VIET NAM ELECTRICITY

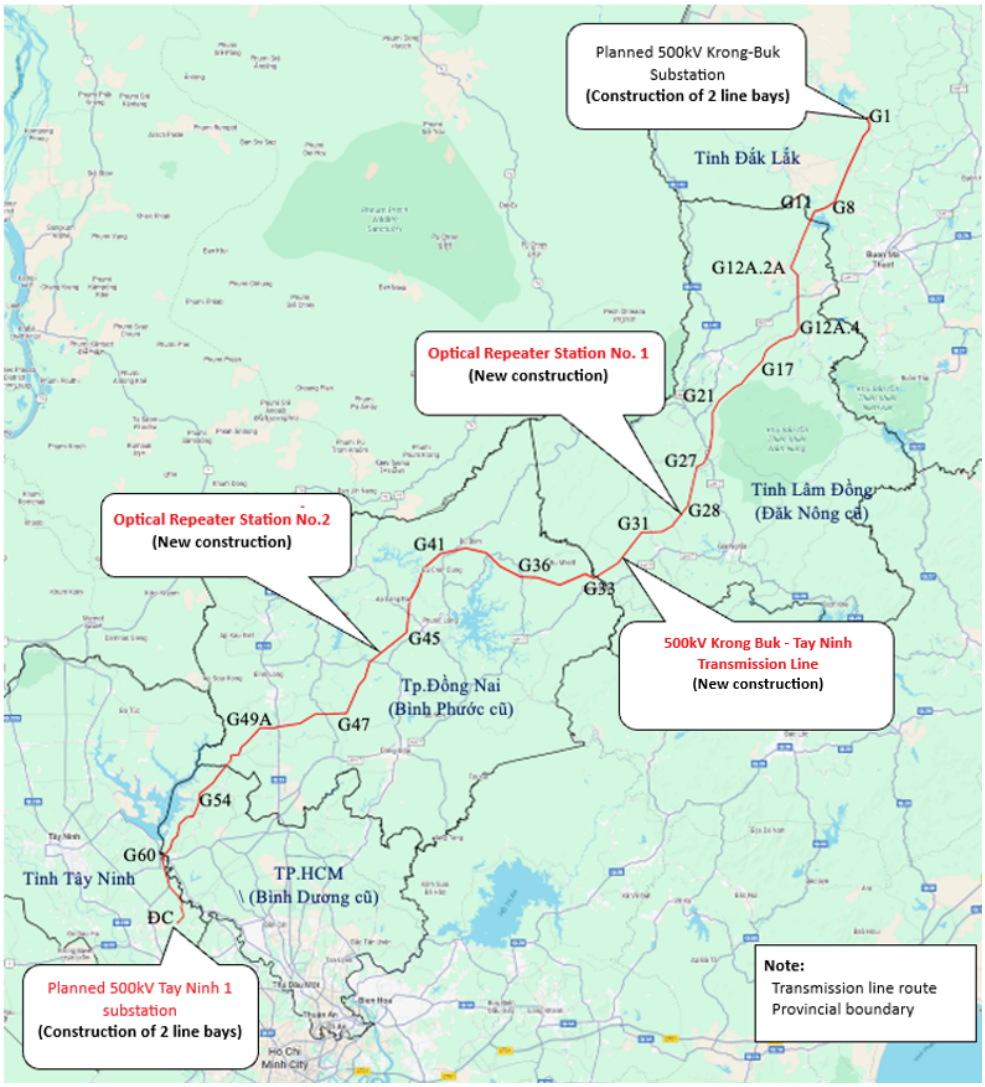
NATIONAL POWER TRANSMISSION CORPORATION

RENEWABLE ENERGY ACCELERATING CHANGE (REACH)

(P516693)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT (ESIA)

(draft)



SEPTEMBER 2026

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ACRONYMS AND ABBREVIATIONS

AD	Advection–Diffusion
AoA	Analysis Of Alternatives
AH	Affected Households
AP	Affected People
BOD	Biochemical Oxygen Demand
CC	Climate Change
C-ES	Contractor's Environmental & Safety Officer
C-ESMP	Contractor's Environmental And Social Management Plan
CHS/CH	Community Health And Safety
CIA	Cumulative Impact Assessment
COD	Chemical Oxygen Demand
CR, EN, V	Critically Endangered, Endangered, Vulnerable
CPC	Commune-Level People's Committees
CSC	Construction Supervision Consultant
dB/dBA	Decibels/A-Weighted Decibels
DAI	Direct Impacted Areas
DED	Detailed Engineering Design
DO	Dissolved Oxygen
EHS	Environment, Health And Safety
EHSG	World Bank Group Environmental, Health And Safety Guidelines
EIA	Environmental Impact Assessment
EMC	Ethnic Minority Communities
EMDP	Ethnic Minority Development Plan
EO	Environmental Officer
EPA	Environmental Protection Agency
ESA	Environmental And Social Assessment
ESCOP	Environmental And Social Code Of Practice
ESCP	Environmental And Social Commitment Plan
ESHS	Environmental, Social, Health And Safety
ESF	Environmental And Social Framework
ESIA	Environmental And Social Impact Assessment
ESMF	Environmental And Social Management Framework
ESMP	Environmental And Social Management Plans
ESMU	Environmental And Social Management Unit
ESS	Environmental And Social Standards
FDI	Foreign Direct Investment
FS	Feasibility Study
GBV	Gender-Based Violence
GHG	Greenhouse Gases
GIEP	Good International Engineering Practice
GWP	Global Warming Potential
GRM	Grievance Redress Mechanism
HIVAIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HW	Hazardous Waste
IESMC	Independent Environmental And Social Monitoring Consultant
IOL	Inventory of Losses
IFC	International Financial Institutions
IPCC	Intergovernmental Panel On Climate Change
IUCN	International Union For Conservation Of Nature

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KBA	Key Biodiversity Area
LA	Land Acquisition
LMP	Labor Management Procedure
LP	Landscape Protection
MARD	Ministry Of Agriculture And Rural Development
MAE	Ministry Of Agriculture And Environment
MOC	Ministry Of Construction
MONRE	Ministry Of Natural Resources And Environment
NA	Natural Area
NH	National Highways
NP	National Parks
NTU	Nephelometric Turbidity Unit
ODA	Official Development Assistance
OHS	Occupational Health and Safety
OHSP	Occupational Health And Safety Plan
PAPs	Project's Affected People
PC	People's Committees
PCC	Particular Contract Conditions
PDIES	Process of Data and Information Exchange and Sharing
PDO	Project Development Objectives
PNPCA	Prior Notification, Consultation and Agreement Process
PR	Provincial Road
PPE	Personal Protective Equipment
QCCP	Permissible Regulations
QCVN	Viet Nam's Regulation
QD	Decision
RP	Resettlement Plan
RC	Reinforced Concrete
RCP	Representative Concentration Pathway
RCIA	Rapid Cumulative Impact Assessment
SEP	Stakeholder Engagement Plan
SEA	Strategic Environment Assessment
SEAH	Sexual Exploitation, Abuse And Harassment
SEO	Senior Environmental Officer
SH	Sexual Harassment
S-HC	Species And Habitat Conservation
SLR	Sea Level Rise
SO	Social Worker
SOPs	Safe Operating Procedures
SW	Solid Waste
TMP	Traffic Management Plan
STDs/STIs	Sexually Transmitted Diseases/Infections
TSS	Total Suspended Solids
TCVN	Viet Nam's Standards
TOR	Terms Of Reference
TTg	Prime Minister
UNESCO	United Nations Educational, Scientific And Cultural Organization
USD/VND	Us Dollar/Vietnamese Dong
URENCO	Urban Environment Company
UXO	Unexploded Explosives
VEC	Valued Environmental And Social Components
VOCs	Volatile Organic Compounds

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WB	World Bank
WBG	World Bank Group
WRB	World Reference Base for Soil Resources
WBV	Whole-Body Vibration
WHO	World Health Organization
WQM	Water Quality Monitoring
WWF	World Wide Fund for Nature

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EXECUTIVE SUMMARY

1. Project Description

The 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project is a critical energy infrastructure development proposed to enhance the transmission capacity of the national power grid from the Central and Central Highlands regions of Viet Nam to the Southern Key Economic Zone. Strategically aligned with the Revised National Power Development Plan for the 2021–2030 Period, with a Vision to 2050 (Revised PDP VIII), approved under Decision No. 768/QD-TTg, and identified as a nationally important energy project under Decision No. 2634/QD-TTg, the project facilitates the full evacuation of electricity generated from various regional renewable sources, including wind, solar, and hydropower plants, as well as gas turbine power facilities. By establishing this vital transmission link, the project directly addresses the low reserve margin in the Southern region, which is projected to fall below five percent during the 2025–2030 period. This intervention increases inter-regional power flow limits beyond the existing 4,000 MW bottleneck, thereby enhancing national energy security, optimizing inter-regional grid adequacy, reducing transmission losses, and ensuring a stable and reliable electricity supply to meet growing industrial and socio-economic demands.

The geographical scope of the project spans approximately 330 kilometers (specifically 329.63 kilometers) of double-circuit overhead 500kV transmission lines, traversing 34 communes and wards across five provinces and cities: Ea Kiet, Ea M'Droh, and Ea Wer Communes in Dak Lak Province; twelve communes in Lam Dong Province; fifteen communes and wards in Dong Nai City; Minh Thanh and Dau Tieng Communes in Ho Chi Minh City; and Loc Ninh and Hung Thuan Communes in Tay Ninh Province. The starting point is located at the 500kV gantry of the planned 500kV Krong Buk Substation in Ea Kiet Commune, Dak Lak Province, and the alignment terminates at the 500kV gantry of the planned 500kV Tay Ninh 1 Substation in Hung Thuan Commune, Tay Ninh Province. The safety corridor (Right-of-Way, or ROW) of the transmission line is designed with a total width of 36 meters, measuring 18 meters symmetrically from the centerline to each side, with a minimum ground clearance of 15 meters for safety and grid integrity.

The main physical investment components of the project consist of the construction of the 330-kilometer double-circuit overhead transmission line supported by 657 hot-dip galvanized steel towers with bolted connections, which are secured on 657 cast-in-place reinforced concrete foundations. It also includes the complete construction and equipment installation for two new 500kV Feeder Bays on reserved land within the existing fences of both the 500kV Krong Buk Substation and the 500kV Tay Ninh 1 Substation, requiring no additional land acquisition. Furthermore, the project involves the construction of two optical repeater stations, each covering an area of approximately 900 square meters, along with 10-meter access roads to the stations. Optical Repeater Station No. 1 is located in Quang Tan Commune, Lam Dong Province, and Optical Repeater Station No. 2 is located in Long Ha Commune, Dong Nai City.

Auxiliary work items necessary to support the 12-month construction phase include the establishment of 16 temporary construction sites (main storage yards and warehouses) covering a total of 1.6 hectares, 657 foundation and tower construction yards encompassing 71.85 hectares, 117 temporary rope-pulling sites covering 3.51 hectares, and the development of 120,955 meters of temporary access roads (occupying 42.33 hectares) alongside the repair of 211,080 meters of existing construction roads. Unexploded ordnance (UXO) clearance will be executed over a total area of 173.74 hectares to ensure site safety prior to any physical works. The total project investment is estimated at 11.929.675.260.893VND, with the construction

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phase expected to commence in the first quarter of 2027 and reach completion and acceptance for electrification in the fourth quarter of 2028.

2. Legal and Technical Framework

The preparation of the Environmental and Social Impact Assessment (ESIA) and the Environmental and Social Management Plan (ESMP) has been conducted in strict compliance with the national environmental and social legislation of the Socialist Republic of Viet Nam, as well as the World Bank's Environmental and Social Framework (ESF) and relevant international conventions. The national legal framework is anchored on the Law on Environmental Protection No. 72/2020/QH14, the Law on Biodiversity No. 20/2008/QH12, the Forestry Law No. 16/2017/QH14, the Land Law No. 31/2024/QH15, and the Law No. 146/2025/QH15 amending and supplementing articles of fifteen laws in the agriculture and environment sectors. Subordinate legislation includes Decree No. 08/2022/ND-CP and its subsequent amendment Decree No. 05/2025/ND-CP detailing the implementation of the Law on Environmental Protection, Resolution No. 66.19/2026/NQ-CP dated May 18, 2026 on the reduction, decentralization, and simplification of administrative procedures, and the reduction and simplification of business conditions under the management of the Ministry of Agriculture and Environment, as well as Circular No. 02/2022/TT-BTNMT, Circular No. 07/2025/TT-BTNMT, and Circular No. 09/2026/TT-BNNMT on waste classification, environmental monitoring, and impact assessment templates. Applicable national technical regulations for assessing environmental quality and safety include QCVN 05:2023/BTNMT for ambient air quality, QCVN 26:2025/BTNMT for noise, QCVN 27:2025/BTNMT for vibration, QCVN 08:2023/BTNMT (Class B) for surface water quality, QCVN 03:2023/BTNMT (Type I) for soil quality, QCVN 01:2020/BCT for electrical safety, QCVN 18:2021/BXD for construction safety, and QCVN 25:2016/BYT for industrial frequency electromagnetic fields.

Under the World Bank's ESF, the environmental and social risk of the project is classified as Significant (equivalent to Substantial risk), which triggers the relevance and applicability of nine Environmental and Social Standards (ESSs). These include: ESS1 (Assessment and Management of Environmental and Social Risks and Impacts); ESS2 (Labor and Working Conditions); ESS3 (Resource Efficiency and Pollution Prevention and Management); ESS4 (Community Health and Safety); ESS5 (Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement); ESS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources); ESS7 (Indigenous Peoples); ESS8 (Cultural Heritage); and ESS10 (Stakeholder Engagement and Information Disclosure). The project also incorporates the World Bank Group General Environmental, Health, and Safety (EHS) Guidelines and the sector-specific EHS Guidelines for Electric Power Transmission and Distribution, ensuring that international good industry practices (GIIP) are systematically integrated into project design and implementation. Where host country regulations differ from the standards or guidelines set out under the ESF, the project commits to applying whichever is more stringent.

To bridge the regulatory and conceptual gaps between Viet Nam's environmental impact assessment (EIA) system and the World Bank's ESF, a comparative analysis was performed. Vietnamese regulations focus primarily on waste-related impacts, physical pollution control, and formal administrative approvals of EIA reports. In contrast, the World Bank ESF adopts a more holistic, risk-based approach throughout the project life cycle, emphasizing social impacts, labor management procedures, cumulative impact assessments, comprehensive stakeholder engagement plans, robust grievance redress mechanisms, and detailed management plans for ethnic minorities and resettlement. This ESIA report successfully integrates both regulatory regimes by supplementing the national EIA with specialized ESF safeguard instruments, including a Resettlement Plan (RP), an Ethnic Minority Development Plan

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(EMDP), a Stakeholder Engagement Plan (SEP), a Labor Management Procedure (LMP), and an Environmental and Social Commitment Plan (ESCP) to ensure full compliance with the World Bank's rigorous standards.

3. Existing Socio-Environmental Conditions in the Project Area

The physical, biological, and socio-economic baseline conditions across the 330-kilometer transmission corridor are highly diverse, reflecting a transition from the basaltic highlands of the Central Highlands to the low-lying plains and semi-plains of the Southeastern region of Viet Nam. The topography of the northern section in Dak Lak and Lam Dong provinces is characterized by undulating basaltic plateaus and high hilly landscapes with steep slopes ranging from 15 to 35 degrees, dissected by numerous small valleys and streams. This terrain gradually flattens as the alignment progresses southward through Dong Nai, Ho Chi Minh City, and Tay Ninh, where low-lying hilly and semi-plain geomorphology dominates. The geological profile consists primarily of red and reddish-brown soils developed on basaltic formations in the highlands, transitioning to grey soils on ancient alluvium, ferralitic soils, and alluvial soils along major river basins in the lowlands. The apparent electrical resistivity of the ground varies significantly with altitude and geomorphology, ranging from 700 to 2,000 Ωm in low hilly areas and rising up to 5,000 Ωm in high mountainous and sedimentary zones, which dictates localized design requirements for the tower grounding systems.

Baseline environmental quality along the corridor is generally favorable, as confirmed by comprehensive field sampling and laboratory testing conducted in November 2025 by PECC3 in coordination with HATICO (VIMCERTS 269). Ambient air quality and noise monitoring at 15 sensitive receptor locations (primarily road crossings with medium-to-high traffic density) indicated that concentrations of air pollutants, including total suspended particles (TSP), sulfur dioxide, nitrogen dioxide, and carbon monoxide, are well within the permissible limits set by QCVN 05:2023/BTNMT. Baseline noise levels fluctuated between 54.5 and 60.1 dBA, fully complying with the 70 dBA daylight standard defined in QCVN 26:2025/BTNMT. Soil quality analysis at 12 representative locations at the start, end, and along the route showed that heavy metal concentrations (lead, zinc, arsenic, and cadmium) are extremely low and safely beneath the thresholds established in QCVN 03:2023/BTNMT (Type I). However, surface water quality monitored at five major waterbodies (including the Saigon River, Be River, Serepok River, and small streams) revealed signs of slight organic pollution, representing Class B water under QCVN 08:2023/BTNMT. This is characterized by biochemical oxygen demand (BOD5) concentrations exceeding the regulatory standard (≤ 6 mg/l) by 1.05 to 1.44 times, ranging from 6.31 to 8.65 mg/l, which is attributed to localized agricultural runoffs, aquaculture, and untreated domestic wastewater discharges from adjacent settlements.

The biological baseline and forestry conditions represent a critical sensitive element of the project area. The 330-kilometer alignment traverses various modified and semi-natural habitats, including sections of forestry land and production or protection forests. Total permanent land acquisition required for the project is 107.74 hectares, of which 20.86 hectares consist of forest land that must undergo formal forest land use repurposing. This forest land includes 5.12 hectares of protection forests, 4.53 hectares of production forests, and 11.21 hectares of forestry land located outside the formal planning boundaries of the three forest categories. Disaggregating this forest land by status and origin, natural forest represents a very small fraction of only 1.11 hectares (comprising 0.24 hectares of functional production forest in Dak Lak Province and 0.87 hectares of forest land outside the planning boundaries), while planted forest accounts for 17.17 hectares, dominated by three-needle pine, rubber, cashew, teak, and hybrid acacia plantations. The remaining 2.58 hectares of forest land is currently devoid of forest cover.

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A spatial analysis using the Integrated Biodiversity Assessment Tool (IBAT) confirmed that the transmission line does not cross or occupy land within any national parks, nature reserves, or key biodiversity areas. The alignment maintains a safe physical separation distance of 6.0 kilometers from Yok Don National Park, 6.0 kilometers from the boundary of the Nam Nung Nature Reserve, 6.5 kilometers from the Dray Sap – Gia Long Landscape Protection Area, and is located far from other sensitive national parks such as Cat Tien (21 km), Bu Gia Map (27 km), and Lo Go Sa Mat (32 km). Within the natural forest patches of the project area, botanical investigations recorded 31 timber species, primarily deciduous and mixed broadleaf species such as Lim xẹt (*Peltophorum pterocarpum*), Dầu lông (*Dipterocarpus intricatus*), Cẩm lai (*Dalbergia oliveri*), and Chiêu liêu (*Terminalia chebula*), with average growing stocks of 32.17 to 59.7 m^3/ha and canopy coverages of 0.1 to 0.2. Faunal surveys indicated that large mammals of high conservation value are entirely absent from the Right-of-Way (ROW) due to decades of agricultural expansion, habitat fragmentation, and human disturbance, leaving only common rodents, small birds, reptiles, and insects. Within the broader regional landscape surrounding the Nam Nung Nature Reserve, high-value conservation species such as the Germain's Peacock-pheasant (*Polyplectron germaini*, VU), the Orange-necked Partridge (*Arborophila davidi*, EN), and the Great Hornbill (*Buceros bicornis*, VU) are present, but their habitats are physically segregated from the transmission corridor.

Socio-economically, the project corridor traverses a diverse human landscape, starting from agrarian upland communes in the Central Highlands (Dak Lak and Lam Dong) and descending into the highly industrialized and urbanized plains of the Southeast (Dong Nai, Ho Chi Minh City, and Tay Ninh). The upland populations are heavily dependent on agricultural and forestry livelihoods, specifically the cultivation of high-value perennial industrial crops (coffee, black pepper, rubber, cashew, and durian orchards), which represent the primary source of household income. The project area of influence is home to a rich tapestry of ethnic minority communities, with concentration levels reaching 33% in Dak Lak, 32.1% in Lam Dong (formerly Dak Nong), and 19.7% in Dong Nai (formerly Binh Phuoc), representing groups such as the Stieng, M'nong, Hmong, Tay, Thai, Cham, and Ta Mun. The total population directly affected by land acquisition and corridor restrictions includes 6,524 households and 4 organizations or companies, requiring comprehensive, culturally appropriate social safeguards and robust livelihood restoration plans.

4. Environmental and Social Impacts and Risks

The environmental and social impacts and risks associated with the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project have been comprehensively evaluated across the project life cycle, consisting of the preparation, construction, and operation phases. Given the extensive linear scale of the project passing through 330 kilometers of diverse terrain, the overall E&S risk is significant, although the majority of negative impacts are localized, short-term, and manageable through standard engineering controls and dedicated mitigation measures.

During the project preparation phase, the primary impacts and risks are associated with land acquisition, structural displacement, and physical safety hazards from unexploded ordnance (UXO). The permanent acquisition of 107.74 hectares of land for tower foundations and optical repeater stations will lead to the permanent loss of productive agricultural land and forestry assets. Furthermore, the safety corridor (ROW) covering 1,026.96 hectares introduces severe land-use restrictions. Under Article 68 of the Electricity Law, the existence of residential houses and structures where people live or work is strictly prohibited within the safety protection corridor of overhead power lines with a voltage of 500kV or higher. Consequently, the project will physically displace and require the complete relocation of 543 houses and structures, including 170 residential houses and 373 ancillary structures (huts, pigsties, cowsheds, and

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chicken coops) situated within the 36-meter-wide corridor. This displacement poses substantial social and economic risks to affected households, potentially disrupting local communities, agricultural production, and household income streams if compensation and resettlement support are not implemented transparently. Additionally, physical safety risks during the preparation phase stem from the potential presence of residual UXO and explosive remnants of war across the 173.74-hectare project footprint, requiring complete clearance before any on-site construction works begin.

During the construction phase, environmental and physical impacts will arise from civil works at the 657 tower foundation sites and 16 temporary construction warehouses. Earthworks and excavations for tower foundations (averaging 350 m^3 of soil and rock excavated per pit) will generate localized dust emissions and exhaust gases containing carbon monoxide, sulfur dioxide, nitrogen oxides, and hydrocarbons from the operation of heavy construction vehicles and machinery. Noise and vibration impacts will occur during excavation, concrete mixing, and pile driving, particularly at tower sites located within 50 to 100 meters of rural houses or sensitive receptors, potentially causing temporary public nuisance. Water environment impacts include groundwater seepage into deep foundation excavations, with approximately 3 m^3 of highly turbid water needing to be pumped and drained per tower foundation, as well as highly alkaline wastewater generated from concrete aggregate washing and concrete mixer cleaning (averaging 0.78 m^3/day per site). If discharged untreated, this wastewater poses a risk of local surface water pollution, soil alkalinization, and sedimentation of agricultural lands and natural streams.

Solid waste generation during construction is another moderate-to-substantial impact. Site clearance and selective right-of-way pruning will generate approximately 4,128.04 tons of fresh vegetation biomass. If not cleared and disposed of in a timely manner, this biomass represents a severe combustible fuel load, escalating the risk of forest fires during the dry season (November to April). Additionally, topsoil removal will generate 10,773.5 m^3 of organic soil, which must be carefully stockpiled and managed on-site to prevent soil erosion and downslope sedimentation during heavy rainstorms. Hazardous waste generation, estimated at 75 to 90 kg/month for the entire project, consists of oil-contaminated rags, empty fuel containers, waste paint, and chemical detergents, which pose contamination risks to highly permeable basaltic soils and shallow aquifers if leaks occur from construction equipment.

Furthermore, heavy rainstorms can trigger high-volume stormwater runoffs at excavated tower sites. Using the TCVN 7957:2023 rational formula, estimated stormwater runoff at individual column foundation sites ranges from a minimum of 4.30 L/s up to a maximum of 61.47 L/s during intense rainfall events (such as the 65.3 mm/h extreme rainfall recorded at Buon Ma Thuot). Uncontrolled runoff carrying eroded soils and spilled cement mortar directly threatens surface water quality and aquatic ecosystems across major river basins crossed by the line, including the Saigon River, Be River, Serepok River, and the Thac Mo Reservoir. On steep hilly terrains (15 to 35 degrees) in Dak Lak and Lam Dong, deep excavations also present landslides and soil slippage risks, which can endanger construction workers and block natural drainage channels.

The influx of up to 400 workers (distributed across 20 construction teams of ~20 workers each) living in temporary camps adjacent forests introduces risks of illegal hunting, trapping, and collection of wildlife and forest products, potentially placing poaching pressure on small forest mammal populations.

Social risks during construction include temporary traffic disruptions at 25 major road crossings, including National Highways 13, 14, and 14C, where conductor stringing

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scaffoldings could cause traffic bottlenecks or present falling object hazards. The concentration of migrant workers also introduces community safety risks, including the spread of sexually transmitted infections (such as HIV/AIDS), community conflicts due to cultural differences, and risks of gender-based violence (GBV) and sexual exploitation, abuse, and harassment (SEA/SH) within host communities.

During the operation phase, long-term environmental and safety impacts are primarily related to electromagnetic fields (EMF), corona noise, cumulative grid interactions, and ecological interactions. To comply with the National Technical Regulation on Industrial Frequency Electromagnetic Fields (QCVN 25:2016/BYT), the transmission line is designed with a minimum conductor-to-ground clearance of ≥ 8 meters over agricultural lands and ≥ 12 meters over perennial crops. Calculated electric field strengths at 1 meter above ground level beneath the transmission line remain strictly ≤ 5 kV/m, ensuring that local farmers can cultivate crops inside and outside the safety corridor without any exposure time restrictions. Magnetic flux densities under the line range from 20 to 40 μT, and drop below 10 μT at the corridor boundary, far below the ICNIRP public exposure reference level of 200 μT, rendering public health impacts from magnetic fields negligible.

However, because approximately one-thirds of the 330-kilometer route runs parallel to (at a 50-meter centerline distance) the existing 500kV Pleiku – My Phuoc – Cau Bong transmission line, electromagnetic field resonance and cumulative interactions will occur. Within the inter-corridor zone between the two parallel lines, the combined electric field strength at a ground clearance height of 12 meters is calculated to range from 2.95 to 6.81 kV/m. While this exceeds the 5 kV/m public threshold, it occurs entirely within the combined safety corridors where residential housing is legally prohibited. Under Decree No. 62/2025/ND-CP, households situated in this narrow inter-corridor zone (where the horizontal distance between the nearest outer phase conductors of the two lines is less than 60 meters) are eligible for full compensation to eliminate psychological concerns and land-use restrictions.

Long-term ecological impacts during operation include bird collision and electrocution risks. The permanent presence of towers (54 to 107 meters high) and thin Optical Ground Wires (OPGW) presents physical collision risks for high-flying canopy birds and nocturnal fruit bats. Specifically, the parallel alignment with the existing 500kV line along 130 kilometers may create a dual spatial barrier effect, narrowing the travel corridor and increasing the cumulative risk of collisions for species with large feeding radiuses, such as the Great Hornbill (*Buceros bicornis*, VU), particularly during extreme weather events (thunderstorms or dense fog). In contrast, direct impacts on understory-dwelling, low-mobility species like the Germain's Peacock-pheasant and the Orange-necked Partridge are excluded, as their behavioral ecology prevents them from flying across open agricultural gaps or the cleared ROW.

Other operational risks include forest fires triggered by technical grid failures, such as electrical short circuits, lightning strikes, or conductor breakages, which can ignite dry understory vegetation beneath the ROW, especially during the dry season. The 6-kilometer separation buffer from Nam Nung Nature Reserve, interspersed with agricultural lands and roads acting as firebreaks, effectively mitigates fire spread to the core reserve. Additionally, the periodic maintenance of the corridor and movement of maintenance vehicles can act as pathways for introducing invasive alien plant species, particularly the highly aggressive *Mimosa pigra* (Mai trinh nữ), *Lantana camara* (Ngũ sắc), and *Mikania micrantha* (Cúc leo), which can colonize disturbed moist soils around tower bases and outcompete native low-growing vegetation.

5. Environmental and Social Management Plan (ESMP)

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To ensure that all identified environmental and social risks and impacts are systematically avoided, minimized, mitigated, or offset, a comprehensive Environmental and Social Management Plan (ESMP) has been developed. Adhering strictly to the World Bank's mitigation hierarchy, the ESMP serves as an actionable framework detailing institutional responsibilities, compliance protocols, environmental monitoring programs, capacity-building requirements, and cost estimates.

