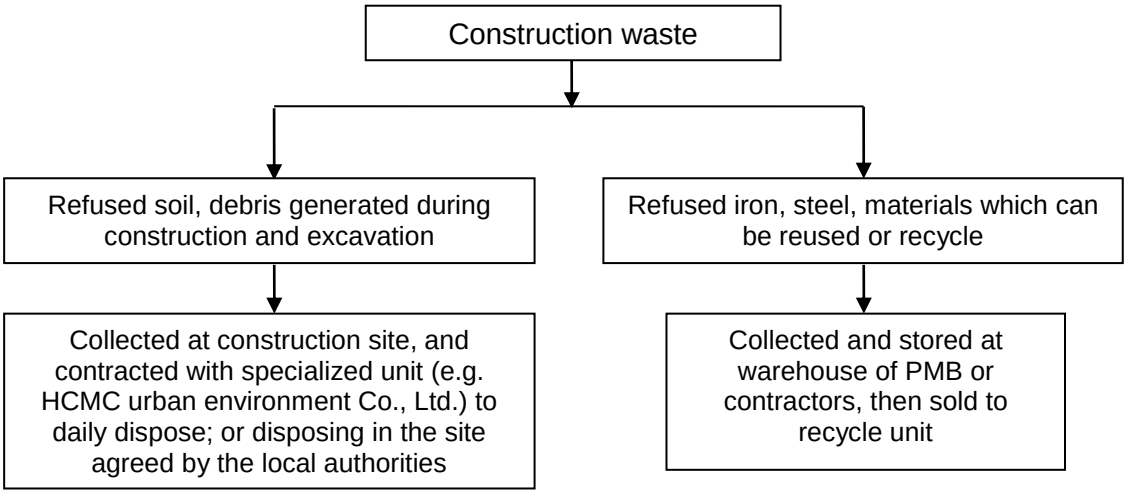

Figure 2. Management of construction waste

e) Implementation Schedule

37. The implementation schedule of the Cat Lai - Tan Cang 220kV Transmission line is expected as follows:

- The preparation phase:
  + Completion and approval of feasibility study report in Quarter II of 2016;
  + Preparation of technical design document in Quarter III of 2017;
  + Completion and approval of construction drawing in Quarter III of 2017;
  + Submitting bidding plan and bidding document to ADB for approval in Quarter III of 2017;
  + Completion and approval of bidding document in Quarter IV of 2017;
  + Organization of bidding for the supplying and civil and installation package: Quarter IV of 2017
- The construction phase:
  + Construction of the subproject will be in Quarter IV of 2017.
  + Completion, Acceptance and Operation in Quarter IV of 2018.

V. DESCRIPTION OF THE ENVIRONMENT

38. Environmental baseline information was mainly obtained from the environmental impact assessment report prepared by PECC2 and approved by Department of Natural Resources and Environment in Ho Chi Minh City at Decision No.712/QD-STNMT-CCBVMT on 24 March 2017. The metrological data and socio-economic data are obtained from Statistical Yearbooks of Ho Chi Minh City and socio-economic reports of communes/districts. The affected environmental descriptions focus on natural characteristics and the current land use.

A. Physical Environment

39. The information of physical environment is taken from statistical Year book (2014) issued by Ho Chi Minh City Statistical Office. The data include temperature, sunlight hours, humidity and rainfall, wind velocity in Ho Chi Minh area. These data have been measured and analyzed at Tan Son Hoa station, which is one of the meteorological stations in the Southern. This is also one of three high photometric stations of the nationwide. Its location is in 236B Le Van Sy street, ward 1 of Tan Binh district in Ho Chi Minh City where is 6.4km far from the subproject (Figure 3).

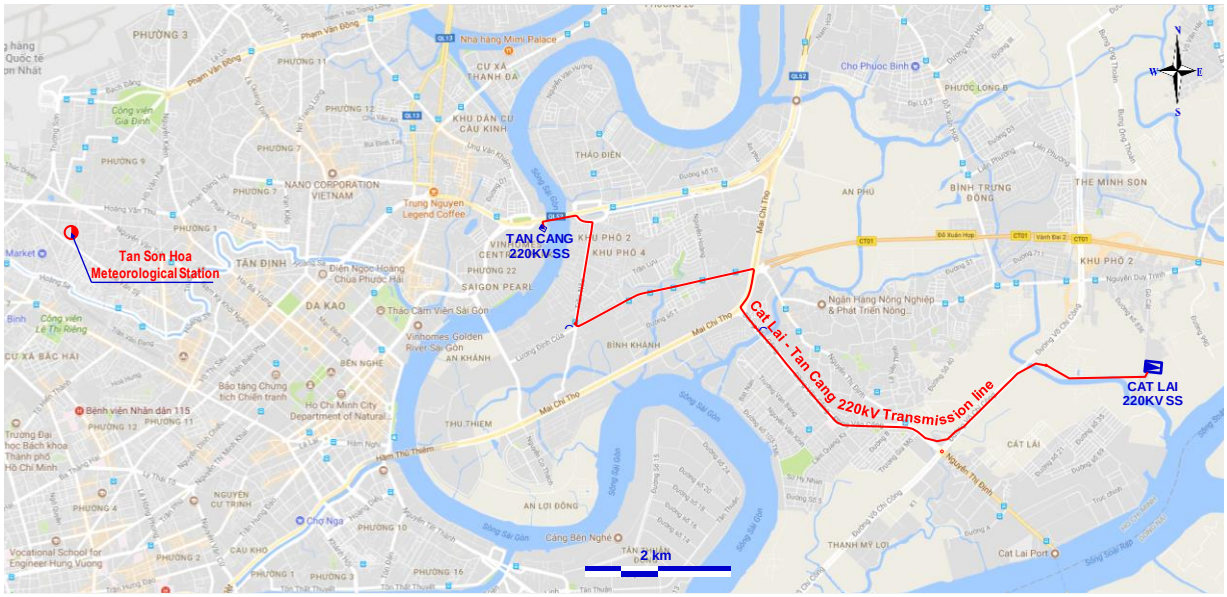

Figure 3. Location map of Tan Son Hoa Meteorological Station and Subproject

1. Climate

40. The project areas is situated in the Southern climate zone which is typified by a tropical monsoon climate characterized by high temperatures with very little seasonal variation, summarized as follows:

a) Temperature

41. Air temperature is high and it changes little in year-round. Average annual temperature is 28.4^{o}C. Minimum monthly temperature is 26^{o}C, and maximum monthly temperature is 30,5^{o}C (Table 5).

Table 5. Temperature features at Tan Son Hoa Station[1]

Unit: ^{0}C

Year / Month	2010	2011	2012	2013	2014
Annual Average	***28.6***	***28.1***	***28.6***	***28.4***	***28.4***
January	27.3	26.9	27.6	27.3	26.0

[1] Location of Tan Son Hoa Station is indicated in Figure 3.

Year / Month	2010	2011	2012	2013	2014
February	28.4	27.6	28.2	29.0	26.9
March	29.4	28.3	29.5	29.3	29.1
April	30.3	29.1	29.3	30.4	30.2
May	31.3	29.5	29.2	29.8	30.5
June	29.3	28.5	28.7	28.9	28.7
July	28.3	27.9	28.3	28.1	28.0
August	27.9	28.4	29.1	28.3	28.4
September	28.6	28.1	27.5	27.6	28.3
October	27.5	28.1	28.2	27.7	28.1
November	27.2	28.1	28.8	28.1	28.8
December	27.4	27.2	29.1	26.6	27.9

(Source: Statistical Yearbook of Ho Chi Minh city, 2014)

42. According to the report of the Working Group on Climate Change and Development, (2007), in the Mekong region (Ho Chi Minh City) average temperature in the last century has risen 0.3 - 0.8°C. Further temperature increase is expected along with more extreme weather events, such as floods and droughts, change in the amount and distribution of rainfall, disruption of seasonal monsoons, and rising sea level.

b) Sunlight Hours

43. The average number of sunlight hours in Ho Chi Minh City is rather high as compared with many other provinces in the country. The Table 6 shows that the number of sunlight hours observed in Tan Son Hoa meteorological station.

Table 6. Average number of sunlight hours at Tan Son Hoa station

Unit: hours

Year / Month	2010	2011	2012	2013	2014
Annual Average	***2,073.7***	***1,892.9***	***2,131.6***	***2,023.4***	***2,238.2***
January	157.1	120.1	141.1	161.8	178.3
February	245.3	188.9	176.8	192.6	216.3
March	239.6	157.8	208.6	243.7	274.7
April	240.8	187	217.3	186.8	187.3
May	210.4	165	198.2	192.9	195.8
June	177.0	163.6	164.3	147.8	152.7
July	150.0	162.6	182.1	150.8	155.7
August	141.2	198.1	218.9	185.9	183.0
September	155.2	144.8	118.7	110.7	174.3
October	102.7	154.3	154.1	156.6	169.8
November	130.6	141.0	164.9	172.3	184.0
December	123.8	109.7	186.6	121.5	166.3

(Source: Statistical Yearbook of Ho Chi Minh city, 2014)

c) Humidity and Rainfall

44. Annual average humidity is around 78% - 82%. Rainy regime is divided into the two seasons; rainy season lasts from May to October and dry season lasts from November to the next year's April. Maximum daily rainfall in the area is 200mm/day. Total annual average rainfall in the area is from 1,800 mm to 2,000 mm (see Table 7).

Table 7. Monthly and annual average rainfall and humidity at Tan Son Hoa Station

Unit: mm

Year / Month	2010	2011	2012	2013	2014
Annual Average	***2,016.2***	***1,953.8***	***1,883.0***	***1,980.5***	***2,042.2***
January	23	9.4	18	38.1	2.5
February	-	-	68.7	0.1	22.1
March	3.9	40.3	36.4	10.1	-
April	9.9	181.9	144.4	18.3	111.5
May	8.8	124.4	72.2	196.8	179.7
June	160	213.1	270.6	173.3	258.0
July	294.3	281.5	200.4	175.8	234.2
August	400.6	244.4	113.4	260.7	353.4
September	373.7	232.1	407.9	411.2	342.1
October	321.8	232.6	434.4	407.4	306.5
November	379.9	321.1	91.2	257.4	182.2
December	40.3	73.0	25.4	31.3	50.0

(Source: Statistical Yearbook of Ho Chi Minh city in 2014).

d) Wind Velocity

45. From November to April, wind is mainly from the northeast and dry while from May to October wind is mainly from the southwest and brings heavy rainfall to the low-lying plains and the eastern slope of Truong Son Mountain Range. Annual average wind speed recorded at Tan Son Hoa station is 2.8 m/s. Thunderstorm is mainly in rainy season from May to October, number of thunderstorm days is presented in Table 8.

Table 8. Wind velocity and number of thunderstorm days at Tan Son Hoa Station

Parameter	Month, year												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	**Year** (average)
Wind speed (m/s)	2.3	3.1	3.6	3.3	2.5	2.7	2.9	3.8	2.7	2.2	2.2	2.0	2.8
Number of thunderstorm days	0.0	0.3	0.2	2.0	11.0	8.0	13.0	9.0	9.0	8.0	6.0	1.0	67.5

(Source: Data of Tan Son Hoa Station is referred to National Technical Regulation on Climatic data for construction).

2. Ambient Air Quality and noise

46. Air quality in the subproject area was measured and analyzed in July 2016. Ambient air quality around the subproject area is assessed by measuring and sampling methods. During the monitoring period, PECC2 and consulting unit (Technology and Environment Service Research Center - ETC) was cooperated, measured, sampled and analyzed the air quality (including dust, contents of CO, NO_2, SO_2) at three locations, coded as KK1, KK2 and KK3. Locations of KK1, KK2 and KK3 are shown on the map as attached in Figure 4.

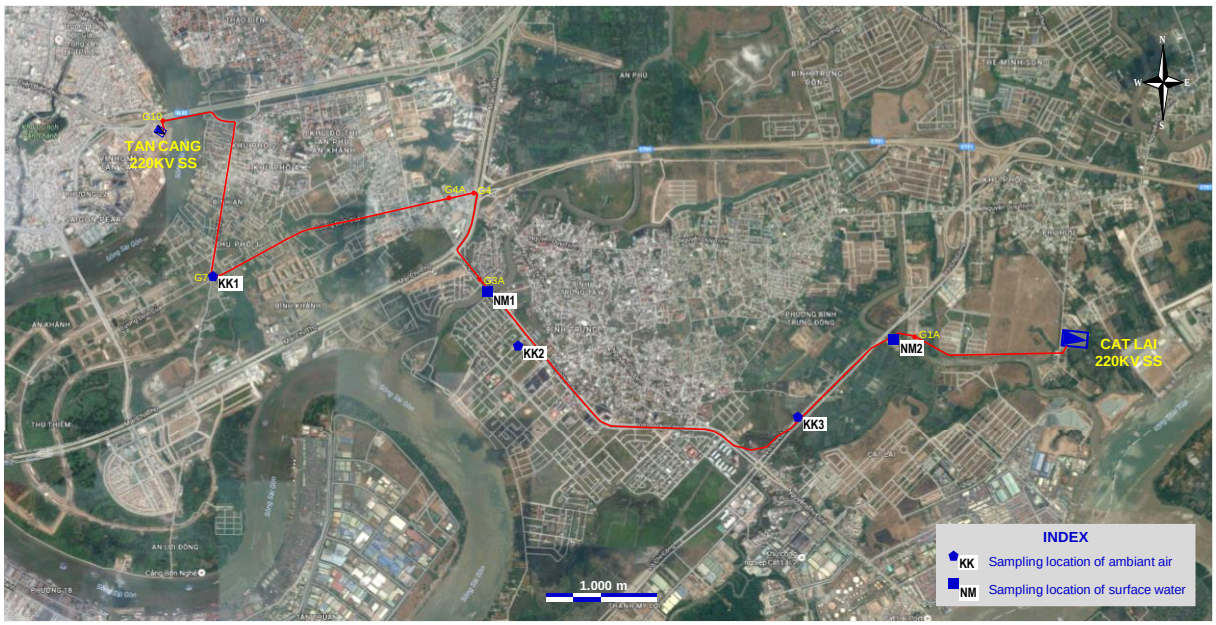

Figure 4. Map of sampling locations for air and water quality

- KK1: at intersection between Luong Dinh Cua and Tran Nao streets in district 2 of Ho Chi Minh City (X: 0607178, Y: 1194290).
- KK2: at Dong Van Cong street of Binh Trung Tay ward, district 2 of Ho Chi Minh City (X: 0609971, Y: 1192204).
- KK3: at Vanh Dai 2 street in Binh Trung Dong ward, district 2 of Ho Chi Minh City (X: 0612946, Y: 1192189).

47. The results of air quality analysis are presented in Table 9.

Table 9. Monitoring results of ambient air quality in the subproject area

No.	Parameter/unit	Unit	Monitoring result			Standards		
			KK1	KK2	KK3	Decision No.3733/QD-BYT	QCVN 05:2013/BTNMT	QCVN 26:2010/BTNMT
1	Temperature	^oC	30.6	30.9	31.2	≤ 32	-	-
2	Humidity	%	62.7	63.9	65.1	≤ 80	-	-
3	Dust	mg/m^3	0.19	0.17	0.14	-	0.3	-
4	CO	mg/m^3	4.15	3.28	3.50	-	30	-
5	NO_2	mg/m^3	0.075	0.060	0.051	-	0.2	-
6	SO_2	mg/m^3	0.080	0.077	0.071	-	0.35	-
7	Noise	dBA	65.3-69.8	63.9-68.2	62.4-67.4			70

(Source: Center for Technology Research Service and Environment, July 2016 and May 2017)

Notes: The standard values are based on the following Decision and Standards:
Decision No.3733/QD-BYT on 10/10/2002 of the Ministry of Health promulgating 21 labor hygiene standards, 5 principles and 7 labor hygiene measurements;
QCVN 05:2013/BTNMT - National technical regulation on ambient air quality
QCVN 26:2010/BTNMT - National technical regulation on noise (normal area from 6 a.m to 9 p.m)

48. According to the above results show that the concentration of pollutants in the ambient air is relatively low in comparison with the QCVN 05:2013/BTNMT. All numeric value of analyzed parameters meet the allowable limits on the ambient air quality under the QCVN 05:2013/BTNMT, so the ambient air quality in the subproject area is relatively good.

3. Topography, Geology and Soil

49. In general, topography in Ho Chi Minh City is fairly diverse; therefore, it has good conditions for multi-faceted development. According to the survey report of “Cat Lai – Tan

Cang 220kV transmission line" subproject in feasibility study phase, topography in the proposed subproject area is the North-south low plain region. Topographical surface is relatively flat. The subproject is located in the residential area with a complex topography and crowded houses. Tower foundations are designed near to the local people house and greenery corridor.

50. During feasibility study, the design unit investigated and drilled soil at the subproject's region, and the result shows that geological feature is sedimentary formations mixed with the Holocene age (QIV).

51. Based on the survey results in the field and test result in the laboratory of soil physic-mechanical properties and archived geological materials structure is described as follows:

- Layer 1 (tQIV) is backfill soil layer (depth of 0-1.6m). Composition consists of hot asphalt concrete (depth of 0-0.1m), stony ground layer (depth of 0.1-0.7m) and sandy clayed and poor compaction (depth of 0.7-1.6m).
- Layer 2 (ambQIV) is black-grey clay mud, ashy grey, strain status with many organic substances. Soil layer at depth of 1.6-3.1m is clay loam mud and soil layer at depth of 6.6-8m is light clay loam with rigid plastic status.

52. Mechanical indicators of soil in subproject area is presented in Table 10.

Table 10. Mechanical indicators of soil in subproject area

Layer / Mechanical properties of soil	*Layer 1 Surface soil*	*Layer 2 Clay mud*
Natural humidity (W%)	15.60	51.00
Natural density γ_w (g/cm^3)	1.66	1.70
Dry density γ_K (g/cm^3)	1.44	1.13
Density Δ (g/cm^3)	2.67	2.67
Pore grade n%	46.1	57.6
Pore coefficient ε_o	0.854	1.358
Saturated degree G%	48.70	97.7
Consistency B	-	+1.83
Compressibility coefficient a_{1-2} (cm^2/kG)	0.017	0.310
Angle of interior friction φ_o	25^{0}43'	05^{0}05'
Cohesion C (kG/cm^2)	0.065	0.069
Modulus of deformation E_0 (kG/cm^2)	174	9
Standard load pressure R_0 (kG/cm^2)	1.3	0.5

(Source: Southern General Investigation Enterprise – PECC2)

4. Surface Water/Ground Water Resource

53. Ho Chi Minh City has a diverse river system. Dong Nai River discharges about 20 - 500 m^3/s, supplying 15 billion m^3 water. This supplies main source of fresh water for the city. In addition, Saigon river has 80 km in length running through the city with discharge of 54 m^3/s. The width of the river section running through Ho Chi Minh City is in the range of 225-370 m at the depth of 20 m. Dong Nai and Saigon rivers are connected inside the city by Rach Chiec canal system. Another river in Ho Chi Minh City is Nha Be river where is the confluence of Dong Nai and Saigon rivers, discharging into East sea through two estuaries, Soai Rap and Ganh Rai. Except the main rivers, Ho Chi Minh City still has a tangled canal system such as Lang, Bau Nong, Tra, Ben Cat, An Ha, Tham Luong, Cau Bong, Nhieu Loc – Thi Nghe etc.

54. However, location of Cat Lat - Tan Cang 220kV transmission line has a plain topography and there are many rivers and arroyos in the surrounding areas such as Saigon river, Giong Ong To, Bau Nong, Tra, Ben Cat, An Ha, Tham Luong, Cau Bong, Nhieu Loc – Thi Nghe rivers but it crosses over arroyos/canals such as Ky Ha, Ba Cua. At these crossing

sections is an OTL. Towers are designed to be located about 50m from the arroyo side so it will not impact on water resource. The subproject is designed according to the flood level at Phu An hydrographic station. The water level reaches to the highest crest of tide in history H = 1.36m so the designed water level for subproject is H_{design} = 1.58m.

5. Water Quality

55. Additionally, in survey duration, the consultant unit has cooperated with Center for Technology Research Services and Environment for taking samples and analyzing quality of surface water at the subproject's area. The samples for quality of surface water are collected at 10 – 11 am in July 2016 at 02 locations on Giong Ong To river and Ba Cua canal in Binh Trung Tay and Binh Trung Dong ward of district 2, Ho Chi Minh City. The water quality sampling locations are presented in Figure 4. The results of surface water quality are presented in Table 11.