The institutional arrangement for ESMP implementation establishes a clear chain of responsibility and oversight. National Power Transmission Corporation (EVNNPT) holds overall administrative ownership, while Southern Power Projects Management Board (SPMB) is designated as the primary implementing agency. SPMB will establish a dedicated Environmental and Social Safety Department consisting of at least two full-time, highly qualified experts: an Environmental Specialist in charge of ecological affairs and contractor compliance, and a Social/Resettlement Specialist responsible for land acquisition, livelihood restoration, and community relations.

During construction, civil contractors are contractually obligated to prepare and submit a site-specific Contractor's Environmental and Social Management Plan (C-ESMP) for approval within 30 days of contract signing, and must appoint full-time ESHS officers to manage daily site safety. Daily on-site supervision and compliance verification will be executed by the Construction Supervision Consultant (CSC), which will maintain qualified Environmental Supervision Engineers on-site. To ensure objective evaluation, SPMB will mobilize an Independent Environmental and Social Monitoring Consultant (IESMC) to conduct semi-annual compliance audits, perform periodic environmental sampling, and deliver specialized safeguards training.

General mitigation measures for construction activities are codified in the Environmental and Social Codes of Practice (ESCOPs) integrated directly into bidding and contract documents. To control dust, contractors must spray water on access roads adjacent residential areas, cover all material transport vehicles with heavy-duty tarpaulins, and enforce a 5 km/h site speed limit. Noise and vibration will be mitigated by restricting heavy machinery operations to daytime hours (06:00 to 18:00), installing engine silencers/mufflers, and conducting pre-construction structural integrity surveys of all houses within 20 meters of vibration-generating activities.

Wastewater management requires the routing of all turbid water pumped from foundation pits into temporary sandbag-lined sedimentation pits (6 m^3 volume) to allow solids to settle before discharge. Alkaline concrete washing wastewater must be neutralized and treated in temporary settling tanks (typical sizes 0.8m x 1.0m x 1.0m) before reuse or discharge. All solid wastes will be segregated in covered bins, and domestic wastes will be hauled twice a week to municipal landfills under contract with local environmental services. Hazardous wastes, including waste oil and chemicals, must be stored in labeled drums on impermeable concrete pads with secondary containment dikes, protected from weather, and transferred to licensed industrial waste treatment facilities. Soil erosion on steep slopes will be controlled by stockpiling topsoil separately, protecting stockpiles with geotextile covers, and constructing stone-masonry retaining walls at steep-slope tower bases.

Specific ecological and biodiversity mitigation measures are designed to satisfy ESS6 requirements. To minimize impacts on protection forests and natural forest canopies, the project’s technical design incorporates elevated steel towers, raising tower heights from the standard 80 meters up to 107 meters across steep-slope forest segments in Lam Dong and Dong Nai. This solution ensures that the transmission line passes above the forest canopy with a safe vertical clearance of ≥ 6 meters from the lowest point of the conductor (at maximum sag) to the maximum mature height of the forest trees. This technical optimization eliminates the need for clear-cutting the entire 36-meter safety corridor, confining forest clearing strictly to the physical footprints of the tower foundations.

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To offset the residual loss of 1.11 hectares of natural forest and 5.12 hectares of protection forests permanently acquired for foundations, SPMB will implement a formal Biodiversity Offset and Reforestation Program. Natural forest losses will be offset through replacement planting at a 3:1 ratio, and protection forests at a 1:1 ratio, with full funding transferred to the Provincial Forest Protection and Development Funds.

Invasive alien species will be managed by enforcing a mandatory tire-washing protocol for all construction vehicles prior to entering forest zones, immediately revegetating bare soils around tower bases with native grasses to outcompete weeds, and conducting manual eradication of *Mimosa pigra* before seed maturation during routine operation patrols.

Social and livelihood safeguards will be implemented in accordance with the Resettlement Framework and Site-Specific Resettlement Plans aligned with ESS5. To address the physical displacement of 543 houses and structures, SPMB will provide cash compensation at full replacement cost and assist households with self-relocation or coordinate scattered resettlement within the same commune. Affected agricultural lands will be compensated, and households experiencing land parcel fragmentation will receive supplementary transition support.

For the rich ethnic minority populations traversed by the line, an Ethnic Minority Development Plan (EMDP) aligned with ESS7 will be executed. This plan guarantees that project information is disclosed in culturally appropriate, accessible formats, and provides targeted agricultural training, job skill development, and priority recruitment for unskilled local labor positions during construction.

To address the influx of migrant workers, contractors must enforce a strict Worker Code of Conduct, register all workers with local commune police, and conduct mandatory, documented quarterly training on the prevention of gender-based violence (GBV) and sexual exploitation, abuse, and harassment (SEA/SH).

The Grievance Redress Mechanism (GRM) established for the project is a multi-tier, transparent, and culturally appropriate system designed to resolve stakeholders' complaints efficiently and without cost.

To monitor compliance, a robust Environmental Quality Monitoring Program will be executed. During the construction phase, air quality, noise, soil, and surface water will be sampled and analyzed at designated sensitive locations with a frequency of once every three months. During the operation phase, electromagnetic field (EMF) strengths will be measured annually at six sensitive residential and agricultural receptors adjacent the ROW to verify safety compliance.

The total estimated cost for implementing the ESMP (excluding land acquisition and resettlement compensation) is compiled comprehensively, encompassing environmental quality sampling, independent safeguards monitoring, capacity-building, and localized E&S training. Resettlement, compensation, and livelihood restoration support costs, estimated at 1,827.485 billion VND, are managed under a separate dedicated budget from EVNNPT. To enforce strict contractor compliance, a contract-based ESHS Performance Security representing 1 to 3% of the contract value will be required, backed by a four-level penalty system (Level 1 to Level 4) that allows SPMB to withhold payments or mobilize third parties to repair E&S non-compliances at the contractor's expense.

Through the synchronized execution of the ESMP, C-ESMP, RP, EMDP, and the environmental quality monitoring program, the project is fully equipped to control, minimize, and manage all environmental and social risks, ensuring sustainable grid development that aligns with the World Bank's rigorous standards.

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CHAPTER 1. GENERAL INFORMATION

1.1. BACKGROUND AND NECESSITY OF THE PROJECT

1.1.1. Background and necessity of the project

The 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project has been proposed to enhance the transmission capacity of the grid from the Central and Central Highlands regions, thereby enabling the evacuation of generation capacity from regional power sources, including hydropower, solar, wind, and gas turbine power plants, to the National Power System. The Project is expected to improve the adequacy of electricity supply to the Southern, Central and Central Highlands regions, enhance overall system reliability, contribute to national energy security, reduce power losses, and improve the operating efficiency of the transmission network.

The Project is aligned with the Revised National Power Development Plan for the 2021–2030 Period, with a Vision to 2050 (Revised PDP VIII), as approved by the Prime Minister under Decision No. 768/QD-TTg dated 15 April 2025. Specifically, the Project is included in Appendix III.2, Table 8 – List of New and Upgraded 500kV Transmission Lines in the Central Region (No. 21). The Project is also included in the list of nationally important projects and key energy projects approved by the Prime Minister under Decision No. 2634/QD-TTg dated 2 December 2025, where it is identified in Table IV – Transmission Line and Substation Projects (*Item No. 11, Section C, Table IV – Transmission Line and Substation Projects).*

The Project extends across 34 communes/wards in five provinces/cities: Dak Lak, Lam Dong, Dong Nai, Ho Chi Minh City, and Tay Ninh. The proposed route alignment has been agreed by the People's Committees of the five provinces/cities under the following official letters: No. 2716/UBND-CN dated 1 April 2021 (Dak Lak Province), No. 95/UBND-KTN dated 7 January 2022 (Dak Nong Province, now Lam Dong Province), No. 2888/UBND-KT dated 16 June 2025 (Binh Phuoc Province, now Dong Nai), No. 4017/UBND-KT dated 26 July 2024 (Binh Duong Province, now Ho Chi Minh City), and No. 666/UBND-KT dated 23 February 2022 (Tay Ninh Province). The Project was subsequently granted approval in principle for investment and approval of the investor by the People's Committee of Lam Dong Province under Decision No. 3319/QD-UBND dated 6 July 2026.

1.1.2. Project's Objectives and Scope of Work

The investment into the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project aims to:

- ensure full transmission of power output from power sources in the Central and Central Highlands regions (including hydropower plants, solar power plants, gas turbines, and wind power plants) to the national power system, thereby enhancing electricity supply capacity for the Southern, Central and Central Highlands regions;
- ensure energy security; and
- improve transmission capacity and reduce losses in the regional power grid.

The Project scope includes:

- construction of a new double-circuit 500kV transmission line from the proposed 500kV Krong Buk Substation in Ea Kiet Commune, Dak Lak Province, to the proposed 500kV Tay Ninh 1 Substation in Hung Thuan Commune, Tay Ninh Province, with an approximate route length of 330 km;
- construction and installation of two new line bays on the reserved land area within the 500kV

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Krong Buk Substation and the 500kV Tay Ninh 1 Substation; and

- construction of two optical repeater stations, each with an area of approximately 900m², together with access roads to the stations of approximately 10 m.

Table 1: Summary of the project's scope of investment

No.	Work item	Scope
A	**Main work items**	
1	***500kV Transmission Line Section***	330km
1.1	Number of circuits	02 circuits
1.2	Foundations	657 cast-in-place reinforced concrete foundations
1.3	Towers	657 hot-dip galvanized steel towers with bolted connections
1.4	Right-of-way width	36 m (18 m from the centerline to each side)
1.5	Minimum ground clearance	≥ 15m
2	***500kV feeder bays at 500kV Krong Buk Substation*** (Construction and complete installation of equipment for two 500kV feeder bays)	within the fence of the planned 500kV Krong Buk Substation
3	***500kV feeder bays at 500kV Tay Ninh 1 Substation*** (Construction and complete installation of equipment for two 500kV feeder bays)	within the fence of the planned 500kV Tay Ninh 1 Substation
4	***Optical Repeater Stations*** (Construction and installation of optical communication systems and auxiliary equipment)	02 stations (area: 900 m²/station)
B	**Auxiliary work items**	
1	Temporary construction site (main warehouse)	16 temporary construction sites (1.6 hectares)
2	Foundation and tower construction yards	657 yards (71.85 ha)
3	Rope pulling dump	117 yards (3.51 ha)
4	Temporary roads and repair of construction roads	Temporary roads: 120,955 m (42.33 ha) Road repair: 211,080 m
5	Unexploded ordnance clearance	173.74 ha
C	**Waste Treatment and Environmental Protection Works**	
1	Sedimentation pits for foundation pit wastewater	01 pit per construction location, volume: 6 m³

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No.	Work item	Scope
2	Portable Toilet	01 toilet per construction location (depending on the construction location)
3	Domestic solid waste bins	02 plastic bins per construction location, with lids, capacity: 200 liters
4	Hazardous waste bins	03 plastic bins per construction location, with lids, capacity: 100 liters

Source: Feasibility study, PECC2-PECC3-PECC4, 3/2026.

1.1.3. Conformity of the project with the master plan and related projects

(i) *Conformity of the investment project with the national environmental protection strategy*

The 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project is being implemented to strengthen power transmission capacity from the Central and Central Highlands regions, ensuring the full evacuation of capacity from power sources in the region, including hydropower, solar power, wind power, and gas turbine power plants, to the national power system. The project will help enhance electricity supply capacity for the Southern, Central, and Central Highlands regions, improve the reliability of the power system, ensure national energy security, and reduce power losses on the transmission grid.

By enhancing the integration and transmission of electricity from renewable energy sources, the project will contribute to promoting the Government's energy transition agenda, reducing the risk of curtailment at renewable energy plants, increasing the share of clean electricity in the power generation mix, and supporting greenhouse gas emission reductions in the power sector. Although the transmission project itself does not directly result in emission reductions, strengthening grid capacity to absorb and transmit electricity from renewable energy sources will help reduce long-term dependence on fossil fuel-based power generation. Therefore, the project is consistent with the objectives of the National Environmental Protection Strategy to 2030, with a vision to 2050, approved under Decision No. 450/QD-TTg dated April 13, 2022.

(ii) *Conformity of the investment project with the national environmental protection plan*

The National Environmental Protection Plan for the 2021–2030 period, with a vision to 2050, was approved by the Prime Minister under Decision No. 611/QD-TTg dated July 8, 2024. The Plan aims to proactively prevent and control pollution, restore and improve environmental quality, conserve nature and biodiversity, and at the same time promote economic development in a green, circular, low-carbon, and climate-resilient manner. Upon completion, the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project will strengthen power transmission capacity, ensure a stable power supply to load centers, reduce power losses on the transmission grid, and support the integration of clean energy sources into the national power system. During the operation phase, the project will mainly involve management and maintenance activities, without generating production activities or large-scale waste sources.

(iii) *Conformity of the investment project with the national master plan*

The project is consistent with the National Master Plan for the 2021–2030 period, with a vision to 2050, which was approved by the National Assembly under Resolution No. 81/2023/QH15 dated January 9, 2023. Specifically, Clause 2, Article 9 of Resolution No. 81/2023/QH15 states: *"Develop energy infrastructure to meet the requirements for firmly ensuring national energy security and providing sufficient, stable, and high-quality energy for socio-economic*

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development."

(iv) ***Conformity of the investment project with the planning of the electricity (energy) sector***

The 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project is consistent with the Adjustment to the National Power Development Plan for the 2021–2030 period, with a vision to 2050 (Revised Power Development Plan VIII), approved by the Prime Minister under Decision No. 768/QD-TTg dated April 15, 2025. The project is listed in Appendix III.2, Table 8 (No. 21) – List of New and Upgraded 500kV Transmission Lines in the Central Region.

The project is also consistent with the Implementation Plan for the National Power Development Plan for the 2021–2030 period, with a vision to 2050 (as adjusted), approved under Decision No. 1509/QD-TTg dated May 30, 2025 where the project is listed in Appendix II.2, Table 8 (No. 21).

In addition, the project is included in the List of Nationally Important and Priority Energy Sector Projects, approved by the Prime Minister under Decision No. 2634/QD-TTg dated December 2, 2025, specifically in Table IV – Transmission Line and Substation Projects (Section C, No. 11).

(v) ***Conformity of the investment project with the national biodiversity conservation planning***

According to the Prime Minister's Decision No. 1352/QD-TTg dated November 8, 2024 approving the National Biodiversity Conservation Plan for the 2021–2030 period, with a vision to 2050, a comparison with the planning contents set out in Appendices I to VII shows that the area of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project is not located within any of the planned areas identified therein. These appendices cover the planning of nature reserves, biodiversity conservation facilities, biodiversity corridors, high-biodiversity areas, important ecological landscapes, important national wetlands, and the list of priority projects.

(vi) ***Conformity of investment projects with forestry planning***

According to the Prime Minister's Decision No. 895/QD-TTg dated August 24, 2024 approving the National Forestry Plan for the 2021–2030 period, with a vision to 2050, one of the Plan's orientations is to manage, protect, develop, and use forests sustainably in association with biodiversity conservation, maintenance of forest cover, and climate change response. The 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project requires the conversion of approximately 5.12 hectares of protection forest and 1.11 hectares of natural forest for the construction of tower foundations. The converted area does not fall within special-use forests, nature reserves, or national biodiversity corridors. Upon completion, the project will serve only the function of power transmission and will not generate emissions during operation.

(vii) ***The conformity of the investment project with the provincial planning*****.**

The 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project is consistent with the provincial plans approved by the Prime Minister, specifically as follows:

- Dak Lak Province: The project is included in the list of power grid projects in Appendix V – Power Source and Grid Development Plan, issued together with Decision No. 1747/QD-TTg dated December 30, 2023 approving the Dak Lak Provincial Planning for the 2021–2030 period, with a vision to 2050.

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- Lam Dong Province (formerly Dak Nong Province): The project is included in the list of 500kV power grid projects in Appendix VI – Power Grid Development Plan, issued together with Decision No. 1757/QD-TTg dated December 31, 2023 approving the Dak Nong Provincial Planning for the 2021–2030 period, with a vision to 2050.

- Dong Nai City (formerly Binh Phuoc Province): The project is included in the list of reserved 500kV transmission line development projects in Appendix V – Power Source and Grid Development Plan, issued together with Decision No. 1489/QD-TTg dated November 24, 2023 approving the Binh Phuoc Provincial Planning for the 2021–2030 period, with a vision to 2050.

- Ho Chi Minh City (formerly Binh Duong Province): The project is included in the list of 500kV transmission lines in Appendix XIII – Power Supply Infrastructure Development Plan, issued together with Decision No. 790/QD-TTg dated August 3, 2024 approving the Binh Duong Provincial Planning for the 2021–2030 period, with a vision to 2050.

- Tay Ninh Province: The project is included in the list of 500kV transmission lines in Appendix VIII – Power Source and Grid Development Plan, issued together with Decision No. 1736/QD-TTg dated December 29, 2023 approving the Tay Ninh Provincial Planning for the 2021–2030 period, with a vision to 2050.

(viii) ***Conformity of the investment project with the land use planning***

(a) National land use planning

According to Resolution No. 39/2021/QH15 dated November 13, 2021 of the National Assembly on the National Land Use Plan for the 2021–2030 period, with a vision to 2050, and the National 5-Year Land Use Plan for 2021–2025, the land allocation target for energy projects by 2030 is 288,510 hectares. The 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project requires the conversion of approximately 107.74 hectares, equivalent to about 0.037% of the national land allocation target for energy projects. Therefore, the project's land use demand is consistent with the national land use planning.

(b) Allocation of land use quotas to localities

According to the Prime Minister's Decision No. 326/QD-TTg dated March 9, 2022 on the allocation of national land use planning targets for the 2021–2030 period, the project's land conversion demand falls within the land quota allocated to localities for energy projects, including: Dak Lak (12.69 hectares out of a total quota of 14,888 hectares), Dak Nong (now part of Lam Dong Province) (40.68 hectares out of 12,900 hectares), Binh Phuoc (now part of Dong Nai City) (36.02 hectares out of 23,121 hectares), Binh Duong (now part of Ho Chi Minh City) (10.96 hectares out of 361 hectares), and Tay Ninh (7.39 hectares out of 3,000 hectares).

(c) Provincial-level land use planning

The project is consistent with the provincial planning for the 2021–2030 period, with a vision to 2050, of the localities crossed by the route, as approved by the Prime Minister, including: Dak Lak (Decision No. 1747/QD-TTg dated December 30, 2023), Dak Nong (now part of Lam Dong Province) (Decision No. 1757/QD-TTg dated December 31, 2023), Binh Duong (now part of Ho Chi Minh City) (Decision No. 790/QD-TTg dated August 3, 2024), and Tay Ninh (Decision No. 1736/QD-TTg dated December 29, 2023). In these plans, the project and the land use quotas for energy works have been incorporated into the relevant planning appendices.

In addition, the project's route alignment has been approved by the People's Committees of the

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relevant localities through route alignment agreements. The project has also been incorporated into the land use planning of several localities, including Ea Kiet Commune (formerly within Cu M'gar District and Buon Don District, former Dak Lak Province) and Hung Thuan Commune (formerly within Trang Bang District, former Tay Ninh Province). For the remaining localities, incorporation into the land use planning will be carried out in accordance with applicable regulations during project implementation.

(ix) Conformity with local land use plannings and plans

For Dak Lak Province, the project has been integrated into the land use planning for the 2021–2030 period of the districts prior to the implementation of the administrative unit arrangement. Specifically, for Ea Kiet Commune (formerly part of Cu M'Gar District), the project was incorporated into the Land Use Planning of Cu M'Gar District under Decision No. 1219/QD-UBND dated May 31, 2022. For Ea M'Droh Commune and Ea Wer Commune (formerly part of Buon Don District), the project was incorporated into the Land Use Planning of Buon Don District under Decision No. 1476/QD-UBND dated July 4, 2022. Following the administrative unit arrangement, on August 25, 2025, the Southern Power Projects Management Board (SPMB) sent documents to the Provincial People's Committee, the Department of Agriculture and Environment of Dak Lak Province, and the relevant communes to update the project in the land use planning in accordance with the new administrative units.

For Lam Dong Province (formerly Dak Nong Province), the project passes through Cu Jut, Dak Mil, Dak Sak, Dak Song, Dak Wil, Duc An, Krong No, Nam Dong, Nam Da, Quang Tan, Quang Tin, and Truong Xuan Communes. The project had not been incorporated into the land use planning of the districts prior to the administrative unit arrangement. On August 25, 2025, SPMB issued Document No. 7301/SPMB-PTD to the Provincial People's Committee, the Department of Agriculture and Environment of Lam Dong Province, and the relevant localities, requesting the update and inclusion of the project in the land use planning.

For Dong Nai City (formerly Binh Phuoc Province), the project passes through 15 communes and wards, namely Tho Son, Dak Nhau, Bom Bo, Phu Nghia, Dak O, Da Kia, Binh Tan, Phu Rieng, Long Ha, Tan Hung, Tan Quan, Minh Duc, Tan Khai, and Phuoc Binh Ward and Binh Long Ward. The project had not been incorporated into the land use planning of the districts prior to the administrative unit arrangement. On July 30, 2025, SPMB issued Document No. 6684/SPMB-PTD to the People's Committee of Dong Nai City, the Department of Agriculture and Environment, and the relevant localities, requesting the update and supplementation of the land use planning.

For Ho Chi Minh City (formerly Binh Duong Province), the project passes through Minh Thanh Commune and Dau Tieng Commune. The project had not been incorporated into the land use planning of the districts prior to the administrative unit arrangement. On August 19, 2025, SPMB issued Document No. 7143/SPMB-PTD to the People's Committee of Ho Chi Minh City, the Department of Agriculture and Environment, and the relevant localities, requesting the update and inclusion of the project in the land use planning.

For Tay Ninh Province, the project passes through Loc Ninh Commune and Hung Thuan Commune. In particular, for Hung Thuan Commune, the project was incorporated into the Land Use Planning of Trang Bang District (former district) for the 2021–2030 period under Decision No. 3733/QD-UBND dated December 30, 2021. For Loc Ninh Commune, the project had not been incorporated into the district land use planning prior to the administrative unit arrangement. On August 18, 2025, SPMB issued Document No. 7136/SPMB-PTD to the Provincial People's Committee, the Department of Agriculture and Environment of Tay Ninh Province, and the relevant localities, requesting the update and inclusion of the project in the land use planning in accordance with the new administrative units.

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Thus, the project had been incorporated into the land use planning of certain localities prior to the administrative unit arrangement. For the remaining localities, the investor has completed the procedures for requesting the update and inclusion of the project in the land use planning through documents submitted to the competent authorities. Such updating will be carried out in accordance with the prescribed order and procedures prior to the implementation of land recovery and land use conversion for the project.

1.2. LEGAL, TECHNICAL FRAMEWORK AND METHODOLOGY FOR ESIA PREPARATION

1.2.1. Viet Nam's legal framework

1.2.1.1. Legal Documents

The ESIA report is formulated in accordance with the following major laws and subordinate laws. In case the legal provisions have been amended or replaced, the latest version will be applied throughout the entire project implementation process.

Documents in the field of environment:

- The Law on Biodiversity No. 20/2008/QH12 was approved by the National Assembly of the Socialist Republic of Viet Nam on November 13, 2008.
- The Law on Environmental Protection No. 72/2020/QH14 was approved by the National Assembly of the Socialist Republic of Viet Nam on November 17, 2020.
- Law No. 146/2025/QH15 amending and supplementing a number of articles of 15 laws in the field of agriculture and environment was approved by the National Assembly of the Socialist Republic of Viet Nam on December 11, 2025.
- Decree No. 65/2010/ND-CP dated June 11, 2010 detailing and guiding the implementation of a number of articles of the Law on Biodiversity.
- Decree No. 08/2022/ND-CP dated January 10, 2022 detailing a number of articles of the Law on Environmental Protection.
- Decree No. 05/2025/ND-CP dated January 6, 2025 amending and supplementing a number of articles of the Decree No. 08/2022/ND-CP dated January 10, 2022 detailing a number of articles of the Law on Environmental Protection.
- Decree No. 136/2025/ND-CP dated June 12, 2025 of the Government on delegation and decentralization in the field of agriculture and environment.
- Decree No. 48/2026/ND-CP dated January 29, 2026 amending and supplementing a number of articles of the Decree No. 08/2022/ND-CP dated January 10, 2022 detailing a number of articles of the Law on Environmental Protection amended and supplemented by Decree No. 05/2025/ND-CP dated January 6, 2025.
- Circular No. 02/2022/TT-BTNMT dated January 10, 2022 of the Ministry of Natural Resources and Environment detailing the implementation of a number of articles of the Law on Environmental Protection.
- Circular No. 07/2025/TT-BTNMT dated February 28, 2025 of the Ministry of Natural Resources and Environment amending and supplementing a number of articles of Circular No. 02/2022/TT-BTNMT dated January 10, 2022 detailing the implementation of a number of articles of the Law on Environmental Protection.
- Circular No. 09/2026/TT-BNNMT dated January 29, 2026 of the Ministry of Agriculture and Environment amending and supplementing a number of articles of Circular No.

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02/2022/TT-BTNMT dated January 10, 2022 detailing the implementation of a number of articles of the Law on Environmental Protection, as amended and supplemented by Circular No. 07/2025/TT-BTNMT dated February 28, 2025 and Circular No. 07/2025/TT-BNNMT dated June 16, 2025.

- Circular No. 22/2026/TT-BNNMT dated May 19, 2026 of the Ministry of Agriculture and Environment amending and supplementing a number of circulars relating to decentralization and the reduction and simplification of administrative procedures under the state management of the Ministry of Agriculture and Environment.
- Resolution No. 66.19/2026/NQ-CP dated May 18, 2026 of the Government on the reduction, delegation, and simplification of administrative procedures, and the reduction and simplification of business conditions, under the management of the Ministry of Agriculture and Environment.

Relevant legal documents

- The Forestry Law No. 16/2017/QH14 was adopted by the National Assembly of the Socialist Republic of Viet Nam on November 15, 2017.
- The Land Law No. 31/2024/QH15 was adopted by the National Assembly of the Socialist Republic of Viet Nam on January 18, 2024.
- The Law on Geology and Minerals No. 54/2024/QH15 was adopted by the National Assembly of the Socialist Republic of Viet Nam on November 29, 2024.
- The Electricity Law No. 61/2024/QH15 was adopted by the National Assembly of the Socialist Republic of Viet Nam on November 30, 2024.
- Law No. 147/2025/QH15 amending and supplementing a number of articles of the Law on Geology and Minerals.
- Decree No. 01/2017/ND-CP dated January 6, 2017 amending and supplementing a number of decrees detailing the implementation of the Land Law.
- Decree No. 156/2018/ND-CP dated November 16, 2018 of the Government detailing a number of articles of the Forestry Law.
- Decree No. 88/2024/ND-CP dated July 15, 2024 of the Government on compensation, support, and resettlement upon land recovery by the State.
- Decree No. 102/2024/ND-CP dated July 30, 2024 of the Government detailing a number of articles of the Land Law.
- Decree No. 62/2025/ND-CP dated March 4, 2025 of the Government detailing the implementation of the Electricity Law regarding the protection of electricity works and safety in the electricity sector.
- Decree No. 193/2025/ND-CP dated July 2, 2025 of the Government detailing a number of articles of, and measures for the implementation of, the Law on Geology and Minerals.
- Decree No. 227/2025/ND-CP dated August 16, 2025 amending and supplementing a number of articles of Decree No. 156/2018/ND-CP dated November 16, 2018 of the Government detailing a number of articles of the Forestry Law.
- Circular No. 02/2025/TT-BCT dated February 1, 2025 of the Ministry of Industry and Trade on the protection of electricity works and safety in the electricity sector.

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1.2.1.2. Standards and regulations applicable to the project

The following standards and technical regulations are applied for environmental monitoring, impact assessment, and contractor compliance. In the event that any of these standards or regulations are amended during project implementation, the latest version shall apply automatically.

Air, noise, and vibration

- QCVN 24:2016/BYT – National Technical Regulation on Noise: Permissible Exposure to Noise in the Workplace.
- QCVN 05:2023/BTNMT – National Technical Regulation on Ambient Air Quality.
- QCVN 26:2025/BNNMT – National Technical Regulation on Noise.
- QCVN 27:2025/BNNMT – National Technical Regulation on Vibration.

Water environment

- QCVN 08:2023/BTNMT – National Technical Regulation on Surface Water Quality.
- QCVN 14:2025/BTNMT – National Technical Regulation on Domestic Wastewater and Wastewater in Urban Areas and Concentrated Residential Areas.

Soil environment

- QCVN 03:2023/BTNMT – National Technical Regulation on Soil Quality.

National technical standards and regulations on electrical engineering and safety

- QCVN 01:2020/BCT – National Technical Regulation on Electrical Safety.
- QCVN 01:2021/BXD – National Technical Regulation on Construction Planning.
- QCVN 18:2021/BXD – National Technical Regulation on Safety in Construction.
- QCVN 25:2016/BYT – National Technical Regulation on Industrial Frequency Electromagnetic Fields: Permissible Exposure to Industrial Frequency Electromagnetic Fields in the Workplace.