Table 11. Monitoring results of surface water quality in the subproject area

No.	Environmental parameters/ unit		Analyzed result		QCVN 08-MT:2015/ BTNMT (Column B1)
			NM1	NM2	
1	pH	--	6.14	6.34	5.5 - 9
2	Turbidity	NTU	66	75	-
3	DO	mg/L	4.8	4.5	≥ 4
4	TSS	mg/L	31.2	**55.6**	50
5	COD	mg/L	23	**31**	30
6	BOD_5	mg/L	10	**18**	15
7	NO3-	mg/L	0.69	0.41	10
8	PO43-	mg/L	0.12	0.04	0.3
9	Fe	mg/L	1.13	**2.79**	1.5
10	Pb	mg/L	KPH (LOD<0.003)	KPH (LOD<0.003)	0.05
11	Oil and grease	mg/L	KPH (LOD< 0.9)	KPH (LOD< 0.9)	0.1
12	Coliform	MPN/100mL	6.400	**9,000**	7,500

(Source: Center for Technology Research Service and Environment, July 2016)

Notes:

- QCVN 08-MT: 2015/BTNMT – National technical regulation on quality of surface water. Column B1: used for irrigation purposes, water transport and other purposes with the requirements of low quality water.
- (-): Not stipulated
- KPH: Not found
- NM1: Surface water at Giong Ong To river, near Giong Ong To bridge in Binh Trung Tay ward, district 2, HCMC (X: 0609293, Y: 1193281);
- NM2: Surface water at Ba Cua canal in Binh Trung Dong ward, district 2, Ho Chi Minh City (namely NM2, X: 0613112, Y: 1192350).

56. According to the above results, the all monitored indicators at NM1 sample (Giong Ong To river, near Giong Ong To bridge) meets the allowable limit stipulated in QCVN 08-MT:2015/BTNMT. Meanwhile, some analyzed parameters of NM2 sample has numeric value exceeding the allowable limits regulated in under the QCVN 08-MT:2015/BTNMT, namely TSS, BOD5, COD, Fe and Coliform. These pollution indicators are higher than the allowable limits from 1.03 to 1.86 times. The monitored results show that the surface water of Ba Cua canal at location of NM2 could be affected by wastewater from the aquaculture activities in the surrounding areas.

B. Biological Environment

1. Vegetation Cover and Land Use

57. Cat Lai – Tan Cang 220kV transmission line is situated in districts of 2, 9 and BinhThanh. The route mainly runs along traffic roads at the central reservation of roads and roadside greenery land. Location of the subproject is the residential area with crowded

houses. This is the city region, therefore the system of vegetation is mainly greeneries, mixed trees and grass to create landscape. *(Source: The investigation report of PECC2 prepared in feasibility study stage).*

58. Greeneries mainly grow along central reservations and both sides of roads/streets, in parks including popular types such as Me Tay *(Samanea saman)*, Lim Xet *(Peltophorum pterocarpum)*, Xa Cu *(Khaya senegalensis),* Long Nao *(Cinnamomum camphora)*, etc. Growing these trees is easy with high covering and they create many shades as well as environmental landscape for the urban area. Except these trees, there are many lawns, it is mainly Carpet Grass, Pinto peanut, etc., and these grasses are easy to live, be cared and it's good at green covering. Popular mixed trees are phragmites, weeds growing along the banks of rivers, canals naturally and gradually they develop in sod and bush etc. *(Source: Data supplied by land management staff of district).*

59. Furthermore, because the subproject's area is an urban area, there is no activity of fishery, feeding poultry, cattle, etc. In here animals are mainly domestic animals such as dog, cat, etc. Some popular fishes live in rivers, canals such as tilapia, carp and catfish etc. together with riverweeds, floating water hyacinths.

60. 220kV Cat Lai – Tan Cang transmission line mainly goes along streets, the existing 220kV, and 110kV transmission lines therefore in general this subproject causes less effect to creature natural resources as well as residents in the right of way.

2. Wildlife

61. During the feasibility study stage, PECC2 among others has conducted site survey and observation on biological environment including endangered animal and plant species along the transmission line route. In addition, PECC2 has also organized the public meeting with authorities such as Phu Huu of district 9, Binh Trung Dong, Cat Lai, Thanh My Loi, Binh Trung Tay, An Phu, Binh Khanh and Binh An of district 2 and ward 22 of Binh Thanh district, local people to seek information on wildlife species. Based on the actual site survey and information, the existing species are compared with Vietnamese red list 2007 stipulated on 26 June 2008 by Vietnam Science and Technology Academy as well as with Circular 04/2017/TT-BNNPTNT of Ministry of Agriculture and rural Development regarding list of plant and animal species specified in the annexes of the convention on international trade of dangerous species of wild plants and animal (CITES).

62. It can be concluded that no endangered wildlife exist within the subproject area. There are also no animals that could interfere with or have impact on the subproject area.

3. Conservation Areas

63. There are no conservation areas within or near the subproject site according to the list of natural parks and conservation areas of Viet Nam stipulated by Ministry of Agriculture and Rural Development.

C. Social-Economic Conditions of the District in the Subproject

1. Population

64. The subproject is located in Binh Thanh district, district 2 and 9 of Ho Chi Minh City. No ethnic minority group lives in the subproject area, all local people are Kinh people. The population features of the districts are described in Table 12.

Table 12. Population and labour in the subproject districts

No.	District	Total population (person)	Density of population (person/km^2)	Population in working age (person)	Rate of population in working age (%)
1	***Binh Thanh***	485,772	23,399	369,700	75.90
2	***2***	140,288	2,820	101,428	72.30
3	***9***	284,990	2,500	198,923	69.80

(Source: Statistical Yearbook of Ho Chi Minh City in 2014 and data collected in districts).

2. Local Economy

65. The subproject Districts (District 9, District2 and Binh Thanh District) are located at the Eastern gateway of Ho Chi Minh City, on the North – South transport axis and ring roads of Ho Chi Minh City therefore this area is the important transport gateway connecting Ho Chi Minh City to Southwest and South east provinces. Furthermore, these districts have some industrial zones such as Hightech Park (805 ha) in district 9 and Cat Lai 2 Industrial Zone (111.7 ha) in district 2 under operation and many urban area projects have been under construction to contribute in the rapid social – economic development of this region.

66. In recent years, the three Districts have been experiencing the strong urbanization process therefore economic structure is strongly transferring to the field of trade and services. Based on the report on social – economic situation in 2015 of district 2, district 9 and Binh Thanh districts, economic structure of these districts are Trade – Services, Industry – Construction, Agriculture – Aquiculture. In which, Trade – Services occupies the highest rate and is increasing, the next is Industry – Construction and Agriculture – Aquaculture that are at very low rates and strongly decreased in recent years. Agricultural land is narrower according to the urbanization process together with low income from agricultural activities therefore most former farmers have switched to seek for works in other areas; mainly they switch to services, small business and construction. Per capita income in the three districts is continuously increasing during recent years due to the trend of moving residents to new towns. Per capital income in 2015 at Binh Thanh District, District 2 and District 9 are VND 94,000,000/person/year, VND 96,000,000/person/year and VND 87,000,000/person/year respectively. Presently, all three districts do not have any poor household as the poor standard of Ho Chi Minh City

3. Social Infrastructure

a) Public Health and Environmental Sanitation

67. The subproject locates in the city, so hospital, regional polyclinic, preventive medicine center and medical service units are provided in the districts. Activities for taking care the local people's health over the past years have been paid a great attention.

68. The propaganda is regularly maintained through some activities such as organizing communication sessions, broadcasting for prevention of some diseases; organizing the launching ceremony for the action month for food safety; implementing initial health care for local people; carrying out injection of 8 types of vaccine; continuosly communicating the program of population; organizing a total sanitary to respond to green Sundays and public holidays; and mobilizing people to join the week collecting hazardous waste.

69. Hospital, regional polyclinic, preventive medicine center and medical service units were provided in districts is summarized in Table 13

Table 13. List of medicine units in the subproject districts

No.	District	Medicine Unit				
		Hospital	Regional polyclinic	Prevention medicine center	Medical service	Total
1	Binh Thanh	4	0	1	20	25
2	2	2	0	1	8	11
3	9	2	0	1	13	16

(Source: Statistical Yearbook of Ho Chi Minh City in 2015)

70. All residents in the ward have access to the tap water supplied by the local water supply company. Water quality is good but has to be boiled for cooking and drinking purposes, especially for younger children and older adults.

71. All local people of the subproject are connected to the national electricity grid.

b) Education

72. The districts were organized activities for the day “take all children to school” and completed the enrolment task for 1015 – 2016 school year, the ratio of children at school age is 100%.

73. Number of school, class, pupil and teacher allocated in the subproject’s districts is summarized in the Table 14.

Table 14. Number of school, class, pupil and teacher in the subproject districts

No.	District	General Education							
		Preshool education				Schools education			
		Preschool	*Class*	*Pupil*	*Teacher*	*School*	*Class*	*Pupil*	*Teacher*
1	Binh Thanh	44	628	16,153	1,116	51	1,434	59,960	2,401
2	No.2	41	393	7,170	446	20	526	19,901	944
3	No.9	33	332	10,836	539	36	1,089	43,911	1,760

(Source: Statistical Yearbook of Ho Chi Minh City in 2015)

4. Transportation and Communication

74. Traffic road: all inter roads are asphalted and the others are cemented so it is convenient for local people to travel and get access easily to the ward and other surrounding areas.

75. The traffic network is advantageous to develop a comprehensive economy, exchange domestic and international trade in the fields of business production and exchange of goods.

76. The majority of traffic routes connecting to the subproject site are main roads such as Ring Road No.2, Dong Van Cong street, Luong Dinh Cua street, Tran Nao street, Nguyen Van Huong street which are asphalt paved roads with heavy load. The median reservation areas of Mai Chi Tho avenue where the UGC runs under, are mainly grass and trees of urban greenery.

77. Communication is good; all households in the ward have television and connect the internet.

5. Culture and Heritage

78. No recognized culture and heritage resource is found within 500m surrounding the route. The route of power line runs along some roads/streets in the city, there are several cultural and social infrastructures such as schools, health establishments, religious structures, and people committee’s offices in the surrounding areas of the transmission line. However, the subproject activities will not have an impact on those cultural and social sites. The OTL will goes along the central reservations of roads and UGC runs beneath roadways of roads/street. Moreover, The PECC2 confirms that the separation distances are acceptable and as such none of these structures will be affected by the subproject. A list of sites in the area and distance from the transmission line is shown in Table 15.

Table 15: Sites of cultural and social infrastructures in the surrounding areas of the transmission line

No.	Distance to centre of line		Name of cultural heritage and structure	Location
	Left (m)	Right (m)		
1	1.210		Son Ca kindergarten	Cat Lai ward, district 2
2	1.270		My Thy primary school	Cat Lai ward, district 2
3		950	Tan Lap Church	Binh Trung Dong ward, district 2
4		920	My Hoa Church	Binh Trung Dong ward, district 2
5		1.020	Thu Thiem Vocational College	Binh Trung Dong ward, district 2
6		986	Hospital of District 2	Cat Lai ward, district 2
7		475	Thien Ton Pagoda	Cat Lai ward, district 2
8		140	PC's office of Cat Lai ward	Cat Lai ward, district 2
9		130	Cat Lai kindergarten	Cat Lai ward, district 2

No.	Distance to centre of line		Name of cultural heritage and structure	Location
	Left (m)	Right (m)		
10	230		PC's office of Thanh My Loi ward	Thanh My Loi ward, district 2
11	150		Nguyen Thi Dinh Secondary School	Thanh My Loi ward, district 2
12	230		Luong The Vinh Primary School	Thanh My Loi ward, district 2
13	390		PC's of District 2	Thanh My Loi ward, district 2
14	430		Luong Dinh Cua Secondary School	Thanh My Loi ward, district 2
15		325	Giong Ong To High School	Binh Trung Tay ward, district 2
16		620	Giong Ong To Secondary School	Binh Trung Tay ward, district 2
17	430		An Khanh Primary School	Bình Khánh ward, district 2
18	280		Binh An Secondary School	Binh An ward, district 2
19		570	Nguyen Hien Primary School	An Phu ward, district 2
20		650	HCMC University of Culturology	Thao Dien ward, District 2
21		460	Kidzone Kindergarten	Thao Dien ward, District 2
22		530	Minh Hoa Pagoda	Ward 25, Binh Thanh district
23	600		Vinmec International Hospital	Ward 22, Binh Thanh District
24		800	PC's office of ward 22	Ward 22, Binh Thanh District

6. UXO Clearance

79. After many decades of war, bombs, mines and explosives are still an important issue in Vietnam. The route runs along the central reservation of roadway of existing roads in the city so the bombs, mines and explosives do not exist in the subproject's area. However, in order to ensure safety during construction and avoid any accidents incurred due to landmines or explosive materials remaining from the war, HCMCPMB will hire the Military Headquarters to detect and clear them before construction. Area of UXO clearance is estimated 17,400m^2 in which OTL section is 10,100m^2 and UGC section is 7,300m^2.

7. Subproject Affected People

80. The subproject location is chosen to minimize losses of both the assets and land of local people and create beauty in the city. The subproject is expected to be constructed two components (including the OTL and UGC). The UGC will be constructed in the central reservation of traffic road and greenery land area in districts of 2, 9 and Binh Thanh so there are not any houses and structures in the location. However, the OTL locates in district 2, there are 21 households to be affected by the subproject. They all will be compensated before carrying out the subproject.

8. Land Acquisition

81. The main scope of subproject includes construction of one new OTL of 5,013 m in length and one new UGC of 5,666 m in length. The UGC route goes under the roadways and median reservation areas of the streets in inner city, *so* the entire area of land for construction of the UGC is the public traffic land. The land for cable trench construction will be restored to initial status for traffic activities right after completion of the UGC construction. Thus, it doesn't cause impacts of permanent land acquisition by the project. However, temporary occupation of some area of roadway during construction of the UGC is unavoidable. Most route of the OTL runs on median reservation areas of the existing roads, so most land for construction of OTL pole foundations and for OTL ROW is the public traffic land of road median reservation areas. Only two short sections with the aggregate length of 313 m are on the outside of traffic land and other public land. The temporarily and permanently acquired land for the subproject is as below.

a) Permanent land acquisition

82. Total land area acquired permanently to construct the OTL pole foundations is 2,206m^2, in which 1,667 m^2 is in median reservation areas of existing roads belonged to

public traffic land; 111 m^2 is of public vacant land and greenery land; and 428 m^2 of residential land belongs to two households and one institution.

b) Restriction on utilization of land in the ROW

83. The land area in the ROW will be affected by restriction on utilization because of regulations on electric safety. The aggregate area of affected land in the ROW is about 108,080 m^2, of which 101,617 m^2 is of public land including traffic land, greenery land, vacant land and river/arroyo; while 6,463 m^2 is of private lands including 3,946 m^2 of residential land and 2,517 m^2 of perennial land. However, the OTL is designed with the height of conductor cable in compliance with regulations on electric safety that ensure the safety for traffic activities and life activities of people in the ROW. No household will have to relocate due to the subproject land acquisition.

c) Temporary land acquisition

84. It will be included land along the UGC route for construction corridor of cable trenches. However, most UGC trench is built in conjunction with existing street renovation projects. The rest of that with the length of 1,364 m travelling along the median reservation area of Mai Chi Tho avenue and short section of Luong Dinh Cua street will be built separately. The land for construction corridor of cable trench will be restored to initial status for traffic activities right after completion of the UGC construction.

85. In addition, construction of OTL will temporarily occupy 700 m^2 of land for cable stretching yard and temporary storage yard. To reduce impacts of temporary land acquisition, the temporarily acquired land will be arranged within median reservation areas of existing roads, such as Ring Road No.2 in district 9 (at location G1C; this section is vacant land) and Dong Van Cong and Mai Chi Tho streets (at location G4; this is greenery land). Traffic in these streets is heavy in the rush hour, this is main roads for moving means into the city. However, temporary storage yards will be arranged in the median reservation area so it will not affect moving of traffic means. After completed subproject construction, it will be recovered the ground to the original condition.

9. Site Features of the Transmission Line

86. The Cat Lai – Tan Cang 220kV transmission line is designed with the route along the existing roads and streets in districts of No 9, No 2 and Binh Thanh. The UGC section goes under the roadways and median reservation areas of the existing streets in inner city, namely Mai Chi Tho avenue, Luong Dinh Cua street, Tran Nao street and Nguyen Van Huong street and under Sai Gon bridge in An Phu and Binh An wards of district 2 and 22 ward of Binh Thanh district. The entire area of land for construction of the UGC is the public traffic land. Traffic of these roads is usually heavy in the rush hour. However, these roads are newly built with good infrastructure and multiple divisions so traffic jump is limited.

87. The OTL section mainly runs on the median reservation areas of existing roads, including Ring road No 2 and Dong Van Cong road in district 9 and district 2. Only two short sections of the OTL run over the various types of land including residential lands, gardens, traffic corridors, public greenery lands and public vacant lands. The vegetation cover of the road median reservation areas where the OTL and UGC run along is mainly grass, bushes and decorative plants. These plants are also found on traffic corridors, public greenery lands. In addition, the plants on gardens and residential lands consist of fruit trees (coconut, mango, star apple, carambola, jujube, guava, tamarind, Annona, etc.), and miscellaneous trees. Nipa trees is found on the lands beside rivers and arroyos.

88. The site features of the transmission line are shown in some photographs below (in Table 16).

Table 16. The site features of the Cat Lai – Tan Cang 220kV transmission line

Illustrated photos (taken in July, 2016)	Area description
	The tower of existing transmission line connecting to the new OTL, the vegetable cover on this area are mainly grass and bushes.
	The proposed area for construction of the first tower of OTL beside Ring Road No. 2, the current land use is vacant land with vegetation cover consisting of grass, bushes, reeds, annona trees... but it is residential land in planning.
	The median reservation areas of Ring Road No.2 where the OTL runs over, the plants are mainly grass and trees of urban greenery.

	The site where the OTL crosses over Ring Road No 2 to encroach on the roadside area, the current land use of this area consists of traffic corridor, public vacant land, residential land and garden land with vegetation including fruit trees in garden, nipa trees and miscellaneous trees. There are also some houses in the ROW of this OTL section.
	The residential area where the OTL runs over, the plants found here are mainly fruit trees in garden. There are also some houses in the ROW of this OTL section.
	The junction of Nguyen Thi Dinh street and Dong Van Cong road where the OTL crosses over the intersection and runs on the median reservation areas of Dong Van Cong road. The plants found on the central reservation are mainly grass and trees of urban greenery.
	The median reservation areas of Mai Chi Tho avenue where the UGC runs under, The vegetation is mainly grass and trees of urban greenery.

VI. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

89. Environmental impacts of the subproject are screened and assessed in three phase of subproject implementation defined as: pre-construction, construction and operational phase. The subproject's major components including OTL section and UGC section are addressed within this assessment.

A. Subproject's Benefits

90. The highest benefit of the subproject is to meet the increasing power demand in Ho Chi Minh City, especially in the areas expected to become luxurious urban complexes (zones of Tan Cang and Ba Son). In addition, the subproject will help reduce power losses and improve quality, safety and reliability in power supply for central HCMC as well as regional power grid.

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

1. Land acquisition and compensation

91. Impacts*:* According to the project design, the UGC route has total length of 5,666 m to be set in the cable trench with width of 2.3 m for 220kV double circuits, 2.0 m for 110kV double circuits so it requires about 21,309 m^2 of land for construction of the UGC trenches. However, the UGC route goes under the roadways and central reservations of the streets in inner city, namely Mai Chi Tho avenue, Luong Dinh Cua street, Tran Nao street and Nguyen Van Huong street and under Sai Gon bridge in An Phu and Binh An wards of district 2 and 22 ward of Binh Thanh district. The entire area of land for construction of the UGC is the public traffic land. Most UGC trench will be built in conjunction with existing street renovation projects. The rest of that with the length of 1,364 m travelling along the central reservation of Mai Chi Tho road and short section of Luong Dinh Cua street will be built separately. The land for cable trench construction will be restored to initial status for traffic activities right after completion of the UGC construction. Thus, it does not cause impacts of permanent land acquisition by the project but temporary occupation of some area of roadway during construction of the UGC is unavoidable.

92. The OTL has total length of 6,475 m including 1,462 m of the existing transmission line and 5,013 m of the new transmission line. Most route of the new OTL runs on traffic corridors and central reservation of the Ring road No. 2 and Dong Van Cong Road in district 9 and district 2. Thus, most land for construction of OTL pole foundations and for OTL ROW is the public traffic land of road central reservations and traffic corridors. Only two short sections with the aggregate length of 313 m are on the outside of traffic land and other public land. These sections have two poles and one tower that require the aggregate area of 428 m^2 for construction of their foundations. In addition, the OTL sections on the outside of traffic land and public vacant land also cause restriction on utilization of land in their ROW because of power safety regulations. However, no house will be dismantled by the subproject land acquisition, so no household will have to relocate due to the subproject implementation. The impacts of the subproject land acquisition in not significant and able to be remedied by compensation and assistance. These impacts are described particularly in the resettlement plan prepared for the subproject in separate.

93. Mitigation measures: prepare and implement the resettlement plan for the subproject based on regulations on land acquisition, compensation, assistance and resettlement of the Land Law 2013 and related decrees, circulars, decisions of the Viet Nam Government and PC of HCMC and the ADB SPS 2009.

94. Prior to commencement of construction, HCMCPMB would have to obtain permission from Department of Transport for construction of the OTL and UGC in the roadways and central reservations of the streets/ roads. Each work item or UGC section, pole foundation will be constructed completely and its work site will be restored promptly to minimize the duration of temporary land use for the project construction.

2. UXO Clearance

95. Impact: Most route of the OTL and UGC runs on or under median reservation areas

and roadways of existing roads and streets in districts of No.9, No.2 and Binh Thanh of HCMC. Thus, UXO clearance in nearly all of subproject area was completed for construction of the traffic infrastructure. However, in some areas at OTL poles and tower outside existing traffic land, it may still exist UXO, thus if not implement UXO clearance, it may cause risks of worker's and people's life when conducting construction of these pole and tower foundations.

96. Mitigation measures: UXO clearance procedure: before preparing and clearing site for constructing the foundations of poles and tower outside existing traffic land, it is necessary to coordinate with the competent agency for UXO clearance in the proposed foundation area.

97. Execution of UXO detection and removal 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

Notes: When detecting UXO, 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 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.
- Competent unit shall be responsible to notify The Military Commander of Ho Chi Minh city on the implementation mission: clearance location, construction schedules and staying time in the locality.

3. High risk of negative impacts due to inappropriate Construction Site Arrangement

98. Impact: There are several impact sources which could be arise from inadequate construction site arrangement, such as disposal site selection, the planning of transportation and storage facilities.

i) Disposal site selection: The selection of disposal site in city is more difficult than that in rural area because of high population density and lack of land area; disposal site will affect local land area and cause pollution for citizens living near the site if the selection process is not careful.

ii) Transportation and storage of materials: Materials transportation will affect to air environment due to dust, exhausts. Stockpile and material gathering site can cause temporary acquired land and affect to people living near the site because of the movement of vehicles in and out the stockpile, and dust around the gathering site.

iii) Temporary yards for cable stretch: if the yards are arranged on the roadways, it will be likely to cause traffic obstruction at the roads/streets where the power line runs along.

99. Mitigation Measures: During construction site arrangement, the HCMCPMB will require civil contractor to prepare a disposal plan as part of the Construction/Contractor Environmental Management Plan (CEMP). Based on this disposal plan, civil contractor will be responsible for contracting with sub-contractor, which is HCMC Urban Environment Company Limited) to collection, transportation and disposal of the refused excavated materials to the permitted disposal site. HCMCPMB will be responsible for supervision and include this content in civil work contracts; (i) Contractor will develop transportation plan for equipment and materials to reduce negative impacts; (ii) Contractor will arrange the temporary yards for stockpile and material gathering site within the median reservation areas of existing roads (such as roads of Dong Van Cong and Ring road No.2) in order to avoid

arising impacts due to land acquisition; and (iii) Contractors will obtain the license for safety and environmental requirements of mobilized machines and vehicles according to regulation under the Circular No.70/2015/TT-BGTVT.

C. Potential Impacts and Mitigation Measures during Construction phase

1. Potential Impacts and Mitigation Measures for Construction Activities

100. Potential environmental impacts and mitigation measures of the subproject activities during the construction phase on the different environmental aspects are described as bellows:

a) Ambient Air Quality, Noise and Vibration

101. Impact: Noise, vibration, dust and exhausts generated by operation of machines, equipment and transportation vehicles; excavation and backfilling of soil; and transport of materials may affect ambient air environment. These impacts are short-term and will stop when the construction is completed. The details are as follows:

i) Dust and exhausts such as NOx, SO_2, CO are generated by activities of construction machines' and equipment's, and transportation vehicles. With a scope of construction as mentioned, the subproject shall mobilize about 15 to 20 machines and vehicles to operate regularly in the construction sites and along the transportation roads. Dust and exhausts from the mechanical means may affect ambient air environment in the construction sites (including the UGC construction corridor on Mai Chi Tho avenue, the construction sites of pole foundations and cable stretch yards) and along the transport roads (Ha Noi highway, Mai Chi Tho avenue, Tran Nao street, Luong Dinh Cua street, Dong Van Cong road and Ring road No.2). The mechanical means use the fuel of diesel with 0.05% sulphur content. The concentration of air pollutants in their exhaust gas according to theoretical calculation are 45.9 mg/Nm^3 of dust; 64.7 mg/Nm^3 of SO_2; 622.3 mg/Nm^3 of NO_2; and 141.7 mg/Nm^3 of CO lower than the allowable limits under QCVN 19:2009/BTNMT (column B), so impacts from this activity will be negligible.

ii) Dust generation is expected with an increase in TSP ground level concentration due to earthworks, contact of machinery with bare soil, and exposure of bare soil and soil piles to wind. The major source of diffuse dust is from soil excavation and backfilling. However, earthworks are only conducted in construction of UGC trench (around 1,270 m in length)[2] and OTL pole foundations that are dispersive, so the soil of excavation and filling is in small volume at each construction site. In addition, the humidity of excavation soil in the construction sites is relatively high because of low terrain and many rivers and arroyos, so it could help to minimize dust release from these activities. Moreover, the earthworks last just about two months at each construction sites. Thus, the impact of diffuse dust is considered insignificant.

iii) Noise and Vibration may be generated by activities such as operation of earthmoving and excavation equipment, concrete mixers, compactor, cranes, and capstan engines. Furthermore, vehicles transporting construction materials will add to the average noise level along the transport routes. Noise produced during construction within the construction corridor of UGC and electricity poles will have impact on the communities living nearby. In addition, noise due to the movement of vehicles along the access road may potentially result to nuisance to the normal living conditions of the roadside households. However, the subproject's activities only contributes a small level of noise to the general noise (the background traffic noise) in these areas and the construction activities take place in short period at each subproject's construction site. Thus, the impact of noise is considered insignificant.

[2] Most UGC trenches will be built in conjunction with construction of the existing street renovation projects, the other with the length of 1,270 m travelling along the central reservation of Mai Chi Tho road and short section of Luong Dinh Cua street will be built separately.

102. With the above contents, impact on air quality to the community due to dust, exhaust and noise are insignificant and short-term.

103. Mitigation Measures: Best management practices will be applied to minimize impacts coupled with effective environmental monitoring. Measures that can be applied to minimize impacts on ambient air quality are:

i) Stockpile of excavated soil will be covered and kept moist.

ii) All vehicles used for construction, and equipment and machines emitting noise, exhausts need to be maintained properly to minimize emission and that valid operating permits are secured throughout the project schedule.

iii) Construction materials such as cement, sand and aggregates that are transported by trucks will be covered by canvas and all trucks used should have well fitted bodies and not be overtopped in loading to avoid soil scattering.

iv) Bare soil at the construction sites (the UGC construction corridor, the OTL pole foundation sites and cable stretch yards) will be kept moist by frequently spraying water to minimize dust.

v) Excavation and filling duration should be reduced, and excavated soil will be used to fill right after complete work.

vi) Soil scattered on the paved road and public road shall be removed immediately.

vii) Suitable mufflers will be installed on engine exhausts when appropriate, especially for mechanical means in operation at night.

viii) Drivers will be requested to not make horn and to turn off the truck engine when the truck stops for long time at the clouded residential area to reduce noise and gas emission.

b) Water Environment

104. Impacts: Sources causing impacts on water environment include domestic sewage and construction wastewater. The locations where water quality can be impacted are Ba Cua arroyo at section between T7 and T8 poles, Ky Ha arroyo between T17 and T18 poles, Giong Ong To river between T40 and T41 poles, Ca Tre arroyo between G5 and G6 points of UGC, and Sai Gon river between G9 and G10 points of UGC. However, the impact on water quality at these locations is not significant and can be mitigated and controlled as shown below:

- *Domestic sewage* is generated by worker's life activities. Number of workers is about 80 people, thus domestic sewage volume generated is small, about 6.4m^3 per day. Components of domestic sewage include residues, SS, organic matters (BOD/COD), nutrient matters (N, P) and micro-organisms. Therefore domestic sewage generated will be collected by existing toilets of hired houses for workers' stay. In addition, , the subproject shall mobilize two construction teams in site; each construction team will provide one mobile toilet with septic tank to collect domestic wastewater. After completing each tower, the consrtruction team will move these toilets to other tower locations for the workers to be used during their working time at site. For this reason, impacts of domestic sewage will be mitigated, emission source can be managed and controlled.
- *Construction wastewater* includes mainly runoff water from construction sites, water pumped from the cable trenches and pole foundation pits, abundant water from concrete maintenance. Components of the wastewater are mainly SS originated from soil and sand, thus it can cause increase in the turbidity of surface water sources near the subproject site. This wastewater does not contain hazardous substances to impact on environment. Furthermore, in order to mitigate impact on environment due to construction wastewater, the construction unit should do excavation and concrete works only on sunny days and require workers to use water for proper purposes, avoiding wasteful use, so that the volume of construction wastewater will be small.

- *Refused oil and gearse*; duster cloths contaminated with oil, grease; waste water from wash of vehicles and equipment will cause surface water source pollution if not collected and treated. According to research result of "Research of refused lubricant, oil recycle into liquid fuel" conducted by military science and technology center – Ministry of National Defense in 2002, the average volume of oil, lubricant refused from construction machines and vehicles is 7 liters for every changing time. The period for changing lubricant and maintenance is from 3 to 6 months depending on machines' and vehicles' intensity of activity. With about 15 types of machines and vehicles, construction duration of 9 months, the volume of refused oil and lubricant is about 157.5 to 315 litres[3].

105. Mitigation Measures: Water environmental impact mitigation measures include:

* *For domestic sewage*:

- Use of local labour is encouraged if possible to reduce amount of worker staying in rented houses and thus to minimize the amount of domestic wastewater. For the nonlocal workers, the construction contractor/s will rent residents' houses with adequate sanitation facilities for them.
- At the construction site, the subproject shall mobilize two construction teams in site; each construction team will provide one mobile toilet with septic tank to collect domestic wastewater. After completing each tower, the consrtruction team will move these toilets to other tower locations for the workers to be used during their working time at site. The construction contractor/s will periodically hire competent unit (e.g. HCMC Urban Environment Company Limited) to collect the waste from those mobile toilets.

* *For construction wastewater:*

- Wastewater during construction of OTL and UGC consists of mainly rainwater runoff into the cable trenches and the foundation pits carrying the contaminants. Mitigation measures before buried cable, casting foundation or backfilled trench bottom is to arrange construction sewage collection holes for depositing SS before wastewater flows into the drainage system of the city. The detail for technical specification for these holes is depended on the existing land available along the excavated trench and locations of foundation pits. The amount of water stored in the period from 12 - 24 hours, then pumping the water into sewage system.
- In addition, the contractors will follow strictly construction schedule; require workers to use water for proper purposes, avoiding wasteful use; no arrangement to gather materials near water.
- After the end of the construction process, utilizing soil of trench excavation to backfill the trench and foundation pits.
- To minimize the impact of storm water runoff to the drainage system along the construction area, the contractors will implement measures to:
  - + Exploit available sewer drainage, maintain good working conditions of the sewer;
  - + Create a groove around the pit area to collect wastewater and lead to the drainage system of the area;
  - + Use or transport excavated soil immediately to reduce the amount of storage on the construction sites;
  - + Collect construction solid waste, domestic solid waste generated at the construction site and hire functional units to transport to Da Phuoc landfill, Binh Chanh District for treatment.

* *For oil and grease:*

[3] The total amount of generated waste oil calculated by the amount of waste oil generated during a replacement of each means of construction (7 liters / time. Vehicle) multiplied by means of construction (15 vehicles), multiplied by the number of replacements in the construction period (9 months/6 months or 9 months/3 months) [7L x 15 x (9/6) = 157.5] or [7L x 15 x (9/3) = 315].

- All the reparation and, maintenance of vehicles and equipment will be implemented at garages not in the construction sites. Refused oil and gearse, wastewater from wash of vehicles and equipment, clouts contaminated with oil, grease will be collected and treated at these garages as stipulated.

c) Soil Environment

106. Impact: Sources causing impacts on soil environment include: impacts due to domestic and construction solid wastes, and impacts due to excavation causing soil erosion.

i) Impacts due to domestic solid wastes: The number of workers is about 80 people. Thus, domestic solid waste volume is small, about 48 kg/day and it can be controlled by proper collection and disposal by the HCMC Urban Environment Company Limited. The composition of domestic solid wastes includes: organic matters, plastic, paper, glass and other inorganic matter, of which organic matters are accounted for the main part. The domestic solid waste can contain pathogenic bacteria/viruses that are harmful for human health and domestic animals. The soil environment quality can be contaminated with pollutants of domestic solid waste through endosmosis of polluted rainwater. Therefore, it is necessary to collect and treat rubbishes effectively.

ii) Impacts due to construction solid wastes: These wastes includes: refused filled and excavated soil and rock, fallen materials; empty cement sacks, wooden barrel used for packaging equipment and devices, clouts etc.

- Excavated soil volume is proposed to be 18,813.8 m^3. Consideration will be given to reuse and salvage materials, e.g. excavated soil may be used on refilling the foundations and ground leveling. Volume of reused excavated soil of the subproject is about 8,070.7 m^3. The remained excavated soil that cannot be reused can suffer washout due to surface runoff during temporary storage at the construction site causing impacts on soil environment in the area.
- Refused construction materials, empty cement sacks, steel, lubricants, fuels, and wood debris will be generated during the construction process. Packaging materials such as wooden barrel, plastic, foam, cardboard boxes used for equipment and devices, electrical parts will also be generated. These wastes are generated at construction site and some material composition of them can be deliquesced by rainwater causing impacts on environment quality of soil and water in case of failure in collection and control.
- Oil may be leaked from machines and equipment during operation and maintenance activities or from changing fuel and lubricants. These can cause soil pollution in the subproject area. However, the construction corridor is along the existing streets/roads, so the impacts as described above are insignificant on soil quality.

iii) Impacts due to soil erosion: Excavation of cable trenches and pole foundation pits will change structure of topsoil, making uncovered soil that is under impacts of wind or runoff increasing risks of soil erosion. However, terrain of the subproject area is low and flat. The river and arroyo sections at the transmission line crossings have stable embankments. Moreover, activities of excavation and filling will be priority in dry season so erosion is assessed as a minor impact.

107. Mitigation Measures: Soil environmental impact mitigation measures include:

- The contractors will prepare a Waste Disposal Plan as part of the CEMP.
- Use of local labour is encouraged if possible to reduce amount of worker staying in rented houses and thus mitigation of domestic solid waste.
- Contractor will set up dustbins for collecting rubbish at the rented houses for workers' stay and the domestic solid waste of workers will be collected by local collection system.
- Duration of excavation and filling should be minimized to avoid bare land for a long time, to reduce soil erosion and runoff due to rain.
- The construction unit should do excavation and concrete works only on sunny days.

- Utilize excavated soil for filling cable trenches, foundation pits according to method of balance between excavation and filling.
- For excavated soil which cannot be reused, it will be collected and transported to the permitted disposal site for treatment as stipulated at Decision No. 44/2015/QĐ-UBND dated 9 Sep 2015 of Ho Chi Minh City People's Committee Promulgating regulations on management of sludge in Ho Chi Minh City.
- Collect salvage materials such as steel pieces, cement sacks, wooden barrels etc. to reuse or sell. For other construction materials which cannot be reused, it will be collected, transported and transferred to competent unit for treatment as stipulated at Article 31 of Decree No.38/2015/NĐ-CP date 24 Apr 2015 of Government regarding waste management.
- Hazardous wastes such as paint containing can, clouts contaminated 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 the Circular No.36/2015/TT-BTNMT dated 30 Jun 2015 issued by the MONRE regarding the hazardous wastes management.
- Completely finish each earthwork item before start other one by good construction arrangement where possible to reduce large spread of bare land. Conduct site cleaning and leveling after construction completion to return the temporary borrowing ground for local community.
- Present and past land use will be reviewed to assess whether excavated soils are contaminated. If any, contaminated soil should be treated, disposed at a disposal area or a location approved by the DoNRE.

d) Urban greenery and Landscape

108. Impact: The subproject location will not cause impact on general landscape of the localities because HCMCPMB has consulted with the local authorities, especially Department of Planning and Architecture, to select the optimal environmental-friendly alternatives of the subproject location, which will be appropriate with the local planning. However, impact on landscape at particular positions (around subproject site) can be caused by site clearance, excavation and filling activities. This impact is only temporary in the construction time (about 9 months).

109. For site clearance, the vegetation cover of the road central reservations where the OTL and UGC run along is mainly grass, bushes and decorative plants. Thus, the tree cutting will not significantly affect microclimate of subproject area, but urban aesthetics may be affected slightly.

110. Mitigation Measures:

- The construction areas and warehouses should be shielded around with metal sheets to ensure aesthetics of landscape around the areas.
- Clear, level, compact and return the impacted locations (UGC section under streets/ roads, construction sites, and temporarily acquired areas for construction materials storage) to the initial status right after finishing construction.
- Minimize cutting trees and other vegetation in all construction locations and along the traffic road.
- Regrow and protect trees and vegetation cover as much as possible.

e) Other Underground Works

111. Impacts: Most UGC trenches will be built in conjunction with construction of the existing street renovation projects, the other with the length of 1,270 m travelling along the central reservation of Mai Chi Tho road and short section of Luong Dinh Cua street will be built separately. It is likely to have some underground structures under the streets and roads including water supply pipes, drainage pipes, information cables, and power cables. Thus, excavation of cable trenches and pole foundation pits can cause impacts/failures on the

existing underground structures such as damage to drainage pipe, water supply pipe, and power and communication cable affecting people's life and production activities.

112. Mitigation measures

- Collect information/data about existing underground works intersecting with or adjacent to the proposed UGC route and those at the sites of the OTL poles.
- Contractor establishes emergency risk/failure response plan such as pipe break, or cable break (if any).
- Ensure safe distance to existing underground structures (if any) when conducting the excavation or construction. Prepare excavation and construction alternative at the locations where the UGC crosses or the OTL poles are adjacent to the existing underground works to ensure safety for these works.
- For construction of the UGC sections or the pole foundations at locations where existing underground structures crossing or adjacent to, mitigation impact measures are as follows:
  - + Soil excavation should be conducted by manual method in compliance with design drawing.
  - + Consolidate banks of excavation trenches or pits by Larsen piles to avoid landslide.
  - + Consolidate temporarily the existing underground structures.

113. During construction of the UGC sections or the pole foundations at locations where existing underground structures crossing or adjacent to, if any extraordinary (such as collision with other underground structure; Leakage of sewer or pipeline; break of underground line or pipeline…), the contractor must stop construction and inform the relevant units (HCMCPMB, consultant, etc.) to check and treat.

f) Other Transmission Lines and Communication Lines

114. Impacts: According to survey, the OTL will cross over low and medium voltage transmission lines 4 times at the crossing sections including P19-P20 in Cat Lai ward and P29-P30, P32-P33 and P36-P37 in Thanh My Loi ward, and cross over communication line once at crossing section of P21-P22 in Thanh My Loi ward. Thus, wire pull and scatter at locations where this transmission line crosses over other transmission lines and communication line, power of those transmission lines may be cut off because of safety but the operation of communication line will be unaffected. These will cause interruption in power supply at some area in the wards of Cat Lai and Thanh My Loi. However, time for wire pull and scatter is short (it requires to power cut in the time of approximately 1 to 2 hours at one crossing point) and only during the day, therefore power cut will be only at specific time in each local area. Impact is assessed insignificant.

115. Mitigation measures:

- Coordinate with management unit of the transmission lines to cut off power to ensure safety during wire pull and scatter process at the inter-cross locations if any.
- Inform people at least one week in advance of power cut for their life and production arrangement.
- Put up scaffolding during wire scatter and pull process. Put warning boards. Have protection measures to prevent impact on other lines. Ensure safety distance to those lines.

g) Quality of road and traffic activities

116. Impacts: There will be increased movement of heavy vehicles to the sites during the transport of materials and cable drum. This will result to an increase in risk of traffic-related accidents and injuries to local communities and local road degradation. The roads and streets along OTL and UGC, vicinal streets and main streets leading to the project location such as Ha Noi highway, Mai Chi Tho avenue, Dong Van Cong road and Ring road No. 2 will be used and large vehicles containing special loads may cause impacts on traffic if

unplanned and uncontrolled. Especially, these roads or streets are relatively crowed so movement of large construction vehicles may cause temporary impact on traffic.

117. Road degradation particularly of the streets along UGC route is anticipated due to excavation of UGC trench on the streets and repeated use of trucks (5 – 15 tons) for transport of other construction materials. Delivery of construction materials by trucks is only for a short and intermittent period of time. Most UGC trenches (sections along streets of Luong Dinh Cua, Tran Nao, and Nguyen Van Huong) will be built in conjunction with construction of the existing street renovation projects. The cable trench of the UGC section along Dong Van Cong road and Mai Chi Tho avenue will be built on the central reservations so traffic obstacle due to construction activities is not high. For the short section along Luong Dinh Cua street and at the intersections (Dong Van Cong - Mai Chi Tho junction; Mai Chi Tho -Tran Nao junction), arrangement of cable trench construction corridor will be able to cause significant impacts on activities of traffic and business shops. However, the construction of UGC trench in these areas will be divided into some little segments for complete construction at night in order to minimize the impacts on traffic and business activities in the street. The grounds and streets surfaces will be restored as initial status right after completion of UGC construction. Therefore, impacts on traffic are anticipated to be moderate and short-term.