1.2.1.3. Legal documents, decisions or written opinions of competent authorities related to the Project

1. Legal documents on planning

- Decision No. 768/QD-TTg dated April 15, 2025 of the Prime Minister approving the Adjustment of the National Power Development Plan for the 2021–2030 period, with a vision to 2050. The *"500kV Krong Buk – Tay Ninh 1 Transmission Lines project" is listed at No. 21, Table 8 – List of new and rehabilitated 500kV transmission lines in the Central Region*, *Appendix III.2*.
- Decision No. 1509/QD-TTg dated May 30, 2025 of the Ministry of Industry and Trade approving the Plan for implementation of the adjusted National Power Development Plan for the 2021–2030 period, with a vision to 2050. The *"500kV Krong Buk – Tay Ninh 1 Transmission Lines project" is listed in Appendix II.2, No. 21, Table 8 – List of new and rehabilitated 500kV transmission lines in the Central Region*.
- Decision No. 2634/QD-TTg dated December 2, 2025 of the Prime Minister approving the List of nationally important works and key projects in the energy sector. The *"500kV Krong Buk – Tay Ninh 1 Transmission Lines project" is listed at No. 11, Section C, Table IV – Transmission line and substation projects*.

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2. Documents on investment policy

- Decision No. 3319/QD-UBND dated July 6, 2026 of the People's Committee of Lam Dong Province approving the investment policy and concurrently approving the investor.
- Official Letter No. 287/BCT-DL dated January 15, 2026 of the Ministry of Industry and Trade providing comments on the dossier for approval of the investment policy for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project proposed by the National Power Transmission Corporation.
- Official Letter No. 802/BNNMT-KHTC dated January 26, 2026 of the Ministry of Agriculture and Environment providing comments on the dossier of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project.
- Official Letter No. 1239/BQP-TM dated February 3, 2026 of the Ministry of National Defense providing opinions on national defense aspects of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project.
- Official Letter No. 1608/BTC-DNNN dated February 9, 2026 of the Ministry of Finance regarding the dossier of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project proposed by the National Power Transmission Corporation.
- Official Letter No. 8152/UBND-DTKT dated June 8, 2026 of the People's Committee of Dak Lak Province providing comments for appraisal of the project proposal dossier for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines submitted by the National Power Transmission Corporation (second submission).
- Official Letter No. 3560/UBND-KTN dated June 22, 2026 of the People's Committee of Dong Nai City providing appraisal comments on the dossier requesting approval of the investment policy for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project proposed by the National Power Transmission Corporation (second submission).
- Official Letter No. 5401/UBND-DA dated June 19, 2026 of the People's Committee of Ho Chi Minh City providing comments on the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project.
- Official Letter No. 10485/UBND-KTTC dated June 16, 2026 of the People's Committee of Tay Ninh Province providing comments on the dossier requesting approval of the investment policy for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project.

3. Legal documents on route alignment agreement

- Official Letter No. 2716/UBND-CN dated April 1, 2021 of the People's Committee of Dak Lak Province agreeing on the route alignment of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project for the section passing through Dak Lak Province.
- Official Letter No. 95/UBND-KTN dated January 7, 2022 of the former People's Committee of Dak Nong Province agreeing on the route alignment plan for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project for the section passing through Dak Nong Province (now Lam Dong Province).
- Official Letter No. 2888/UBND-KT dated June 16, 2025 of the People's Committee of Binh Phuoc Province agreeing on the route alignment plan for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project for the section passing through Binh Phuoc Province (now Dong Nai City).
- Official Letter No. 4017/UBND-KT dated July 26, 2024 of the People's Committee of Binh Duong Province agreeing on the route alignment of the 500kV Krong Buk – Tay Ninh 1

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Transmission Lines project for the section passing through Binh Duong Province (now Ho Chi Minh City).

- Official Letter No. 666/UBND-KT dated February 23, 2022 of the People's Committee of Tay Ninh Province agreeing on the route alignment of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines project for the section passing through Tay Ninh Province.

1.2.1.4. Documents and data prepared by the project owner to be used in the process of implementing ESIA

- Feasibility Study Report for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project, TVXDD2–TVXDD3–TVXDD4 Joint Venture, March 2026.
- Topographic Survey Report for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (G1–G20), TVXDD3, December 2025.
- Topographic Survey Report for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (G20–G43), TVXDD4, December 2025.
- Topographic Survey Report for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (G43–DC), TVXDD2, December 2025.
- Geological Survey Report for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (G1–G20), TVXDD3, December 2025.
- Geological Survey Report for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (G20–G43), TVXDD4, December 2025.
- Geological Survey Report for the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (G43–DC), TVXDD2, December 2025.
- Environmental Measurement Results for the Project Area, HATICO Technology and Engineering Joint Stock Company, November 2025.

1.2.2. Environmental and Social Framework and World Bank Guidelines

The Project will apply the World Bank's Environmental and Social Framework (ESF) and comply with the applicable laws and regulations of Viet Nam. The environmental and social risk of REACH has been assessed as Significant. Nine of the ten Environmental and Social Standards (ESSs) under the ESF are relevant to the Project, including: i) ESS1 – Assessment and Management of Environmental and Social Risks and Impacts; ii) ESS2 – Labor and Working Conditions; iii) ESS3 – Resource Efficiency and Pollution Prevention and Management; iv) ESS4 – Community Health and Safety; v) ESS5 – Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement; vi) ESS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources; vii) ESS7 – Indigenous Peoples; viii) ESS8 – Cultural Heritage; and ix) ESS10 – Stakeholder Engagement and Information Disclosure.

The applicability of the ESSs is assessed below.

(a) Project-related ESS

ESS 1: Assessment and management of environmental and social risks and impacts

ESS1 requires borrowers to assess, manage, and monitor environmental and social (E&S) risks and impacts throughout the project life cycle in order to ensure compliance with the World Bank's Environmental and Social Standards (ESSs).

The Project is expected to generate significant environmental benefits by enhancing the

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transmission capacity for electricity generated from renewable energy sources, thereby supporting the reduction of greenhouse gas emissions, reducing dependence on fossil fuels, improving energy efficiency, and contributing to improved environmental quality. However, given the nature, scale, and scope of the anticipated impacts, the Project's overall environmental and social (E&S) risk is assessed as **Significant**.

- **The main social risks and impacts** include temporary and permanent land acquisition; loss of land, assets, and livelihoods; physical and economic displacement; and impacts on local livelihood and production activities, particularly in relation to the 500kV transmission lines. Other key risks include occupational health and safety (OHS), community health and safety (CHS), and risks associated with the influx of migrant workers, such as gender-based violence (GBV), sexual exploitation and abuse and sexual harassment (SEA/SH), community conflict, and the spread of infectious diseases.
- **Environmental risks and impacts** will arise primarily during the construction phase, especially from the development of the 500kV transmission lines, which traverses areas of biodiversity value and natural habitats. Although the alignment does not cross any nature reserves or national parks, site clearance and construction activities may result in the loss or fragmentation of natural habitats and may adversely affect ecosystems if appropriate mitigation measures are not implemented. Other significant risks include unexploded ordnance (UXO) and explosive remnants of war (ERW), work at height, and electrical hazards during construction and testing. Impacts such as soil erosion, sedimentation, dust, noise, and construction waste are considered moderate and can be managed through appropriate mitigation and management measures.
- During the operation phase, the main risks include exposure to electromagnetic fields (EMF), electrical safety risks, and working at height during maintenance activities, which may affect community health and safety. Potential incidents such as oil leakage, fire, and explosion at electrical facilities are also relevant considerations.

ESS 2: Labor and working conditions

ESS2 recognizes the importance of employment creation and income generation in promoting economic development and poverty reduction. It requires borrowers to ensure fair treatment of workers, non-discrimination and equal opportunity, safe and healthy working conditions, and respect for labor rights in accordance with national law and the requirements of *ESS2*.

During project implementation, the Project will employ direct workers, contracted workers, and local labor to carry out construction activities. The main labor-related risks include occupational health and safety *(*OHS) hazards, construction accidents, the spread of infectious diseases, as well as social risks associated with the influx of migrant workers, such as gender-based violence (GBV), sexual exploitation and abuse, sexual harassment (SEA/SH), and labor disputes.

To meet the requirements of ESS2, the Project has prepared a Labor Management Procedures (LMP) as part of its environmental and social management instruments. The LMP sets out measures on labor management, working conditions, contractor management, worker grievance mechanisms, and occupational health and safety requirements to ensure compliance with Vietnamese law and the requirements of ESS2.

ESS3: Resource Efficiency and Pollution Prevention and Management

ESS3 requires the Project to promote the efficient use of resources, prevent and control pollution, and manage associated risks and impacts throughout the project life cycle. For this Project, the main impacts will arise during the construction phase, including demand for land, construction materials, water, and energy; and the generation of dust, exhaust emissions, noise, wastewater, solid waste, and hazardous waste, together with risks to public health and the

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environment.

To meet the requirements of *ESS3*, the Project will apply measures on resource efficiency, pollution prevention, and waste management in accordance with the World Bank Group's Environmental, Health, and Safety Guidelines (EHS Guidelines), including the EHS Guidelines for Electric Power Transmission and Distribution, while also complying with the applicable laws and regulations of Viet Nam.

An assessment of risks and impacts related to resource use, water and energy consumption, emissions to the environment, hazardous materials, and waste management, together with corresponding mitigation measures, will be presented in the ESIA Report and the Environmental and Social Management Plan (ESMP).

ESS4: Community Health and Safety

ESS4 addresses the health, safety, and security risks and impacts on project-affected communities, as well as the responsibilities of the Project owner and subproject owners to avoid or minimize such risks and impacts.

Community health and safety issues considered during project implementation include traffic safety along transport routes, public health and safety at construction sites, electric shock risks, electromagnetic interference, visual impacts, aviation safety, risks associated with labor influx, security issues, exposure to electromagnetic fields (EMF) under transmission lines during operation, and the potential spread of infectious diseases.

Relevant measures set out in the World Bank Group's Environmental, Health, and Safety Guidelines (EHS Guidelines) to protect community health and safety will be incorporated into the ESMF and ESIA, and will be implemented throughout the construction and operation phases of the Project.

ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement

ESS5 recognizes that project activities may cause adverse impacts on local people, particularly those who are poor, vulnerable, or disadvantaged. Involuntary resettlement should be avoided wherever possible. Where involuntary resettlement is unavoidable, it should be minimized, and appropriate measures to mitigate adverse impacts on displaced persons, as well as on host communities receiving displaced persons, must be carefully planned and implemented.

Impacts related to land acquisition and resettlement are expected to arise mainly from activities under Component 1, including the construction of the 500kV transmission lines and optical repeater stations. These works will require the permanent acquisition of approximately 107.74 hectares of various land types for project facilities such as tower foundations and optical repeater stations. In addition, approximately 1,026.96 hectares of land will be subject to restrictions on land use, although not permanently acquired, because such land is located within the transmission line safety corridor.

In general, the most significant impacts will result from the construction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines. The main forms of economic displacement include loss of houses, structures, crops, trees, agricultural land, and residential land. While the exact locations, extent of impacts, and affected assets will be determined in greater detail during project preparation and implementation, the Borrower will prepare a Resettlement Framework (RF) to guide the preparation of site-specific Resettlement Plans (RPs) for investments identified during project implementation. The RF will include measures to ensure that displaced persons: (i) are informed about their resettlement options and rights; (ii) are consulted on, and offered, feasible resettlement alternatives; and (iii) receive compensation at replacement cost together with livelihood restoration support.

ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

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ESS6 requires the protection and conservation of biodiversity, the maintenance of the ecological functions of natural habitats and critical habitats, and the sustainable management of living natural resources, following the mitigation hierarchy of avoidance, minimization, restoration, and, where necessary, offsetting.

The Project area passes through various types of natural habitats, including areas of biodiversity value. Initial survey results indicate that the transmission lines does not pass through any national parks or nature reserves. However, construction activities may result in the loss or fragmentation of natural habitats due to land acquisition and site clearance, which could affect terrestrial and aquatic ecosystems, particularly at river and stream crossings or in forested areas. In addition, the transmission lines may increase the risk of bird collision and electrocution, especially for migratory bird species if the alignment is located near migration routes.

To meet the requirements of ESS6, the ESIA will assess in detail the potential impacts on natural habitats, critical habitats, species of conservation importance, terrestrial and aquatic ecosystems, and bird migration routes, where relevant. Route selection and engineering design will follow the mitigation hierarchy, with priority given to avoiding biodiversity-sensitive areas. Where impacts cannot be avoided, appropriate mitigation, restoration, and, if required, offset measures will be applied in accordance with ESS6.

ESS7: Indigenous Peoples

ESS7 aims to ensure that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of Indigenous Peoples. It also seeks to avoid adverse impacts on Indigenous Peoples or, where avoidance is not possible, to minimize, mitigate, and/or compensate for such impacts.

The Project will be implemented in the South Central Coast, Central Highlands, and Southeast regions, which are home to a large population of ethnic minority communities. Ethnic minority populations are most concentrated in Dak Lak, Lam Dong, and Dong Nai, where they account for approximately 33%, 32.1%, and 19.7% of the total population, respectively. In other provinces, the proportion of ethnic minority populations is lower, ranging down to approximately 1.9% in Tay Ninh.

The applicability of ESS7 at the subproject level will be assessed on a case-by-case basis through early screening. As site-specific impacts were not fully identified at the time of assessment, the Project will prepare an Ethnic Minority Planning Framework (EMPF) to set out the principles, procedures, and institutional arrangements for implementation of ESS7. The EMPF will include procedures for screening the presence of ethnic minority communities in specific subprojects and for conducting meaningful consultation with affected communities in a culturally appropriate manner.

ESS8: Cultural Heritage

ESS8 recognizes that cultural heritage provides a tangible and intangible link between the past, present, and future. It sets out measures to protect cultural heritage throughout the project life cycle.

Given the type, scale, and location of the Project, significant adverse impacts on intangible cultural heritage are not currently anticipated. However, the locations of optical repeater stations and the alignment of the transmission lines may require the relocation of some graves, which are considered cultural property. The ESMF and ESIA include a screening process to identify potential cultural heritage sites in accordance with ESS8 and will provide guidance on impact assessment and mitigation measures. In addition, the ESIA will include chance finds procedures, requiring the immediate suspension of construction activities in the event that cultural heritage is discovered, followed by prompt notification to the relevant authorities for further action.

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ESS10: Stakeholder Engagement and Information Disclosure

ESS10 emphasizes the importance of effective, transparent, and ongoing stakeholder engagement throughout the project life cycle in order to improve project design, strengthen social acceptance, and ensure effective management of environmental and social risks and impacts.

Project stakeholders include government agencies, the investor and project implementing entities, local authorities at all levels, directly affected communities, including households subject to land acquisition, vulnerable households, and ethnic minority communities where relevant, as well as other interested parties such as power sector entities, social organizations, development partners, and the general public.

To meet the requirements of ESS10, the Project has prepared a Stakeholder Engagement Plan (SEP) to identify stakeholders and define methods and plans for consultation and information disclosure at each stage of the Project, while ensuring the meaningful participation of affected and interested parties. The SEP also establishes a Grievance Redress Mechanism (GRM), which sets out procedures for receiving, processing, monitoring, and responding to complaints in accordance with Viet Nam's law and the requirements of the World Bank's Environmental and Social Framework (ESF).

World Bank Access to Information Policy

The World Bank requires that, during the environmental assessment (EA) process, the Government carry out meaningful consultations with relevant stakeholders, including project-affected groups and local non-governmental organizations (NGOs), on the environmental and social aspects of the Project, and take their views into account in project design.

All draft safeguard instruments must be disclosed locally in places that are accessible to stakeholders and in forms and languages that are understandable to them. In addition, English versions must be disclosed at the World Bank Infoshop prior to project appraisal.

World Bank Environmental, Health, and Safety Guidelines

Projects financed by the World Bank are also required to take into account the World Bank Group's Environmental, Health, and Safety Guidelines (EHS Guidelines). The EHS Guidelines are technical reference documents, both general and sector-specific, that represent international good industry practice. They contain the performance levels and measures that are generally considered achievable in new facilities at reasonable cost using existing technologies.

The environmental assessment process may recommend alternative performance levels or measures, provided that these are acceptable to the World Bank and are justified based on the specific circumstances of the Project. Once agreed, such measures become project-specific requirements.

Where host country regulations differ from the levels and measures set out in the EHS Guidelines, the Project is expected to apply whichever is more stringent. If less stringent levels or alternative measures are considered appropriate in view of the specific project context, a full and detailed justification must be provided as part of the environmental assessment. This justification must demonstrate that the selected alternative will protect human health and the environment. The EHS Guidelines will be applied to the REACH Project.

The EHS guidelines were consulted during the preparation of this ESIA. In preparing the ESIA/EIA and ESMP for the Project, the client is required to refer to the "*General Environmental, Health, and Safety Guidelines and the Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution"* to ensure their effective application in practice.

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1.2.3. Relevant International Conventions

Some of the key international agreements to which the Government of Viet Nam is a party, and which are relevant to the Project, are listed below.

Environmental Sector

- United Nations Convention on Biological Diversity (1992): Viet Nam signed the Convention in May 1993. It aims to promote the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the utilization of genetic resources.
- Ramsar Convention on Wetlands (1982): Viet Nam acceded to the Convention in 1989. It aims to conserve and promote the wise use of wetlands of international importance.
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1973): Viet Nam acceded to the Convention in 1994. It regulates international trade in specimens of wild animals and plants to ensure that such trade does not threaten their survival.
- Cartagena Protocol on Biosafety: Viet Nam became a Party in 2004. The Protocol establishes measures for the safe handling, transport, and use of living modified organisms resulting from modern biotechnology.
- United Nations Convention on the Law of the Sea (UNCLOS) (1982): Viet Nam acceded to the Convention in July 1994. It provides the legal framework governing the peaceful, equitable, and efficient use of marine resources, protection of the marine environment, and maritime safety.
- International Convention for the Prevention of Pollution from Ships (MARPOL) (1973/1978): Viet Nam acceded in August 1991. The Convention aims to prevent and minimize pollution from ships, including both accidental pollution and pollution from routine operations.

Culture and Society

- UNESCO World Heritage Convention (1972): Viet Nam acceded to the Convention in 1987. It promotes international cooperation in the identification, protection, conservation, and transmission to future generations of cultural and natural heritage of outstanding universal value.
- Convention on the Elimination of All Forms of Discrimination against Women (CEDAW): Viet Nam signed the Convention in July 1980. It requires States Parties to eliminate discrimination against women and to ensure the protection and promotion of women's rights.
- International Covenant on Economic, Social and Cultural Rights (ICESCR): Viet Nam acceded to the Covenant in 1982. It provides an important framework for protecting economic, social, and cultural rights, including those of vulnerable and disadvantaged groups.

Labour and Working Conditions (ILO conventions)

- C029 Convention on Forced Labour (1930): Entered into force in Viet Nam on 5 March 2007. It prohibits all forms of forced or compulsory labour.
- C098 Convention on the Right to Organise and Collective Bargaining (1949): Entered into force in Viet Nam on 5 July 2020. It protects workers against anti-union discrimination and promotes voluntary collective bargaining.

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- C100 Convention on Equal Remuneration (1951): Entered into force in Viet Nam on 7 October 1997. It requires equal remuneration for men and women workers for work of equal value.
- C111 Convention on Discrimination (Employment and Occupation) (1958): Entered into force in Viet Nam on 7 October 1997. It seeks to eliminate discrimination in employment and occupation on the grounds of race, colour, sex, religion, political opinion, national extraction, or social origin.
- C138 Convention on Minimum Age (1973): Entered into force in Viet Nam on 24 June 2003. It establishes the minimum age for admission to employment in order to abolish child labour.
- C182 Convention on the Worst Forms of Child Labour (1999): Entered into force in Viet Nam on 19 December 2000. It requires immediate and effective measures to prohibit and eliminate the worst forms of child labour as a matter of urgency.
- C155 Convention on Occupational Safety and Health (1981): Entered into force in Viet Nam on 3 October 1994. It provides for national policies and workplace measures aimed at preventing occupational accidents and diseases.

1.2.4. Comparative Analysis of Viet Nam's Environmental and Social Legislation and the ESF

The differences between Viet Nam's and the World Bank's environmental assessment regulations lie not only in the content of the EIA/ESIA report, but also in fundamental aspects such as concepts, approaches, assessment tools, and implementation processes.

The table below presents the results of a detailed analysis of the differences between the two systems and provides recommendations for the concurrent application of World Bank and Vietnamese regulatory requirements in the Project's ESIA in order to bridge regulatory gaps. This gap analysis covers not only the content of the EIA/ESIA, but also definitions, implementation procedures, and assessment tools, thereby supporting not only the Project's ESIA consultants but also other relevant specialists involved in the implementation process.

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Table 2: Comparison between the World Bank and Viet Nam on ESF legal regulations for ESIA/EIA and applicable recommendations

Environment & Social Assessment Phase	World Bank (specified in the Framework for Social Protection and Environment and Social Affairs)	Viet Nam's regulations (specified in Decree No. 08/2022/ND and amended and supplemented in Decree No. 48/2026/ND-CP) and updated according to Resolution No. 66.19/2026/NQ-CP	Recommended solutions for the difference
Preparation of ESIA report			
Objectives	The ESF framework consists of 10 ESS designed to assess and manage the risks and negative E&S impacts of projects towards sustainable development.	Law on Environmental Protection No. 72/2020/QH14 and relevant laws, decrees, standards and regulations on environmental protection. This system is supplemented and supported by legal documents related to natural resource management, labor, and construction management. The comparison focuses on the Law on Environmental Protection 2020, Decree 08/2022/ND-CP (amended by Decree 05/2025/ND-CP, Decree 48/2026/ND-CP and Resolution No. 66.19/2026/NQ-CP), Circular 02/2022/TT-BTNMT (amended by Circular 07/2025/TT-BTNMT and Circular 09/2026/TT-BNNMT)	The WB's ESF is applied to WB-funded projects.

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Environment & Social Assessment Phase	World Bank (specified in the Framework for Social Protection and Environment and Social Affairs)	Viet Nam's regulations (specified in Decree No. 08/2022/ND and amended and supplemented in Decree No. 48/2026/ND-CP) and updated according to Resolution No. 66.19/2026/NQ-CP	Recommended solutions for the difference
ESA Tools	Tools developed under ESS can include regional and local ESMF, ESIA, ESMP, ESIA; SESA, LMP hazard or risk assessment; ES audit. Based on the information provided by the Borrower, the WB evaluates the E&S instruments of the proposed projects expected to be financed by the WB. The borrower prepares, submits and publishes all E&S documents (including the Environmental and Social Commitment Plan (ESCP) and the Stakeholder Engagement Plan (SEP), LMP, ESIA/ESMP, EMDP RP) to the World Bank prior to due diligence.	Environmental assessment tools include Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA/EIA), Environmental Permit, and Environmental Registration. The application of these tools is decided based on Appendices I to Appendix V of Decree No. 08/2022/ND-CP (amended by Decree No. 05/2025/ND-CP) and the reduction screening criteria in Sections VI and VII, Appendix IX of Resolution No. 66.19/2026/NQ-CP.	ESIA/ESMP, ESCP, SEP, EMDP, RP, and LMP meet ESSs 1, 2, 3, 4, 5, 6, 8, and 10; The EIA meets the requirements of Viet Nam.
ESIA Report Approval			

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Environment & Social Assessment Phase	World Bank (specified in the Framework for Social Protection and Environment and Social Affairs)	Viet Nam's regulations (specified in Decree No. 08/2022/ND and amended and supplemented in Decree No. 48/2026/ND-CP) and updated according to Resolution No. 66.19/2026/NQ-CP	Recommended solutions for the difference
Scope and approvals	The borrower conducts ESIA for the project. The level of assessment depends on the level of environmental and social risks of the Project. If the Borrower and the World Bank propose to apply part or all of the country's Socio-Economic Development Plan (SEDP), the World Bank will evaluate that legal framework to ensure that the Project meets the objectives under the ESS (article 20, ESS1) The borrower manages environmental and social impacts and risks throughout the entire project cycle, from preparation to construction and operation. WB reviews E&S documents before evaluating the project Mitigation measures are considered in the steps of project location, design, construction and operation. Contractor and Worker Management Requirements There are required E&S assessments for key suppliers	Normally, after consulting with the local Department of Agriculture and Environment or the Ministry of Agriculture and Rural Development, if the project is on the list that must make an EIA or EPA report, the project owner will prepare an EIA or EPA report. Submit the preliminary environmental impact assessment report or content together with the Pre-Feasibility Study Report (PFS) and the Environmental Impact Assessment (EIA) report together with the Feasibility Study (FS) report. There are regulations on labor management and construction management in a number of relevant legal documents, but there are no strict regulations on management of environmental and social requirements in bidding documents like the World Bank. There are legal provisions on the management of mines and alluvial fields. Authorities will supervise and inspect the observance of the law on environment (Department of Agriculture and Environment) and labor (now the Department of Home Affairs).	The preparation of ESIA/ESMP, ESCP, SEP, EMDP, RP, LMP for the Project will comply with the ESS. These documents will be submitted to the World Bank prior to the project appraisal. Prepare the EIA report and submit it to the Provincial People's Committee (The project owner chooses 1 of the local provinces to request appraisal if it is an inter-provincial project). Requirements for environmental impact mitigation measures are included in the bidding documents and monitored throughout the project implementation.

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Community Consultation, Stakeholder Engagement, and Complaint Resolution Mechanism (GRM)	The borrower will consult with the project's stakeholders and those interested in the project. The borrower must prepare the SEP, which includes the identification of stakeholders, consultation, disclosure, and the establishment and operation of the GRM. ESS2 also requires the preparation of labor management procedures (LMP) as well as the establishment and operation of the GRM for project workers. If an ethnic minority group is present and negatively affected, voluntary, prior and fully informed consent (FPIC) is required. Consult with affected people, including vulnerable people, throughout the implementation of the project. In order to obtain informed consent, the Borrower shall promptly provide relevant project documents prior to consultation in a form and language that is understandable and accessible to the consulted group. The minutes of the public meeting are included in the report.	Pursuant to Article 33 of Law No. 72/2020/QH14 (specified in Article 26 of Decree No. 08/2022/ND-CP on consultation in environmental assessment, amended and supplemented in Clause 8, Article 1 of Decree No. 05/2025/ND-CP) as follows: When assessing environmental impacts, project owners must consult the following two groups of topics: a) Residential communities and individuals directly affected by the environmental impacts of the project, specifically: Residential communities and individuals living, producing and doing business on land, water surface, water surface land and sea surface assigned for project investment. Residential communities and individuals are directly affected by wastewater, exhaust gas, dust, noise, solid waste, and hazardous waste caused by the project. Residential communities and individuals are affected by subsidence, landslides, riverbank and coastal sedimentation caused by the project. Other affected communities and individuals are identified through the environmental impact assessment process. b) Agencies and organizations directly related to the investment project include: commune-level People's Committees and Viet Nam Fatherland Front Committees of the communes where the projects are implemented. Management boards and investors in construction and business of infrastructure of production and business zones, concentrated service zones and industrial clusters where the projects are located are located within the	Consultation according to ESS10. The results of the consultation will be included in ESIA/ESMP, ESCP, SEP, EMDP, RP, LMP.

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Environment & Social Assessment Phase	World Bank (specified in the Framework for Social Protection and Environment and Social Affairs)	Viet Nam's regulations (specified in Decree No. 08/2022/ND and amended and supplemented in Decree No. 48/2026/ND-CP) and updated according to Resolution No. 66.19/2026/NQ-CP	Recommended solutions for the difference
		management boundaries of their management. State agencies managing irrigation works for projects on discharging wastewater into irrigation works or occupying irrigation works. State management agencies assigned to manage areas with environmentally sensitive factors (if any). the Ministry of National Defense, the Ministry of Public Security or the Provincial Military Command, the Provincial Police for projects related to security and defense factors (if any). The project owner shall send the EIA report to the commune-level People's Committee of the relevant unit (as above) enclosed with a written request for comments. Within 15 working days from the date of receipt of the EIA report. Within 15 working days from the date of receipt of the EIA report, the commune-level People's Committee shall give a written reply if it does not approve the project.	
Disclosure of information	The World Bank requires the disclosure of E&S documents to local authorities before appraisal of the project. The World Bank will make public the E&S documents of large, high-risk and medium-risk projects before appraisal of the project.	After the EIA report is approved, the project owner carries out the necessary procedures to publicize the EIA at the W/CPC office in the project area, in which the community is consulted for people to know, inspect and monitor (Article 26, Decree No. 08/2022/ND-CP, amended, supplemented in Clause 8, Article 1 of Decree No. 05/2025/ND-CP).	ESIA/ESMP, ESCP, SEP, RP, LMP will be made public as required by ESS 10; and EIA according to the Government of Viet Nam.

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Environment & Social Assessment Phase	World Bank (specified in the Framework for Social Protection and Environment and Social Affairs)	Viet Nam's regulations (specified in Decree No. 08/2022/ND and amended and supplemented in Decree No. 48/2026/ND-CP) and updated according to Resolution No. 66.19/2026/NQ-CP	Recommended solutions for the difference
ESIA Implementation			
Independent Experts	For complex and high-risk projects, the Borrower may be required to hire independent ESA experts who are not affiliated with the project to implement the ESA.	The project owner must establish or sign a contract with an organization that fully meets the conditions under the current Law on Enterprises	The risk of the project is average. The project will not require independent experts.