118. In addition, the wire pull and scatter of the OTL may cause obstacles to traffic on existing roads and waterways at locations where the OTL crosses over. According to survey, the OTL crosses existing roads three times (including two times at Vanh Dai 2 road and the other at Dong Van Cong road) and existing waterways two times (the once at Ba Cua arroyo and the other at Giong Ong To river).

119. Mitigation measures: The Contractor will be required to prepare, educate workers, and implement a Transportation and Traffic Management Plan as part of the CEMP. Mitigation measures to be applied will include:

- Schedule movement of heavy vehicles to avoid peak hours of local street network wherever practicable.
- Monitor traffic at access roads to ensure project vehicles are not causing congestion.
- Ensure vehicles are maintained regularly and require that vehicles and machinery using combustion engines has and maintains valid operating permits issued by the Motor Vehicle Register Agency as stipulated in the Circular No.70/2015/TT-BGTVT throughout the project schedule. The permits shall form part of the bid documents.
- Implement road safety training and adherence to speed limits.
- Rehabilitate any damage to existing roads that may be caused by the movement of construction vehicles to the site. This will be a condition for the release of the contractor's performance bond.
- Manage traffic by posting warning signs and assigning flag persons to direct traffic on affected roads.
- At intersections and on Luong Dinh Cua street, divide the construction of UGC trench into some little segments for complete construction at night in order to minimize the impacts on traffic and business activities in the street.
- Restore the central reservation and street surfaces to initial status right after completion of the UGC construction.
- Prepare a Specific Construction Plan for the OTL at every crossing section as part of the CEMP.
- Contact with management unit of the roads and waterways for coordination to ensure construction safety and uninterrupted traffic activities.
- At the locations where the OTL section crossing over the roads and waterways, it need to set up scaffolding during wire scatter and pull process.
- Inform time of wire pull and scatter at crossing locations to local authority and people one week in advance.

- Put up warning board at two heads of the OTL section where wire will be pulled and scattered.
- Height of the suspended conductor of this OTL section must be in compliance with regulation on electric safety distance at sections crossing over road and waterway as stipulated in Decree No.14/2014/NĐ-CP.
- Complete wire pull and scatter as quickly as possible and only within the daytime to reduce traffic obstacle.

h) Occupational health and safety of workers

120. Impacts: Construction activities may cause harm and danger to the lives and welfare of workers. Hazards during project construction, cable pull, and pole assembly include exposure to EMF, live power lines/equipment, chemicals and fire and explosion. General construction impacts include physical hazards, trip and fall hazards, exposure to dust and noise, falling objects, and ergonomic injuries and illnesses. These impacts are anticipated to be high during line synchronization.

121. Mitigation measures: The Contractor will be required to prepare, educate workers, and implement a Occupational Health and Safety Plan (OHSP) as part of the CEMP. Mitigation measures to be applied will include:

- All construction equipment, tools will be carefully examined for quality and quantity before used.
- Constructor need to work with Construction Supervision Consultant (CSC)4, PIC and HCMCPMB to establish labour safe regulations on the sites required by law and by good engineering practice, which include: electric safety, operating equipment, general safety requirements.
- Workers shall be provided with appropriate personal protective equipment (PPE) such as safety shoes, hard hats, safety glasses, ear plugs, gloves, etc. at no cost to the employee and force them to use.
- A first aid kit will be provided at the 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.
- Strictly comply with safety norms for installation of electrical equipment and relative regulations.
- Workers conducting transport and installation of electrical equipment must understand regulations on installation and transport safety of electrical equipment.
- 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.
- Before switching on power to test the power grid and electrical equipment, it must stop relative all works and people not on the duty must go out of the danger area.
- Fuse of the electrical networks connected to electrical equipment which will be installed, must be disconnected during the connection time. Fuse is only closed to adjust the equipment after everyone is in a safe location.
- The danger areas must have signs.
- Safety and fire prevention for the construction area by some simple methods such as water tanks, sand tanks, buckets, shovels, fire ladder.
- Contact the local fire protection agencies to take measures to ensure safety in the fire prevention.
- Contractors will prepare Emergency Management Plans as part of the CEMP.

[4] See para.195

- When accident occurs, conduct in-site first aid, then quickly drive the wounded to hospital for treatment. It must keep a phone number of the nearest hospital to call ambulance. Besides, it must be equipped medicine cabinet for aid.

i) Community health and safety

122. Impacts: Impacts on community health and safety may include i) dust and noise generated due to increased traffic activities from the transport of materials; ii) traffic accident during transportation of construction materials and wastes to and from the construction site; iii) fires, emergency spills of materials especially in temporary storages of fuel and inflammable materials (paint, gas, diesel oil, fuel oil, etc.); iv) accidents of residents if they enter into work areas without permission, for example, falling into cable trench or foundation pits, electric shock during testing electric, etc. However, these impacts are considered as minor since: i) the construction corridor of cable trench and construction sites of electricity poles are fenced to deter people access to the sites; ii) construction activities will be in short time and within the construction corridor and construction sites;

123. Mitigation measures: To mitigate these potential impacts, the civil works Contractor will be required to develop a Community Health and Safety Plan (CHSP) that incorporates good international practice and recognized standards, as part of the CEMP. The CHSP will include emergency response and preparedness procedures to be developed in close consultation with potentially affected communities and local authorities, the plan 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);
- Remain the light during the night time on all construction sites;
- Provide warning signs to warn people of danger place;
- Assign several security persons on the construction sites;
- Periodically check the distance from power equipment to other objects as stipulated. Monitor minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working.

j) Social aspect

124. Impacts: It is estimated that 80 workers will be mobilized on the construction sites, and concentration of workers and poor housekeeping by contractors at work sites could lead to several social problems on the site such as Social evils and infectious diseases could negatively affect local residents; Conflict between workers and local people is likely to happen because of difference of culture. Surrounding residential areas will be the main impacted objects, but the impact is considered as minor due to number of workers are not high and these impacts could be controlled through appropriate mitigation measures.

125. Mitigation measures**:**

- Local labors will be hired as much as possible to prevent or minimize influx of migrant workers, and incidence of social diseases and community chaos.
- Examine periodically workers' health.
- 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, contractors provide the training for workers on occupational safety regulations and sufficient skill to communicate with local residents as stated in Decree No. 39/2016/ND-CP dated May 15th, 2016 of the GOV regarding the detailed regulation on some articles of the

Occupational Safety and Hygiene Law and Circular No. 22/2010/TT-BXD dated on December 03, 2010 of MOC on labour safety in work construction.

- Equip medicine cabinet for protecting workers' health in time.
- Establish the specific food safety regulations for construction workers.
- Construction units will implement temporary residence registration and provide accurate information about the quantity and stay time of all construction workers to CPC during the construction phase. They should also establish the relationship with the local authority 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 hired houses for workers' stay. Propagandize, educate workers and create good relations with local people in order to avoid conflicts arising.
- Require workers to respect and not to violate the cultures, habits and customs, religious beliefs, historical and cultural parks, pagodas, and temples in the locality.

2. Protected Areas, Rare and Precious Species, and Cultural Resources

126. The Cat Lai – Tan Cang 220kV transmission line is not located in any protected area and it has no rare, precious and endangered animal/plant species in the area as well as the vicinity.

127. The subproject will not affect any culturally sensitive area such as mosques, temples, and burial sites since the alignment of transmission line already avoided these sensitive areas. Chance find procedures will be developed in the event that physical cultural resources are unearthed during digging. The relevant Government authorities will be informed in case of chance find.

3. Repair, Restore, and Return the Ground after Construction Completion

128. 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, culverts, drainage system and public infrastructures (if any) damaged by the subproject construction.
- Clear, level and restore the ground after construction completion. Grow trees in temporarily acquired areas.

D. Potential Impacts and Mitigation Measures during Operation Phase

129. The potential impacts of the operation and maintenance of the OTL and UGC are generally related to the occupational and community health and safety issues. Hazards to occupational and community health and safety such as exposure to high voltage electrical equipment (electrocution), working in high elevation, exposure to EMF. The impacts are reversible, manageable, and can be mitigated with proper engineering and management controls. High voltage Power Network Company will be responsible for the operation of the subproject and its ancillary services.

1. Biological environment

130. Impacts: In the operation phase, the process of periodic maintenance and repair of the OTL, branches and tops of the trees violating the power lines safety inside the ROW, and trees outside the ROW with the risk of falling down or branches affecting to the ROW must be trimmed and cut down. According to the survey result, the vegetation cover on the median reservation areas of existing streets and traffic corridors where the transmission line travels along is mainly grass, bushes and decorative plants. These greeneries do not have height enough to be affected by regulation on safe distance to the conductor cables. Only small quantity of garden trees (majority of fruit trees) that shall be possibly trimmed to ensure safe distance to conductor cables is found in the ROW of section G2A – G2D of the OTL. Crops and trees can be planted in the ROW provided that the vertical clearance between the

treetop and the sag point of the power cable is not less than 2.0 m for 110 kV transmission line5. Therefore, after the transmission line is come into operation, the cutting of branches and/or top of trees in the maintenance and repair process will have negligible impact on ecological environment.

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

i) Trees, crops in the ROW: According to Decree No.14/2014/ND-CP, crops must be away from electric tower foundations at least 0.5m. Trees can be grown within the ROW but the vertical distance from the highest point of tree to the sag point of lowest conductor of 110kV transmission line while in maximum deflection state must not be less than 2.0m for the transmission line in the city, town.

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

132. Mitigation measures to be applied for control of trees inside and outside the ROW will include:

- 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 transmission line during operation.
- Use manual method to clear plants. Not use herbicide for plant clearance.
- Trees and branches of trees which are cut down will be collected by the operation agency, the operation agency will contact to local authorities to collect, transport and handle them as stipulated.
- Recommend local people to grow trees theirs height meets the requirements of height as stipulated. Local people will not be allowed to grow trees growing rapidly and their height might exceed the allowable limits, that affect to the safety of the transmission line.

2. Occupational health and safety of the workers

133. Impacts. The occupational health and safety issues inherent in the operation of the OTL and UGC include hazards due to exposure to live power lines and high voltage systems, working in heights and risks of accidents, and potential exposure to EMF. Accidents that may occur include electrocution, fires, and explosion.

134. Workers may be in contact with live power lines during the maintenance of the facilities and electrocution from direct contact with high-voltage electricity. Electrocution is a hazard directly related to power facilities.[6] Furthermore, electric utility workers have higher exposure to EMF than the general public because of working in close proximity to electric power lines or facilities.

135. Accidents may also happen when working in high elevation. However, an OHSP will be prepared as part of the CEMP and implemented to reduce risks that include testing of structural integrity prior to proceeding with the work and the use of fall protection measures.

136. Mitigation measures. HCMC high voltage Company shall be guided by the "Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution" (IFC) dated 30 April 2007 when working at the power lines or facilities. Some of

[5] The OTL sections of Cat Lai – Tan Cang 220kV TL and Cat Lai – An Khanh 110kV TL share the same poles, two circuits of 220kV TL above and two circuits of 110kV TL below. Thus, regulation on safety distance in vertical is for 110kV TL.

[6] International Finance Corporation (IFC), *Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution.* 30 April 2007.

the prevention and control measures for health and safety when working with live high-voltage electrical equipment are:

137. Some of the prevention and control measures when working with electrical systems are:

i) Restricting access to electrical equipment by workers only trained and certified to work on electrical equipment. Personnel will wear PPEs at all times when entering safety zones.

ii) Adherence to electrical safety standards.

iii) Proper grounding and deactivation of live power equipment during maintenance work or if working in close proximity to the equipment.

iv) Provision of personal safety devices or PPEs for workers and other precautions.

v) Observe guidelines regarding minimum approach distances for excavations, tools, vehicles, and other activities when working around power lines and cables.

vi) The entrance to cable jointing chambers or enclosures containing exposed live parts or exposed conductors should be kept locked unless such entrances are under the observation of a qualified person at all times.

vii) Switchboards, panel boards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized will be field marked to warn qualified persons of potential electric arc flash hazards.

138. Follow safety measures when working at height during maintenance and repair electric equipment on the OTL, particularly:

i) All workers will be examined health for working at height, equip sufficiently labor protection tools and cloths.

ii) 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.

iii) 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.

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

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

i) Identification of potential exposure levels in the work area including surveys of exposure levels and establishment of safety zones.

ii) Properly limit time for contacting with EMF for trained workers as stipulated and those equipped with appropriate PPE when entering safety zones.

iii) Utilization of personal monitors during work activities.

iv) Posting of safety reminders and warning signs.

v) Check compliance with “Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution” (IFC): Table 3 on the International Commission on Nonionizing Radiation Protection (ICNIRP)[7] exposure limits for occupational exposure

[7] ICNIRP is a non-governmental organization formally recognized by the World Health Organization (WHO), which published the “Guidelines for Limiting Exposure to Time-varying Electric, Magnetic, and Electromagnetic Fields” following reviews of all the peer-reviewed scientific literature, including thermal and non-thermal effects. The standards are based on evaluations of biological effects that have been established to have health consequences. The main conclusion from the WHO reviews is that exposures below the limits recommended by the ICNIRP international guidelines do not appear to have any known consequence on health.

to electric and magnetic fields.

3. Community Health and Safety

140. Impacts. The community may also be exposed to electrocution 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.

141. In terms of exposure to EMF, the transmission frequency commonly used in transmission systems ranges from 50–60Hz, which is considered as extremely low frequency with impacts becoming low with distance. Trees, buildings, and other materials that conduct electricity shield the electric fields. In general, the electric fields are strongest close to the source and diminish with distance. The World Health Organization (WHO) reported that there is still weak evidence about substantive long-term health issues related to low frequency electric fields at levels generally encountered by members of the public. The potential health effects associated with exposure to EMF are not well established due to lack of empirical data demonstrating adverse health effects. However, the public will be warned about the safety distances from the transmission system through warning signs.

142. The subproject will be designed and constructed in compliance with regulations on electrical safety under Decree No. 14/2014 / ND-CP, 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, according to observation results, EMF intensity of Thu Duc – Xa Lo 110kV transmission line, section under the intervals between tower 21 – tower 22A, Nguyen Huu Canh St. is 0.12 kV/m and Hoc Mon – Hoa Xa 220/110kV transmission line, section under the intervals between tower 6 – tower 7, Le Van Khuong St. is 0.22 kV/m. All these observation results of EMF intensity are lower than the allowable limits (≤ 5kV/m). So impact on local people caused by forecasted EMF of this subproject will be insignificantly. The public will also be warned about the safety distances from the transmission system and power lines through warning signs.

143. Mitigation measures. To prevent electrocution risk, HCMC high voltage Company will implement the following:

i) Provision of warning signs and anti-climbing devices on the electricity poles of OTL.
ii) Grounding of conducting objects such as metallic structures in the ROW of OTL.
iii) Regularly check compliance of the OTL with the safety clearances.
iv) Provision of warning signs at the OTL poles and of identification marks along UGC route.
v) Conduct earthing for the cable sheath and the OTL, especially UGC coupling pole.
vi) Check compliance with “Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution” (IFC): Table 1. ICNIRP exposure limits for general public exposure to electric and magnetic fields.
vii) Regularly check compliance with list of prohibited activities within the ROW.
viii) Increase awareness of communities close to the OTL and UGC about hazards of electricity.

4. Risks And Emergencies Associated With the UGC and OTL

144. Impacts. There are several risks that could occur with the operation of the OTL and UGC. Among these are the likelihood of cable being damaged, corrosion of the poles and equipment over time which could compromise its structural integrity, potential discharge incident, explosion of equipment, and being hit by lightning.

145. Mitigation Measures. Lightning arresters are to be installed along the OTL and the UGC coupling pole. There will also be provision for ensuring security of cables and equipment to avoid vandalism. Regular inspections of the facilities would help identify missing or corroded parts.

146. Earth leakage relay are to be provided in entire power transmission system. The relays will automatically switches to prevent people from electric shock when failures occur. In case

of discharge incident, explosion, and other related situations, a repair program is included in the emergency preparedness and response plan of the project.

147. Workers are also trained on emergency preparedness and response procedures and a manual on safety and emergency procedures is prepared and disseminated to workers. The health and safety guidelines include cautionary measures when working with live power lines and working at height.

5. Bird Collisions

148. Based on the field inspections and interviews with key informants about the path of migratory birds, there are relatively few birds in the subproject area. The site is not established as a path of migratory birds. There have been no reports about birds colliding with existing transmission lines in the subproject area.

6. Climate Change

149. Regional and Global climate change modeling project showed that climate change induced changes to the frequency and severity of rainfall events in the subproject area. Design of Cat Lai - Tan Cang 220kV transmission line considered and calculated floods due to storms with the frequency of P=2%. Thus, the foundations of the OTL poles will be high enough to avoid exposure of the base of the pole to local flooding events. Similarly, the UGC will be designed to withstand long periods of overlying standing water from flooding.

VII. ANALYSIS OF ALTERNATIVES

150. In the feasibility study phase, design consultant was coordinated with HCMCPMB to collect alternatives for design the subproject's route. The selected subproject's route was based on geographical condition, power demand, land acquisition, planning schedule of city, infrastructure and sensitive areas (namely protected area, natural reserves, cultural property, historical monument, temple and pagoda) in the region and the cost for investment considered in the selection of route alternative as well.

151. The proposed 220kV Cat Lai – Tan Cang transmission line is proposed to locate in district 2, 9 and Binh Thanh. This region has a great population density and strong development plan so the subproject is selected in accordance with the local plan; the route of subproject is surveyed and selected according to the opinion of the relevant authority; the details are as follows:

- Minimize crossing over the existing planning and residential area;
- Make the most utilization of the current 110kV, 220kV transmission lines (being operated) to minimize opening the corridor of the route;
- Carry out associated with the projects to upgrade and expand the road; combine with the bridge projects to be constructing in local region.

152. All the above criteria have agreed by the relevant authorities. A route of the subproject only considered one alternative according to the above criteria. Accordingly, the route is based on geographical location of the existing 220kV Cat Lai substation in district 9 and (ii) new-built 220kV Tan Cang substation in Binh Thanh district.

153. On the other hand, the areas of district 9 and 2 have high residential density. Empty land areas have been planning for residential areas and functional areas. Therefore, the selected route of 220kV Cat Lai – Tan Cang transmission line mainly follows (i) transportation roads, (ii) existing 220kV and (iii) 110kV transmission lines to minimize effects to existing residential areas, planning areas delivered by Ho Chi Minh City People's Committee to investors for projects' implementation.

154. The proposal construction plan is appropriate with requirements in ensuring beauty for the area, planning of traffic roads and central residential areas in the region.

155. With the sections of transmission line crossing the central area, they are proposed to be underground according to the existing streets such as Tran Nao, Luong Dinh Cua, Mai Chi Tho. For the areas out of the central area will be proposed for OTLs with single steel tower on separators of Dong Van Cong, Ring Road 2 and reusing 220kV – 110kV Cat Lai – Thu Duc 04 circuit transmission line.

156. The alternative for collection of the route of 220kV Cat Lai – Tan Cang transmission line had been developed and agreed by the relevant authorities. However, the area the transmission line crosses is the area, which is a strongly urban planning area of Ho Chi Minh City so arrangement of infrastructure must be synchronized and followed the parallel planning schedule.

157. Through a long working process with the local authority, the route has formed and the only feasible alternative had been approved by relevant parties. The selected alternative of the route reached 95% without crossing over residential area and planning area in region and reached 45% in constructing associated with projects of road and bridge. In addition, the route is designed the same corridor of the current projects and to be constructed in associated with the projects being constructed so the route was minimized using corridor for local region.

158. The chosen alternative was designed to coordinate and install cable pipes at the same time with the projects of road which are expanded and upgraded in the region such as construction of Sai Gon 2 bridge in Binh Thanh district and district 2, expansion of Nguyen Van Huong street in district 2, expansion and upgrading of Tran Nao street in district 2 and expansion and upgrading of Luong Dinh Cua street in district 2 not to affect residential areas and new completed infrastructure systems.

159. Based on the the approved route, the design consultant has analyzed and developed the explanation report, including the explanation of investment subproject, implementing solution and description of basic design. All reports will be submitted to HCMCPMB for approval.

160. According to the schedule set up by Ho Chi Minh City Power Corporation, the work of construction investment and completion of the system of 220kV Cat Lai – Tan Cang transmission line and 220kV Tan Cang substation was requested to be implemented comprehensively in the period of 2014-2016. However, due to obstacles in agreement of route and location of substation, the work of construction investment and completion for operation is later than the schedule.

161. To ensure qualitative and stable power supply to high class complex new towns under construction including Tan Cang, Ba Son and Thu Thiem, the work of construction investment and completion of the system of 220kV Cat Lai – Tan Cang and 220kV Tan Cang substation must be finished at the latest in the quarter 4 of 2017.

VIII. INFORMATION DISCLOSURE AND PUBLIC CONSULTATION

A. Public Consultation

162. During the subproject preparation stage, the following activities were accomplished:

- Activity 1: Investigation and discussion with local authorities about the route location.
- Activity 2: Site investigation, Preparation of EIA approved by Ho Chi Minh Department of Natural Resources and Environment at the Decision No. 712/QD-STNMT-CCBVMT dated 24 March 2017 in accordance with the Decree No.18/2015/ND-CP on 14 February 2015 of the Government and EMP for the subproject.
- Activity 3: Public consultation

163. A public consultation strategy with the stakeholders was established to meet the requirements of ADB SPS. This strategy embodied the principles of meaningful, transparent and comprehensive consultation to ensure that affected people groups and fragile people groups such as women and poor people, were given equal opportunities to participate in the design of the subproject.

1. Identification of Stakeholders

164. Stakeholders were identified and participated in consultation. Communication with the 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) People's Committees of the subproject wards, namely Phu Huu of district 9, Binh Trung Dong, Cat Lai, Thanh My Loi, Binh Trung Tay, An Phu, Binh Khanh and Binh An of district 2 and ward 22 of Binh Thanh district (ii) Project management agency (HCMCPMB), (iii) IEE preparation consultant (PECC2), and (v) Leaders of the subproject wards;
- Organizations/unions such as Women's Union, Fatherland Front, Veterans Organization and Youth Union which provided various information for the design of the subproject and which might participate in implementation of measures and interventions;
- Organization, individuals affected by the subproject.

2. Public Consultation Meeting

165. Formal public consultation meetings were held at People's Committee of wards where the transmission line travelling, namely Phu Huu ward in District 9, wards of Binh Trung Dong, Cat Lai, Thanh My Loi, Binh Trung Tay, An Phu, Binh Khanh and Binh An in District 2, and ward 22 in Binh Thanh district. The public consultation meetings took place in September and October, 2016 with participation of 129 people in the aggregate, including 82 male and 47 female (Table 17). During the meeting, participants and consultant unit had discussed scope and environmental, social issues, impacts on environment of the subproject and grievance redress mechanism for environmental, social and compensation problems.

Table 17. The time, location and number of participants of pubic consutation meetings

No.	Time	Location	Participants		Total
			Female	Male	
1	September 7, 2016	Phu Huu ward in District 9	4	8	12
2	October 5, 2016	Binh Trung Dong ward in district 2	3	7	10
3	September 1, 2016	Cat Lai ward, district 2	12	18	30
4	October 7, 2016	Binh Trung Tay ward, district 2	9	18	27
5	October 7, 2016	An Phu ward, district 2	4	6	10
6	September 23, 2016	Thanh My Loi ward, district 2	2	5	7
7	September 29, 2016	Binh Khanh ward, district 2	6	5	11
8	September 22, 2016	Binh An ward, district 2	9	13	22
9	September 22, 2016	Ward 22, Binh Thanh district	3	6	9
	Grant total		**52**	**86**	**138**

166. Public consultation meetings consisted of the following three component procedures:

i) On the behalf of HCMCPMB, the consulting unit introduced the subproject, including

scope, location, engineering issues, the necessity of construction of the above-mentioned subproject;

ii) Environmental consultant, as a representative of HCMCPMB, presented environmental policy, safety regulations of the ADB and the Vietnam power sector, anticipated environmental impacts caused by the subproject and respective mitigation measure (to be developed in IEE's report), grievance redress mechanism for environmental, social and compensation problems; and

iii) Social/resettlement consultants presented: ABD's resettlement/compensation plan; impacts on land and properties acquisition; policies of the Government and local authorities, the Project's policies on compensation for the losses when the State acquires land and properties on land; and potential impacts due to land acquisition.

167. During the meeting, participants were presented their questions and comments on environmental issues. The consulting unit (PECC2), on the behalf of HCMCPMB, was answered and explained all their questions.

168. Participants of the public consultation meetings included the ward leaders, the representatives of Vietnamese Fatherland Front of the locality, Veterans Organization, Women Union, Communist Youth Union and Trade/Labor Union, land surveyors and affected households. List of participants of the public consultation meetings is referred in Appendix B.

3. Results of Public Consultation

169. The summary of comments/questions received from the local authorities, affected people and other stakeholders and answers of HCMCPMB/consultant at the meeting are summarized in table 18.

Table 18. Discussion summary of public consultation

Comments/question of local authorities and communities	HCMCPMB and PECC2 answers	Project's response (issues are addressed by the IEE)
- Owner should announce in writing commencement period of the project and all documents of owner / relevant authorities relating to the project to wards People Committee for management during construction phase.	- Proposed construction schedule of project is Quarter I of 2017 and completes Quarter IV of 2017. Implementation schedule of the project will be sent to local authority at least 5 days before starting. And relevant documents of project send to ward for disclosure at wards as well.	- The information disclosure to the local authorities is presented in Section VIII. Information Disclosure and Public Consultation
- Construction unit shall co-ordinate with local authorities to register a temporary residence of worker and to avoid disturbing public order in region at wards.	- According to the plan, construction will carry out in shift so residence will not happen; however, construction unit shall also coordinate with local authority to register temporary residence for his workers at ward, if any.	- Registering temporary residence of worker presented in secion VI. Environment Impacts and Mitigation Measures.
- Site should be protected to avoid causing insanitary and urban beauty.	- Contractor shall provide a protected-fence of 2 m in height at site so construction of project will ensure safety and environmental sanitary.	Environmental protection measurements and safety method during construction are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
- Project is far from the residential region so it does not affect local people on socio-economic and health of people as well. However,	- Contractor will restore road surface after completing construction. Transportation of materials will be covered by canvas sheet so the scattering will be	Environmental protection measurements, (including mitigation measurements on waste, noise) and safety method during construction are

Comments/question of local authorities and communities	HCMCPMB and PECC2 answers	Project's response (issues are addressed by the IEE)
this is an underground section via ward so transportation activities on materials will happen and it is required to restore the road surface if causing damages. Waste must strictly forbid scattering on the road surface during transportation. Traffic shall co-ordinate well and reasonable allocation to avoiding affecting the public traffic.	limited. Transportation unit and contractor will co-ordinate with traffic police to avoid obstructing traffic of the surrounding region.	presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
- The contractor should propose a method to handle in case of scattering materials on the road and describbe location of watse storage to be generated in construction process and as well as the time for handling wastes.	- Materials are covered by canvas during transportation to avoid scattering on the road. The contractor shall bear responsibility for cleaning if any. Materials are transported to site according to the implementation schedule so the stockpile will be arranged temporarily at construction location such as median reservation area of existing roads, namely Dong Van Cong and Ring road No.2. Besides, contractor will provide dust-pins at site; the contractor will be collected daily domestic and construction wastes. The contractor will sign a contract with functional units at local to handle in accordance with the current stipulations. Waste will be collected and handled daily.	Environmental protection measurements, (including mitigation measurements on dust, waste, noise) and safety method during construction are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
- Contractor shall meet environmental commitment as stated in the IEE's and EIA's report and avoid scattering materials on the road and causing impacts on life of local people.	- HCMCPMB and contractor will meet environmental commitment as stated in the IEE's and EIA's report. - During the construction phase, it will avoid scattering materials on the road and cause impacts on life of local people.	Environmental protection measurements, and safety method during construction are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
- Project's implementation will be at night so noise will affect residential region during excavation; The contract will propose measurements to limit impacts on life of local people.	- Subproject will be implemented at night by contractor and must be stopped before 9 p.m to limit impact on life of local people.	Environmental protection measurements, and safety method during construction are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
- Contractor must ensure environmental sanitation and public order during construction process. The contractor should construct a toilet for worker during construction and they will be strictly forbidden making	- Implementation schedule is proposed 1 to 2 months at each ward; contractor will rent a local house for staying of worker so worker will use the existing toilets of rented houses for worker's stay. In addition, the subproject shall mobilize two construction teams in	Environmental protection measurements, and safety method during construction are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental

Comments/question of local authorities and communities	HCMCPMB and PECC2 answers	Project's response (issues are addressed by the IEE)
a mess uncontrolled from worker.	site; each construction team will provide one mobile toilet with septic tank to collect domestic wastewater. After completing each tower, the construction team will move these toilets to other tower locations for the workers to be used during their working time at site.	Management Plan.
- Owner is required to manage worker effectively, ensure sanitary in region; wastewater must meet standard regulations.	- HCMCPMB and contractor commit to be met requirements of local authority on sanitary in region and worker's management.	Environmental protection measurements, and safety method during construction are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
- Contractor must take measures to handle conflicts between construction worker and local people and between his worker and worker of other projects in ward region.	- Worker is signed a contract by contractor; they all have trained and educated so conflicts between them will not happen. However, the contractor also proposes measures for handling if any and he will bear responsible for conflicts to local authority and local people.	Handling conflicts between constrution worker and local people are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
- Electromagnetic field can or can not effect during construction of project.	- In design stage, HCMCPMB and consulting unit have designed project in accordance with specification of electrical safe. Electromagnetic field will be zero when it is outside of cable trench, so effect of electromagnetic will not happen. However, management and operation unit will check and measure it for each six months during operation stage or when having complaints to ensure health of local people.	Electromagnetic field is presented in Environmental monitoring plan.
- Local authorities require contractor to restore site as the original status for easy transportation of local people.	- Contractor is responsible for site's restoration as the original status after completing each item of construction.	Environmental protection measurements and safety method during construction are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
- Owner is required to fulfill strictly mitigation measures on environment. Construction shall ensure that it does not affect society, economy and health of community.	- HCMCPMB and contractor will fulfill strictly mitigation measures on environment. Construction shall ensure that it does not affect society, economy and health of community.	Environmental protection measurements, and safety method during construction are presented in section VI. Environmental Impacts and Mitigation Measures, and Section X. Environmental Management Plan.
Conclusion: the Ward People Committees, mass organization and subproject affected people of all wards had agreed with construction of the subproject and they will support HCMCPMB constructor in the construction process. Beside the above-mentioned issues and answers, HCMCPMB and Consultant also agreed to receive all comments and had considered in process subproject design.		

B. Information Disclosure

170. Formal information disclosure to the relevant stakeholders of "Cat Lai - Tan Cang 220kV Transmission Line" subproject that is presented in the IEE aims to begin a 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.

171. IEE must be easily understandable in order that the stakeholders can comment in written and verbal form in local language of Vietnamese. At a minimum, an executive summary of the IEE should be written in Vietnamese and distributed to office of ward/district People's Committees (DPC). IEE should be available at the EVNHCMC office in Ho Chi Minh City. Similarly, all reports on public consultation with the stakeholders prepared by the EA/IA should be available in Vietnamese language at the above office. IEE will be available on the ADB website, as well as environmental monitoring report prepared by the EA/IA after starting the subproject's implementation.

172. The People's Committees of the subproject wards of districts of No.9, No.2, Binh Thanh, Ho Chi Minh City were received the draft IEE in Vietnamese version during the public consultation process on 22-29 Sep 2016 to 5-7 Oct 2016.

C. Future Consultation Activities

173. The whole final IEE (after receiving the letter of No Objection from ADB) will be translated into Vietnamese language, then send to the People's Committees of subproject wards for disclosure. By doing this, local authorities and people can easily refer the final IEE.

174. HCMCPMB will, before starting the construction work, i) dispatch a focal person, who clearly understands the subproject, and who will be responsible for the communication with stakeholders; and ii) announce a detailed implementation schedule to the relevant local authorities (People's Committee of wards) and the communities in the subproject area.

175. In addition, during subproject construction phase, HCMCPMB and construction unit will continue to receive feedback from communities and affected households. All their feedbacks will be supervised and monitored by CSC.

176. Following the loan agreement of the project[8], EVN HCMC will disclose relevant information of environmental monitoring reports (See Section VI) to the affected persons promptly upon submission in Vietnamese language. The summary of environmental monitoring reports will be sent to wards People's Committees by HCMCPMB for disclosure and then local authorities and people can refer this.

[8] Schedule 5, Para 10, a) of LOAN AGREEMENT (Ordinary Operations) DATED 7 NOVEMBER 2014 <https://www.adb.org/sites/default/files/project-document/149476/46391-001-lbj.pdf>

IX. GRIEVANCE REDRESS MECHANISM

177. A well-defined grievance redress mechanism will be established to address the affected peoples' grievances and complaints regarding the environmental issues, land acquisition, compensation and resettlement in a timely and satisfactory manner. All affected peoples will be made fully aware of their rights, and the detailed procedures for filing grievances and an appeal process will be published through effective information dissemination.

178. Affected peoples are entitled to lodge complaints regarding any aspect of the affected environments, land acquisition and resettlement, problems such as, noise, pollution, entitlements, compensation rate and payment, and procedures for resettlement and income restoration programs. Affected peoples' complaints can be made verbally or in written form. In the case of verbal complaints, the contractor/HCMCPMB will be responsible for make a written record during the first meeting with the affected peoples.

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

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

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

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

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

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

Stage 5: If the affected people is still not satisfied with the decision of the HCMC People' Committee or in the absence of any response within the stipulated time, the affected peoples, 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 executing agency, PCP, DPC, CPC and the affected peoples. If, however, the affected people is still not satisfied with the City Court's decision, the case may be elevated to the court at higher level (the Higher Court).

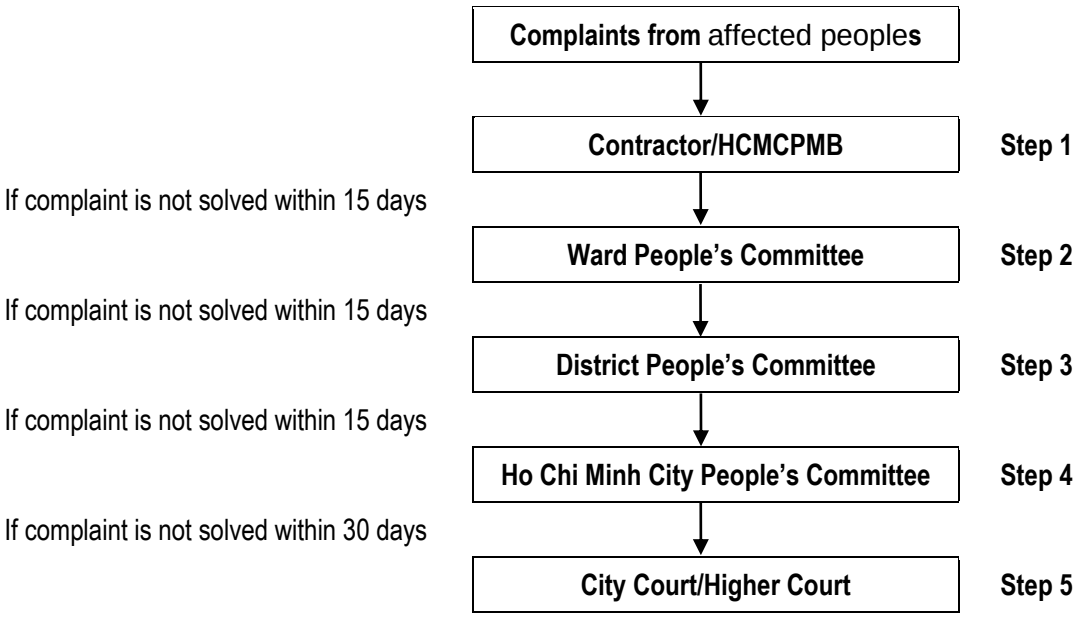

Figure 5. Public grievance redresses process

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

182. 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 local authority, 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 agency will ensure that the concerned APs are provided with copies of complaints and decisions or resolutions reached.

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

X. ENVIRONMENTAL MANAGEMENT PLAN

184. An EMP has been prepared for the subproject "Cat Lai - Tan Cang 220kV Transmission line" 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.

185. The EMP consists of an impacts mitigation plan and a monitoring 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 HCMCPMB follows to prevent or minimize unnecessary environmental impacts of the subproject.

A. Mitigation Plan

186. Environmental impact mitigation plan has been developed based on each subproject activity 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 19.

Table 19. Environmental Impact Mitigation Plan

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Preparation phase, detailed design								
Contract with contractor(s)	Incorporation of IEE and EMP into bidding documents and contracts	- Environmental mitigation measures indicated in the IEE, and the EMP will be included in contractor's bidding documents, technical specifications, and contracts for civil constructions and equipment installations. All contractors will be required to strictly comply with the EMP.	Subproject area	Before construction begins	Once for all tenders and contracts	No marginal cost	PIC	PECC2/EVNHCMC/HCMCPMB/Contractors
Contract with other entities	Compliance with the Law on Environmental Protection	Identify the following entities and make a contract with them; - A competent unit (e.g. HCMC Urban Environment Company Limited) to collect, transport and treat garbage and waste from mobile toilets at construction sites. - A permitted disposal site for treatment as stipulated at Decision No. 44/2015/QĐ-UBND dated 9 September 2015 of Ho Chi Minh City People's Committee Promulgating regulations on management of sludge in Ho Chi Minh City. - A competent unit for transporting to treat in accordance with the Circular No.36/2015/TT-BTNMT dated 30 June 2015 issued by the MONRE	Subproject area	Before construction begins	01 time Before construction begins	No marginal cost	EVNHCMC/ HCMCPMB/ PIC	Contractors

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

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		regarding the hazardous wastes management. - A competent unit for treatment as stipulated at Article 31 of Decree No.38/2015/NĐ-CP date 24 April 2015 of Government regarding waste management.						
Detailed design	Incorporation of IEE and EMP into the detailed design	- The environmental mitigation measures indicated in the IEE and the EMP will be incorporated into the detailed design.	Subproject location	Before construction begins	Once with detailed design documents	No marginal cost	PIC	PECC2/ EVNHCMC/HCMCPMB
Construction/ Contractor Environmental Management Plan (CEMP)	CEMP Review and Approval	Contractors will develop CEMP that outlines the manner by which they will comply with the requirements of the IEE and EMP. This will include: - Waste Disposal Plan[10] - Transportation and Traffic Management Plan[11] - Specific Construction Plan[12] - Occupational Health and Safety Plan (OHSP)[13] - Emergency Management Plans[14] - Community Health and Safety Plan (CHSP)[15]	Subproject site	Before construction begins	01 time Before construction begins	No marginal cost	EVNHCMC/ HCMCPMB/ PIC	Contractors
Land	Impacts on local	- Prepare and implement the	At	Before implementing	See	See	EVNHCMC	DPCs of District

[10] See para 107 of the IEE.
[11] See par 119 of the IEE.
[12] See para 119 of the IEE.
[13] See par 121 of the IEE.
[14] See para 121 of the IEE.
[15] See par 123 of the IEE.