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Environment & Social Assessment Phase	World Bank (specified in the Framework for Social Protection and Environment and Social Affairs)	Viet Nam's regulations (specified in Decree No. 08/2022/ND and amended and supplemented in Decree No. 48/2026/ND-CP) and updated according to Resolution No. 66.19/2026/NQ-CP	Recommended solutions for the difference
Approval procedures	The WB screens and classifies the risks of the project and the documents are reviewed and approved at different levels	New update according to Resolution 66.19/2026/NQ-CP: Regarding jurisdiction (Promoting decentralization for localities): 1. The Ministry of Agriculture and Environment shall only organize EIA appraisal for large/special projects (nuclear power plants, research reactors; projects using special-use forest land/protected areas/core areas of world heritage sites approved by the National Assembly or the Prime Minister; projects using over 300 hectares of land/water surface or over 60 hectares of sea; projects on declaration group-I mineral exploits under the Ministry's licensing competence). 2. The Chairman of the provincial-level People's Committee shall organize the appraisal and approval of the EIA report for all remaining investment projects implemented in the area under their management. Regarding the application dossier: Simplifying procedures, the dossier of request for appraisal does not include draft basic design drawings or construction drawing designs of waste treatment works. Regarding the appraisal time limit (Shortening the time): Counting from the date of receipt of a complete and valid dossier: Not more than 30 days for the ministerial level; not more than 20 days for provincial level; and not more than 10 days for special public investment projects.	The World Banks will review ESIA/ESMP, ESCP, SEP, RP, LMP before appraising the project. Generally, the documents will be finalized before the end of the appraisal.

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Environment & Social Assessment Phase	World Bank (specified in the Framework for Social Protection and Environment and Social Affairs)	Viet Nam's regulations (specified in Decree No. 08/2022/ND and amended and supplemented in Decree No. 48/2026/ND-CP) and updated according to Resolution No. 66.19/2026/NQ-CP	Recommended solutions for the difference
ESIA/EIA report contents	According to ESS1	The environmental impact assessment report (EIA must be in accordance with Circular No. 02/2022/TT-BTNMT, amended and supplemented in Circular No. 07/2025/TT-BTNMT and Circular No. 09/2026/TT-BNNMT.	The content of ESIA must be in line with the requirements of the World Bank and the Government of Viet Nam.
ESIA/EIA Monitoring	During the implementation of the project, the World Bank monitors the implementation of environmental and social commitments in accordance with the approved documents.	New update according to Resolution 66/2026/NQ-CP: The local regulatory authority (DWD) is responsible for monitoring compliance with environmental regulations. When a safety/environmental incident occurs, an interdisciplinary inspection team will be established to assess and request remediation. Major changes in the monitoring mechanism (Abolition of procedures for licensing monitoring units): The Government completely abolishes the procedures for granting certificates of eligibility for environmental monitoring services. Independent monitoring organizations that meet the ISO/IEC 17025 standard, have sufficient personnel and equipment capacity only need to self-declare their capacity and notify the Ministry of Agriculture and Environment before operation. The project owner is responsible for selecting these self-announced organizations to implement the project's environmental monitoring program.	Comply with ESCP and ESIA/ESMP, RP, SEP, and LMP; The approved EIA of the project.

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1.3. IMPLEMENTATION ARRANGEMENT AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT METHOD

1.3.1. ESIA Implementation Arrangements

Project owner: National Power Transmission Corporation (Acting General Director: Mr. Hoang Xuan Khoi, Address: No. 27, Niche 68/37 Cau Giay Street, Nghia Do Ward, Ha Noi City. Phone: 024.22226666, Fax: 024.22204455).

Representative of the project owner responsible for the project management: Southern Power Projects Management Board (Director: Mr. Bui Quang Thanh, Address: 610 Vo Van Kiet, Cau Ong Lanh Ward, Ho Chi Minh City, Phone: 028.2210.0714, Fax: 028.3836.1096).

ESIA preparation consultant:

Information on team members is provided in Table 3.

Table 3: List of members involved in the preparation of ESIA

No.	Full name	Expertise	Working Units	Mission	Years of Experience
A	**Project owner**				
1	Dang Chien Thang	Electrical Engineer	Deputy Director – Southern Power Projects Management Board	Environmental Impact Assessment Report Management	> 20 years
2	Luu Nguyen Huong Lan	Environmental Engineer	Compensation Department – Southern Power Projects Management Board	Monitoring the progress of the implementation of the Environmental Impact Assessment report	> 20 years

1.3.2. Applied Approach

- Mitigation Hierarchy-Based Approach: Under this approach, all environmental and social risks and impacts are addressed in accordance with the mitigation hierarchy, in the following order of priority: avoidance at the design stage through route selection and design optimization to prevent or minimize adverse impacts; minimization through the application of mitigation measures during construction and operation, such as warning signs, barriers, and site safety controls → restoration/remediation of affected areas after impacts occur → compensation where impacts cannot be avoided, minimized, or restored, including compensation for affected land and assets in accordance with applicable regulations and project requirements.

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- Cumulative Impact Assessment Approach: Project impacts are not assessed in isolation by individual work items. Instead, the assessment considers the combined and cumulative effects of the entire transmission line alignment across five provinces/cities, particularly where project activities may occur simultaneously, in order to understand the overall impacts on the environment, communities, and regional infrastructure systems.
- Risk-Based Approach: This approach focuses on identifying and assessing risks with potentially significant consequences, such as secondary erosion, labor influx-related conflict, occupational and community safety risks, and impacts on natural ecosystems, rather than relying solely on generalized or overly optimistic impact assumptions.
- Participatory Approach: Community consultation is a central element of the assessment process. Data collection and risk assessment should involve local communities, especially vulnerable groups such as women, poor households, and ethnic minorities. This approach also requires the establishment of a transparent and accessible Grievance Redress Mechanism (GRM).

1.3.3. ESIA Implementation Methodology

- Interactive Matrix Method (assessment of impact significance): This method is used to assess the significance of impacts based on: (i) spatial extent, that is, whether the impact is localized at the construction site or extends downstream or across a wider area; (ii) duration, including whether the impact is temporary during construction or permanent after construction; (iii) the degree of change compared to baseline conditions; (iv) likelihood of occurrence, including whether the impact is certain, likely, or rare; and (v) sensitivity of the receptors, for example highly **affected structure**s such as protected areas and protection forests, or moderately **affected structure**s such as open land and abandoned agricultural areas. Based on the assessment of magnitude, likelihood, and receptor sensitivity, a composite matrix is developed to determine the overall significance of environmental and social impacts.
- Field Survey Method: Field surveys are conducted at project sites, associated work items, and **affected structure**s, as well as in areas surrounding proposed construction camps, laydown areas, and disposal sites. Surveys also cover land use characteristics in potentially affected areas. In addition, environmental quality monitoring of soil, water, air, and noise is carried out to establish baseline environmental conditions prior to construction. Details of sample numbers, sampling locations, and monitoring parameters are presented in Chapter 3 – Environmental and Social Baseline Conditions.
- Spatial Analysis (GIS): Geographic Information System (GIS) tools are used to map sampling locations, **affected structure**s, spoil disposal sites, and affected areas, thereby supporting spatial analysis of project impacts.
- Community Consultation Method: Meaningful stakeholder consultation has been carried out in accordance with ESS10. Consultations are conducted with local authorities, including Commune/Ward People's Committees, the Fatherland Front, the Women's Union, the Farmers' Union, and relevant specialized agencies, in order to introduce the Project and discuss its potential environmental and social impacts. The consultation process also aims to collect comments and recommendations from government representatives and project-affected people. Consultation will continue throughout the Project cycle, from the design stage through construction and project completion.
- Information Collection Method: Surveys and interviews are conducted with project-affected households to collect information on demographic and ethnic characteristics, occupation, gender, income, and the status of local infrastructure in the project area, such as electricity supply, roads, schools, and health stations. The assessment also draws upon and updates

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available environmental quality monitoring data from previous studies and monitoring programs conducted in the Project area.

- Comparative Analysis Method: Environmental quality monitoring results are compared with applicable Vietnamese standards (QCVN) for soil, air, water, noise, and vibration, as well as relevant health criteria under WHO guidelines and the IFC/WB EHS Guidelines. The results are also reviewed against baseline conditions established through previous studies, monitoring, and supervision data.

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CHAPTER 2. PROJECT DESCRIPTION

2.1. PROJECT LOCATION

2.1.1. Location of 500kV transmission line section

The 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project starts at the 500kV gantry of the 500kV Krong Buk Substation in Ea Kiet Commune, Dak Lak Province, and ends at the 500kV gantry of the 500kV Tay Ninh 1 Substation in Hung Thuan Commune, Tay Ninh Province. The total route length is approximately 330 km.

The geographical location of the Project is summarized as follows:

- Starting point: 500kV gantry of the 500kV Krong Buk Substation.
- End point: 500kV gantry of the 500kV Tay Ninh 1 Substation.
- Length: approximately 330 km.

Location: The transmission line passes through 34 communes/wards in five provinces/cities, namely Dak Lak, Lam Dong, Dong Nai, Ho Chi Minh City, and Tay Ninh.

Table 4: Statistics on the length of the project passing through each locality

No.	Province/commune	**Length** (km)	Notes
1	**Dak Lak Province**	**32.64**	
1.1	Ea Kiet Commune	7.86	G1-G7
1.2	Ea M'Droh Commune	13.42	G6-G8
1.3	Ea Wer Commune	11.36	G7-G12A
2	**Lam Dong Province** (former Dak Nong)	**117.52**	
2.1	Dak Wil Commune	9.16	G12A-G12A.2A
2.2	Nam Dong Commune	7.51	G12A.2-G12A.4
2.3	Cu Jut Commune	5.97	G12A.3-G12A.4
2.4	Dak Mil Commune	7.13	G12A.3-G13
2.5	Nam Da Commune	0.78	G12A.4-G13
2.6	Dak Sak Commune	13.20	G12A.4-G18
2.7	Krong No Commune	6.68	G15-G20
2.8	Dak Song Commune	10.94	G19-G24
2.9	Duc An Commune	10.16	G23-G28
2.10	Truong Xuan Commune	13.96	G24-G29
2.11	Quang Tan Commune	23.28	G28-G33
2.12	Quang Tin Commune	8.75	G31-G33
3	**Dong Nai City (**former Binh Phuoc)	**129.92**	
3.1	Tho Son Commune	11.00	G32-G36

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No.	Province/commune	Length (km)	Notes
3.2	Dak Nhau Commune	13.29	G35-G39
3.3	Bom Bo Commune	4.10	G36-G38
3.4	Phu Nghia Commune	21.16	G38-G43
3.5	Dak O Commune	4.41	G38-G40
3.6	Da Kia Commune	4.92	G42A-G45
3.7	Phuoc Binh Ward	5.35	G43-G45
3.8	Binh Tan Commune	11.34	G43-G45A
3.9	Phu Rieng Commune	0.90	G45-G45A
3.10	Long Ha Commune	16.75	G45-G47
3.11	Tan Hung Commune	9.37	G47-G48
3.12	Tan Quan Commune	8.88	G47B-G48A
3.13	Binh Long Ward	1.88	G48-G49A
3.14	Minh Duc Commune	5.46	G49-G50
3.15	Tan Khai Commune	11.11	G49A-G53B
4	**Ho Chi Minh City** (former Binh Duong)	**30.37**	
4.1	Minh Thanh Commune	11.23	G52B-G55
4.2	Dau Tieng Commune	19.14	G54-G60
5	**Tay Ninh Province**	**19.18**	
5.1	Loc Ninh Commune	7.18	G59-G61
5.2	Hung Thuan Commune	12.00	G60-ĐC
	Total	**329,63**	

Source: Feasibility study report, PECC2-PECC3-PECC4, 3/2026.

The alignment of the transmission line is shown in the following figure:

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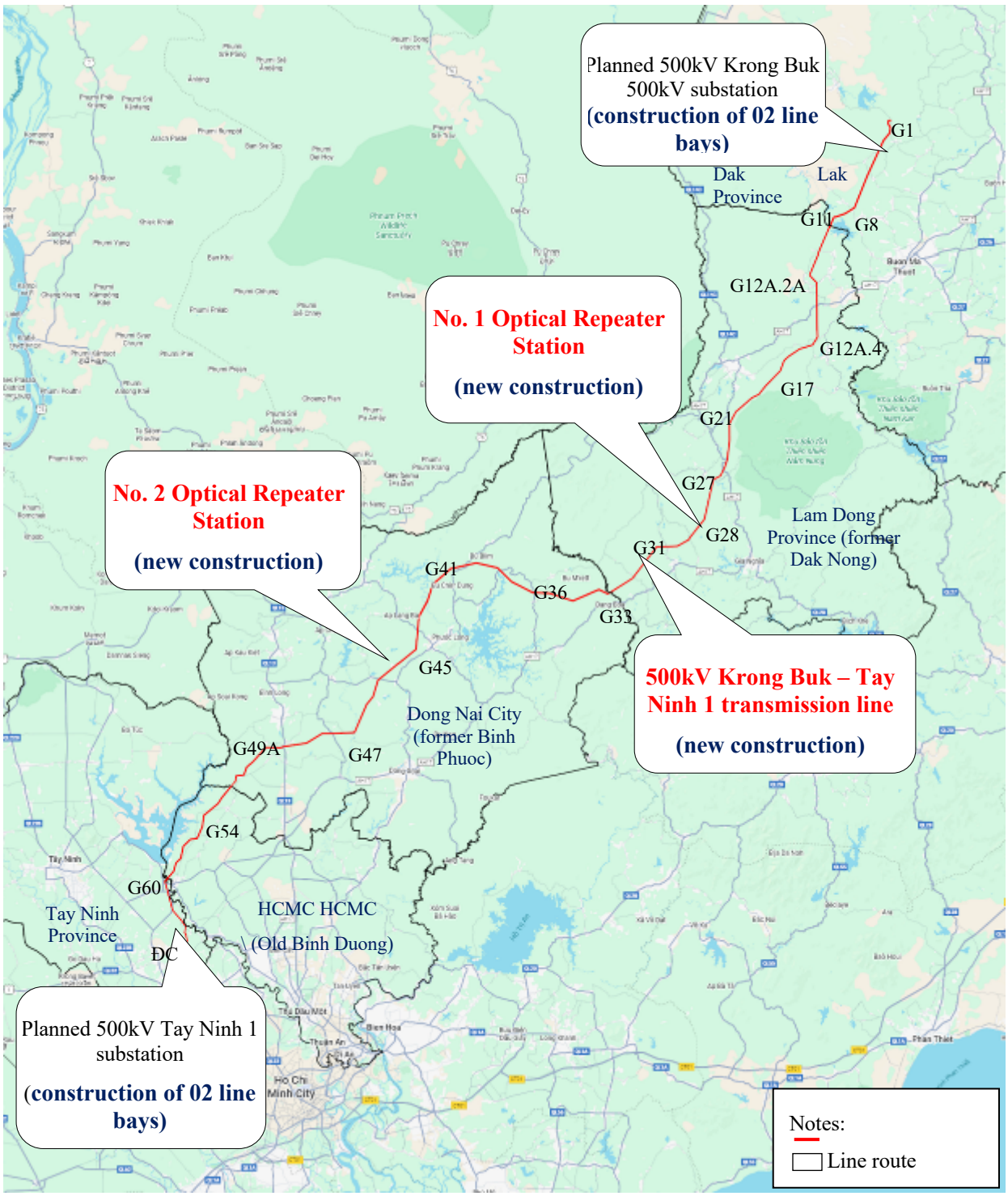


Figure 1: Project location map of 500kV Krong Buk - Tay Ninh 1 transmission lines

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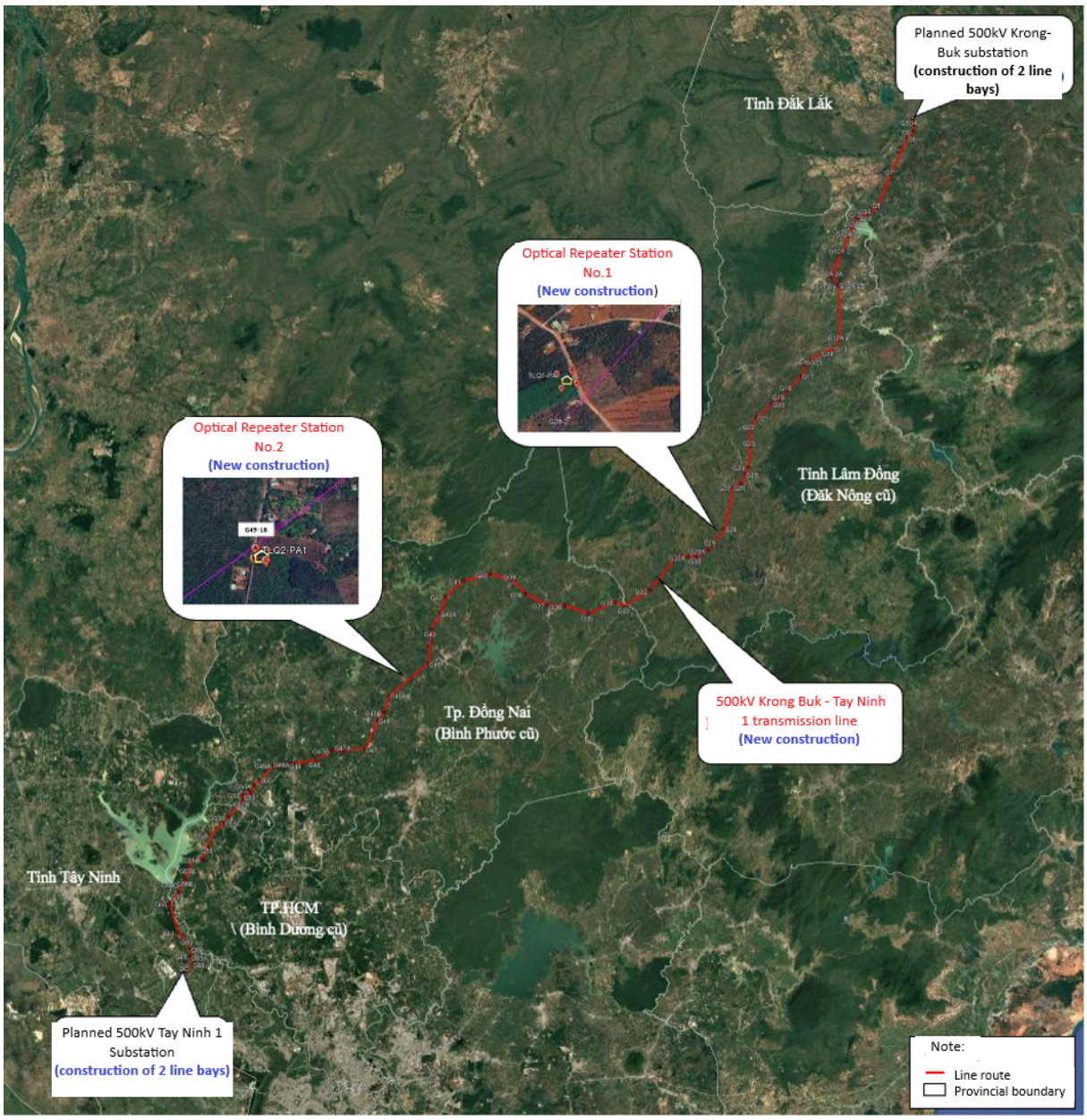


Figure 2: Satellite View of the Project Location

The line direction description is as follows:

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Table 5: Line Route Direction Description

No.	Route Segment (Length)	Commune /Ward	Characteristics
1. Dak Lak province			
1	G1 – G2 (513.80m)	Ea Kiet	- **Topography**: Slightly sloping terrain. - **Vegetation:** Dipterocarpus, bamboo, mixed shrubs, and cassava - **Waterbody crossing:** None. - **Infrastructure crossing:** None - **Affected structure:** None.
2	G2 – G3 (832.88m)		- **Deflection angle** at G2: T81°19'36" - **Topography**: Slightly sloping terrain. - **Vegetation:** Pepper, dipterocarp tree, mixed vegetation, coffee, cassava. - **Waterbody crossing:** 2 small streams. - **Infrastructure crossing:** 5 dirt roads. - **Affected structure:** None.
3	G3 – G4 (1048.07m)	Ea Kiet	- **Deflection angle** at G3: T35º19' 60" - **Topography**: Slightly sloping terrain. - **Vegetation:** pepper, cashew, coffee, senna, teak, bamboo, and cassava. - **Waterbody crossing:** None. - **Infrastructure crossing:** None - **Affected structure:** None.
4	G4 – G5 (1334.20m)	Ea Kiet	- **Deflection angle** at G4: P39°12'24" - **Topography**: Slightly sloping terrain. - **Vegetation:** pepper, cashew, coffee, teak, durian, melaleuca, and rubber. - **Waterbody crossing:** 2 ponds for reserve water, 1 small stream - **Infrastructure crossing:** 4 dirt roads, 3 stone roads, 1 concrete road, 5 low-voltage lines. - **Affected structure:** None.
5	G5 – G6 (2368.97m)	Ea Kiet	- **Deflection angle** at G5: P32°19'47" - **Topography**: Slightly sloping terrain. - **Vegetation:** Pepper, cashew, rubber, coffee, cassia, teak, mixed trees, maize, cassava. - **Waterbody crossing:** Two drains, three water storage ponds, one fish pond, and two small streams. - **Infrastructure crossing:** 1 asphalt road, 14 dirt roads, 1 medium voltage line, 3 low voltage lines, parallel with 500kV Pleiku – My Phuoc – Cau Bong line is currently at position G6. - **Affected structure:** 01 hut and 01 house will be affected within the right-of-way corridor
6	G6 – G7 (9674.87m)	Ea Kiet and Ea M'Dro	- **Deflection angle** at G6: T15º1' 54" - **Topography**: Slightly sloping terrain. - **Vegetation:** black pepper, cashew, rubber trees, coffee, durian, maize, teak, rice. - **Waterbody crossing:** 12 ditches, 9 ponds, 12 streams, and 1 drainage channel. - **Infrastructure crossings:** 2 asphalt roads, 3 concrete roads, 3 3-phase medium-voltage lines, 2transmission lines, 26 low-voltage lines. The parallel 500kV Pleiku – My Phuoc – Cau Bong project exists and is about 40-45m away. - **Affected structure:** 17 houses and other 39 houses will be affected within the right-of-way corridor.
7	G7 – G8 (8541.62m)	Ea M'Droh and Ea Wer	- **Deflection angle** at G7: T3º1' 47" - **Topography**: Slightly sloping terrain. - **Vegetation:** black pepper, cashew, rubber trees, coffee, durian, maize, teak, rice.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Waterbody crossing:** 5 canals/ditches, 14 ponds, 9 streams, including Duc Stream with a width of 40 m, and 5 creeks. - **Infrastructure crossing:** 2 asphalt roads, 2 concrete roads, 1 rocky bank, 43 dirt roads, 110kV Cu M'Gar – JPO road, 1 medium voltage line, 28 low voltage lines, running in parallel with the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines. - **Affected structure:** 7 works, other 27 works within the right-of-way corridor.
8	G8 – G9 (2743.66m)	Ea Wer	- **Deflection angle** at G8: P35º34' 38" - **Topography**: Slightly sloping terrain. - **Vegetation:** Black pepper, coffee, cashew, annual crops, forest trees (dipterocarp, cho tree, rattan, ironwood), and rice. - **Waterbody crossings**: 4 ditches, 3 ponds, and 1 creek. - **Infrastructure crossings**: Provincial Road 967 (at Km15+826), 10 dirt roads, 2 medium-voltage lines, and 21 low-voltage lines. The alignment runs parallel to the 500kV Pleiku – My Phuoc – Cau Bong 500 transmission lines. - **Affected structures**: 2 houses will be affected; 7 houses, 5 huts, and 2 drilled wells within the right-of-way corridor.
9	G9 – G10 (2260.02m)	Ea Wer	- **Deflection angle** at G9: P13°06'42". - **Topography**: slightly sloping terrain. - **Vegetation**: black pepper, coffee, cashew, annual crops, fruit trees, and timber forest trees (Dipterocarpus alatus, Senna siamea, Vitex pinnata, Xylia xylocarpa, Calamus poilanei, Terminalia alata, Peltophorum pterocarpum, Hopea odorata). - **Waterbody crossing**s: 3 creeks/streams and 1 pond. - **Infrastructure crossing**s: 11 dirt roads, 8 low-voltage lines, and the 220 kV Sre Pok 4 – Krong Buk transmission line. The alignment runs parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong 500 transmission lines. - **Affected structure**s: 2 houses and 1 drilled well will be affected; 2 houses, 1 foundation, 4 livestock sheds, and 1 drilled well are located within the right-of-way corridor**.**
10	G10 – G11 (142.00m)	Ea Wer	- **Deflection angle** at G10: T0°8'46". - **Topography**: Relatively gentle slope. - **Vegetation**: Cashew and timber forest trees (Dipterocarpus alatus, Senna siamea, Vitex pinnata, Xylia xylocarpa, Calamus poilanei, Terminalia alata, Peltophorum pterocarpum, Hopea odorata). - **Waterbody crossing**: None. - **Infrastructure crossing**: Running parallel to and crossing the 500kV Pleiku – My Phuoc – Cau Bong transmission lines. - **Affected structure**s: None.
11	G11 – G12 (535.15m)	Ea Wer	- **Deflection angle** at G11: P15°44'6". - **Topography**: Relatively gentle slope. - **Vegetation**: Cashew trees. - **Waterbody crossing**: None. - **Infrastructure crossing**: One dirt road. - **Affected structure**s: None.
12	G12 – G12A (2439.97m)	Ea Wer	- **Deflection angle** at G12: T61°38'10". - **Topography**: Relatively gentle slope. - **Vegetation**: Cashew and timber forest trees (Dipterocarpus alatus, Senna siamea, Vitex pinnata, Xylia xylocarpa, Calamus poilanei, Terminalia alata, Peltophorum pterocarpum, Hopea odorata, and Neolamarckia cadamba). - **Waterbody crossing**s: Three small streams and one water canal of the Serepok 3 hydropower plant. - **Infrastructure crossing**s: 10 dirt roads, 5 gravel roads, 3 roads on the dam, 3 medium-voltage lines, 1 low-voltage line, and the 220 kV Buon Kuop – Serepok 3 transmission line.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Affected structure**s: One house, one cowshed, one water tank, and a waste rock dump within the right-of-way corridor**.**
2. Lam Dong Province			
13	G12A – G12A.1 (2564.85m)	Ea Wer and Dak Wil	- **Deflection angle** at G12A: T0°0'4". - **Topography**: Relatively gentle slope. - **Vegetation**: Cashew, pepper, and annual crops. - **Waterbody crossing**s: The Serepok River, 217 m wide; 7 streams of varying sizes; and 1 pond. - **Infrastructure crossing**s: 9 dirt roads, 1 paved road on the dam (Km 1+15.93), and 4 low-voltage lines. - **Affected structure**s: 1 house, 1 hut, and 1 well within the right-of-way corridor.
14	G12A.1 – G12A.2 (4407.09m)	Dak Wil	- **Deflection angle** at G12A.1: T1°31'43". - **Topography**: Relatively gentle slope. - **Vegetation**: Coffee, rubber, cashew, pepper, Cassia, and annual crops. - **Waterbody crossing**s: 3 streams, 1 canal, and 3 ponds. - **Infrastructure crossing**s: 1 asphalt road, 8 dirt roads, 2 concrete roads, 5 stone embankments, 4 medium-voltage lines, and 11 low-voltage lines. - **Affected structure**s: 34 houses, 2 huts, 9 livestock sheds, 01 grave.
15	G12A.2 – G12A.2A (5966.17m)	Dak Wil	- **Deflection angle** at G12A.2: 0°0'0". - **Topography**: Agricultural land. - **Vegetation**: Coffee, cashew, jackfruit, durian, rubber, and annual crops. - **Waterbody crossing**s: 7 earthen canals. - **Infrastructure crossing**s: 14 dirt roads (1–2 m wide), 2 asphalt roads (4 m wide), and 20 low-voltage lines. - **Affected structure**s: 2 structures, including a water tank and a storage shed; and 25 architectural structures (field huts, storage sheds, kitchens, livestock sheds, etc.) within the right-of-way corridor.
16	G12A.2A – G12A.2B (2555.62m)	Nam Dong	- Straight alignment. - **Topography**: Agricultural land. - **Vegetation**: Coffee, pepper, cashew, durian, jackfruit, and avocado. - **Waterbody crossing**s: 1 pond and 1 earthen canal. - **Infrastructure crossing**s: 17 dirt roads (1–2 m wide) and 15 low-voltage lines. - **Affected structure**s: 1 livestock and 1 chicken sheds crossed; 5 houses and 1 field hut within the right-of-way corridor
17	G12A.2B – G12A.3 (543.22m)	Nam Dong	- Straight alignment. - **Topography**: Agricultural area. - **Vegetation**: Coffee, pepper, cashew, and annual crops. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 2 dirt roads, 1 concrete road, and 3 low-voltage lines. - **Affected structure**s: 1 house crossed.
18	G12A.3 – G12A.4 (12979.52m)	Cu Jut	- **Deflection angle** at G12A.3: Right turn, P0°0'4". - **Topography**: Agricultural land. - **Vegetation**: Coffee, pepper, durian, cashew, cassia, avocado, rubber, and annual crops. - **Waterbody crossing**s: 6 ponds and 51 canals/creeks/streams. - **Infrastructure crossing**s: 66 dirt roads (1–3 m wide), 2 concrete roads (3–6 m wide), crossing National Highway 14 at Km 1804+535, 17 low-voltage lines, 2 medium-voltage lines, 2 telecommunication lines, and the 110 kV Cư Jut Solar Power Plant – Đăk Mil transmission line.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Affected structure**s: 1 house crossed; 23 structures (field huts, livestock sheds, etc.) within the right-of-way corridor.
19	G12A.4 – G13 (2261.04m)	Dak Mil, Nam Da, Dak Sak	- **Deflection angle** at G12A.4: Right, P32°5'25". - **Topography**: Fruit orchard area. - **Vegetation**: Coffee, pepper, durian, cashew, jackfruit, and avocado. - **Waterbody crossing**s: 4 canals and 4 streams. - **Infrastructure crossing**s: 1 asphalt road, 1 concrete road, 12 dirt roads, 1 medium-voltage line, and 1 low-voltage line. The route runs parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission line at a distance of 50 m. - **Affected structure**s: 2 field huts crossed; 4 structures within the right-of-way corridor.
20	G13 – G14 (3455.3m)	Dak Sak	- **Deflection angle** at G13: Right, P41°18'43". - **Topography**: Orchard area. - **Vegetation**: Coffee, pepper, durian, and cashew. - **Waterbody crossing**s: 1 pond and 9 streams. - **Infrastructure crossing**s: 10 dirt roads, 3 concrete roads, 1 provincial road (DT683), a planned expressway with a width of 100 m, 7 low-voltage lines, and 1 medium-voltage line. The route runs parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines at a distance of 50 m. - **Affected structure**s: 1 field hut crossed; 12 structures (field huts, houses, livestock sheds, etc.) within the right-of-way corridor.
21	G14 – G15 (3315.16m)	Dak Sak	- **Deflection angle** at G14: Left, T16°21'18". - **Topography**: Orchard area. - **Vegetation**: Coffee, pepper, durian, and cashew. - **Waterbody crossing**s: 5 ponds and 2 streams. - **Infrastructure crossing**s: 12 dirt roads, 2 concrete roads, and 3 low-voltage lines. The route runs parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines at a distance of 50 m. - **Affected structure**s: 19 structures (field huts, houses, livestock sheds, etc.) within the right-of-way corridor.
22	G15 – G16 (1530.85m)	Dak Sak	- **Deflection angle** at G15: Left, T8°47'50". - **Topography**: Orchard area. - **Vegetation**: Coffee, pepper, durian, cashew, and rubber. - **Waterbody crossing**s: 2 ponds. - **Infrastructure crossing**s: 6 dirt roads and 1 low-voltage line. The route runs parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines at a distance of 50 m. - **Affected structure**s: 1 garden house within the right-of-way corridor.
23	G16 – G17 (2704.11m)	Dak Sak	- **Deflection angle** at G16: Left, T27°22'17". - **Topography**: Orchard area. - **Vegetation**: Coffee, durian, and rubber. - **Waterbody crossing**s: 1 pond, 2 streams, and 1 earthen canal. - **Infrastructure crossing**s: 19 dirt roads, 4 low-voltage lines, and 1 medium-voltage line. The route runs parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines at a distance of 50 m. - **Affected structure**s: 1 garden house crossed; 5 garden houses and 1 warehouse within the right-of-way corridor.
24	G17 – G18 (5033.34m)	Dak Sak	- **Deflection angle** at G17: Right, P24°48'42". - **Topography**: Orchard area. - **Vegetation**: Coffee, pepper, durian, and avocado. - **Waterbody crossing**s: 1 pond, 6 streams, and 1 canal. - **Infrastructure crossing**s: 54 dirt roads, 1 asphalt road, the planned expressway crossing, and 3 telecommunication lines. The

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			route runs parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines at a distance of 50 m. - **Affected structure**s: 1 garden house crossed; 9 garden houses within the right-of-way corridor.
25	G18 – G19 (2862.36m)	Krong No	- **Deflection angle** at G18: Left, T6°6'30". - **Topography**: Orchard area. - **Vegetation**: Coffee, pepper, durian, and avocado. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 14 dirt roads. The route runs parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines at a distance of 50 m. - **Affected structure**s: 1 house within the right-of-way corridor.
26	G19 – G20 (1931.39m)	Krong No and Dak Song	- **Deflection angle** at G19: Right, P24°57'16". - **Topography**: Orchard area. - **Vegetation**: Coffee, pepper, cashew, durian, and avocado. - **Waterbody crossing**s: 1 pond and 1 stream. - **Infrastructure crossing**s: 11 dirt roads and 1 telecommunication line. The route runs parallel to the existing 500kV Pleiku – Cầu Bông transmission lines at a distance of 50 m. - **Affected structure**s: 4 garden houses and 1 field hut within the right-of-way corridor.
27	G20 – G21 (5327m)	Dak Song	- **Deflection angle** at G20: Left, 14°22'. - **Topography**: Hilly and mountainous area. - **Vegetation**: Coffee, durian, pepper, avocado, and macadamia. - **Waterbody crossing**s: 1 river/stream. - **Infrastructure crossing**s: 11 dirt roads. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines. - **Affected structure**s: 11 houses/structures within the right-of-way corridor
28	G21 – G22 (3345m)	Dak Song	- **Deflection angle** at G21: Left, 20°56'. - **Topography**: Hilly and mountainous area. - **Vegetation**: Coffee, durian, pepper, avocado, and macadamia. - **Waterbody crossing**s: 3 rivers/streams. - **Infrastructure crossing**s: 2 dirt roads and 1 220 kV transmission line. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines. - **Affected structure**s: 7 houses/structures within the right-of-way corridor.
29	G22 – G23 (3910m)	Dak Song, Duc An commune	- **Deflection angle** at G22: Left, 28°54'. - **Topography**: Highland hilly terrain, dissected by small streams. - **Vegetation**: Coffee, durian, pepper, avocado, macadamia, and rubber. - **Waterbody crossing**s: Small streams. - **Infrastructure crossing**s: 6 dirt roads. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines. - **Affected structure**s: 5 houses/structures within the right-of-way corridor.
30	G23 – G24 (5092m)	Duc An and Truong Xuan	- **Deflection angle** at G23: Right, 08°54'. - **Topography**: Highland hilly terrain, dissected by small streams. - **Vegetation**: Coffee, durian, pepper, avocado, macadamia, and rubber. - **Waterbody crossing**s: Small streams. - **Infrastructure crossing**s: 1 concrete road and the 0.4 kV power line crossed twice. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines. - **Affected structure**s: 15 houses/structures within the right-of-way corridor.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
31	G24 – G25 (1883m)	Truong Xuan	- **Deflection angle** at G24: Right, 11°23'. - **Topography**: Highland hilly terrain, dissected by small streams. - **Vegetation**: Pine, coffee, durian, pepper, avocado, macadamia, and rubber. - **Waterbody crossing**s: Small streams. - **Infrastructure crossing**s: 3 dirt roads, National Highway 14 crossed twice, and the 0.4 kV power line crossed twice. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines. - **Affected structure**s: 2 houses/structures within the right-of-way corridor.
32	G25 – G26 (2432m)	Truong Xuan	- **Deflection angle** at G25: Right, 11°47'. - **Topography**: Highland hilly terrain. - **Vegetation**: Coffee, durian, pepper, avocado, macadamia, and rubber. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 1 dirt road, National Highway 14, and the 0.4 kV power line crossed 6 times. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines. - **Affected structure**s: 4 houses/structures within the right-of-way corridor.
33	G26 – G27 (2042m)	Truong Xuan	- **Deflection angle** at G26: Right, 35°44'. - **Topography**: Highland hilly terrain. - **Vegetation**: Coffee, durian, pepper, avocado, macadamia, and rubber. - **Waterbody crossing**s: Đăk N'Đrung Stream. - **Infrastructure crossing**s: Asphalt Road crossed twice, 1 dirt road, 1 110 kV transmission line, and the 22/0.4 kV power line crossed twice. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bongtransmission line. - **Affected structure**s: 6 houses/structures within the right-of-way corridor.
34	G27 – G28 (10104m)	Truong Xuan, Duc An and Quang Tan	- **Deflection angle** at G27: Left, 49°12'. - **Topography**: Highland hilly terrain with gentle slopes. - **Vegetation**: Coffee, durian, pepper, avocado, macadamia, and rubber. - **Waterbody crossing**s: 7 rivers/streams. - **Infrastructure crossing**s: 1 asphalt road, dirt roads crossed 4 times, and 1 22/0.4 kV power line. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines. - **Affected structure**s: 19 houses/structures within the right-of-way corridor.
35	G28 – G29 (5180m)	Quang Tan	- **Deflection angle** at G28: Right, 25°40'. - **Topography**: Highland hilly terrain with gentle slopes. - **Vegetation**: Coffee, durian, pepper, avocado, macadamia, and cashew. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: Dirt roads crossed 18 times, 1 220 kV transmission line, and the 22/0.4 kV power line crossed 5 times. The route runs parallel to the 500kV transmission line. - **Affected structure**s: 11 houses/structures within the right-of-way corridor.
36	G29 – G29A (1252m)	Quang Tan	- **Deflection angle** at G29: Left, 05°11'. - **Topography**: Highland hilly terrain with gentle slopes. - **Vegetation**: Coffee, cashew, durian, pepper, avocado, and macadamia. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 1 inter-commune asphalt road, 1 concrete road, dirt roads crossed 3 times, the 22/0.4 kV power line

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			crossed twice, and 1 telecommunication line. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines on the right side. - **Affected structure**s: 6 houses/structures within the right-of-way corridor.
37	G29A – G30 (3264m)	Quang Tan	- **Deflection angle** at G29A: Right, 27°05'. - **Topography**: Highland hilly terrain with gentle slopes. - **Vegetation**: Coffee, cashew, durian, pepper, avocado, macadamia, and rubber. - **Waterbody crossing**s: 1 river/stream. - **Infrastructure crossing**s: 1 inter-commune asphalt road, dirt roads crossed 7 times, the 22/0.4 kV power line crossed twice, and 1 telecommunication line. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines on the right side. - **Affected structure**s: 3 houses/structures within the right-of-way corridor.
38	G30 – G30A (1979m)	Quang Tan	- **Deflection angle** at G30: Right, 28°03'. - **Topography**: Highland hilly terrain with gentle slopes. - **Vegetation**: Coffee, cashew, rubber, durian, pepper, avocado, and macadamia. - **Waterbody crossing**s: Đăk R'Tih Stream. - **Infrastructure crossing**s: Concrete roads crossed twice, dirt roads crossed 3 times, and the 22/0.4 kV power line crossed 3 times. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines on the right side. - **Affected structure**s: 6 houses/structures within the right-of-way corridor.
39	G30A – G31 (3184m)	Quang Tan	- **Deflection angle** at G30A: Left, 01°42'. - **Topography**: Highland hilly terrain with gentle slopes. - **Vegetation**: Coffee, cashew, durian, pepper, avocado, and macadamia. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: Provincial Road 681, 1 concrete road, 3 dirt roads, and the 22/0.4 kV power line crossed twice. - **Affected structure**s: 10 houses/structures within the right-of-way corridor.
40	G31 – G32 (9895m)	Quang Tan and Quang Tin	- **Deflection angle** at G31: Left, 49°57'. - **Topography**: Highland hilly terrain with gentle slopes. - **Vegetation**: Coffee, cashew, rubber, durian, pepper, avocado, and macadamia. - **Waterbody crossing**s: 1 river/stream. - **Infrastructure crossing**s: Concrete roads crossed 5 times, dirt roads crossed 5 times, and the 22/0.4 kV power line crossed 4 times. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines on the right side. - **Affected structure**s: 16 houses/structures within the right-of-way corridor.
41	G32 – Provincial boundary (Lam Dong, Dong Nai) (6730m)	Quang Tin and Quang Tan	- **Deflection angle** at G32: Right, 19°58'. - **Topography**: Highland hilly terrain with gentle slopes. - **Vegetation**: Coffee, cashew, and fruit trees. - **Waterbody crossing**s: Crossing the tail section of an irrigation reservoir and 2 rivers/streams, including the Đăk R'Lấp River. - **Infrastructure crossing**s: 1 inter-commune asphalt road, 1 concrete road, and dirt roads crossed 8 times. The route runs parallel to the 500kV Pleiku - My Phuoc - Cau Bong transmission lines on the right side. - **Affected structure**s: 4 houses/structures within the right-of-way corridor.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
3. Dong Nai City			
42	Boundary (Lam Dong, Dong Nai)-G33 (517m)	Tho Son	- Straight alignment. - **Topography**: Hilly terrain. - **Vegetation**: Cashew. - **Waterbody crossing**s: Đăk R'Lấp River. - **Infrastructure crossing**s: 1 dirt road. - **Affected structure**s: None.
43	G33 – G34 (2520m)	Tho Son	- **Deflection angle** at G33: Right, 57°06'. - **Topography**: Highland hilly terrain with gentle, undulating, and relatively flat slopes, dissected by valleys. - **Vegetation**: Rubber and cashew. - **Waterbody crossing**s: Đăk R'Lấp River. - **Infrastructure crossing**s: 2 dirt roads. - **Affected structure**s: 4 houses/structures within the right-of-way corridor.
44	G34 – G35 (7073m)	Tho Son	- **Deflection angle** at G34: Left, 48°23'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew, coffee, durian, and rubber. - **Waterbody crossing**s: The Đăk R'Lấp River crossed 4 times. - **Infrastructure crossing**s: Dirt roads crossed 9 times and 1 22/0.4 kV power line. - **Affected structure**s: 3 houses/structures within the right-of-way corridor.
45	G35 – G36 (6114m)	Tho Son, Dak Nhau and Bom Bo	- **Deflection angle** at G35: Right, 41°30'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew, rubber, coffee, durian, and pepper. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: Dirt roads crossed 5 times, concrete roads crossed 7 times, and 1 22/0.4 kV power line. - **Affected structure**s: 13 houses/structures within the right-of-way corridor.
46	G36 – G37 (4259m)	Bom Bo	- **Deflection angle** at G36: Left, 15°24'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew and rubber. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: Provincial Road 760 at Km 16+254, 1 inter-commune asphalt road, concrete roads crossed 7 times, dirt roads crossed 2 times, and the 22/0.4 kV power line crossed 4 times. - **Affected structure**s: 9 houses/structures within the right-of-way corridor.
47	G37 – G38 (5969m)	Bo Bo and Dak Nhau	- **Deflection angle** at G37: Right, 24°39'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew and rubber. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 1 inter-commune asphalt road, 1 concrete road, dirt roads crossed 3 times, 1 110 kV transmission line, and the 22/0.4 kV power line crossed 12 times. - **Affected structure**s: 6 houses/structures within the right-of-way corridor.
48	G38 – G39 (4869m)	Dak Nhau, Phu Nghia, and Dak O	- **Deflection angle** at G38: Right, 17°05'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew, fruit trees, and rubber. - **Waterbody crossing**s: A small branch of Thác Mơ hydropower reservoir and 3 rivers/streams. - **Infrastructure crossing**s: Provincial Road 760, concrete roads crossed 2 times, dirt roads crossed 4 times, 1 110 kV transmission line, and the 22/0.4 kV power line crossed 2 times.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Affected structure**s: 11 houses/structures within the right-of-way corridor.
49	G39 – G40 (5468m)	Dak O and Phu Nghia	- **Deflection angle** at G39: Left, 31°02'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew, coffee, pepper, fruit trees, and rubber. - **Waterbody crossing**s: 3 rivers/streams. - **Infrastructure crossing**s: 1 concrete road and dirt roads crossed 9 times. - **Affected structure**s: 2 houses/structures within the right-of-way corridor.
50	G40 – G41 (6597m)	Phu Nghia	- **Deflection angle** at G40: Left, 25°56'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew, coffee, pepper, fruit trees, and rubber. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: National Highway 14C, 1 inter-commune road, 1 concrete road, dirt roads crossed 7 times, and the 22/0.4 kV power line crossed 4 times. - **Affected structure**s: 5 houses/structures within the right-of-way corridor.
51	G41 – G42 (5929m)	Phu Nghia	- **Deflection angle** at G41: Left, 28°28'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew, coffee, pepper, fruit trees, and rubber. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 1 inter-commune road, concrete roads crossed 2 times, dirt roads crossed 9 times, and the 22/0.4 kV power line crossed 8 times. - **Affected structure**s: 10 houses/structures within the right-of-way corridor.
52	G42 – G42A (4285m)	Phu Nghia	- **Deflection angle** at G42: Left, 30°50'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew, rubber, and fruit trees. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 2 inter-commune roads, dirt roads crossed 2 times, and 1 22/0.4 kV power line. - **Affected structure**s: 4 houses/structures within the right-of-way corridor.
53	G42A – G43 (4422m)	Phu Nghia and Da Kia	- **Deflection angle** at G42A: Right, 10°58'. - **Topography**: Plains, semi-plains, and midlands. - **Vegetation**: Cashew and rubber. - **Waterbody crossing**s: Bé River. - **Infrastructure crossing**s: 3 dirt roads and 1 22/0.4 kV power line. - **Affected structure**s: 2 houses/structures within the right-of-way corridor.
54	G43 – G45 (8220m)	Da Kia, Phuoc Binh and Binh Tan	- **Deflection angle** at G43: Left, 123°44'20". - **Topography**: High mountainous terrain with relatively steep slopes. - **Vegetation**: Rubber and cashew. - **Waterbody crossing**s: 7 gullies/streams. - **Infrastructure crossing**s: Provincial Road 759 at Km 27+670, 1 asphalt road, 24 dirt roads, 1 medium-voltage line, 1 low-voltage line, 2 telecommunication lines, and the 110 kV Thác Mơ - Lộc Ninh transmission line. - **Affected structure**s: 4 houses within the right-of-way corridor.
55	G45 – G45A (12172m)	Binh Tan, Phu Rieng and Long Ha	- **Deflection angle** at G45: Right, 45°55'28". - **Topography**: High mountainous terrain with relatively steep slopes. - **Vegetation**: Rubber, cashew, and durian. - **Waterbody crossing**s: 4 gullies/streams.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Infrastructure crossing**s: 5 asphalt roads, 3 concrete roads, 40 dirt roads, 5 low-voltage lines, 2 medium- and low-voltage lines, and 1 telecommunication line. - **Affected structure**s: 11 houses within the right-of-way corridor.
56	G45A – G45B (4279m)	Long Ha	- **Deflection angle** at G45A: Left, 34°15'03". - **Topography**: High mountainous terrain with gentle slopes. - **Vegetation**: Rubber, cashew, and durian. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 1 asphalt road, 2 concrete roads, 6 dirt roads, 2 low-voltage lines, 1 medium- and low-voltage line, and the 220 kV Đăk Nông - Phước Long - Bình Long transmission lines at span towers 257–258. - **Affected structure**s: 1 house within the right-of-way corridor.
57	G45B – G46 (2504m)	Long Ha	- **Deflection angle** at G45B: Right, 22°16'43". - **Topography**: High mountainous terrain with relatively steep slopes. - **Vegetation**: Rubber and cashew. - **Waterbody crossing**s: 3 gullies/streams. - **Infrastructure crossing**s: 1 concrete road, 1 gravel road, 4 dirt roads, and 1 low-voltage line. - **Affected structure**s: 4 houses and 1 livestock shed within the right-of-way corridor.
58	G46 – G47 (7615m)	Long Ha	- **Deflection angle** at G46: Left, 15°36'54". - **Topography**: Low hilly terrain, dissected. - **Vegetation**: Rubber, cashew, and a small amount of fruit trees. - **Waterbody crossing**s: 9 gullies/streams. - **Infrastructure crossing**s: 2 asphalt roads, 2 concrete roads, 3 gravel roads, 13 dirt roads, and 1 medium-voltage line. - **Affected structure**s: 1 house, 1 chicken coop, 2 field huts, and 1 toilet within the right-of-way corridor.
59	G47 – G47A (5149m)	Long Ha and Tan Hung	- **Deflection angle** at G47: Right, 63°32'23". - **Topography**: Low hilly terrain, dissected. - **Vegetation**: Rubber and cashew. - **Waterbody crossing**s: Bé River and 8 gullies/streams. - **Infrastructure crossing**s: Provincial Road 758 at Km 15+550, 3 concrete roads, 7 dirt roads, and 2 medium-voltage lines. - **Affected structure**s: 1 house, 2 chicken coops, 1 storage shed, and 4 field huts within the right-of-way corridor.
60	G47A – G47B (3009m)	Tan Hung	- **Deflection angle** at G47A: Right, 02°42'14". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber and sparse cashew. - **Waterbody crossing**s: 1 gully/stream. - **Infrastructure crossing**s: Provincial Road 756, 2 concrete roads, 4 dirt roads, and 2 medium-voltage lines. - **Affected structure**s: 1 abandoned house, 1 sheet-metal hut, and 4 livestock sheds within the right-of-way corridor.
61	G47B – G48 (4543m)	Tan Hung and Tan Quan	- **Deflection angle** at G47B: Left, 30°57'22". - **Topography**: High mountainous terrain with steep slopes. - **Vegetation**: Rubber and shrubs. - **Waterbody crossing**s: Gullies/streams present. - **Infrastructure crossing**s: 1 asphalt road, 4 concrete roads, 9 dirt roads, 2 low-voltage lines, 1 medium-voltage line, and 1 telecommunication line. - **Affected structure**s: 5 houses, 2 livestock sheds, 1 toilet, 1 storage shed, and 3 field huts within the right-of-way corridor.
62	G48 – G48A (5725m)	Tan Quan and Binh Long	- **Deflection angle** at G48: Right, 22°22'31". - **Topography**: High mountainous terrain with steep slopes. - **Vegetation**: Rubber and fruit trees. - **Waterbody crossing**s: 3 gullies/streams.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Infrastructure crossing**s: 2 asphalt roads, 6 concrete roads, 6 dirt roads, the 110 kV Bình Long 2 - Minh Hưng transmission lines, the 110 kV Bình Long 2 - Bình Long transmission lines, the 220 kV Mỹ Phước - Bình Long transmission lines, 2 low-voltage lines, 1 mixed medium-/low-voltage line, and 1 telecommunication line. - **Affected structure**s: 8 houses within the right-of-way corridor.
63	G48A – G49 (918m)	Binh Long Ward	- **Deflection angle** at G48A: Left, 08°37'28". - **Topography**: High mountainous terrain with gentle slopes. - **Vegetation**: Rubber and fruit trees. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: National Highway 13 at Km 88+700, 1 asphalt road, 1 concrete road, 2 mixed medium-/low-voltage six-wire lines, 1 low-voltage line, and 1 telecommunication line. - **Affected structure**s: 2 houses within the right-of-way corridor.
64	G49 – G49A (3634m)	Binh Long Ward and Minh Duc Commune	- **Deflection angle** at G49: Right, 18°49'50". - **Topography**: High mountainous terrain with steep slopes. - **Vegetation**: Rubber, fruit trees, and miscellaneous trees. - **Waterbody crossing**s: 2 gullies/streams. - **Infrastructure crossing**s: 2 asphalt roads, 4 concrete roads, 7 dirt roads, 3 low-voltage lines, and 1 medium-voltage line. - **Affected structure**s: 12 houses within the right-of-way corridor.
65	G49A – G50 (4907m)	Minh Duc and Tan Khai	- **Deflection angle** at G49A: Left, 48°42'20". - **Topography**: Low hilly terrain with gentle slopes. - **Vegetation**: Rubber and fruit trees. - **Waterbody crossing**s: 7 gullies/streams. - **Infrastructure crossing**s: 1 asphalt road, 7 concrete roads, 7 dirt roads, the 110 kV Bình Long - Xi Măng Tay Ninh transmission lines, 1 three-phase medium-voltage line, 3 low-voltage lines, and 1 telecommunication line. - **Affected structure**s: 9 houses within the right-of-way corridor.
66	G50 – G50A (2025m)	Tan Khai	- **Deflection angle** at G50: Right, 06°35'16". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber and fruit trees. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 1 asphalt road, concrete roads crossed 4 times, 1 dirt road, the single-phase medium-voltage line crossed 2 times, and the low-voltage line crossed 2 times. - **Affected structure**s: 6 houses within the right-of-way corridor
67	G50A – G51 (2041m)	Tan Khai	- **Deflection angle** at G50A: Left, 29°56'17". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber, melaleuca, and fruit trees. - **Waterbody crossing**s: 2 streams/ponds. - **Infrastructure crossing**s: 2 concrete roads, 2 dirt roads, and 1 low-voltage line. - **Affected structure**s: None.
68	G51– G52 (2048m)	Tan Khai	- **Deflection angle** at G51: Right, 63°12'23". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber, melaleuca, and annual crops. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 2 concrete roads, 4 dirt roads, and 4 low-voltage lines. - **Affected structure**s: None.
69	G52 – G52B (1270m)	Tan Khai	- **Deflection angle** at G52: Left, 78°14'13". - **Topography**: Low hilly terrain. - **Vegetation**: Melaleuca, rubber, and fruit trees. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 1 asphalt road, 1 dirt road, the existing 110 kV Bình Long - Tay Ninh 2 transmission lines, and 1 medium-voltage line.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Affected structure**s: None.
70	G52B – G53B (5447m)	Tan Khai, Dong Nai City and Minh Thanh Commune, Ho Chi Minh City	- **Deflection angle** at G52B: Right, 35°42'37". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber and sugarcane. - **Waterbody crossing**s: 3 gullies/streams. - **Infrastructure crossing**s: 1 concrete road, 7 dirt roads, 1 mixed medium-/low-voltage line, and 1 low-voltage line. The route runs parallel to the existing 110 kV Bình Long - Tay Ninh 2 transmission lines on the left side. - **Affected structure**s: 3 houses within the right-of-way corridor
4. Ho Chi Minh City			
71	G53B – G53C (1623m)	Minh Thanh	- **Deflection angle** at G53B: Left, 08°12'13". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber, mahogany, and bamboo. - **Waterbody crossing**s: 1 gully/stream. - **Infrastructure crossing**s: 5 dirt roads, 1 three-phase mixed medium-/low-voltage line, and 1 low-voltage line. The route runs parallel to the existing 110 kV Bình Long – Tay Ninh 2 transmission lines on the left side. - **Affected structure**s: 3 houses within the right-of-way corridor.
72	G53C – G54 (4684m)	Minh Thanh	- **Deflection angle** at G53C: Right, 18°31'50" - **Topography**: Low hilly terrain. - **Vegetation**: Rubber, fruit trees, and cassava. - **Waterbody crossing**s: 3 gullies/streams. - **Infrastructure crossing**s: 2 asphalt roads, Provincial Road 749B, 6 dirt roads, the 110 kV Dầu Tiếng - Minh Hưng transmission lines at span towers 141–142, 1 three-phase mixed medium-/low-voltage line, and 1 low-voltage line. The route runs parallel to the existing 110 kV Bình Long – Tay Ninh 2 transmission lines on the left side. - **Affected structure**s: 1 house within the right-of-way corridor.
73	G54 – G55 (2769m)	Minh Thanh and Dau Tieng	- **Deflection angle** at G54: Left, 43°02'42". - **Topography**: Gentle slopes. - **Vegetation**: Rubber, durian, cassava, and miscellaneous trees. - **Waterbody crossing**s: 1 gully/stream and 1 diversion canal of Dầu Tiếng Reservoir. - **Infrastructure crossing**s: 7 dirt roads, 1 single-phase mixed medium-/low-voltage line, and 1 low-voltage line. - **Affected structure**s: 1 house within the right-of-way corridor.
74	G55 – G55B (3278m)	Dau Tieng	- **Deflection angle** at G55: Right, 16°49'25". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber, Dau (Dipterocarp) trees, and cassava. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 3 asphalt roads, 4 dirt roads, 1 three-phase medium-voltage line, and 1 low-voltage line. - **Affected structure**s: 3 houses within the right-of-way corridor.
75	G55B – G56B (1706m)	Dinh An and Dau Tieng	- **Deflection angle** at G55B: Right, 59°24'45". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber, melaleuca, and cassava. - **Waterbody crossing**s: 3 streams/ponds. - **Infrastructure crossing**s: Provincial Road 744 at Km 57+116, 3 dirt roads, the 110 kV Dầu Tiếng - Minh Hưng transmission lines, the 110 kV Bình Long - Tay Ninh 2 transmission lines, 1 medium-voltage line, and 3 low-voltage lines. - **Affected structure**s: 3 houses within the right-of-way corridor.
76	G56B– G57B (2448m)	Dau Tieng	- **Deflection angle** at G56B: Left, 37°38'40". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber, banana, and jackfruit.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Waterbody crossing**s: 4 streams/ponds. - **Infrastructure crossing**s: 2 asphalt roads, 4 dirt roads, 1 medium-/low-voltage line, and 3 low-voltage lines. The route runs parallel to the existing 110 kV Bình Long – Tay Ninh 2 transmission lines on the right side and Provincial Road 744. - **Affected structure**s: 2 houses within the right-of-way corridor.
77	G57B – G58B (3085m)	Dau Tieng	- **Deflection angle** at G57B: Left, 34°11'25". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber. - **Waterbody crossing**s: 7 gullies/streams. - **Infrastructure crossing**s: 1 asphalt road and 1 low-voltage line. The route runs parallel to the existing 110 kV Bình Long – Tay Ninh 2 transmission lines on the right side and Provincial Road 744. - **Affected structure**s: 5 houses within the right-of-way corridor
78	G58B – G58C (1701m)	Dau Tieng	- **Deflection angle** at G58B: Right, 34°42'31". - **Topography**: Low hilly terrain. - **Vegetation**: Rubber, melaleuca, and miscellaneous trees. - **Waterbody crossing**s: 2 streams/ditches. - **Infrastructure crossing**s: 1 asphalt road, 2 dirt roads, and 1 medium-voltage line. The route runs parallel to the existing 110 kV Bình Long – Tay Ninh 2 transmission lines on the right side and Provincial Road 744. - **Affected structure**s: None.
79	G58C – G59 (2097m)	Dau Tieng	- **Deflection angle** at G58C: Left, 30°42'15". - **Topography**: Gentle slopes. - **Vegetation**: Rubber. - **Waterbody crossing**s: 2 streams/ditches. - **Infrastructure crossing**s: District Road 710, 1 gravel road, the 110 kV Bình Long - Tay Ninh 2 transmission lines, the 110 kV Dầu Tiếng - Tay Ninh 2 transmission lines, and 1 medium-voltage line. - **Affected structure**s: 2 houses within the right-of-way corridor.
80	G59 – G60 (3390m)	Dau Tieng Commune, Ho Chi Minh City and Loc Ninh Commune, Tay Ninh Province	- **Deflection angle** at G59: Right, 24°59'02". - **Topography**: Gentle slopes. - **Vegetation**: Rubber, annual crops, and durian. - **Waterbody crossing**s: Sài Gòn River and 1 canal/creek. - **Infrastructure crossing**s: District Road 703, Trần Văn Lắc Road, 4 dirt roads, 2 medium-voltage lines, and 4 low-voltage lines. - **Affected structure**s: 10 houses within the right-of-way corridor.
	5. Tay Ninh Province		-
81	G60 – G61 (7316m)	Loc Ninh and Hung Thuan	- **Deflection angle** at G60: Left, 56°11'20". - **Topography**: Gentle slopes. - **Vegetation**: Rubber and melaleuca. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: Provincial Road 789, Provincial Road 782 at Km 25+133, 1 asphalt road, 6 dirt roads, 1 medium-voltage line, and 3 low-voltage lines. - **Affected structure**s: None.
82	G61 – G62 (3071m)	Hung Thuan	- **Deflection angle** at G61: Left, 25°34'06". - **Topography**: Gentle slopes. - **Vegetation**: Rubber and crops. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: 4 dirt roads and 1 medium-voltage line. - **Affected structure**s: None.
83	G62 – G63 (861m)	Hung Thuan	- **Deflection angle** at G62: Right, 03°37'42". - **Topography**: Relatively flat terrain.