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
acquisition and compensation	AP's life and economy	resettlement plan for the subproject based on regulations on land acquisition, compensation, assistance and resettlement of the Land Law 2013 and related decrees, circulars, decisions of the Viet Nam Government and PC of HCMC and the ADB's policy on Involuntary Resettlement. - HCMCPMB will have to obtain permission from Department of Transport for construction of the UGC and OTL in the central reservations and roadways of the roads and streets prior to commencement of construction.	affected land area	the subproject	resettlement plan	resettlement plan		9, Disttrict 2 and Binh Thanh District.
UXO clearance (bombs, mines and other explosives)	Impact on people's and worker's safety (maybe injured or dead if UXO still exist in construction area without cleared)	- Engage an authorized UXO clearing contractor to conduct UXO removal and ensure that the civil work shall be only commenced after the UXO clearing form has certificated that the subproject is already been cleared. - 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	Construction sites of the poles and tower outside existing traffic land.	Before the subproject construction	Once	$3,663 Included in the cost of construction ground preparation. (See Table 23).	EVNHCMC	Military Unit

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		+ 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 - 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. - Ensure that the contractors shall only commence site works after the UXO clearing agency has certified that the project areas are already been cleaned.						
Construction site arrangement	No impact. This activity help to prevent or avoid impacts by disposal and civil works	- The PPMP requires civil contractor to prepare a Waste Disposal Plan as part of CEMP and to make a contract with specialized unit (e.g. HCMC Urban Environment Company Limited) whose disposal site is ready to collect, transport and dispose the refused excavated materials to the permitted disposal site.	Subproject site	Before construction begins	01 time Before construction begins	No marginal cost	EVNHCMC/ HCMCPMB/ PIC	Contractors

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		- The PHCMCPMB is responsible for supervision and include this content in civil work contracts. - Contractor develops, as part of CEMP, Transportation and Traffic Management Plan for equipment and materials to reduce negative impacts. - Contractor will arrange the temporary yards for stockpile and material gathering site within the median reservation of existing roads. - Contractors must have the license for safe and environmental requirements of mobilized machines and vehicles according to regulation under the Circular No.70/2015/TT-BGTVT.						
Construction Phase of Subproject								
Tree cutting and site clearance	Loss of vegetation and landscape deformation	- The construction areas and warehouses should be shielded around with metal sheets to ensure aesthetics of landscape around the areas. - Clear, level, compact and return the impacted locations (UGC section under streets/ roads, construction sites, and temporarily acquired areas for construction materials storage) to the initial status right after finishing construction.	All construction sites	From the beginning to the completing of the subproject construction.	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		- Minimize cutting trees and other vegetation in all construction locations and along the traffic road. - Regrow and protect trees and vegetation cover as much as possible.						
Concentration of workers and domestic wastes generated	Generate domestic wastes causing environmental pollution; generate social problems, spread diseases	A Waste Disposal Plan will be prepared as part of the CEMP and implemented by the contractor. The measures to be applied include: - Contractors consider hiring local labors for unskilled jobs to prevent or minimize influx of migrant workers, and incidence of social diseases and community unrest. - Hire residents' houses with adequate sanitation facilities for workers' stay. - At the construction site, the subproject shall mobilize two construction teams in site; each construction team will provide one mobile toilet with septic tank to collect domestic wastewater. After completing each tower, the consrtruction team will move these toilets to other tower locations for the workers to be used during their working time at site. The construction contractor/s will periodically hire competent unit (e.g. HCMC Urban Environment	At hired houses for workers' stay	Throughout construction phase	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		Company Limited) to collect the waste from those mobile toilets. - Put dustbins for collecting rubbish at the hired houses for workers' stay. - Examine periodically worker health. Equip medicine cabinet for protecting workers' health in time. - Manage, propagandize and educate to enhance the awareness of environmental sanitation and health protection for workers. - Provide the training for workers on occupational safety regulations and sufficient skill to communicate with local residents. - Establish the specific food safety regulations for construction workers. - Construction units should implement temporary residence registration for all construction workers to CPCs at the subproject area. 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 hired houses for						

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		workers' stay. Propagandize, educate workers and create good relations with people in order to avoid conflicts arising. - 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.						
Refused rock and soil, debris, other hazardous wastes generated by soil excavation and filling, construction activities, pole erection and cable pull	Cause pollution of soil and surface water by refused rock and soil, debris, other hazardous wastes	- Salvage excavated soil, rock for filling cable trench and foundation pits according to excavation and filling balance method. - For excavated soil which cannot be reused, it will be collected and transported to the permitted disposal site for treatment as stipulated at Decision No. 44/2015/QĐ-UBND dated 9 September 2015 of Ho Chi Minh City People's Committee Promulgating regulations on management of sludge in Ho Chi Minh City. - Collect salvage materials such as steel pieces, cement sacks, wooden barrels … to reuse or sell. For other refused construction materials that cannot be reused, it will be collected, transported and transferred to competent unit for treatment as stipulated at Article 31 of Decree No.38/2015/NĐ-CP date 24 April 2015 of Government	All construction sites	Throughout construction phase	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		regarding waste management. - If excavated soil is suspected contamination, it must be tested, and disposed at a disposal area or a location approved by the DoNRE. <u>Hazardous waste impact mitigation</u> - For refused grease, oil: implement repair and maintenance of equipment, machines and vehicles at local garage. Waste grease, oil will be collected to treat at this garage as stipulated. - Other wastes such as paint containing can; duster cloth with oil, grease; failed fluorescent lamp must be collected into tanks and kept temporarily at the construction site, then hiring competent unit for transporting to treat in accordance with the Circular No.36/2015/TT-BTNMT dated 30 June 2015 issued by the MONRE regarding the hazardous wastes management.						
Construction activities and transportation of materials	Noise, dust and exhausts impact on ambient air environment quality	- Cover stockpile of excavated soil and keep it moist. - Maintain vehicles and equipment regularly to ensure emissions and noise comply with the standards and get valid operating permits throughout the project schedule. - Cover construction materials such as cement, sand and aggregates during transit and while stored on-	All construction sites	Beginning of construction (for operating permits of equipment, machines and means) and throughout construction phase	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		site. - Spray water on bare soil at the construction sites (the UGC construction corridor, the OTL pole foundation sites and cable stretch yards) frequently to keep it moist. - Reduce excavation and filling duration, and excavated soil will be used to fill right after complete work. - Remove soil scattered on the paved road and public road immediately. - Install suitable mufflers on engine exhausts when appropriate, especially for mechanical means in operation at night. - Request drivers to not make horn and to turn off the truck engine when the truck stops for long time at the clouded residential area to reduce noise and gas emission.						
Construction materials transportation, and storage	Traffic accidents, increase in traffic activities, damage to roads, traffic disruption	- Arrange Schedule of movement of heavy vehicles to avoid peak hours of local street network wherever practicable. - Monitor traffic at access roads to ensure project vehicles are not causing congestion. - Ensure vehicles are maintained regularly and require that vehicles and machinery using combustion engines has and maintains valid	All construction sites.	Throughout construction phase	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		operating permits issued by the Motor Vehicle Register Agency as stipulated in the Circular No.70/2015/TT-BGTVT throughout the project schedule. The permits shall form part of the bid documents. - Implement road safety training and adherence to speed limits. - Manage traffic by posting warning signs and assigning flag persons to direct traffic on affected roads. - Rehabilitate any damage to existing roads that may be caused by the movement of construction vehicles to the site. This will be a condition for the release of the contractor's performance bond. - Divide the construction of UGC trench into some little segments for complete construction at night in order to minimize the impacts on traffic and business activities At intersections and on Luong Dinh Cua street; - Restore the central reservation and street surfaces to initial status right after completion of the UGC construction.						
Earthwork, excavation and filling of cable trenches	Soil erosion causes an iincrease in the turbidity of	- Minimize duration of excavation and filling bu good construction organization to avoid bare land for a long time, to reduce soil erosion	All constructi on sites	Throughout construction phase	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
and foundation pits.	surface flow, the loss of soil	and runoff due to rain. - Set up construction schedule so that earthworks should be conducted during dry periods (the dry season runs from December to April in Ho Chi Minh city). - The construction unit should do excavation and concrete works only on sunny days. - Utilize excavated soil for filling cable trenches, foundation pits according to method of balance between excavation and filling. - For excavated soil which cannot be reused, it will be collected and transported to the permitted disposal site for treatment as stipulated at Decision No. 44/2015/QĐ-UBND dated 9 September 2015 of Ho Chi Minh City People's Committee Promulgating regulations on management of sludge in Ho Chi Minh City. - Completely finish each work item before start other one by good construction organization where possible to reduce large spread of bare land. - Conduct site cleaning and leveling after construction completion to return the temporary borrowing ground for local community.						

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
Excavation and construction of UGC trench, and pole foundations.	Damage to or failure of existing underground works	- Collect information/data about existing underground works intersecting with or adjacent to the proposed UGC route or the OTL poles. - Contractor establishes emergency risk/failure response plan such as pipe break, or cable break... (if any). - Ensure safe distance to existing underground structures (if any) when conducting the excavation or construction. Prepare excavation and construction alternative at the locations where the UGC crosses or the OTL poles are adjacent to the existing underground works to ensure safety for these works. - For construction of the UGC sections or the pole foundations at locations where existing underground structures crossing or adjacent to, mitigation impact measures are as follows: + Soil excavation should be conducted by manual method in compliance with design drawing. + Consolidate banks of excavation trenches or pits by Larsen piles to avoid landslide. + Consolidate temporarily the existing underground structures.	All construction sites.	Throughout construction phase	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		- During construction of the UGC sections or the pole foundations at locations where existing underground structures crossing or adjacent to, if any extraordinary, the contractor must be stopped construction and inform to the relevant units (the PO, Consultant …) to check and treat.						
The wire pull and scatter of the OTL	Discontinue utilities and services such as power supply, traffic disruption.	*For other transmission lines* - Coordinate with management unit of the transmission lines to cut off power to ensure safety during wire pull and scatter process at the inter-cross locations if any. - Inform people one week in advance of power cut for their life and production arrangement. - Put up scaffolding during wire scatter and pull process. Put warning boards. Have protection measures to prevent impact on other lines. Ensure safety distance to those lines. *For traffic disruption* - Prepare a specific construction plan for the OTL at every crossing section. - Contact with management unit of the roads and waterways for coordination to ensure construction safety and uninterrupted traffic activities.	Construction sites at crossing sections.	Throughout construction phase	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		- At the locations where the OTL section crossing over the roads and waterways, it need to set up scaffolding during wire scatter and pull process. - Inform time of wire pull and scatter at crossing locations to local authority and people one week in advance. - Put up warning board at two heads of the OTL section where wire will be pulled and scattered. - Height of the suspended conductor of this OTL section must be in compliance with regulation on electric safety distance at sections crossing over road and waterway as stipulated in Decree No.14/2014/NĐ-CP. - Complete wire pull and scatter as quickly as possible and only within the daytime to reduce traffic obstacle.						
The general construction	Occupational health and safety of workers - Worker injury and health	Occupation Health and Safety Plan (OHSP) will be prepared as part of the CEMP and implemented by the contractor with measures to be applied include: - All construction equipment, tools will be carefully examined for quality and quantity before used. - Constructor need to work with CSC, PIC and HCMPPMB to	All construction sites.	Throughout construction phase (fulltime)	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		establish labour safe regulations on the sites required by law and by good engineering practice, which include: electric safety, operating equipment, general safety requirements. - Workers shall be provided with appropriate personal protective equipment (PPE) such as safety shoes, hard hats, safety glasses, ear plugs, gloves, etc. at no cost to the employee and force them to use. - A first aid kit will be provided at the 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. - Strictly comply with safety norms for installation of electrical equipment and relative regulations. - Workers conducting transport and installation of electrical equipment must understand regulations on installation and transport safety of electrical equipment. - Use specialized tools and devices to anchor, fasten electrical equipment during movement and installation process. Not use steel						

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		wires, cables, chains to tie the insulation parts, the connectors of the base holes. - Before switching on power to test the power grid and electrical equipment, it must stop relative all works and people not on the duty must go out of the danger area. - Fuse of the electrical networks connected to electrical equipment which will be installed, must be disconnected during the connection time. Fuse is only closed to adjust the equipment after everyone is in a safe location. - The danger areas must have signs. - Safety and fire prevention for the construction area by some simple methods such as water tanks, sand tanks, buckets, shovels, fire ladder. - Contact the local fire protection agencies to take measures to ensure safety in the fire prevention. - 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. Besides, it must be equipped medicine cabinet for aid.						

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
The construction and transportation	Community health and safety - Local people injury and health	Civil contractor will be required to develop a Community Health and Safety Plan (CHSP), as part of the CEMP, that includes: - 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); - Remain the light during the nigh time on all construction sites; - Provide warning signs to warn people of danger place; - Assign several security persons on the construction sites; - Periodically check the distance from power equipment to other objects as stipulated. Monitor minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working.	All construction sites.	Throughout construction phase (fulltime)	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor
Construct drainage system of rainwater, water pumped from the foundation pits, cable	Deposit mud sand; reduce suspended solids in surface rainwater and water pumped from the foundation pits, cable trench;	- Provide drainage system of rainwater, water pumped from the cable trenches and foundation pits when constructing to prevent standing water and local flooding; deposit mud sand; reduce suspended solids in surface rainwater and water pumped from the foundation pits, cable trenches	All construction sites.	Design and construction phases	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
trenches.	prevent rainwater and water pumped from the foundation pits from overflowing on the ground.	before pumping into the existing drainage system. - Arrange construction sewage collection holes for depositing SS before wastewater flows into the drainage system of the city. The detail for technical specification for these holes is depended on the existing land available along the excavated trench and locations of foundation pits. The amount of water stored in the period from 12 - 24 hours, then pumping the water into sewage systemr; - Follow strictly construction schedule; require workers to use water for proper purposes, avoiding wasteful use; no arrangement to gather materials near water; - The construction unit should do excavation and concrete works only on sunny days. - After the end of the construction process, utilizing soil of trench excavation to backfill the trench and foundation pits. - To minimize the impact of storm water runoff to the drainage system along the construction area, the contractors will implement measures to: + Exploit available sewer drainage, maintain good working						

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		conditions of the sewer; + Create a groove around the pit area to collect wastewater and lead to the drainage system of the area; + Use or transport excavated soil immediately to reduce the amount of storage on the construction sites; + Collect construction solid waste, domestic solid waste generated at the construction site and hire functional units to transport to Da Phuoc landfill, Binh Chanh District for treatment.						
Detect cultural and historical properties or values	Avoid damage to cultural and historical properties or values	- Chances of detection of valuable relics and cultural values should be anticipated by contractors. Site supervisors should be on the watch for finds. - When detection of valuable relics and cultural values, stop immediately all work, untouched to anything of them. And EA/IA informs the authorized agency (DoCST) to determine their value and treat appropriately. - Work at the found site will be stopped until DoCST allows to be continued working.	All construction sites	At the begging, and throughout construction phase	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor
Repair, restore, return the ground after	Mitigate impacts on environment after construction	- Repair, recover, and return the road sections, culverts, drainage system and public infrastructures damaged by the subproject	All construction sites.	Throughout construction phase until the project is put into operation.	Monthly	Include in the civil work contract	HCMCPMB/ PIC/ CSC	Contractor

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
construction completion		construction. - Clear, level and restore the ground after construction completion. Grow trees in temporarily acquired areas.						
Subproject Operation phase								
Maintenance and repairment of the transmission line in the operation process.	Occupational health and safety (Exposure of workers to hazards due to exposure to live power equipment and high voltage systems, working in heights, fires, explosion, and potential exposure to EMF).	Some of the prevention and control measures when working with electrical systems are: - Restricting access to electrical equipment by workers only trained and certified to work on electrical equipment. - Adherence to electrical safety standards. - Proper grounding and deactivation of live power equipment during maintenance work or if working in close proximity to the equipment. - Provision of personal safety devices or PPEs for workers and other precautions. - Observe guidelines regarding minimum approach distances for excavations, tools, vehicles, and other activities when working around power lines and cables. - The entrance to cable jointing chambers or enclosures containing exposed live parts or exposed conductors should be kept locked unless such entrances are under the observation of a qualified	Along OTL and UGC	Fulltime	Semiannual	Included in operation and Maintenance cost	The high voltage grid company of Ho Chi Minh City	

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		person at all times. - Follow safety measures when working at height during maintenance and repair electric equipment on the OTL, particularly: - Examine health of workers for working at height, equip sufficiently labor protection tools and cloths. - Require workers to have Safety Certificate of Class 3 or above and sufficient conditions for working at height. - Carefully examine equipment, tools and means for quality and quantity before used. - 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 work area including surveys of exposure levels and establishment of safety zones. - Properly limit time for contacting with EMF for trained workers as stipulated and those equipped with appropriate PPE when entering safety zones. - Utilization of personal monitors						

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		during work activities. - Posting of safety reminders and warning signs. - Comply with "Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution" (IFC)						
Operation of the transmission line	Community Health and Safety (Community risks due to exposure to electrocution hazards, direct contact with high voltage electricity, exposure to EMF)	- Provision of warning signs and anti-climbing devices on the electricity poles of OTL. - Grounding of conducting objects such as metallic structures in the ROW of OTL. - Regularly check compliance of the OTL with the safety clearances. - Provision of warning signs at the OTL poles and of identification marks along UGC route. - Conduct earthing for the cable sheath and the OTL, especially UGC coupling pole. - Check compliance with "Environmental, Health, and Safety Guidelines – Electric Power Transmission and Distribution" (IFC): Table 1. ICNIRP exposure limits for general public exposure to electric and magnetic fields; - Regularly check compliance with list of prohibited activities within the ROW. - Increase awareness of	Along OTL and UGC	Fulltime	Semiannual	Included in operation and Maintenance cost	The high voltage grid company of Ho Chi Minh City	

Activities of Subproject	Potential Environmental Impacts	Proposed Mitigation Measures	Location	Timing	Activity Reporting	Estimated Cost[9] (USD)	Responsibility	
							Supervision	Implementation
		communities close to the OTL and UGC about hazards of electricity.						
Operation of the transmission line	Emergencies and accidents (Possible discharge incident, explosion of equipment, lighting strikes, damage to cables, and corrosion of equipment may result to emergency situations)	- Install lightning arresters along the OTL and the UGC coupling pole. - Ensure security of cables and equipment to avoid vandalism. - Conduct regular inspection of facilities to identify missing or corroded parts. - Equip entire power transmission system with Earth leakage relay. - Ensure the emergency preparedness and response procedures to be ready. - Conduct training of workers on emergency preparedness and response procedures.	Along OTL and UGC	Fulltime	Semiannual	Included in operation and Maintenance cost	The high voltage grid company of Ho Chi Minh City	

CEMP = Construction/Contractor Environmental Management Plan, CSC = Construction Supervision Consultant , DoCST = Department of Culture, Sports and Tourism, DoNRE = Department of Natural Resources and Environment , DPC = Precinct/District People's Committee , EMF = Electromagnetic Field , EMP = Environmental Management Plan, EVNHCMC = Ho Chi Minh City Power Corporation , HCMCPMB = Ho Chi Minh City Power Project Management Board, ICNIRP = International Council on Non-Ionizing Radiation Protection , IEE = Initial Environmental Protection, MONRE = Ministry of Natural and Resources and Environment, PIC = Project Implementation Consultant, PPMB = Power Project Management Board, QCVN = Vietnam Standard , UXO = Unexploded Ordnance.

B. Monitoring Plan

1. Environment Effects Monitoring

187. The environmental effects monitoring plan for the EMP is provided in Table 20. 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.

188. The Contractor, particularly the Environmental Officer of the Contractor, will be responsible for the implementation of the environmental monitoring program during the construction phase as mentioned in IEE report. The environmental monitoring plan will be implemented by the construction contractor (particularly Environmental Officer of the Contractor). However, the field sampling and laboratory analyses of the environmental monitoring will be implemented by an Environmental Monitoring Consultant (EMC) because the contractor can not take sample and analyses; therefore Environmental Officer of the Contractor will sign a contract with a EMC by his budget to conduct the field sampling and laboratory analyses for completing the monitoring plan. The PIC/ESU will provide logistical support to the Contractor where necessary for the implementation of environmental monitoring plan.

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

190. After construction is completed, the potential impacts of the operation of the subproject will be monitored by EVNHCMC. Monitoring of the success of the minor resettlement in the affected areas will be undertaken as part of the separate Resettlement Plan prepared for the subproject.

Table 20. Environmental monitoring plan

Environmental Indicators	Location	Means of Monitoring	Frequency	Reporting	Responsibility		Estimated Cost (USD)
					Supervision	Implementation	
Pre-construction Phase							
A) Air quality: dust, CO, NO_2, SO_2, noise B) Affected surface water quality: pH, TSS, oil and grease, COD, BOD_5, NO^-_3, PO_4^{3-}, Coliform	A) 03 positions, one in the junction of Luong Dinh Cua street and Tran Nao street; one in Dong Van Cong road; and the other in Vanh Dai 2 road. B) 02 positions, one at Giong Ong To river; and the other at Ba Cua arroyo.	Using field and analytical methods regulated in National Technical Regulations (QCVN 05:2013/BTNMT and QCVN 08-MT:2015/BTNMT).	One measurement	One baseline supplement report before construction phase starts	PIC/ESU	EIA preparation consultant	$ 1,500 (included in domestic EIA preparation cost)
Construction Phase							
A) Air quality: dust, exhaust and noise, CO, NO_2, SO_2 B) Affected surface water quality (domestic and construction wastewater): pH, TSS, COD, BOD_5, NO_3^-, PO_4^{3-}, Pb, Coliform C) Domestic (worker) and construction solid waste inside and outside construction sites including hired houses for workers' stay. D) Public comments and complaints E) Incidence of worker or public accident or injury	A) 06 positions, (i) at the junction of Luong Dinh Cua street and Tran Nao street; (ii) in Dong Van Cong road; (iii) in Vanh Dai 2 road; (iv) at gate of 220kV Tan Cang substation; (v) at Saigon bridge and (vi) at Ba Cua ditch in district 9. B) 02 positions, (i) at Giong Ong To river in district 2 and (ii) Ba Cua ditch in district 2. C) Construction sites, stockpile, and hired houses for workers' stay D) Using hotline number placed at construction areas E) At all construction areas	A) Using field and analytical methods regulated in National Technical Regulation - QCVN 05:2013/BTNMT. Include visual observations of dust and noise from contractor and public reports. B) Using field and analytical methods regulated in National Technical Regulation - QCVN 08-MT:2015/BTNMT; visual observation of discharge flow, turbidity C) Visual observation D) Information transferred by telephone hotline number posted at all construction sites E) Regular reporting by contractors/ESU	(A and B): Quarterly during construction period and daily visual records C) Daily visual records D) Continuous public input E) Continuous	Quarterly	(A – B)		
					ESU, CSC, and PIC	Environmental Monitoring Consultant (EMC) of Contractor	$ 3,000 (included in the construction contracts).
					(C - E) and daily observations		
					EVNHCMC/ESU and CSC, PIC	Contractor	No marginal cost

Environmental emergency (oil spill, fire, accidents)	at where happens emergency (if any).	Using field and analytical methods approved by DoNRE (if applicable).	In case of incidence		EVNHCMC/ESU and CSC, PIC	Contractor	$ 2,000 (included in the construction contracts).
Operation phase							
Incidence of worker accidents, or or maintenance of the ROW	ROW of the OTL and along the UGC	Regular documentation and reporting	Continuous	Quarterly	EVNHCM		O&M cost
Electromagnetic field monitoring	ROW of the OTL and along the UGC	Equipment for measuring electromagnetic field	Biannual	Biannual	EVNHCM		O&M cost

BTNMT = Ministry of Natural and Resources and Environment, CSC = Construction Supervision Consultant, ESU = Environmental and Social Unit, EVNHCMC = Ho Chi Minh City Power Corporation, IEE = Initial Environmental Examination , O&M = Operation and Management , PIC = Project Implementation Consultant , QCVN = Vietnam Standard.