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No.	Route Segment (Length)	Commune /Ward	Characteristics
			- **Vegetation**: Rubber and durian. - **Waterbody crossing**s: 2 streams/ponds. - **Infrastructure crossing**s: Provincial Road 789, 1 medium-voltage line, and 1 telecommunication line. - **Affected structure**s: None.
84	G63– G64 (1133m)	Hung Thuan	- **Deflection angle** at G63: Right, 03°19'41". - **Topography**: Relatively flat terrain. - **Vegetation**: Rubber, durian, and crops. - **Waterbody crossing**s: A branch of the Sài Gòn River. - **Infrastructure crossing**s: 2 dirt roads and 3 low-voltage lines. - **Affected structure**s: 1 sheet-metal hut within the right-of-way corridor.
85	G64 – G65 (1718m)	Hung Thuan	- **Deflection angle** at G64: Right, 38°59'12". - **Topography**: Gentle slopes. - **Vegetation**: Rubber and durian. - **Waterbody crossing**s: 2 canals/creeks. - **Infrastructure crossing**s: Provincial Road 789, Sóc Lào Road, 3 dirt roads, and 2 medium-voltage lines. - **Affected structure**s: 4 houses within the right-of-way corridor.
86	G65 – G65A (372m)	Hung Thuan	- **Deflection angle** at G65: Left, 45°10'23". - **Topography**: Gentle slopes. - **Vegetation**: Rubber, durian, and melaleuca. - **Waterbody crossing**s: 1 canal/creek. - **Infrastructure crossing**s: None. - **Affected structure**s: None.
87	G65A – G66 (1813m)	Hung Thuan	- **Deflection angle** at G65A: Right, 29°13'06". - **Topography**: Gentle slopes. - **Vegetation**: Rubber and crops. - **Waterbody crossing**s: 2 canals/ditches. - **Infrastructure crossing**s: 2 canal banks, 2 dirt roads, and 1 low-voltage line. - **Affected structure**s: 1 house within the right-of-way corridor.
88	G66 – G67 (2203m)	Hung Thuan	- **Deflection angle** at G66: Right, 52°24'02". - **Topography**: Gentle slopes. - **Vegetation**: Rubber and crops. - **Waterbody crossing**s: 4 canals/ditches, including the East Canal. - **Infrastructure crossing**s: Tân Thuận Road, 4 canal banks, 1 dirt road, 2 medium-voltage lines, and 6 low-voltage lines. - **Affected structure**s: 11 houses within the right-of-way corridor.
89	G67 – ĐC (220m)	Hung Thuan	- **Deflection angle** at G67: Right, 54°41'29". - **Topography**: Relatively flat terrain. - **Vegetation**: Rubber and rice. - **Waterbody crossing**s: None. - **Infrastructure crossing**s: Connection to the planned 500kV Tay Ninh 1 Substation. - **Affected structure**s: 1 abandoned house within the right-of-way corridor.

The table above shows that the 500kV transmission lines pass through highly diverse topographic conditions, characterized by hilly and plateau terrain with relatively steep slopes and strongly dissected landforms in the Đắk Lắk and Lam Dong areas, then gradually transitioning to low hilly, semi-plain, and relatively flat terrain as it traverses Dong Nai, Ho Chi Minh City, and Tay Ninh. Vegetation cover along the right-of-way corridor is abundant, consisting mainly of industrial crops such as coffee, rubber, pepper, and cashew; fruit trees such as durian, avocado, and macadamia; annual crops; and, in some areas, forest trees. In terms of hydrology, the route naturally crosses a dense river and stream network, including major rivers such as the Sêrêpốk River, Đăk R'Lấp River, Bé River, and Sài Gòn River, as well

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as numerous streams, canals, and ditches. In terms of infrastructure, the project has a complex level of crossings with the road network, including major national highways (NH14 and NH13, as well as provincial roads and rural roads) and also crosses or runs parallel to numerous existing power lines, ranging from low-voltage and medium-voltage lines to 110 kV, 220 kV, and existing 500kV transmission lines. As the route passes through many agricultural production areas and residential areas, the project's safety corridor directly affects a large number of scattered civil structures along the alignment, mainly houses, field huts, livestock sheds, and ancillary works such as storage sheds and water wells.

2.1.2. Location of the 500kV transmission line feeder bay

The Project will start from two 500kV feeder bays located on the land already reserved within the planned 500kV Krong Buk Substation in Ea Kiet Commune, Dak Lak Province, and the planned 500kV Tay Ninh 1 Substation in Hung Thuan Commune, Tay Ninh Province. The locations of the planned 500kV Krong Buk Substation and the planned 500kV Tay Ninh 1 Substation are shown in the two figures above.

2.1.3. Location of the optical repeater station

As the 500kV Krong Buk – Tay Ninh 1 transmission lines project has a total length of approximately 330 km, the Project requires the construction of two optical repeater stations along the line (*Under the design and construction regulations of Viet Nam Electricity, 500kV transmission lines longer than 145 km are required to have optical repeater stations for the amplification and relay of optical communication signals*)

- Optical repeater station No. 1: near position G28-2 of the 500kV transmission line, in Quang Tan Commune, Lam Dong Province.



Figure 3: Location of the Optical Repeater Station No. 1

- Optical repeater station No. 2: near position G45-18 of the 500kV transmission line, in Long Ha commune, Dong Nai city.

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Figure 4: Location of the Optical Repeater Station No. 2

2.2. SCOPE OF CONSTRUCTION INVESTMENT

2.2.1. Main work items of the project

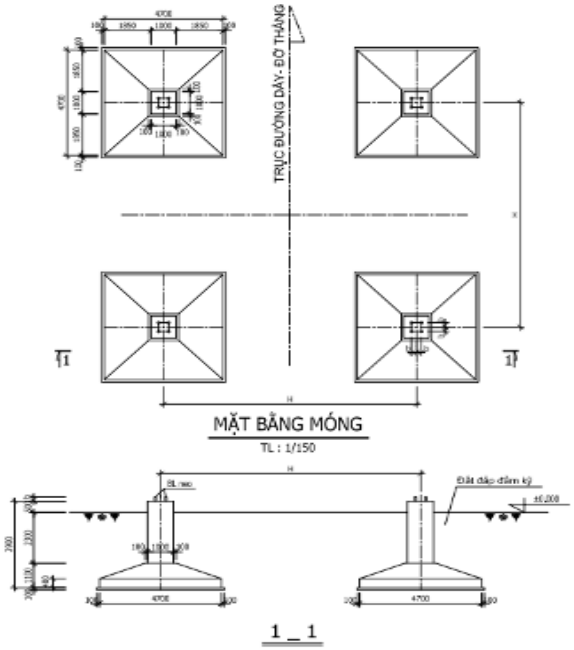
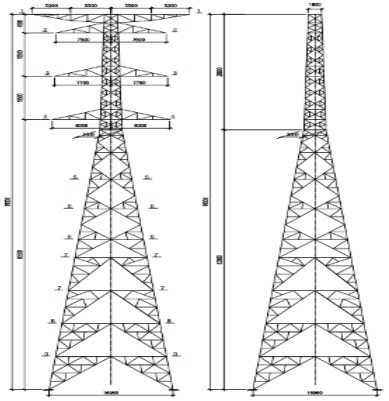
The Project scope includes:

- Construction of a new double-circuit 500kV transmission line from the planned 500kV Krong Buk Substation in Ea Kiet Commune, Dak Lak Province, to the planned 500kV Tay Ninh 1 Substation in Hung Thuan Commune, Tay Ninh Province, with a total length of approximately 330 km.
- Construction and installation of two new 500kV line bays on the land already reserved within the planned 500kV Krong Buk Substation and the planned 500kV Tay Ninh 1 Substation.
- Construction of two optical repeater stations, each covering an area of approximately 900 m2, together with access roads of approximately 10 m in length to each station.

The information and key parameters of the Project components are summarized in the table below.

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Table 6: Summary of the project's construction investments

No	Work item	Investment scope	Existing status/Typical cross section
1	Construction of new 500kV transmission line	Construction of a new double-circuit 500kV transmission line from the planned 500kV Krong Buk Substation in Ea Kiet Commune, Dak Lak Province, to the planned 500kV Tay Ninh 1 Substation in Hung Thuan Commune, Tay Ninh Province, with a total length of approximately 330 km. - Transmission line length: approximately 330 km, with 4xACSR-400/51 conductors, PHLOX-116 lightning protection wire, OPGW-90 optical ground wire cable (24 single-mode fibers, ITU-T G655), and insulation using glass, ceramic, or composite insulators rated at 70 kN, 120 kN, 210 kN, and 300 kN. - Number of circuits: 02. - Number of foundations: 657, of cast-in-place reinforced concrete. - Number of towers: 657, using galvanized steel structures. - Safety corridor width: 36 m, measured 18 m from the transmission line centerline on each side. - Minimum clearance height: ≥ 15 m. - Grounding arrangement: galvanized steel grounding system of mixed rod-and-radial configuration. - The transmission route crossing points are detailed in the table below.	 *Typical columnar foundation form of line*  *Support Column D522-91B*

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No	Work item	Investment scope	Existing status/Typical cross section
2	Construction and installation of two new 500kV line bays on the land already reserved within the planned 500kV Krong Buk Substation and the planned 500kV Tay Ninh 1 Substation	Construction and installation of complete equipment for two 500kV outgoing line bays, including compensation equipment consisting of series compensation capacitors rated at 30.5 Ω–2000 A and a 500kV–128 MVAr shunt reactor. The scope for one outgoing line bay includes one set of 500kV circuit breakers (three single-phase units); one set of disconnectors (three single-phase units) with two earthing blades; two sets of disconnectors (three single-phase units each) with one earthing blade; three single-phase current transformers; and four single-phase voltage transformers. + installation and completion of the control, metering, and protection system for the two 500kV line bays, including two control cabinets to be installed in the existing outdoor bay housing building and connected to the substation control and protection system. + installation of additional lightning protection, grounding, and outdoor lighting systems for the newly constructed bays, + construction of equipment support structures, gantry columns, and outdoor control cable trenches for the new bays.	
3	Construction of 02 optical repeater stations	Construction of two optical repeater stations, each covering an area of approximately 900m^2, together with access roads of approximately 10m in length to each station, including one station in Quang Tan Commune, Lam Dong Province, and one station in Long Ha Commune, Dong Nai City. The principal components of each optical repeater station include: - two OLA-type DWDM optical transmission devices, with optical line interfaces oriented toward the planned 500kV Krong Buk Substation and the planned 500kV Tay Ninh 1 Substation, interconnected for the transmission and relay of high-capacity optical communication signals; - auxiliary equipment for equipment monitoring at the repeater station; - station service power supply, lighting, air-conditioning, fire protection, and grounding systems; and - a two-storey repeater station building with a reinforced concrete structural frame and a building footprint of 6.6 m x 13.9 m, including a storage room, equipment room, and other supporting rooms.	 

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Table 7: Summary of crossing points of the transmission line

No.	Description	Unit	Total	Notes
A	**Crossing with transmission line**			
1	110 kV Cu M'Gar – JPO transmission line	times	1	G7-G8
2	220 kV Sre Pok 4 – Krong Buk transmission line	times	1	G9-G10
3	500kV Pleiku – My Phuoc – Cau Bong transmission lines	times	1	G10-G11
4	220 kV Buon Kop – Sere Pok 3 transmission line	times	1	G12-G12A
5	220 kV Dak Hoa – Dak Nong transmission line	times	1	G21-G22
6	220 kV Dak Nrung Wind Power Plant – 500kV Dak Nong Substation transmission line	times	1	G28-G29
7	110 kV Dak Glun Hydropower Plant transmission line	times	1	G37-G38
8	110 kV Thac Mo – Loc Ninh transmission line	times	1	G43-G45
9	220 kV Dak Nong – Phuoc Long – Binh Long transmission line	times	1	G45A-G45B
10	220 kV My Phuoc – Binh Long transmission line	times	1	G48-G48A
11	110 kV Binh Long 2 – Minh Hung transmission line	times	1	G48-G48A
12	110 kV Binh Long 2 – Binh Long transmission line	times	1	G48-G48A
13	110 kV Binh Long – Tay Ninh Cement Plant transmission line	times	1	G49A-G50
14	110 kV Binh Long – Tay Ninh 2 transmission line	times	3	G52-G52B, G55B-G56B, G58C-G59
15	110 kV Dau Tieng – Minh Hung transmission line	times	2	G53C-G54, G55B-G56B
16	110 kV Dau Tieng – Tay Ninh 2 transmission line	times	1	G58C-G59
17	Medium-voltage and low-voltage lines	times	707	
B	**Crossing with roads**			
1	Provincial Road 967	times	1	G8-G9
2	Road along the Sere Pok 3 Hydropower Dam route	times	4	G12-G12A-G12A.1
3	NH14	times	4	G12A.3-G12A.4, G24-G25, G25-G26
4	Provincial Road 683	times	1	G13-G14
5	Planned Binh Phuoc – Dak Nong – Dak Lak Expressway	times	2	G13-G14, G17-G18
6	Provincial Road 681	times	1	G30A-G31
7	Provincial Road 760	times	2	G36-G37, G38-G39
8	NH14C	times	1	G40-G41
9	Provincial Road 759	times	1	G43-G45
10	Hoang Ngoc Thuc Road	times	1	G45-G45A
11	Provincial Road 757	times	1	G45-G45A
12	Provincial Road 758	times	1	G47-G47A

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No.	Description	Unit	Total	Notes
13	Provincial Road 756	times	1	G47A-G47B
14	NH13	times	1	G48A-G49
15	Provincial Road 749B	times	1	G53C-G54
16	Provincial Road 744	times	1	G55B-G56B
17	Provincial Road 710	times	1	G58C-G59
18	Tran Van Lac Road	times	1	G59-G60
19	District Road 603	times	1	G59-G60
20	Provincial Road 789	times	3	G60-G61, G62-G63, G64-G65
21	Provincial Road 782	times	1	G60-G61
22	Soc Lao Road	times	1	G64-G65
23	Canal bank road	times	6	G65A-G66-G67
24	Tan Thuan Road	times	1	G66-G67
25	Crossings with asphalt roads, earth roads, stone roads, and rural roads (width ≤ 10 m)	times	1581	
C	**Crossing with rivers and streams**			
1	Duc Stream (width: 38.5 m)	times	1	G7-G8
2	Water conveyance canal of Sere Pok 3 Hydropower Plant (width: 94.8 m)	times	1	G12-G12A
3	Sere Pok River (width: 217 m)	times	1	G12A-G12A.1
4	Dak N'Drung Stream (width: 36 m)	times	1	G26-G27
5	Dak R'Tih Stream (width: 18 m)	times	1	G30-G30A
6	Dak RLap River (width: 31–126 m)	times	6	G32-G33-G34-G35
7	Small branch of Thac Mo Hydropower Reservoir (width: 244 m)	times	1	G38-G39
8	Be River (width: 88–110 m)	times	2	G42A-G43, G47-G47A
9	Sai Gon River (width: 64–200 m)	times	2	G59-G60, G63-G64
10	East Canal (width: 35 m)	times	1	G66-G67
11	Streams, creeks, ditches, and ponds with width < 30	times	879	

Source: Topographic survey report, PECC2-PECC3-PECC4, 12/2025.

2.2.2. Auxiliary work items

a) Construction sites and work areas

Based on the existing topographical and access conditions along the transmission line route, and in order to ensure construction progress, quality, and convenience of execution, the project is planned to establish 16 temporary construction sites (main storage yards) along the transmission line route to serve the construction works.

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Table 8: Number of temporary construction sites (main storage yards) for construction

No.	Construction site	Location	Notes
1	Site 1 (Warehouse 1)	Areas near G6-7 (Ea M'Droh Commune, Dak Lak Province)	For construction of the section from the starting point to G7-06, with a length of approximately 23 km.
2	Site 2 (Warehouse 2)	Areas near G12 (Ea Wer commune, Dak Lak province)	For construction of the section from G7-06 to G12A.2-11, with a length of approximately 26 km.
3	Site 3 (Warehouse 3)	Areas near G12A.3-09 (Cu Jut commune, Lam Dong province)	For construction of the section from G12A.2-11 to G13, with a length of approximately 21 km.
4	Site 4 (warehouse 4)	Areas near G17 (Krong No commune, Lam Dong province)	For construction of the section from G13 to G20, with a length of approximately 22 km.
5	Site 5 (Warehouse 5)	Areas near G24 (Truong Xuan commune, Lam Dong province)	For construction of the section from G20 to G26, with a length of approximately 13.3 km.
6	Site 6 (Warehouse 6)	Areas near G27-8 (Truong Xuan commune, Lam Dong province)	For construction of the section from G26 to G29A, with a length of approximately 16.5 km.
7	Site 7 (Warehouse 7)	Areas near G31-19 (Quang Tin commune, Lam Dong province)	For construction of the section from G29A to G33, with a length of approximately 15.7 km.
8	Site 8 (Warehouse 8)	Areas near G35 (Tho Son Commune, Dong Nai City)	For construction of the section from G33 to G35, with a length of approximately 14.5 km.
9	Site 9 (Warehouse 9)	Areas near G36-8 (Bom Bo Commune, Dong Nai City)	For construction of the section from G35 to G40, with a length of approximately 10.7 km.
10	Site 10 (Warehouse 10)	Areas near G41-13 (Phu Nghia Commune, Dong Nai City)	For construction of the section from G40 to G43, with a length of approximately 8.1 km.
11	Site 11 (Warehouse 11)	Areas near G45 (Binh Tan Commune, Dong Nai City)	For construction of the section from G43 to G45A, with a length of approximately 10.2 km.
12	Site 12 (warehouse 12)	Areas near G46-8 (Long Ha Commune, Dong Nai City)	For construction of the section from G45A to G47A, with a length of approximately 9.77 km.
13	Site 13 (Warehouse 13)	Areas near G48A-1 (Binh Long Ward, Dong Nai City)	For construction of the section from G47A to G50, with a length of approximately 11.37 km.
14	Site 14 (Warehouse 14)	Areas near G52B (Tan Khai Commune, Dong Nai City)	For construction of the section from G50 to G54, with a length of approximately 9.57 km.
15	Site 15 (Warehouse 15)	Areas near G57B-3 (Dau Tieng Commune, Ho Chi Minh City)	For construction of the section from G54 to G60, with a length of approximately 10.24 km.

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No.	Construction site	Location	Notes
16	Site 16 (Warehouse 16)	Areas near G62-1 (Hung Thuan commune, Tay Ninh province)	For construction of the section from G60 to the DC endpoint, with a length of approximately 9.38 km.

Source: Feasibility study report, Power Engineering Consulting JSC.3, March 2026.

At the temporary construction sites, enclosed warehouses and covered open storage areas will be arranged as follows:

- Enclosed warehouses for storing cement, anchor bolts, accessories, and precious goods.
- Covered open storage areas for storing foundation steel, grounding materials, conductors, lightning protection wires, insulators, and for foundation steel fabrication.

According to calculations, the area of each temporary construction site (main storage yard) is approximately 1,000 m². The project owner and construction contractors will prioritize leasing vacant land from local residents for arranging these temporary construction sites (main storage yards). Upon completion of construction, the land will be cleared and restored to its original condition for return to the landowners.

In addition, to serve foundation construction and stringing works, the project will arrange the following:

- 657 foundation/tower construction sites: the total land area required for these sites is 71.85 ha. These construction sites are located directly at the tower foundation positions..
- 117 conductor stringing yards: each yard has an area of 300 m², with a total land area of 3.51 ha.

The project owner and construction contractors will pay land rental costs for temporary use of the sites for 15–20 days per site and compensate for crop damage if temporary use of agricultural land or residential land of local residents is required. After construction is completed, these areas will be cleared and returned to the landowners.

b) Worker's camp

- Basic construction works such as excavation, backfilling, and material transportation will be carried out using local labor hired by the contractor. These workers will arrange their own accommodation.
- Skilled construction workers will be accommodated in boarding houses or rented houses of local residents near the project area for convenience during construction.
- The project will not establish worker camps or organize on-site living facilities for construction workers.

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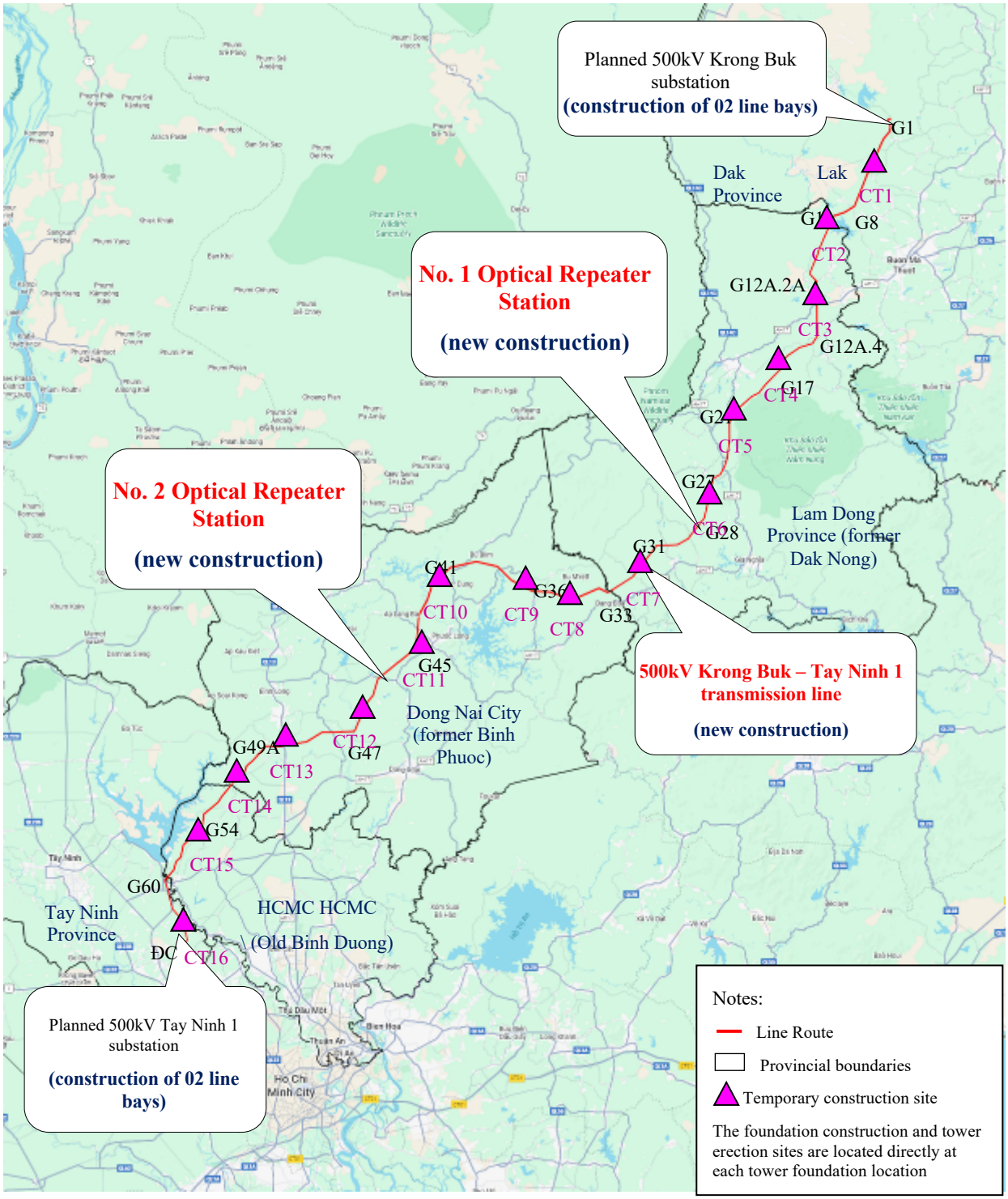


Figure 5: Location map of the temporary construction site (main warehouse)

c) Temporary road for construction

The transportation of construction materials, equipment, and supplies will mainly utilize national highways, provincial roads, inter-commune and inter-village roads, and earth roads.

To access the foundation and tower construction locations, the project will require temporary roads and the upgrading of existing roads, with the following estimated quantities:

- Total length of temporary roads: 120,955 m
- Total length of road upgrading: 211,080 m

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The temporary roads are expected to have a width of 3.5 m.

The total land area required for temporary roads is 42.33 ha.

Detailed design of the temporary roads will be determined and calculated during the Technical Design and Construction Drawing stage of the project.

2.3. DEMAND FOR RAW MATERIALS, FUEL, LABOR AND WORKFORCE

2.3.1. Sources of construction materials and transportation routes

The construction materials required for the construction of the port and embankment are presented in the table below. The Project will use only licensed material sources and will not require the development of any new quarries.

Table 9: Main construction volume of the project

No.	Description	Unit	Volume	Construction Method
I	**CONSTRUCTION WORKS**			
1	Excavation	m3	545.673	Manual + Motorized
2	Backfilling	m3	488.108	-
3	Backfilling of the foundation surface within the permanently acquired foundation area	m3	57.565	-
4	Lean concrete B7.5	m3	8.901	-
5	Concrete B20 and B25	m3	76.641	-
6	Fabrication of foundation steel	tons	6.650	Welding Machine - Bending Cutting
7	Fabrication of pile reinforcement steel	tons	208	-
8	Fabrication of galvanized grounding steel	Location	657	Pressing Machine - Bending Cutting
9	Fabrication of anchor bolts	tons	2.005	Welding Machine - Bending Cutting
10	Fabrication of tower stubs	tons	78	-
11	Erection of steel towers	Location	657	Manual + Motorized
		tons	66.881	
II	**ELECTRICAL WORKS**			
II.1	**Conductors and lightning protection wires**			
1	ACSR-400/51 steel-reinforced aluminum conductor	km	8.039,9	
2	PHLOX-116 steel lightning protection wire	km	335.4	
3	OPGW-90 optical ground wire	km	345.7	
II.2	**Insulators and accessories**			
1	Insulator strings of various types	Chain	6,210	
2	Counterweights of various types	Sets	370	
3	Spacer frames for span sections	Sets	34.721	
4	Jumper positioning frames	Sets	3.883	

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No.	Description	Unit	Volume	Construction Method
5	PHLOX-116 lightning protection wire suspension string	Chain	502	
6	PHLOX-116 lightning protection wire tension string	Chain	320	
7	Vibration dampers for ACSR-400/51 conductors	Sets	15.126	
8	Vibration dampers for PHLOX-116 lightning protection wire	Sets	2.955	
9	Splice sleeves for ACSR-400/51 conductors	Sets	2.277	
10	Splice sleeves for PHLOX-116 lightning protection wire	Sets	92	
11	Type B medium-intensity aviation warning lights, mounted at the tower top	Sets	355	
12	Type B low-intensity aviation warning lights, installed approximately at mid-height of the tower	Sets	638	
13	River crossing warning lights	Sets	6	
14	500kV surge arresters, including accessories and grounding leads	Sets	36	
15	Danger signs	Location	677	

Source: Feasibility study report, PECC2-PECC3-PECC4, March 2026.

❖ **Balancing of exaction and backfilling**:

- At each foundation location, the foundation type and dimensions are calculated and designed by the consultant based on geological, topographical, meteorological, and hydrological conditions, in compliance with applicable regulations and standards.
- The volume of excavation and backfilling at each foundation location is determined based on the selected foundation type and the designed foundation dimensions.
- At each foundation construction location, excavated soil will be temporarily stored at the foundation construction site adjacent to the foundation position. The total area of the 657 foundation construction sites is 71.85 ha. At these sites, the construction contractor will cover the excavated soil with tarpaulins and construct temporary peripheral drainage ditches to prevent rainwater runoff and avoid soil erosion and sediment washout to surrounding areas.
- The project will reuse excavated soil for backfilling foundation pits and constructing foundation embankments. Excess excavated soil will be compacted on the foundation surface within the area of the foundation that has been permanently acquired. The project will not transport surplus excavated soil outside the project area. The project owner commits to complying with and fully implementing all legal procedures in accordance with the Law on Geology and Minerals, including identification of disposal site location and capacity, agreement with the receiving individual or organization, and approval by the competent authority, in the event that disposal of surplus soil outside the project area becomes necessary.

2.3.2. List of machinery and equipment for construction

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The main machinery and equipment for the construction of the project are as follows:

Table 10: List of main machinery and equipment for construction

No.	Description	Specifications	Quantity	Notes
1	Bulldozers and graders	≥ 110CV	22	Site leveling
1	Excavators	≥ 0.4m3	22	Excavation for foundations and subgrade
2	Cranes	≥ 5T	15	Equipment lifting and installation
3	Dump trucks	≥ 7T	44	Transportation of soil, sand, stone, and other materials
4	Concrete mixers	≥ 0.25m3	22	Concrete mixing
5	Internal vibrators and plate compactors	1.5kW	22	Concrete compaction
6	Tamping rammers	≥ 80kg	15	Soil compaction
7	Vibratory rollers and sheepsfoot rollers	≥ 9T	15	Foundation compaction
8	Pumps	≥ 2HP	18	Construction dewatering / water pumping
9	Welding machines	23kW	22	Steel welding
10	Surveying instruments		22	Setting out of centerlines, benchmarks, and elevations
11	Chain hoists, winches, and braking devices		44	Installation of steel towers and conductor stringing
12	Generators, drills, and steel cutting and bending machines		22	

Source: Feasibility study report, PECC2-PECC3-PECC4, 3/2026.

2.3.3. Fuel and Power Supply

Power supply for construction: power for construction will mainly be used for concrete casting and foundation reinforcement works, and will be sourced from local power supplies and diesel generators provided by the construction contractors.

Water supply for construction

- Water used for construction will be purchased either from the local water supply system or from rivers and streams in the areas crossed by the transmission line.
- After procurement, the water will be transported to the construction sites and stored in tanks with capacities of 1–3 m^3 for use.

Supply of construction materials and equipment

- Imported materials, including conductors, optical fiber cables, insulators, and accessories, will be supplied from the warehouse of SPMB in Ho Chi Minh City.
- Domestic materials, including sand, stone, and cement, will be sourced locally in the areas crossed by the transmission line.
- Steel towers will be delivered by the supplier to the site warehouses.
- Foundation steel and grounding materials will be procured locally.

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Long-distance transportation

- Major materials such as conductors, optical fiber cables, insulators, and accessories will be transported by truck from SPMB warehouse to the site warehouses along the route.
- The average long-distance transportation distance to the site warehouses is preliminarily estimated at 400 km on Class III roads.

Intermediate transportation

- Materials will be transported by truck from the warehouses to stockpiling points along the route via provincial and inter-commune roads.
- The average intermediate transportation distance for the entire route is 16 km on average Class III roads.
- Sand, stone, cement, and steel will be sourced locally, with an average transportation distance of 15 km using mechanized transport.

Short-distance transportation

- Materials will be transported from the stockpiling points to the tower foundation locations manually or by a combination of manual and mechanized methods.
- The short-distance transportation distance is calculated using the weighted average formula based on the concrete volume of each foundation location. The weighted average manual transportation distance for the entire route is Ltc = 195 m (without difficulty coefficient) and Ltt = 218 m (with difficulty coefficient).

2.3.4. Construction workforce

To ensure the project construction schedule, which is expected to be 12 months, the transmission line is divided into 16 segments. Each segment will be assigned one construction and installation team to carry out rolling construction of items such as tower foundation works, tower erection, installation of insulators and accessories, and conductor stringing. In addition, four construction and installation teams will be assigned to construct Optical Repeater Station No. 1, Optical Repeater Station No. 2, the outgoing bay at the planned 500kV Krong Buk Substation, and the outgoing bay at the planned 500kV Tay Ninh 1 Substatin. The total number of construction and installation teams will therefore be 20 along the route.

The number of workers assigned to each construction and installation team will depend on the specific stage of works, including excavation and backfilling, foundation reinforcement, foundation concreting, tower erection, equipment installation, and conductor stringing.

- The maximum workforce for each construction and installation team is expected to be 20 workers per day.
- The maximum total construction workforce per day is estimated at:

$$20 \text{ workers/day/team} \times 20 \text{ teams} = 400 \text{ workers/day}.$$

2.4. CONSTRUCTION METHOD

2.4.1. Construction process

Based on the main characteristics of the project and the topographical conditions along the transmission line route, the construction method for the 500kV transmission lines is expected to combine manual labor and mechanized methods. The construction sequence is as follows:

- Foundation works, including excavation of foundation pits, installation of grounding,

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reinforcement works, foundation concreting, backfilling, and embankment around the foundation.

- Erection of steel towers.
- Installation of insulators and accessories.
- Conductor stringing and sagging.

Note: *To ensure the project construction schedule, the transmission line is divided into 16 line sections. Each section will be assigned one specialized construction and installation team to carry out consecutive construction of items such as tower foundation works, tower erection, installation of insulators and accessories, and conductor stringing while the other four construction and installation teams will be assigned to construct the optical repeater stations and outgoing bays. The total number of construction and installation teams will therefore be 20.*

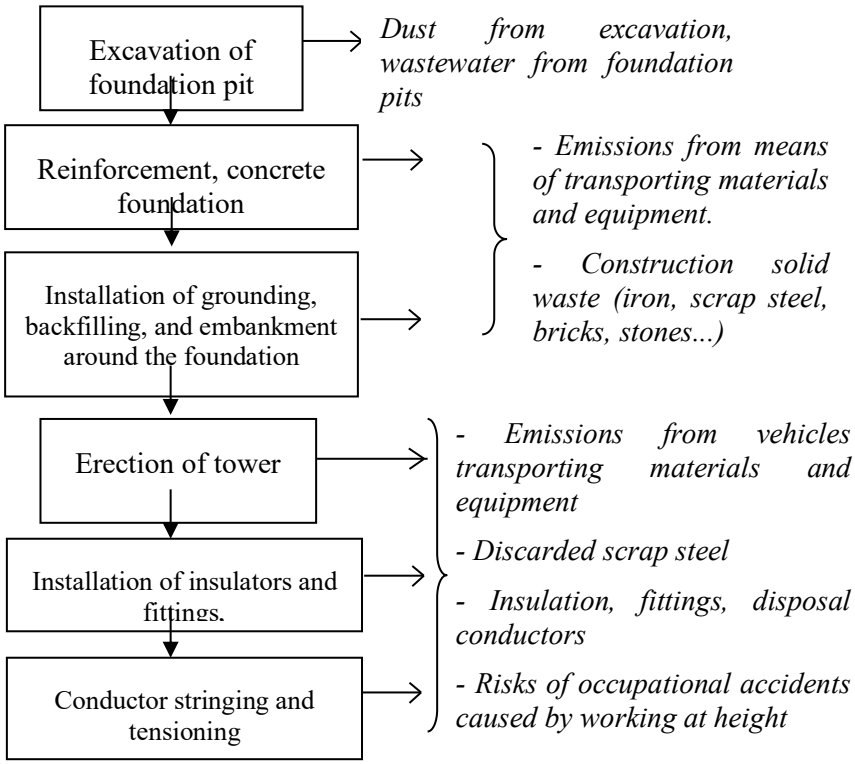


Figure 6: Diagram of the construction process of the line and the sources of waste generated

2.4.2. 500kV transmission line construction method

General measures for foundation construction

- Excavation of foundation pit:

Excavation of foundation pits will be carried out mainly by a combination of manual and mechanical methods. The foundation pits shall be excavated to the correct dimensions, at the correct locations as specified in the design, and with the required slope gradients in accordance with applicable regulations.

Before excavation begins, a surface drainage system shall be installed to prevent water from flowing across the work area and to avoid the formation of standing water during construction. A sump pit shall be arranged at the bottom of each foundation pit, and water shall be pumped out to keep the foundation base dry in the event of rainfall or groundwater seepage during construction.

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Depending on the terrain and the characteristics of each construction location, consideration shall be given to excavating diversion ditches and constructing temporary embankments to prevent water from entering the foundation pits.

The drainage system shall ensure rapid drainage and shall not cause flooding, soil erosion, or damage to the works.

The bottom of each foundation pit shall be carefully leveled and compacted in accordance with the design elevation.

Excavated soil shall be temporarily stored at the foundation construction site. These stockpiles shall be covered with tarpaulins, and temporary drainage ditches shall be provided around them to prevent stormwater runoff and avoid the washing of soil and sediment into adjacent areas. Excavated soil shall be reused for backfilling foundation pits and embankment around the foundations. Surplus soil shall be spread and compacted on the foundation surface within the area permanently acquired for the foundations.

- Grounding installation:

Grounding systems shall be provided for tower locations along the radial transmission line in combination with grounding rods.

Grounding arrangements along the route shall be designed based on soil resistivity data for the areas through which the line passes.

Grounding installation shall be carried out after excavation of the foundation pit and in parallel with the installation of foundation reinforcement. The grounding lead brought up for connection to the tower leg shall be threaded through the foundation chimney before concrete pouring.

- Reinforcement and foundation concreting:

Concrete mixing and pouring shall be carried out by machine, and concrete compaction shall also be performed mechanically. The concrete mixing and pouring process shall strictly comply with the procedures for cast-in-place concrete works. During concreting, concrete samples shall be taken on site, and slump tests shall be conducted.

- Backfilling and embankment around the foundation:

Excavated soil from the foundation pits shall be used for backfilling. Backfill soil shall be compacted thoroughly layer by layer in accordance with the design requirements and shall ensure the required design density.

Surplus soil shall be placed back on the foundation surface within the area permanently acquired for the foundation.

- Foundation protection works:

Depending on the terrain and the characteristics of the works, the need for foundation protection works shall be considered in order to protect the foundation structure.

General measures for tower erection

- All towers along the route are galvanized steel lattice towers assembled with bolts. Tower erection shall be carried out by manual methods using the gin-tower erection method in combination with mechanical support, with members assembled progressively in sequence. Before erection, construction equipment such as gin tower, winches, steel cables, anchor piles, and anchor pits shall be inspected.
- The tower shall be erected from the bottom upward, with the main members installed first and the bracing members connected simultaneously. During tower erection, the winch system, cables, and related machinery and equipment shall be continuously inspected to ensure safety.

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- For locations near energized power lines, the contractor shall prepare a specific construction method statement to ensure safety before erection begins, and such method statement must be approved by the Project Management Unit.

Installation of insulators and fittings:

Installation of insulators and fittings shall be carried out manually at height. Insulator strings shall be pre-assembled on the ground before being installed on the tower. During installation, the markings and type of each insulator string shall be checked to ensure suitability for each tower location and compliance with design requirements, together with the full set of galvanized fittings.

As composite insulators are used for the line, appropriate protective measures shall be taken during storage, transportation, and installation to prevent tearing or scratching of the insulators.

Conductor stringing and tensioning:

Stringing and tensioning of conductors and shield wires shall be carried out by manual methods in combination with mechanical support in the following sequence

Conductor stringing:

Stringing and pulling of conductors shall be carried out by a combination of manual and mechanical methods as follows:

- Stringing: Stringing and pulling of conductors shall be carried out in accordance with the requirements of the design documents, applicable standards, and current regulations.

For conductor and shield wire stringing at river crossings, road crossings, and intersections with existing power lines, detailed construction methods shall be prepared for each location. Construction safety measures shall also be established, including notification and arrangement of watch personnel for traffic on rivers and roads, and installation of scaffolding where necessary to ensure construction safety. Pilot ropes shall be used to pull conductors across such crossings and structures.

- Tensioning to achieve design sag:
  + This work shall be carried out only after the conductor or shield wire has been fully pulled and all spans within the tension section have been placed on the stringing pulleys.
  + Tensioning shall be carried out by a combination of manual and mechanical methods. A sighting device shall be used to check sag at selected spans in accordance with the design. The sag after tensioning shall comply with the design requirements.
  + After sagging is completed, spacer frames shall be installed manually at height. Personnel shall move for spacer frame installation by trolley traveling on the conductor.
- Clipping the conductor to the insulator string: After confirmation that the conductor sag conforms to the design requirements, the conductor may be clipped to the insulator string.

2.4.3. Construction meathod at the crossing with existing power transmission line

The project involves 19 crossings with existing 500kV, 220 kV, and 110 kV transmission lines. To ensure safe clearance between the project's 500kV transmission line and the existing transmission lines, and to minimize outages during crossing works, the following design solutions have been adopted:

- The project's 500kV transmission line will be routed beneath the existing 500kV transmission lines.
- The project's 500kV transmission line will cross over the existing 110 kV and 220 kV transmission lines.
- The crossing clearance between the project conductors, or between the project conductors and

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shield wires, and the existing 110 kV, 220 kV, and 500kV transmission lines shall comply with the requirements of the electrical code.

Construction measures at these locations are as follows:

- Construction of foundations and complete erection of towers for the tension section at each crossing location.
- Implementation of warning and safety measures to support conductor stringing operations and ensure construction safety.
- Erection of scaffolding and application of specific construction measures at crossing locations in order to minimize impacts on the power supply in the area.
- Scheduled outage of the existing lines for approximately 3 to 6 hours to install and remove protective wire-mesh cradles.
- Completion of conductor stringing and tensioning for the tension section at each crossing location.

Note: During the detailed design stage, the project will prepare detailed construction methods for each crossing location, develop construction safety measures, and design detailed scaffolding arrangements.

2.4.4. Measures for stringging the conductors across roads

The project has 4 crossings over National Highway 14, 2 crossings over Provincial Road DT760, 3 crossings over Provincial Road DT789, and 1 crossing each over DT967, DT683, DT681, National Highway 14C, DT759, DT757, DT758, DT756, National Highway 13, DT749B, DT744, DT710, DH603, DT789, DT782, Hoang Ngoc Thuc Road, Tran Van Lac Road, Soc Lao Road, canal bank roads, and Tan Thuan Road; 2 crossings over the proposed Binh Phuoc – Dak Nong – Dak Lak Expressway, which have medium to high traffic density; and many crossings over inter-village and commune roads.

The construction measures for conductor stringing at these crossing locations are as follows:

a. Preparation works

- Contact the road management authority so that, together with the Employer and relevant parties, field surveys can be conducted at the crossing locations, and survey minutes can be prepared as a basis for the preparation of the construction method statement.
- The contractor shall prepare the construction method statement and submit it to the road management authority and the road and traffic management authority for agreement on the method and for the issuance of the construction permit.
- Coordinate with the road operation management authority throughout the construction period in order to ensure traffic safety on the roads.
- Coordinate with the Traffic Police to regulate and provide support throughout the process of stringing conductors across the roads.
- Prepare tools, equipment, machinery, scaffolding, materials, construction warning signs, speed limit signs, and line materials such as conductors, shield wires, insulators, and fittings for the crossing span.
- Prepare the site for erection of scaffolding across the road.
- Prepare anchor blocks in advance for scaffolding installation.
- Install counter-stay anchors and suspend insulators and fittings at the steel towers.

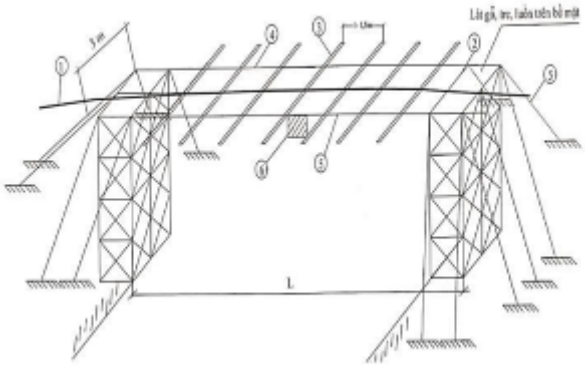
b. Scaffolding installation

- The contractor shall erect paired scaffolding structures on both sides of the road for the two

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conductor-stringing paths.

- Construction scaffolding shall be used to form an overhead crossing scaffold above the road.
- The scaffold tiers shall be stacked on top of one another and connected by bamboo poles, timber members, or steel tubes.
- After each tier is erected, it shall be tied to anchoring ropes secured to the ground.
- When the scaffolding reaches a height of approximately 6.8 m (1.7 × 4 = 6.8 m), equivalent to 4 scaffold tiers, erection shall stop and the scaffold blocks shall be anchored and braced together. Steel cable mesh, binding wire, and bamboo poles shall then be stretched and woven between the scaffold blocks along the conductor-stringing route.





c. Construction

After obtaining the construction permit from the road management authority for the conductor stringing work, the contractor shall carry out the work in the following sequence:

- Transport tools, equipment, machinery, scaffolding, and materials (conductors, shield wires, insulators, fittings, etc.) to the crossing location for assembly.
- Arrange construction signs and warning signs at both ends of the construction area in accordance with the uniform instructions of the road management authority, and assign communication personnel equipped with walkie-talkies as appropriate at the crossing location.
- Coordinate with the road operation management authority throughout the construction process to ensure traffic safety on the road, and with the Traffic Police to support traffic regulation as appropriate during conductor stringing across the road (if necessary).
- Erect supporting scaffolding above the road so as not to affect road traffic.
- Carry out conductor stringing sequentially from the upper cross-arm downward and symmetrically on both sides of the cross-arm.
- After completion of each phase, install vibration dampers and spacer frames, and complete that phase.
- After completion of conductor stringing and sagging, remove construction equipment, tools, cranes, signs, and other temporary facilities, and restore the site to its original condition.
- Conductor stringing work shall only be carried out during daytime. At night, warning lights shall be used to illuminate the construction area and the warning signs.

2.4.5. Measures for conductor stringing across rivers and streams

The project has 2 crossings over Be River *(88–110 m wide)*, 2 crossings over Saigon River *(64–200 m wide)*, 6 crossings over Dak R'Lap River *(31–126 m wide)*, and 1 crossing each over Duc Stream *(38.5 m wide)*, the water conveyance canal of Serepok 3 Hydropower Plant *(94.8 m wide)*,

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the Serepok River *(217 m wide)*, Dak N'Drung Stream *(36 m wide)*, Dak R'Tih Stream *(18 m wide)*, a small branch of Thac Mo hydropower reservoir *(244 m wide)*, and East Canal *(35 m wide)*; the traffic density of watercraft is average

The measures applied for conductor stringing across rivers are as follows:

- The span length and the tower height at line crossings over rivers and streams shall take into account the sag of the conductors and the safe clearance required for vessels to pass.
- Stringing and sagging of conductors at river crossings require careful preparation.
- Materials, construction machinery, transport means, and tools shall be assembled in a complete and coordinated manner. Workers in the crew shall be instructed so that they fully understand the design for the crossing span and the sequence of construction work, and responsibilities shall be assigned among crew members. Agreed conventions on signals and communications between workers at different working locations must be established (for large crossings, walkie-talkies shall be used).
- The completion status of the crossing towers and foundations shall be checked. Conductor reels, shield wires, insulators, conductor fittings, as well as construction machinery, tools, and transport means shall be moved to locations near the towers. Long suspension insulator strings with multiple sub-strings shall be assembled in a vertical position. First, the conductor attachment fittings shall be installed at the upper part of the insulator string; then a winch with a cable passed through the hanging block above the cross-arm shall be used to lift the string to a height of 1.5 m above the ground, after which 6 insulator discs shall be hung on each sub-string. The string shall then be lifted by another 1.5 m so that the next 6 discs can be hung, and this process shall continue until the entire string is fully assembled.
- Contracts shall be signed for the hire of watercraft operating on the river (tugboats for stringing conductors across the river, motorboats for coordinating works and preventing vessels from passing through the work area on the river, or boats for transporting people from one bank to the other). A navigation channel across the river shall be prepared, and the berthing capability of the tugboats or canoes shall be checked.
- Crossing scaffolding shall be erected, or obstructing structures shall be temporarily dismantled, where they interfere with conductor stringing and sagging. Stringing and sagging works shall be carried out in the following logical sequence:
- First, the shield wire shall be strung and sagged, followed by the conductors in that order, so as to eliminate dangerous torsional moment on the tower.
- Stringing and sagging shall first be carried out for the spans adjacent to the crossing span, and then for the crossing span itself. If tensioning of the lower conductors in the adjacent spans would obstruct stringing and sagging at the crossing span, those conductors should be installed later.
- Conductors and shield wires shall be strung and sagged one at a time, in sequence (each wire shall only be strung and sagged after completion of the stringing and sagging of the previous wire).

2.4.6. Measures for construction of the 500kV Feeder Bays and optical repeater station

- Foundation works for equipment:
  + Excavation and backfilling for equipment foundations: excavation and backfilling shall comply with the applicable regulations and ensure the required excavation depth. The bottom surface of the foundation pit shall be cleaned, leveled, and kept dry to avoid turning

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into mud.

+ Foundation reinforcement: before fabrication, reinforcing steel shall be tested for tensile strength and bending in accordance with technical standards. Reinforcement installation shall be inspected and accepted under the supervision of the Employer, the Supervision Consultant, and the Designer before proceeding to the next construction step. Reinforcement shall be installed manually and in accordance with the design drawings.
+ Foundation concrete works: after checking the preparation of materials including cement, water, sand, stone, and construction tools, the entire technical work such as formwork, foundation bolts, transverse and longitudinal dimensions, elevations, etc. shall be inspected. If all requirements are found satisfactory, concrete pouring shall be carried out. Concrete shall be mixed by machine in combination with manual work, and compacted by machine.

- Equipment installation works:
  + Before installation, equipment and fittings shall be carefully checked for quantity, type, preservation quality, transportation condition, as well as technical parameters. During the inspection process, if any doubtful issue arises, it shall be reported immediately to the SPMB for instructions and resolution. All components and equipment transported to the site shall be placed in a dry location and firmly supported.
  + Assembly shall be carried out by mechanical means combined with manual work. Installation shall be in accordance with the design and shall ensure safety for both personnel and equipment.

2.5. IMPLEMENATION ARRRANGEMENT

2.5.1. Total investment and project implementation schedule

Total project investment:

The total investment of the project is 11.929.675.260.893VND (In words: Eleven trillion, nine hundred twenty-nine billion, six hundred seventy-five million, two hundred sixty thousand, eight hundred ninety-three VND).

Project implementation schedule:

- Approval of the construction investment feasibility study report: 3/2026.
- Completed the survey, technical design – estimate: 06/2026.
- Submission for appraisal and approval of technical design – cost estimate: 06/2026 – 09/2026.
- Contractor selection: 01 – 02/2027.
- Approval of construction drawing design: 02-03/2027.
- Commencement: Quarter I/2027.
- Completion and acceptance of electrification: Quarter IV/2028.
- The construction time of the project is expected to be 12 months.

2.5.2. Project implementation arrangement

The project management method shall be implemented in accordance with Decree No. 15/2021/ND-CP dated 03 March 2021 of the Government, which provides detailed regulations on a number of contents related to management of construction investment projects. The project implementation management form is “the Employer directly manages project implementation”, as follows:

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- Project Owner: National Power Transmission Corporation
- Project Management: Southern Power Projects Management Board – branch of the National Power Transmission Corporation
- Operation Unit: Power Transmission Company No. 3 and Power Transmission Company No. 4 – branches of the National Power Transmission Corporation

The agencies and units participating in the project implementation process shall have responsibilities and powers in accordance with the provisions of the Government's Decrees and the current guiding Circulars issued by the ministries and the Government.

With regard to environmental protection:

The environmental specialist department of the Southern Power Projects Management Board – branch of the National Power Transmission Corporation shall organize, monitor, and inspect all activities related to environmental protection during the construction phase.

The environmental specialist department of Power Transmission Company No. 3 and Power Transmission Company No. 4 – branches of the National Power Transmission Corporation shall organize, monitor, and inspect all activities related to environmental protection during the operation phase.

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CHAPTER 3. NATURAL, ENVIRONMENTAL, BIODIVERSITY AND SOCIO-ECONOMIC CONDITIONS

3.1. NATURAL CONDITIONS

3.1.1. Geography and topography

The 500kV Krong Buk - Tay Ninh 1 transmission line starts from the 500kV gantry tower of the 500kV Krong Buk Substation in Ea Kiet Commune, Dak Lak Province, and ends at the 500kV gantry tower of the 500kV Tay Ninh 1 Substation in Hung Thuan Commune, Tay Ninh Province.

The route has a total length of approximately 330 km and passes through the following 34 communes/wards:

- Dak Lak Province: Ea Kiet, Ea M'Droh, and Ea Wer Communes.
- Lam Dong Province: Cu Jut, Dak Mil, Dak Sak, Dak Song, Dak Wil, Duc An, Krong No, Nam Dong, Nam Da, Quang Tan, Quang Tin, and Truong Xuan Communes.
- Dong Nai City: Phuoc Binh Ward, Binh Long Ward, and Tho Son, Dak Nhau, Bom Bo, Phu Nghia, Dak O, Da Kia, Binh Tan, Phu Rieng, Long Ha, Tan Hung, Tan Quan, Minh Duc, and Tan Khai Communes.
- Ho Chi Minh City: Minh Thanh and Dau Tieng Communes.
- Tay Ninh Province: Loc Ninh and Hung Thuan Communes.

The route is mostly aligned in parallel with the 500kV Pleiku 2 - My Phuoc - Cau Bong transmission lines (along the section passing through Dak Lak Province, Lam Dong Province, and Dong Nai City). The terrain under the transmission line in Dak Lak Province, Lam Dong Province, and Dong Nai City is relatively steep, while the section in Ho Chi Minh City and Tay Ninh Province has flat terrain. Vegetation under the route mainly consists of production forest land, acacia plantations, rubber, cashew, fruit trees, agricultural crops, and forest trees. Traffic conditions are favorable because the transmission line route runs close to and crosses many local internal roads.

3.1.2. Geology

According to the geological survey report for the 500kV Krong Buk - Tay Ninh 1 Transmission Lines Project, prepared by the JV of Power Engineering Consulting JSC.2, Power Engineering Consulting JSC.3, and Power Engineering Consulting JSC.4 in December 2025, the geological conditions of the project area are as follows:

Engineering geological stratification:

Based on the compiled results of field investigations and laboratory testing, the geological profile of the project area consists of the following strata:

❖ *Route section G1-G20 (21 main boreholes and 21 supplementary boreholes located 3-5 m from the main boreholes)*

- Layer 1: Reddish-brown to greenish-gray silty clay, in soft plastic state. Thickness: 2.5 m.
- Layer 2: Silty clay, gravelly silty clay, and silty clay containing gravel and pebbles, brownish-gray to yellowish-brown in color, in stiff to hard state. Thickness varies from 1.5 m to 12.0 m.
- Layer IA: Weathered bedrock mixed with gravelly soil, silty clay containing gravel and pebbles, gray-green to gray-brown in color, in hard state. Thickness ranges from 1.5 m to 3.8 m.