2. Performance Monitoring

191. Performance monitoring (Table 21) is required to assess the overall performance of the EMP. A performance monitoring system will be developed by EVNHCMC for the subproject. During the pre-construction stage, contractors signed by EVNHCMC as mentioned in the Table 19 will conduct environmental monitoring. During the construction phase, Environmental Officer of the Contractor will conduct environmental performance monitoring, while HCMCPMB will supervise the monitoring of the EMP with support of CSC/PIC who assist contractor in implementation of the EMP. After the construction is completed, the subproject will be handed over to EVNHCMC, which will conduct environmental performance monitoring during the operation phase.

192. 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 that are summarized in Table 21.

Table 21. Performance Indicators for Subproject

Activities of subproject	Mitigation activities	Key Indicator	Performance Objective	Data Source
Pre-construction Phase				
Contract with contractor(s)	Mentioned in Table 19	All environmental mitigation measures mentioned in contractor's bidding documents and contracts in clear manner.	Mitigation measures appended to bidding documents.	Bidding documents and contracts
Contract with other entities	Mentioned in Table 19	List of entities and relative contracts	Ensure competent units to participate in the subproject and meet the current stipulations.	Contracts with other entities
Detailed design	Mentioned in Table 19	Incorporation of IEE and EMP into the detailed design	Ensure IEE and EMP included in technical documents in the detailed design phase.	Technical documents
Construction/Contractor Environmental Management Plan (CEMP)	Mentioned in Table 19	Adequacy of CEMPs	CEMPs are available to be implemented in compliance with the requirements of the IEE and EMP.	CEMP documents
Land acquisition and compensation	Mentioned in Table 19	Mentioned in Resettlement Plan	Mentioned in Resettlement Plan	Resettlement Plan
UXO clearance	Mentioned in Table 19	UXO disarmament	No risk of life safety of workers and people	Monitoring by PIC/HCMCPMB
Construction site arrangement	Mentioned in Table 19	- Disposal plan - Transportation and Traffic Management 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/HCMCPMB
Construction Phase				
Tree cutting and site clearance	Mentioned in Table 19	Measures for urban greenery protection Measures for urban aesthetics keeping Restoration of impacted areas after construction.	The impacted greeneries are restored after construction The urban aesthetics is kept up The impacted areas are restored after construction	Monitoring by CSC
Concentration of	Mentioned in	Hygiene situation,	Rigorous program of	CSC and

Activities of subproject	Mitigation activities	Key Indicator	Performance Objective	Data Source
workers and domestic wastes generated	Table 19	availability of appropriate capacity of toilet and waste bins. Residential register of workers Food safety regulations Educating and training about health and hygiene for workers	procedures to manage hired house for workers' stay	contractor monitoring reports
Refused rock and soil, debris, other hazardous wastes generated by soil excavation and filling, construction activities, pole erection and cable pull.	Mentioned in Table 19	Solid waste and liquid waste disposal, storage and management 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 hazardous waste from sites practiced.	CSC and contractor monitoring reports,
Construction activities and transportation of materials. Generation of noise, dust and exhausts	Mentioned in Table 19	Dust, exhaust and noise are controlled strictly	Complying with mitigation measures for dust, noise and exhausts mentioned in Table 19	CSC and monitoring report of contractors
Construction materials transportation, and storage – Impact on traffic	Mentioned in Table 19	Frequency of disruptions and blocked roadways is reduced Maintenance and operation method of equipment, machines, and vehicles	Disruptions, stoppages, or detours aremanaged to absolute minimum.	Public input, contractor reports, CSC reports
Earthwork, excavation and filling of cable trenches and foundation pits.	Mentioned in Table 19	Excavation, leveling and soil storage is controlled strictly to avoid bare land for long time	Land quality and minimize land slide or erosion	CSC and monitoring report of contractors
Excavation and construction of UGC trench, and pole foundations.	Mentioned in Table 19	Methods of constructing UGC trenches and pole foundations. Measures for protecting existing underground works.	No existing underground structure is damaged by the subproject construction activities.	Report of contractors
The wire pull and scatter of the OTL	Mentioned in Table 19	Duration of cut-off power Methods of pulling wire at section crossing over existing other lines and roads, waterways.	Minimized time of cut-off power, time of traffic obstruction, impact on the existing lines.	Report of contractors
Construction and transportation (Community and worker safety)	Mentioned in Table 19	Frequency of injuries are reduced	Adherence to GoV occupational health and Safety regulations	Contractor reports
Construct drainage system of rainwater, water pumped from the foundation pits, cable trenches.	Mentioned in Table 19	Affectivity of drainage system	Minimizing suspended solids in surface water and stagnant water Complying with mitigation measures for water quality mentioned in Table 19	Monitoring by CSC
Detect cultural and historical properties or	Mentioned in Table 19	Cultural and historical properties are conserved	No valued cultural property, or unearthed valuable relic is	Public input, contractor reports,

Activities of subproject	Mitigation activities	Key Indicator	Performance Objective	Data Source
values			harmed in any way	CSC reports
Repair, restore, return the ground after construction completion	Mentioned in Table 19	Remain construction material at the site are collected Construction solid waste is cleaned.	Recovery of construction site; remove construction solid waste.	Site observation; Contractor and CSC monitoring reports
Operation phase of transmission line				
Maintenance and repair of the transmission line in the operation process (Occupational health and safety)	Mentioned in Table 19	Frequency of accidents is reduced Electromagnetic field monitoring	No increase in pre-construction frequency	EVNHCMC reports
Operation of the transmission line (Community Health and Safety)	Mentioned in Table 19	Frequency of accidents is reduced Electromagnetic field monitoring	No increase in pre-construction frequency	EVNHCMC reports
Operation of the transmission line (Emergencies and accidents)	Mentioned in Table 19	Availability and affectivity of Incident prevention system and emergency preparedness and response procedures	Prevent incident and minimize damage	EVNHCMC reports

3. Reporting

193. Regular reporting on the implementation of mitigation measures and on monitoring activities is required. Reporting is the responsibility of HCMCPMB's ESU.

194. The mitigation and monitoring plans (**Table 19** and Table 20) summarize proposed timing of reporting. During the construction phase, the Environmental Officer of the Contractor submits monthly environmental report to CSC and the CSC will submit monthly report to HCMCPMB. In reference to the monthly reports, HCMCPB will, with the assistance of PIC, prepare semiannual environmental reports which will be submitted to ADB.

C. Implementation Arrangements

1. Institutional arrangements and responsibilities

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

- **Ho Chi Minh City Power Corporation (EVNHCMC)** is the Executive Agency, which takes ultimate responsibility for overseeing the successful implementation of the environmental safeguards for the subprojects as required by both Viet Nam and the ADB. EVNHCMC reports to the EVN and ADB.
- **Ho Chi Minh City Power Projects Management Board (HCMCPMB),** which is a subsidiary of EVNHCMC is the Implementing Agency of the subproject, and is responsible for the preparation and implementation of the EMP that is prepared for the IEE of the subproject in accordance with the Environmental Assessment and Review Framework (EARF)[16]. HCMCPMB has dedicated 2 personnel for the Environmental and Social Unit (ESU) which is responsible for all environmental and social safeguard activities. HCMCPMB will also be responsible for obtaining any regulatory approvals and maintaining compliance with the Government of Viet Nam's environmental laws as applicable to projects proposed for financing. HCMCPMB will also be responsible for

[16] Environmental Assessment and Review Framework of Ha Noi and Ho Chi Minh City Power Grid Development Sector Project. December 2013 < https://www.adb.org/projects/documents/ha-noi-and-ho-chi-minh-city-power-grid-development-sector-project-earf >

obtaining any regulatory approvals and maintaining compliance with the Government of Viet Nam's environmental laws as applicable to projects proposed for financing..

- **HCMCPMB's Environmental and Social Unit (ESU):** The responsibilities of the ESU include ensuring that the project selection criteria are met in consultation with the IA/EA, preparation of timely IEE document, and that the EMP is implemented successfully. The ESU is responsible to ensure meaningful public consultation is conducted as prescribed by IEE and ADB SPS and the CEMP is prepared by the contractor before the construction starts. The ESU will prepare and submit the REA checklist, and IEE and monitoring reports to ADB for review. The ESU works closely with the PIC to implement the EMP for each non-core project. The ESU also supervises and monitors the preparation and implementation of the CEMP by the environmental officer of the contractor.
- **Construction Supervision Consultant (CSC):** will be an expert with sufficient experience and capacity in social and environment field, he will be signed by the EVNHCMC before beginning construction of the subproject. The responsibilities of this expert is to prepare and implement Environment supervision plan and Environment Monitoring Plan during construction phase, report on any incidents or non-compliances of EMP to HCMCPMB and provide recommendations on EMP performance to HCMCPMB.
- **The Project Implementation Consultant (PIC):** Assist EVNHCMC/HCMCPMB in preparing of IEEs for noncore subprojects and in monitoring and evaluation of safeguards compliance.
- **The Contractor and the Environmental Officer of the Contractor** will prepare CEMP necessary for the implementation of the EMP as required and ensure strict implementation of the mitigation measures outlined in the EMP and the CEMP.
- **Environmental Monitoring Consultant (EMC) of the Contractor:** conduct the field sampling and laboratory analyses of the environmental monitoring plan (e.g., water quality, air quality) of the EMP that cannot be performed by the contractor or HCMCPMB's ESU.
- **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 Ho Chi Minh city. The DoNRE with District staff provides direction and support for environmental protection-related matters including application of LEP 2014, EIA, and environmental standards.
- **ADB** will conduct due diligence environmental issues during the project review missions. ADB will review the semi-annual monitoring reports submitted by HCMCPMB and will disclose the reports on its website. If HCMCPMB fails to meet safeguards requirements described in the EMP, ADB will seek corrective measures and advise the HCMCPMB on items in need of follow-up actions.

196. The specific responsibilities of the parties concerned are indicated in the Table 20.

Table 22. Stakeholder's Responsibilities

Stakeholder	Responsibilities
Ho Chi Minh City Power Corporation (EVNHCMC)	- General oversight role in the construction phase - Overall responsibility for the implementation of the EMP during operational phase
Ho Chi Minh City Power Projects Management Board (HCMCPMB)	- 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 CEMP and approving the CEMP - 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 fulfil commitments to facilitate for community consultations during project life.
Construction Supervision Consultant (CSC)	- 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 HCMCPMB
Project Implementation Consultant (PIC)	- Assist EVNHCMC/HCMCPMB 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 prepare the semi-annual environmental monitoring report; Assist ESU to guide contractor in CEMP preparation
Contractor and Environmental Officer (EO) of Contractor	- Following the award of the construction contracts, prepare CEMP which details the means by which the contractors will comply with the EMP - Implement mitigation measures in the EMP, keep records and necessary data as required in EMP and submit to CSC - Identify an EO - Ensure that workers are informed of purposes of EMP and aware of necessary measures to implement EMP - Prepare and submit monthly reports on any environmental issue, and on implementation of the CEMP at the construction site.
Environmental Monitoring Consultant (EMC) (Hired by contractors)	- Implement the environmental sampling required for monitoring plan of EMP that cannot be conducted by the contractor and HCMCPMB's ESU and environmental officer. - Perform required laboratory analyses for monitoring program detailed in EMP; and - Prepare and submit quarterly reports to HCMCPMB's ESU on monitoring activities.
Local authority and community	- Participate in monitoring EMP implementation

2. Institutional Capacity Review and Needs

197. Currently there is insufficient experience and capacity for environmental assessment and management in EVNHCMC for the implementation of the EMP, and to develop future safeguards document for the non-core subprojects. The PIC with assistance from the HCMCPMB's ESU of the subproject will develop and deliver training courses to HCMCPMB staff including the environmental officer of the contractor. The purpose of the course(s) is to strengthen the ability of HCMCPMB including the ESU to oversee implementation of the EMP by construction contractors, and EMC. Costs for training will be included in costs for implementation of the EMP.

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

3. Estimated Cost

199. 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 20, the preliminary cost for the implementation of the EMP for the subproject is summarized in Table 23.

Table 23. Estimated costs for Environmental Monitoring of EMP

Type of activity	Estimated cost (USD)
Pre-Construction phase	
Environmental quality monitoring (baseline sampling program)	$ 1,500 (Included in the domestic EIA preparation cost)
UXO clearance	$ 3,663 (Included in the cost of construction ground preparation)
Construction phase	
Environmental effects monitoring	$ 3,000 (included in the construction contract of contractor).
Inspecting environmental compliance	No marginal cost. It will be included in the CSC's contract
Monitoring activities in case of environmental emergency (oil spill, fire, accidents)	$ 2,000 (Included in the construction contract of contractor)
Operation phase	
Monitoring environmental quality and electromagnetic measurement	No marginal cost. It will be included in the operation and maintenance management cost
Training and capacity development of EVN*HCMC*/HCMCPMB	No marginal cost It is included in the PIC cost
Total	**$10,163**

200. The cost for EMP is $10,163. Other costs are included in working contracts of of all units.

XI. CONCLUSIONS AND REOMMENDATIONS

201. The initial environmental examination of the Cat Lai - Tan Cang 220kV Transmission line subproject in HCMC indicates that potential environmental impacts are construction-related impacts and that can be mitigated and managed.

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

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

REFERENCES

1) ADB, 2009. Safeguard Policy Statement, ADB Policy Paper.
2) ADB, 2003, Environmental Assessment Guidelines of the Asian Development Bank.
3) ADB, 2012, Environmental Safeguards, A Good Practice Sourcebook, Draft.
4) General Statistics Office, 2015. HCM city Statistical Yearbook 2014.
5) MOC -Ministry of Construction, 2009. Vietnam building Code 02:2009/BXD.
6) PECC2, 2016. Survey report of the Cat Lai - Tan Cang 220kV Transmission line.
7) Technology and Environment Researching Center, 2016. Base Environmental Analysis report.
8) World Bank Group, 2007. Environmental, Health, and Safety Guidelines. Washington DC, 96 pgs.

APPENDICES

Appendix A. Rapid Environmental Assessment (REA) Checklist

Appendix B. Minutes of Public Consultation Meetings

Appendix C. 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	VIE: Ha Noi and Ho Chi Minh City Power Grid Development Sector Project Subproject: Cat Lai - Tan Cang 220kV Transmission line

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	The subproject does not locate in historical and cultural heritage site.
Protected Area		x	There are not any protected areas located near to the subproject location so the subproject will not cause any impacts to these areas.
Wetland		x	Location of the subproject is not in or near to wetland area.
Mangrove		x	Not applicable
Estuarine		x	There are not estuarine in close proximity to the subproject site. The nearest estuarine area is located 38km away.
Buffer zone of protected area		x	There are no buffer zones of protected areas in close proximity to the subproject site.
Special area for protecting biodiversity		x	The subproject area and adjacency are not considered as special areas for biodiversity protection.
B. Potential Environmental Impacts Will the Sub-project cause…			
Encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?		x	The subproject is not cut through to the historical/cultural areas. The Contractors will manage and ban their workers from encroaching into these sites. HCMCPMB and Contractors will strictly implement mitigation measures in construction phase.
Encroachment on precious ecosystem (e.g. sensitive or protected areas)		x	The project will not encroach on sensitive or protected areas.
Alteration of surface water hydrology of waterways crossed by roads and		x	The subproject crosses river and arroyo 5 times, of which 3 times are in the OTL section and 2 times are in the UGC

Screening Questions	Yes	No	Remarks
resulting in increased sediment in streams affected by increased soil erosion at the construction site?			section. However, no pole is erected within the river or arroyo, poles located in safe distance from river or arroyo banks. The UGC crosses river or arroyo in conjunction to existing bridges (it runs under the bridge and attached to girder). Thus, No subproject construction work will encroach on the river or arroyo. No changes in surface water hydrology will occur.
Damage to sensitive coastal/marine habitats by construction of submarine cables?		x	There is no submarine cable to be installed by the subproject.
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. The overall impact on water quality is assessed to be minor and of short duration and can be mitigated through proper implementation of mitigating measures.
Increased local air pollution due to rock excavation and filling, crushing?		x	Low level. There is no rock crushing, cutting in the subproject. However, rock is used to mix concrete. 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		Low impact level due to electromagnetic fields in the operation phase. To minimize potential risks, an Occupational Health and Safety Plan (OHSP) will be developed and implemented.
Chemical pollution resulting from chemical clearing of vegetation for site clearance?		x	The project will not use chemicals in site clearance process.
Noise and vibration due to blasting and other civil works?		x	Minor impact level due to noise and vibration occurred during 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 transmission line route runs mainly on public traffic land. Only little area of residential land and several houses are in the ROW. House is permitted to locate in the ROW of 220kV transmission line, so no house will be dismantled by the subproject and no household will have to relocate due to the subproject implementation. Required compensation and assistance for assets loss is addressed by RP for subproject.
Dis-proportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		x	There are no minority groups are affected by the subproject in this homogenous society. Compensation support policies will be applied for any vulnerable persons affected by project, which will be developed by the subproject RP.
Social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?	x		Small impact. The construction of UGC routes on roadways and increase of vehicle density on roads will hinder traffic. However the mitigation measures have been launched with high feasibility such as: finish construction of each section completely, put signboards, barriers down; clearing the site daily to ensure traffic is returned to normal temporarily, restore roadbed damaged after construction.
Hazardous driving conditions where construction interferes with pre-existing roads?	x		Small impacts. Digging cable trench on roadways, and cable pull over roads could cause traffic accidents to people in traffic. However, the mitigation measures will be strictly implemented such as installing scaffolds, fences, signal panels, traffic control.
Creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?		x	There are no water pools for a long time by subproject. Site always are cleaned and reinstated after the complete work. This is not considered to be an issue.

Screening Questions	Yes	No	Remarks
Dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?		x	It is permitted to keep or build house in the ROW of 220kV transmission line according to regulations of Electricity Law. So, there are no households who are dislocated by subproject.
Environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?		x	It is anticipated that the maintenance of trees and vegetation within the ROW will create insignificant disturbance. Majority of existing vegetation are grass and decorative plant.
Facilitation of access to protected areas in case corridors traverse protected areas?		x	The Subproject doesn't cross any protected areas.
Disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?		x	No herbicides will be used to control vegetative height.
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	Work will be undertaken along the route of transmission line with about 80 workers. Workers will be recruited from surrounding communities. There will be limited impact on social infrastructure.
Social conflicts if workers from other regions or countries are hired?		x	The subproject location is in the Ho Chi Minh city where is profuse in both skilled and unskilled labour, so most workers will be hired from surrounding communities. All workers are Vietnamese.
Poor sanitation and solid waste disposal in construction camp and work sites, and possible transmission of communicable diseases from workers to local populations?	x		Moderate impact. The Contractor shall implement measures to ensure hygiene and health of workers and local people, such as providing sanitary accommodation and hiring specialized units to collect waste daily.
Risks to community safety associated with maintenance of lines and related facilities?		x	The risk from operation is rarely happen. A safe plan are prepared and implemented by operation unit.
Community health hazards due to electromagnetic fields, lightning, land subsidence, lowered groundwater table, and sanitization?		x	Minor impact. No land subsidence, lowered groundwater table, and salinization would happen. Electromagnetic fields occur in operation phase - 220kV UGCs are designed according to current standards so electromagnetic fields do not affect the public health. - 220kV OTL is designed according to the electromagnetic current standards will not impact public health.
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 are no transport, use, store and disposal of materials such as explosives for the project. The fuel using for machines, equipment and vehicles that will be will be purchased at the regional petrol stations, not storage or transport.
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the subproject (e.g., high voltage wires, and transmission poles 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		Community safety risks with power line include unauthorized access. Safety and warning signs will be installed. The transmission poles will be fitted with anti-climbing devices. The UGC may cause risks of power shock, cable broken when it happen earthquake, but this hazard will rarely appear in this subproject area and the subproject was designed to probably stand the earthquake. The project is designed to withstand natural hazards and regular maintenance will reduce the risk of major avoidable issues. Decommissioning will not present any unusual hazards.

Appendix B. Minutes of Public Consultation Meeting

Table. Summary of feedbacks/questions of the Local Authorities, HCMCPMB and Consultant and Project's Response

Place and time	Comments/questions of local authority	HCMCPMB and PECC2 answers
Phu Huu Ward, district 9, Ho Chi Minh city, on 7/9/2016	- Owner should compensate properly for affected people to avoid complaints. - It is required to ensure environmental sanitation and public order during construction process. The contractor should construct a toilet for worker during construction and they will be strictly forbidden making a mess uncontrolled from worker.	- Subproject only affects land area of Le Phan Company; compensation will carry out suitably in accordance with stipulations of the Government and Ho Chi Minh City. - Transmission line runs over the ward of 151m in length. Implementation schedule is proposed 1 month, contractor will rent a local house for staying of worker so worker will use the existing toilets of hired houses for worker's stay. However, the mobile toilet with septic tank will be provided to collect domestic wastewater of workers in working time at site.
	- Subproject will not affect land to local people except Le Phan Company; however, Le Phan company did not attend the public meeting due to busy. Besides, no household is affected by the project so they are not absence too. The meeting only has representatives of authorities/organizations.	- Le Phan company is located in Phu Huu ward, so land acquisition and compensation policies will be announced local authority and the local authority will notice the company in case of project's commencement.
	- About traffic: the owner is required that he shall restore roads when causing damages during construction.	- All damages during construction will be compensated and restored by the contractor.
	- Owner is required by local authority to manage worker effectively, ensure sanitary in region and without making a mess uncontrolled from worker. Waste water must meet standard regulations.	- HCMCPMB and contractor commit to be met requirements of local authority on sanitary in region and worker's management.
	- It is required to ensure labor safety for worker.	- HCMCPMB and contractor commit to ensure labor safety for worker and surrounding people as well.
	- Owner, consultant unit and contractor should be coordinated strictly with local authority in order to ensure advantage construction and environmental sanitary.	- HCMCPMB and construction unit shall cooperate with local authority during construction. All activities will be announced local authority before commencing construction; and it is committed to ensure environmental sanitary during construction process.
	- The land acquisition and compensation, assistance for lost and damaged assets are covered under which subproject (Cat Lai – Tan Cang 220kV transmission line or Cat Lai – An Khanh 220kV transmission line).	- The land acquisition, compensation and assistance for affected assets belongs to scope of the Cat Lai – Tan Cang 220kV transmission line subproject.

Place and time	Comments/questions of local authority	HCMCPMB and PECC2 answers
Binh Trung Dong Ward, district 2, Ho Chi Minh city, on 5/10/2016	- Does route run along central reservation of Ring Road No.2?	- The route runs along the central reservation of Ring road No.2; this is a vacant land.
	- How does the contractor handle in case of scattering materials on the road?	- Materials must be covered by a canvas during transportation to avoid scattering on the road. The contractor shall bear responsibility for cleaning if any.
	- Where does stock pile arrange?	- Materials are transported to site according to the implementation schedule so the stock pile will be arranged temporarily at construction location such as central reservation of existing roads, namely Dong Van Cong and Ring road No.2.
	- Where domestic and construction do wastes store? How do they handle?	- Contractor will provide dust-pins at site; domestic and construction wastes will be collected by the contractor. The contractor will sign a contract with functional units at local to handle in accordance with the current stipulations. Waste will be collected and handled daily.
	- How many days the waste will be handled?	- Waste will be collected and handled daily.
	- Where does worker stay and drink during construction period?	- Construction will carry out full time (starts at 7:30 a.m to 12:00 a.m and 1:00 p.m to 4:30 p.m); so worker will arrange resting time by him.
	- Contractor must take measures to handle conflicts between construction worker and local people and between his worker and worker of other projects in ward region.	- Worker is signed a contract by contractor; they all have trained and educated so conflicts between them will not happen. However, the contractor also proposes measures for handling if any and he will bear responsible for conflicts to local authority and local people.
	- How will effect of electromagnetic field happen?	- In design stage, HCMCPMB and consulting unit have designed project in accordance with specification of electrical safe. Electromagnetic field will be zero when it is outside of cable trench, so effect of electromagnetic will not happen. However, management and operation unit will check and measure it for each six months during operation stage or when having complaints to ensure health of local people.
	- It is required that owner must fulfill and meet the environmental commitments as stipulated by the government.	- HCMCPMB will meet requirement of environment as mentioned in the report and stipulations of the government.

Place and time	Comments/questions of local authority	HCMCPMB and PECC2 answers
Cat Lai Ward, district 2, Ho Chi Minh city, on 01/9/2016	- It is required to avoid impacts on local people during construction.	- HCMCPMB will cooperate with construction contractor during construction to ensure all activities at the site to be met safety and minimze impacts on local people.
	- It is required that compensation shall be met properly in case of land acquisition by the subproject.	- Compensation will be executed in accordance with stipulations of the Government and Ho Chi Minh City.
	- Subproject's owner should provide site diagram and layout of the subproject to each local person who will be affected by the land acquisition. Please in details the area will be acquired for each local person by the subproject?	- Site diagram and layout will be disclosed at office of ward People Committee for reference. - Any land acquisition will be surveyed and measured particularly to each affected person before carrying out compensation.
	- Have or have not any risks when people live under the 220kV transmission line? for example: local people will meet electric shock in case of wire-broken by rain.	- The subproject was designed according to the stipulation on electricity safety and the people can live within/under the right of way of 220kV transmission line when it meets a safety distance under the Decree No.14/2014/ND-CP of the Government. - Electric shock may happen if operation work can not manage well. However, the operation unit always checks and maintanains the transmission line during the operation phase, specially in the rainy season so the elctrict shock will be minimized and can not happen to local people.
	- When does the subproject construct?	- Proposed construction schedule is Quarter I of 2017 and completes Quarter IV of 2017.
	- Compensation should cooperate with the Department of Transportation to execute well.	- HCMCPMB shall review and check completely compensation of subproject before construction commencement.
	- The land acquisition and compensation, assistance for lost and damaged assets are covered under which subproject (Cat Lai – Tan Cang 220kV transmission line or Cat Lai – An Khanh 220kV transmission line).	- The land acquisition, compensation and assistance for affected assets belongs to scope of the Cat Lai – Tan Cang 220kV transmission line subproject.
Thanh My Loi Ward, district 2, Ho Chi Minh city, on 23/9/2016	- Owner is required to fulfill strictly mitigation measures on environment. Construction shall ensure that it does not affect society, economy and health of community. - Transportation of equipment and materials during construction must meet hygiene and safety.	- The opinions of local authorities and communities have recorded by HCMCPMB; HCMCPMB and contractor commit to meet all their requirements. - For providing a parking and canteen at site, HCMCPMB has opinion as follows: route runs over Thanh My Loi ward to be

Place and time	Comments/questions of local authority	HCMCPMB and PECC2 answers
	- It is forbidden to leave waste disorderly by workers in the surrounding region. - Contractor shall provide a parking and a canteen for project's worker to avoid causing disorder in drinking and losing beauty landscape and environmental sanitation in region. - Noise shall be paid attention by contractor to minimize impacts on life of local people. - Contractor shall coordinate with relevant authorities to limit flooding and traffic jam in region.	OTL with total length of 2km. Construction only strings cable wire from tower G2C to G3A for 110kV Cat Lai – An Khanh transmission line and builds two towers for 220kV Cat Lai – Tan Cang transmission line so proposed implementation schedule is three months. Construction will carry out full time (starts at 7:30 a.m to 12:00 a.m and 1:00 p.m to 4:30 p.m); worker will arrange resting time and meal by him; so it is not necessary to provide a parking and canteen in project's location.
Binh Trung Tay Ward, district 2, Ho Chi Minh city, on 7/10/2016	- Compensation will be done properly if caused damages during construction.	- Damage during construction stage will be compensated properly in accordance with stipulations of the government and Ho Chi Minh City.
	- Contractor must cover and water site to avoid distributing dust for surrounding locations on sunny days.	- Watering and covering at site is necessary during construction to avoid dust impacting on the surrounding location on sunny days.
	- Implementation schedule should be announced local authority and people.	- HCMCPMB will send implementation schedule to local authority and people before commencement of project at least 5 days.
	- Construction unit shall co-ordinate with local authority to register a temporary residence of worker at ward.	- According to the plan, construction will carry out in shift so residence will not happen; however construction unit shall also coordinate with local authority to register temporary residence for his workers at ward, if any.
	- It is forbidden to leave litter by contractor.	- Contractor has responsibility for daily collection of wastes at site after completing construction, so litter will be limited during construction stage.
	- Owner and construction unit are required to meet the environmental commitments as mentioned in the IEE and EIA's report.	- HCMCPMB and construction unit commit meeting requirement of environment as stated in the report.
An Phu Ward, district 2, Ho Chi Minh city, on 7/10/2016	- This project and expanding project of Luong Dinh Cua street; which one will be started in advance at ward region?	- Both of projects will be done in parallel at a period.
	- Project's implementation will be at night so noise will affect residential region during excavation; how will it limit?	- All activities caused noise will be done and completed before 9:00 p.m to avoid affecting the rest time of local people.
	- Local authority's proposal should not construct in day because it will affect regional traffic.	- Route runs over An Phu ward to be UGC segment so construction will be done at night. The construction unit will restore site as an original status after

Place and time	Comments/questions of local authority	HCMCPMB and PECC2 answers
		each construction to limit impacts on regional traffic.
	- Owner is required to arrange a public consultation meeting with people of three hamlets/quarters in ward to record their opinion relating to project.	- Route located in An Phu ward is UGC segment; it is arranged along the roadside so it does not affect land and assets of local people. Besides, route segment only runs over region of the second quarter of An Phu ward. So at this public meeting, HCMCPMB has invited local authority and relevant organizations and representative of the community of the second quarter (chief of the second quarter) to participate into the meeting and take information relating to the project from HCMCPMB and give their advices as well. Their opinion will be basis for considering and meeting during construction stage of contractor and HCMCPMB.
	- It is required to allocate a reasonable traffic route and avoid traffic jam in region.	- Priority is not given to construct the project in rush hour. The contractor shall coordinate with local authority and traffic police to allocate travelling route surrounding area. Contractor shall also dispatch a staff to guide people and passers for travelling in construction process.
	- It is ensured that mitigation measures will fulfill to limit impacts on life of people.	- Contractor and HCMCPMB commit to minimize impacts on life of local people in ward.
	- Management of worker shall ensure avoiding disorder on social security.	- Contractor shall manage his worker strictly during construction so disorder of worker will minimize.
	- Contractor shall ensure that waste will affect local people.	- Daily waste at site will collect cleanly by contractor and local hygienic unit will collect and handle under the contract signed between both of them so waste will minimize.
	- It is noted that construction will be done in residential region. - It is required to allocate reasonable traffic route. - Owner shall supervise well in construction process to minimize impacts on death of people. - Restoration of road must reach at least 80% compared to the initial status. - Environmental sanitation and security in	- The opinions of local authorities and communities have recorded by HCMCPMB; HCMCPMB and contractor commit to meet all their requirements relating to traffic, health safety of people, environmental sanitation and security in region during construction stage.

Place and time	Comments/questions of local authority	HCMCPMB and PECC2 answers
	region always meet in construction process.	
Binh Khanh Ward, district 2, Ho Chi Minh city, on 29/9/2016	- Do transportation of material cover canvas?	- Material is covered a canvas to avoid scattering along road during transportation.
	- It is required to limit transportation of material in a rush hour to avoid traffic jam of Luong Dinh Cua street.	- Transportation will minimize in rush hour.
	- Site should be protected to avoid causing insanitary and urban beauty.	- Contractor shall provide a protected-fence of 2 m in height at site so construction of project will ensure safety and environmental sanitary.
	- Contractor is required by local authority to restore site as the original status for easy transportation of local people.	- Site will be restored as the original status after completing construction.
	- Contractor is required to ensure electrical safety as stipulated of the government.	- Construction of the project always ensures electrical safety at site.
	- Contractor should co-ordinate with local authority in worker's management to avoid disturbing public order in region.	- Contractor commits to co-ordinate with local authority in management of workers at site.
	- Contractor shall meet environmental commitment as stated in report. It is noted to avoid scattering materials on the road and leading traffic accident.	- Contractor always meets environmental commitment during construction.
	- Local authority agrees construction of a project in region of ward and the owner is required to supervise strictly construction activities and worker of contractor.	- HCMCPMB shall carry out all requirements of local authority.
Binh An Ward, district 2, Ho Chi Minh city, on 22/9/2016	- Owner can present in detail on scope of project.	- Scope of project includes construction of a 220kV transmission line (overhead and underground line) from the current 220kV Cat Lai substation to 220kV Tan Cang substation with total length of 12.25 km.
	- Has or has not compensation for route section via ward?	- Route via ward is an underground section. Route mainly runs along roadside on the right of Luong Dinh Cua street (this is an extension part of Luong Dinh Cua street) so it will not affect land and house as well of local people.
	- It is required to manage well construction unit as stipulated of the state.	- HCMCPMB and construction unit will meet regulations on safety in construction.
	- Local authority unifies policy on project construction of the state.	-
	- Worker must carry out construction according to regulation and avoid causing impacts on life of local people.	- Workers at site will be managed strictly by construction contractor so impact on life of local people will be minimized.
	- Owner should survey the current underground works/structures to	- In design phase, consulting unit had surveyed all the current

Place and time	Comments/questions of local authority	HCMCPMB and PECC2 answers
	minimize damages during construction.	structures/works so it will minimize in construction phase.
	- It is required to manage and handle strictly solid waste (debris) at cross-sections of Luong Dinh Cua street for easy transportation of local people.	- Solid waste as debris generates in construction will be collected and cleaned by contractor after completion.
	- It is required to present in detail procedure of project's implementation.	- Procedure of project's implementation: - Consulting unit will survey the route; specially the current work/structures. And then he chooses the route to minimize all damages. - Based on the chosen route, the consulting unit will ask permission on project's location to relevant authorities for agreement. - According to unified route by relevant authority, the consulting unit will prepare project investment document and submit them to HCMCPMB for approval. - The project investment document approved; the consulting unit will prepare detail design document for construction of project. - Activities on measurement damage (as such land acquisition by the project if any) and compensation will execute before commencing the project. - HCMCPMB will select contractor through bidding. - The contractor met requirements of bidding document to be signed contract for implementing the project.
	- Contractor should co-ordinate with local authority in registration of temporary residence for worker.	- Workers do at site in shift so they will not stay at night in ward. Construction unit will co-ordinate with local authority in these workers' management to avoid disturbing public order in region.
	- Compensation shall execute if contractor causes damage for local people during construction.	- Contractor shall compensate properly according to the stipulations of government if contractor causes damage for local people during construction.

Place and time	Comments/questions of local authority	HCMCPMB and PECC2 answers
Ward 22, Binh Thanh district, Ho Chi Minh city, on 22/9/2016	- Project is far from the residential region so it does not affect local people on socio-economic and health of people as well. However, this is an underground section via ward so transportation activities on materials will happen and it is required to restore the road surface if causing damages. Waste must strictly forbid scattering on the road surface during transportation. Traffic shall co-ordinate well to avoiding affecting the public traffic.	- Contractor will restore road surface after completing construction. - Transportation of materials will be covered by canvas sheet so the scattering will be limited. - Transportation unit and contractor will co-ordinate with traffic police to avoid obstructing traffic of the surrounding region.
	- Local authority unifies construction of a project in region. It requires that HCMCPMB and contractor shall ensure safety; complete implementation schedule in time to reduce impacts on traffic management and socio-economic activities in region.	- HCMCPMB and contractor commit to meet all requirements of local authority. Transportation will avoid a rush-hour period to limit traffic jam in region.
	- Owner should announce in writing commencement period of the project and all documents of owner/ relevant authorities relating to the project to ward 22 people committee for management during construction phase.	- Implementation schedule and documents of the project will be sent to local authority before starting and during construction.
	- The project locates far from residential region; however, the owner and contractor must ensure regulations on noise, dust, solid waste, waste water to surrounding region.	- During construction, the contractor shall meet standards on noise, dust, solid waste, waste water as stipulated.
Project's response (issues are addressed the IEE)	- Environmental protection measurements, (including mitigation measurements on dust, gas waste, noise, mud) and safety method during construction is stated in the IEE's report. - The information disclosure to the local authority is stated in the IEE's report.	
Conclusion	- The Ward People Committees, mass organization and subproject affected people of all wards have agreed construction of the subproject and they will support HCMCPMB in the construction process.	

Appendix C. Emergency Response Plan

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

i) Emergency Response Team (ERT) of the Contractor as initial responder;

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

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

Table 1. Roles and Responsibilities in Emergency Incident Response

Entity	Responsibilities
Contractor Team (ERT)	- Communicates / alerts the EERT. - Prepares the emergency site to facilitate the response action of the EERT, e.g., vacating, clearing, restricting site. - When necessary and requested by the EERT, lends support / provides assistance during EERT's response operations.
External Emergency Response Team (EERT)	- Solves the emergency/incident
Contractor Resources	- Provide and sustain the people, equipment, tools and funds necessary to ensure Subproject's quick response to emergency situations. - Maintain good communication lines with the EERT to ensure prompt help response and adequate protection, by keeping them informed of Subproject progress.

3. The ERT will be led by the senior Contractor engineer (designated ERTL) on site with a suitably trained foreman or junior engineer as deputy. Trained first-aiders and security crew will be the core members of the ERT.

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

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

i) Subproject sites;

ii) construction time frame and phasing;

iii) any special construction techniques and equipment that will be used;

iv) any hazardous materials that will be brought to and stored in the construction premise and details on their applications and handling/management system;

v) the Contractor's Emergency Management Plan

vi) names and contact details of the ERT members

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

i) their comments on the adequacy of the respective Emergency Management Plans

ii) their own assessment of what types, likely magnitude and likely incidence rate of potential hazards are anticipated

iii) the arrangements for coordination and collaboration.

7. To ensure effective emergency response, prior to mobilization of civil works, the Contractor will:

i) set up the ERT;

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

iii) made arrangements with the EERT;

iv) conducted proper training of ERT members, and encouraged and trained volunteers from the work force;

v) conducted orientation to all construction workers on the emergency response procedures and facilities, particularly evacuation procedures, evacuation routes, evacuation assembly points, and self-first response, among others; and

vi) conducted drills for different possible situations.

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

Alert Procedures

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

(i) Whoever detects an emergency situation first shall immediately :
- call the attention of other people in the emergency site,
- sound the nearest alarm, and/or
- report/communicate the emergency situation to the ERT.

(ii) Only the ERTL and, if ERTL is not available, the Deputy ERTL are authorized to communicate with the EERT. Exceptional cases to this rule may be necessary and should be defined in the Emergency Management Plans.

(iii) When communicating/alerting an emergency to the EERT, it is important to provide them with at least: i) the type of emergency situation; ii) correct location of the emergency; ii) estimated magnitude of the situation; iii) estimated persons harmed; iv) time it happened; v) in case of a spill, which hazardous substance spilled; and vi) in case of fire and explosion, what caused it. Such details would allow the EERT to prepare for the appropriate response actions. For an effective reporting/alerting of an emergency situation:

a) 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
- HCMCPMB Office, route site

b) 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.

c) Contractor's construction vehicles should also be equipped with the appropriate communication facilities.

Emergency Response Situations

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

Table 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 ERT member on- site to meet EERT in access road/strategic location. He/she shall hold orange safety flag to get their attention and lead them to site. + Other ERT members to clear access road for smooth passage of the EERT.
If applicable, vacate site and influence area at once, restrict site, suspend work until further notice.	- Follow evacuation procedure.

Table 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, and/or + Foreman or any ERT member among the construction sub-

Procedure	Remarks
	group contacts the fire department (in this case it should be agreed on that it is alright for any ERT member in the sub-group to alert the fire department) + report/communicate the emergency situation to the ERTL/Deputy ERTL.
Stop all activities/operations and evacuate.	All (non-ERT) workers/staff sub-contractors, site visitors and concerned public to move out to safe grounds following the evacuation procedure.
Activate ERT to contain fire/control fire from spreading.	Guided by the training they undertook, ERT members assigned to mitigate the fire shall assess their own safety situation first before attempting to control fire spread.
Call the nearest fire and police stations and, if applicable, emergency medical services.	When alerting the EERT, ERTL will give the location, cause of fire, estimated fire alarm rating, any injuries.
Facilitate leading the EERT to the emergency site.	ERTL/Deputy ERTL to instruct: + an ERT member to meet the EERT in the access road or strategic location and lead them to the site. He/she shall hold the orange safety flag to get their attention and lead them to the site. + some ERT members to stop traffic in, and clear, the access road to facilitate passage of the EERT.
ERT to vacate the site as soon as their safety is assessed as in danger.	Follow appropriate evacuation procedure.