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❖ *Route section G20-G43 (27 boreholes)*

- Layer 1: Yellowish-brown to reddish-brown clay. The soil is slightly moist to moderately moist, in semi-hard to hard state. This layer is exposed directly at the natural ground surface, with thickness ranging from 0.8 m to 5.2 m. Its distribution is local, within the G20-G22 section of the project.
- Layer 2: Clay and silty clay mixed with gravel, pebbles, and boulders, yellowish-brown to gray-brown in color. The soil is slightly moist to moderately moist, in semi-hard to hard state. Gravel and pebble content accounts for 30-35%. Boulders with diameter Ø = 0.2-1.5 m account for 5-20%. This layer is exposed directly at the natural ground surface; in some boreholes, this layer lies beneath Layer 1. Thickness ranges from 10.5 m to more than 12.0 m. Its distribution extends from G20 to G43 of the project.
- Layer 3: Developed on volcanic rock foundation: basalt strongly weathered into clay, fragments, and boulders, gray-brown to reddish-brown in color, moderately moist, in hard state. Its distribution is local at G35 and from G37 to G40 of the project.
- Layer 4: Developed on volcanic rock foundation: moderately weathered basalt, dark gray to greenish-gray in color, strongly fractured. The rock is moderately strong to strong. Its distribution is local at G39 and G40 of the project.

❖ *Route section G43-ĐC (36 boreholes)*

- Layer 1: Greenish-gray to ash-gray silty clay, in very soft plastic state. Thickness within its distribution area ranges from 4.5 m to 12 m.
- Layer 1a: Brownish-gray to greenish-gray silty clay, in soft plastic to stiff plastic state. Thickness within its distribution area ranges from 2 m to 10 m.
- Layer 1b: Brownish-gray to whitish-gray silty clay, in semi-hard to hard state, containing lateritic concretions. Thickness within its distribution area ranges from 1.2 m to 5.3 m.
- Layer 2: Gray-brown to dark brown silty clay, in semi-hard to hard state, containing a small amount of gravel and pebbles. Thickness within its distribution area ranges from 3 m to 10.7 m.
- Layer 3: Dark brown, dark yellow to yellowish-gray sandy silt, in plastic to hard state, containing a small amount of gravel and pebbles. Thickness within its distribution area ranges from 1.3 m to 5 m.
- Layer 3a: Dark yellow to yellow-brown silty clay, in soft plastic to stiff plastic state. Thickness within its distribution area ranges from 1.5 m to 5 m.

Hydrogeology:

Based on the geological structure and the characteristics of the soils and rocks in the area, the hydrogeological conditions are divided into the following aquifers:

- Pore aquifer in Quaternary sediments: this aquifer contains groundwater existing and moving within the pores of unconsolidated soils and rocks such as sand, gravel, and cobbles. The aquifer thickness is small. The groundwater here is closely related to river water. The recharge sources for groundwater are rainwater and surface water, while the discharge area is the river and stream system in the region.
- Fracture aquifer in sedimentary, intrusive, and volcanic rocks: water is stored and moves within rock fractures, crushed zones, and fault zones. The groundwater level fluctuates seasonally. In the rainy season, the groundwater table is usually located within the strong and intense weathering zones; in the dry season, the groundwater table lies deeper within rock zone IB or IIA, or within tectonic crushed zones. This aquifer has poor water-bearing capacity and low

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yield. The main recharge source is rainwater, with water percolating downward from upper layers. The discharge areas are riverbanks, streams, mountain slopes, and lower aquifer complexes.

Dynamic geological phenomena – earthquakes:

According to QCVN 02:2022/BXD - National Technical Regulation on Natural Condition Data Used in Construction, Chapter 6: Earthquake Data, Appendix 6.1: Ground acceleration zoning by administrative locality, and Appendix 6.2: Conversion from peak ground acceleration to earthquake intensity according to the MSK-64 scale, the survey area has the following ground acceleration and earthquake intensity:

Table 11: Earthquake zoning by commune-level administrative unit

No.	Province/commune	Ground acceleration (a)g	Earthquake intensity (MSK-64 scale)
1	**Dak Lak Province**		
1.1	Ea Kiet Commune	0.0101	V
1.2	Ea M'Droh Commune	0.0084	V
1.3	Ea Wer Commune	0.0084	V
2	**Lam Dong Province**		
2.1	Dak Wil Commune	0.0123	V
2.2	Nam Dong Commune	0.0164	V
2.3	Cu Jut Commune	0.0339	VI
2.4	Dak Mil Commune	0.0339	VI
2.5	Nam Da Commune	0.0123	V
2.6	Dak Sak Commune	0.0164	V
2.7	Krong No Commune	0.0339	VI
2.8	Dak Song Commune	0.0339	VI
2.9	Duc An Commune	0.0123	V
2.10	Truong Xuan Commune	0.0164	V
2.11	Quang Tan Commune	0.0339	VI
2.12	Quang Tin Commune	0.0123	V
3	**Dong Nai City**		
3.1	Tho Son Commune	0.0379	VI
3.2	Dak Gan Commune	0.0179	V
3.3	Bom Bo Commune	0.0179	V
3.4	Phu Nghia Commune	0.0717	VII
3.5	Dak O Commune	0.0379	VI
3.6	Da Kia Commune	0.0179	V
3.7	Phuoc Binh Ward	0.0179	V
3.8	Binh Tan Commune	0.0717	VII
3.9	Phu Rieng Commune	0.0379	VI

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No.	Province/commune	Ground acceleration (a)g	Earthquake intensity (MSK-64 scale)
3.10	Long Ha Commune	0.0379	VI
3.11	Tan Hung Commune	0.0179	V
3.12	Tan Quan Commune	0.0179	V
3.13	Binh Long Ward	0.0717	VII
3.14	Minh Duc Commune	0.0379	VI
3.15	Tan Khai Commune	0.0179	V
4	**Ho Chi Minh City**		
4.1	Minh Thanh Commune	0.0639	VII
4.2	Dau Tieng Commune	0.0639	VII
5	**Tay Ninh Province**		
5.1	Loc Ninh Commune	0.0578	VI
5.2	Hung Thuan Commune	0.0578	VI

Source: QCVN Regulation 02:2022/BXD

Resistivity of the soil

Based on the compiled results of the investigation and document collection carried out by the JV of Power Construction Consulting Joint Stock Company 2, Power Construction Consulting Joint Stock Company 3, and Power Construction Consulting Joint Stock Company 4, the soil resistivity values are as follows:

- For sections of the route passing through accumulation landforms, the apparent resistivity ranges from 50 to 500 (Ωm).
- For sections of the route passing through *erosional and denudational landforms*:
  + In low hilly and mountainous areas with absolute elevation of <600 m, the apparent resistivity ranges from 700 to 2,000 (Ωm).
  + In high hilly and mountainous areas with absolute elevation of >600 m to 1,200 m, the apparent resistivity ranges from 1,000 to 5,000 (Ωm).
  + In the Ba Mieu Formation sedimentary area (sand, gravelly sand and pebbles), the apparent resistivity is approximately 1,500 to 5,000 (Ωm).

Assessment of engineering geological conditions

The 500kV Krong Buk - Tay Ninh 1 transmission lines pass through various terrain and geomorphological types with different geological conditions. Based on the engineering geological characteristics, the route is divided into the following sections:

- Low to medium hilly and mountainous areas account for the majority of the transmission line route and are distributed in sections within Dak Lak Province, Lam Dong Province, and Dong Nai City. The hilly terrain is in the form of gently undulating domes. The stratigraphy consists of colluvial-deluvial residual soil layers (edQ) with an average overburden thickness of 4 m to 10 m or greater than 1 m, overlying the weathered zones of the bedrock. The physico-mechanical properties of this zone are relatively good. However, the thickness of these zones is uneven and subdivided into smaller layers depending on the specific location and geomorphological type. In some areas, sandy silt layers occur within zone IA2, with poor cohesion and high permeability, and in some places these layers are exposed directly at the surface.

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- Steep high hilly and mountainous areas also account for part of the transmission line route and are distributed in sections within Lam Dong Province and part of Dong Nai City. The terrain is mainly rugged high hills and mountains, with difficult access. The stratigraphy consists of colluvial-deluvial residual soil layers with an average overburden thickness of 5 m to 10 m, overlying the weathered zones of the bedrock. The physico-mechanical properties of this zone range from medium to good. However, the thickness of these zones is uneven and subdivided into smaller layers depending on each location and geomorphological type. At some locations, sandy silt layers occur within zone IA2, with poor cohesion and high permeability, and in some places these layers are exposed directly at the surface.
- The section of the route passing through Ho Chi Minh City and Tay Ninh Province has relatively flat terrain, with groundwater level ranging from 1 m to 4 m below ground surface, and with the presence of sand and sandy silt layers.

3.1.3. Climatic conditions

The route section G1-G32 passing through Dak Lak Province. The climate is characterized both by a humid tropical highland climate and by the influence of the hot, dry Southwest monsoon. The climate has two distinct seasons: the rainy season from May to October, accounting for 91% of the annual rainfall, and the dry season from November to April of the following year.

- The average annual temperature is 24-25°C; the highest temperature is 27.1°C, with May being the hottest month. The lowest temperature is 20.6°C, with January being the coldest month.
- The average annual rainfall for the whole area is 1,500-2,000 mm. The average air humidity is 82%, and the total annual evaporation is approximately 1,800 mm.
- The wind regime in the area is governed by two prevailing wind directions, corresponding to the two distinct seasons. In the rainy season, the prevailing winds are West and Southwest, with average wind speed at the beginning of the season reaching 2.5-3 m/s. In the dry season, the prevailing wind direction is Northeast; from December to April of the following year, the wind direction gradually shifts to the East due to the strengthening Pacific atmospheric circulation, which gradually overcomes the Southwest wind pattern. The easterly wind blows strongly, with average wind speed of 4.5-6 m/s. The maximum wind speed recorded at Buon Ma Thuot Station is 22 m/s.
- The seasonal wind regime with prevailing wind directions is as follows: from May to September: West (W) and Southwest (SW); from October to April of the following year: Northeast (NE) and East (E). The area has a very high total annual sunshine duration of approximately 2,400 hours. From January to June, the average sunshine duration is higher than in the remaining months, reaching its maximum in March, and the average solar radiation intensity is 4.94 kWh/m²/day.

The route section G32-G48 passing through Lam Dong Province. This is a transitional area between the Central Highlands and the Southeastern climatic sub-regions. Its climate generally has the characteristics of a sub-equatorial tropical monsoon climate; however, due to the uplifted topography, it also has the characteristics of a humid tropical highland climate and is also influenced by the hot, dry Southwest monsoon. Each year has two distinct seasons: the rainy season from April to the end of November, accounting for more than 90% of the annual rainfall, and the dry season from December to the end of March of the following year, when rainfall is negligible.

- The average annual temperature is 22-23°C, and the highest temperature is 35°C, with April being the hottest month. The lowest temperature is 14°C, with December being the coldest month. The average total annual sunshine duration is 2,000-2,300 hours.

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- The average annual rainfall is 2,513 mm, and the maximum annual rainfall is 3,000 mm. The rainiest months are August and September; the driest months are January and February.
- The average air humidity is 84%. Evaporation in the dry season is 14.6-15.7 mm/day, while in the rainy season it is 1.5-1.7 mm/day.
- The prevailing wind direction in the rainy season is Southwest, while the prevailing wind direction in the dry season is Northeast. The average wind speed is 2.4-5.4 m/s, and storms are almost absent.

The route section G48-ĐC passes through Dong Nai City, Ho Chi Minh City, and Tay Ninh Province. This area is characterized by a tropical monsoon climate with high temperature and humidity. The climate is divided into two distinct seasons during the year: the rainy season from May to October, during which the area is dominated by the Southwest monsoon, and the dry season from November to April of the following year, during which the weather regime is influenced by the Northeast monsoon, with low rainfall and low humidity. In November, rainfall still occurs but has already decreased significantly in both amount and spatial extent. From February, the air temperature gradually increases and usually reaches its annual maximum in April and May.

3.1.4. Climate change and challenges in the project area

The project area is affected by many extreme weather phenomena typical of the Central Highlands and Southeast region, including thunderstorms, lightning, localized heavy rain and the indirect influence of storms or tropical depressions. These phenomena are mainly concentrated during the rainy season (from May to October) and can significantly affect the construction and operation of power transmission lines.

Thunderstorm phenomenon

The project area has distinct seasonal thunderstorms, with the number of thunderstorms concentrated mainly during the rainy season (from around April to October). The average number of thunderstorms per year ranges from 57.8 days in Dak Nong to 107.2 days in Phuoc Long, while Buon Ma Thuot, Dong Xoai and Tay Ninh recorded about 74.0; 103.3 and 104.2 days/year. The highest number of thunderstorms usually occurs in May–September, indicating an increased risk of thunderstorms during this period. This shows that Dong Nai and Tay Ninh cities have a stronger level of convective activity, leading to a higher risk of lightning, gusty winds and heavy rain during the construction season. Details of the average number of winter days by month and year are presented in Table A3.1, Appendix Chapter 4.

Lightning phenomenon

The density of lightning strikes along the project corridor is relatively high, ranging from 10.9 to 14.9 times/km²/year. The lowest value of about 10.9 times/km²/year was recorded in the Krong No area (Lam Dong). While many areas in Dak Lak, Lam Dong, Dong Nai city, Ho Chi Minh City and Tay Ninh have lightning densities of about 13.7–14.9 times/km²/year. The areas of Dong Phu, Hon Quan (Dong Nai city), Dau Tieng (Ho Chi Minh City) and Duong Minh Chau, Trang Bang (Tay Ninh) are the places with the highest lightning density on the route. This condition shows that lightning is a noteworthy natural hazard for the construction, operation and maintenance of 500kV transmission lines, especially during the thunderstorm season. Detailed data for each area are presented in Table A3.2, Appendix Chapter 4.

Storms: Historical data shows that the coastal area from Binh Dinh to Ninh Thuan has been affected by many tropical cyclones/typhoons in the period 1961 to the present, with prevalent intensities ranging from 6–10 and some stronger cases, such as Hagibis, Cimaron and Kyle reaching levels 12–13. For the area from Binh Thuan to Ca Mau, the monitoring history also

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recorded many cases of typhoons and tropical depressions, of which Durian (2006) reached level 13 and Tess (1988) reached level 11. Although most of the project route passes through the inland area and is not directly affected by the storm like coastal areas, statistics show that the South Central and Southeast coastal areas still regularly record storms and tropical depressions that make landfall in the area that can cause heavy rains, strong winds and extreme weather conditions, thereby indirectly affecting access traffic, construction and operation of the project, especially in the period from September to December, with intensities ranging from level 6 to level 13. The list of historical storms is detailed in Tables A3.3 and A3.4, Appendix Chapter 3.

Overall, in terms of climate risk exposure, the Central Highlands region (Dak Lak and Lam Dong) is characterized by a moderate to high thunderstorm frequency and moderate lightning density, whereas the Southeast region (Dong Nai and Tay Ninh) experiences high thunderstorm frequency and lightning density and is also more distinctly affected by tropical cyclone circulation and tropical depressions. These extreme weather phenomena are considered key baseline factors to be taken into account in the project's Environmental and Social Impact Assessment (ESIA), particularly in relation to construction safety, foundation stability, the risk of schedule disruption, and the operational safety of the power transmission line.

3.1.5. Hydrology

a. General characteristics

❖ *Route section G1-G43:*

The G1–G43 section of the Project is located within the Serepok and Krong No river basins, with the Serepok River as the main watercourse and an important tributary of the Mekong River.

The Serepok River originates from the southern part of the Truong Son Range and flows through the former provinces of Dak Lak and Dak Nong (now Lam Dong Province) before entering Cambodia and discharging into the Mekong River. The Serepok River basin has a large catchment area, covering most of the former Dak Lak and Dak Nong areas.

The Krong No River is a tributary of the Serepok River. It flows through Cu Jut and Krong No districts of Dak Nong Province and joins the Serepok River near the boundary between Dak Lak and Dak Nong. The Krong No River has a relatively stable flow regime, but also shows clear seasonal variation, with the rainy season lasting from May to October, similar to the Serepok River. Floods during the rainy season may cause inundation in low-lying areas, while during the dry season, the river may dry up.

The rivers and streams in the area crossed by the transmission line are generally short and steep. Floods are characterized by rapid rise and short duration.

The hydrological regime of these river and stream basins has two seasons: the dry season and the flood season. The dry season lasts from December to April of the following year, while the flood season usually occurs from May to October, with high rainfall concentrated in July, August, and September.

❖ *Route section G43-ĐC:*

The G43-ĐC section of the project is located in the Be and Saigon river basins.

The Be River has a length of approximately 344 km and a basin area of about 7,650 km². The river originates at an elevation of approximately 750–850 m in the western area of Lam Dong Province, flows through Lam Dong Province, Dong Nai City, and Ho Chi Minh City, and joins the Dong Nai River at the Hieu Liem confluence downstream of the Tri An Hydropower Dam. Cascade reservoirs on the Be River include Thac Mo, Can Don, Srok Phu Mieng, and Phuoc Hoa.

The Sai Gon River has a total length of approximately 250 km, originates from the western area

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of Dong Nai City, flows through Dong Nai City, Tay Ninh, and Ho Chi Minh City, and finally joins the Dong Nai River at Mui Den Do in Phu Thuan Ward, Ho Chi Minh City. On the Sai Gon River, there is the Dau Tieng irrigation reservoir, which was formed by damming the Sai Gon River in the border area between Loc Ninh Commune, Tay Ninh Province and Dau Tieng Commune, Ho Chi Minh City.

The flow regime of the Be River and the Sai Gon River has two seasons during the year: the flood season begins from June to November, with the largest floods usually concentrated in September and October each year. The dry season lasts from December of the previous year to May of the following year, with the lowest flows usually occurring in March and April.

In terms of tidal regime, the downstream section of the Sai Gon River is affected by irregular semidiurnal tides, with water levels rising and falling twice within a day; each month has two spring tide periods and two neap tide periods. The period of the highest spring tides in the year is around October to December.

b. Hydrological characteristics along the transmission line route

The G1–G20 section crosses many medium and small streams, of which the section from G12 to G12A1 passes through the water intake and the downstream part of the spillway of the Srepok 3 Hydropower Plant. However, most of the transmission line route runs along hillsides and hilltops, which are areas at higher elevations than the main watercourses such as rivers and streams. Therefore, the likelihood of being directly affected by surface water or flooding is low.

The G20–G43 section is mainly perennial cropland such as pepper, cashew, and coffee, and crosses several small streams, as well as crossing a branch of the Thac Mo Hydropower Reservoir and the Be River.

The G43–DC section successively crosses the following rivers and streams:

- The G52B–53B section crosses a large stream that forms the natural boundary between Dong Nai City and Ho Chi Minh City.
- The G47–G47A section crosses the Be River, with a crossing width of approximately 88 m.
- The G59–G60 section crosses the Sai Gon River at a location 4.8 km downstream of the Dau Tieng Reservoir, with a river crossing width of approximately 65 m (under non-flood conditions).
- The G63–G64 section runs along the right bank of the Sai Gon River and crosses the river confluence where Cau Ngang Canal meets the Sai Gon River, with a crossing width of approximately 320 m.
- In addition, it also crosses many gullies, irrigation canals, and small ponds and lakes.

c. Survey of highest flood water levels

At locations where the route passes through low-lying areas and crosses rivers and streams, field surveys and information collected from local communities along the route show that the project area has been affected by flood events of varying magnitudes and at different times. Flood marks were mainly recorded along rivers, streams, and hydraulic structures, including Ea M'Droh, Suoi Duc (Ea Tul), Srepok River, Dak Sor Stream, Lo O Stream, Dak Mam Stream, Dak Drung Stream, Dak Gouat Stream, Dak Tih Stream, Dak R'lap River, Be River, and Sai Gon River.

Historical flood marks were recorded in many years, notably 1999, 2000, 2013, 2016, 2018, 2019, and 2023, of which some areas recorded annual high water levels or major flood events. In the upstream area, the survey points within the Srepok River basin and its tributaries recorded relatively high flood marks, while downstream areas along the Be River and the Sai Gon

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River also recorded historical flood levels, particularly in 2000. In addition, at some locations, community information indicates that water levels may reach high levels during annual flood events.

The survey results show that flooding is a natural risk factor that needs to be considered in the design and construction of the project, particularly at tower foundation locations near rivers, streams, and low-lying areas. Information on historical flood marks, including location, water level, and time of occurrence, has been used as reference for flood risk assessment and the design of the project's natural disaster risk management measures. Details of the survey points and historical water level values are presented in Table A3.5, Appendix to Chapter 3.

3.1.6. Natural resources

Mineral resources

The project area extends from the basaltic plateaus of the Central Highlands to the Southeast region; therefore, mineral resources show clear differentiation. The most notable resources are bauxite in the Lam Dong–former Dak Nong area; basalt, construction stone, and common construction materials in Dak Lak, former Dong Nai–Binh Phuoc, and the former Binh Duong area; together with sand, gravel, and clay distributed across many localities.

Dak Lak has fairly good mineral potential, in which non-metallic minerals and construction materials are predominant. The main types include basalt/building stone, dimension stone, sand, gravel, and brick and tile clay; in addition, there are several small and scattered occurrences of placer gold and tin. The basaltic geological characteristics of the Buon Ho–Krong Buk area and surrounding areas also provide a source of basalt with value as construction material.

Lam Dong has bauxite as its most prominent resource, widely distributed across the basaltic plateaus of former Dak Nong and Lam Dong; the former Dak Nong area belongs to a region with large bauxite reserves in Viet Nam and is associated with alumina mining and processing activities. In addition to bauxite, there are also construction stone, fill materials, and several other metallic/non-metallic minerals.

Some tower foundation locations within the G1–G12A anchor section and the G17–G32 anchor section of the Project are located within the national mineral reserve area approved by the Prime Minister under Decision No. 1277/QD-TTg dated 1 November 2023, and within the bauxite planning area under Decision No. 866/QD-TTg dated 18 July 2023 of the Prime Minister approving the Plan for exploration, exploitation, processing and use of minerals for the 2021–2030 period, with a vision to 2050.

According to the *Report on the assessment of the level of impact of the Project "500kV Krong Buk – Tay Ninh 1 Transmission Lines" on mineral resources, reserves, and quality within the national mineral reserve area and the planned area for exploration, exploitation, processing, and use of minerals for the 2021–2030 period, with a vision to 2050*, prepared by Power Engineering Consulting Joint Stock Company 3 in January 2026, the geological and mineral characteristics of the project area are as follows:

- The tower foundation areas are located within the basalt eruptive formation of the Tuc Trung Formation (B/N2-Q1tt), which is rather widely distributed in large masses; most of it has been weathered and formed into a lateritic weathering crust containing bauxite. Bedrock remains only in very small areas distributed in low-lying topographic locations.
- In addition to bauxite formed through weathering processes, the area also contains kaolin, construction materials, and others associated with the basalt eruptive formation of the stratigraphic unit.

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- The lateritic weathering crust in the area consists of products formed from the in-situ decomposition of basalt of the Tuc Trung Formation under the action of weathering factors such as temperature, water, and oxygen. The weathering process creates products with new mineral composition, texture, and structure that are stable under exogenic conditions.

The current status of mineral resources and reserves in the project area is as follows:

The areas of tower foundations G6 to G8, G24 to G26, and G31 are located within the national mineral reserve area under Decision No. 1277/QD-TTg dated 1 November 2023 of the Prime Minister. Specifically:

- The construction area of tower foundations G6 to G8 is located within 92.15 ha of the Cu M'Gar 2 and 3 lateritic iron mineral reserve area, Krong Buk, former Dak Nong Province, with reserved lateritic iron resources of 81,000 thousand tonnes of concentrate ore (reserved resources category 334a), within a reserve extent from the surface to a depth of 10 m below the ground surface.
- The construction area of tower foundations G24 to G26 is located within 18.72 ha of the North Gia Nghia bauxite mineral reserve area, with reserved bauxite resources of 12,833 thousand tonnes of concentrate ore (reserved resources category 334a), within a reserve extent from the surface to a depth of 10 m below the ground surface.
- The construction area of tower foundation G31 is located within 103.83 ha of the Dak R'lap bauxite mineral reserve area, with reserved bauxite resources of 30,615 thousand tonnes of concentrate ore (reserved resources category 334a), within a reserve extent from the surface to a depth of 10 m below the ground surface.
- The construction area of tower foundations G17 to G21 and G27 to G30 is located within the planned area for exploration, exploitation, processing, and use of bauxite minerals for the 2021–2030 period, with a vision to 2050 under Decision No. 866/QD-TTg dated 18 July 2023 of the Prime Minister. The total reserves and forecast resources of bauxite ore in the Dak Nong area are 4,290,694 thousand tonnes of raw ore, of which the total planned reserves are 1,784,461 thousand tonnes, and the resources and forecast resources are 2,506,233 thousand tonnes.

Dong Nai and the former Binh Phuoc area have significant mineral resources for construction materials, including construction stone, basalt, brick and tile clay, and fill materials. Project documents record that the former Dong Nai planning area had 40 construction stone quarries with a total area of more than 1,400 ha and approximately 9 clay mines expanded/supplemented with a total area of more than 470 ha. The former Binh Phuoc area also has basalt and construction stone distributed on basaltic geological formations.

The section passing through Ho Chi Minh City is located mainly within the former Binh Duong area; therefore, the directly relevant mineral characteristics are the construction material resources of this area, such as construction stone, sand, and some common construction materials.

The mineral resources of Tay Ninh Province are mainly minerals used as construction materials such as stone, sand, and clay; their scale and value are generally not as prominent as the bauxite of the Central Highlands or the construction stone clusters of Dong Nai–Binh Duong.

Soil and land resources

Soils along the route reflect the transition from the basaltic plateaus of the Central Highlands to the low hills and plains of the Southeast region. Soil groups relevant to the Project include red soil/reddish-brown soil developed on basalt, grey soil on ancient alluvium, ferralitic soil, alluvial soil along rivers, and several localized specific soil groups. These soils also form the foundation of major perennial industrial crop areas such as coffee, pepper, rubber, cashew, and fruit trees; therefore, the land resource value within the transmission line corridor is primarily associated with agricultural and forestry production.

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Dak Lak has abundant land resources. Red basaltic soil is the characteristic soil group, with favorable fertility and geotechnical properties, and is widely distributed in Buon Ho, Krong Buk, and many surrounding areas; this is an important soil foundation for coffee, pepper, rubber, and fruit trees. In addition, there are also grey soils, alluvial soils along rivers, and ferralitic soils. Planning documents for Buon Ho indicate that reddish-brown and yellowish-brown soils on basalt account for more than 90% of the local area, clearly illustrating the pedological characteristics of the upstream part of the route.

The Lam Dong Province area is mainly characterized by plateau and undulating hill terrain with a thick basalt weathering layer; common soils include red-yellow soils, reddish-brown/yellowish-brown soils on basalt, and ferralitic soil groups. Basaltic soils have relatively high fertility, favorable for coffee, pepper, rubber, cashew, and fruit trees.

In Dong Nai, soils are interspersed between red basaltic soil/reddish-brown ferralitic soil and grey soil on ancient alluvium. The former Binh Phuoc area has many belts of red basaltic soil suitable for rubber, cashew, pepper, and perennial crops; some areas of Dong Phu record soils that are mainly red basaltic and reddish-brown ferralitic.

In Ho Chi Minh City, the characteristic soils are grey soil on ancient alluvium, interspersed with red basaltic/red-yellow soils in some areas; alluvial strips are distributed near the Sai Gon River and the Dong Nai River. The land is intensively used for rubber, perennial crops, industrial zones, and urban development.

Tay Ninh Province has five main soil groups with 15 soil types; grey soil is the dominant group, accounting for more than 84% of the area according to project documents. In addition, there are also acid sulfate soil, yellow grassland soil, alluvial soil, and peat soil in smaller proportions. Grey soil and ancient alluvial soil form the basis for areas producing sugarcane, cassava, rubber, cashew, and fruit trees. Project documents also indicate that most of the land fund is suitable for crop cultivation.

3.2. BASELINE ENVIRONMENTAL CONDITIONS

To assess environmental quality in the project area, in November 2025, Power Engineering Consulting Joint Stock Company 3 (PECC3), in coordination with HATICO Viet Nam Technology and Engineering Joint Stock Company, conducted surveys, sampling, and analysis of air, surface water, and soil quality along the transmission line route. Air sampling locations were selected at sites potentially affected in terms of air quality (road crossing locations with medium to high traffic density); surface water samples were collected at crossing points where stringing activities across rivers and streams would be implemented, or near rivers and streams (where accessible); soil sampling locations were selected at the starting point, the end point, and along the transmission line route.

HATICO Viet Nam Technology and Engineering Joint Stock Company has been recognized by the Ministry of Natural Resources and Environment as eligible to provide environmental monitoring services, under Certificate No. VIMCERTS 269. The sampling location layout is presented in the following figure:

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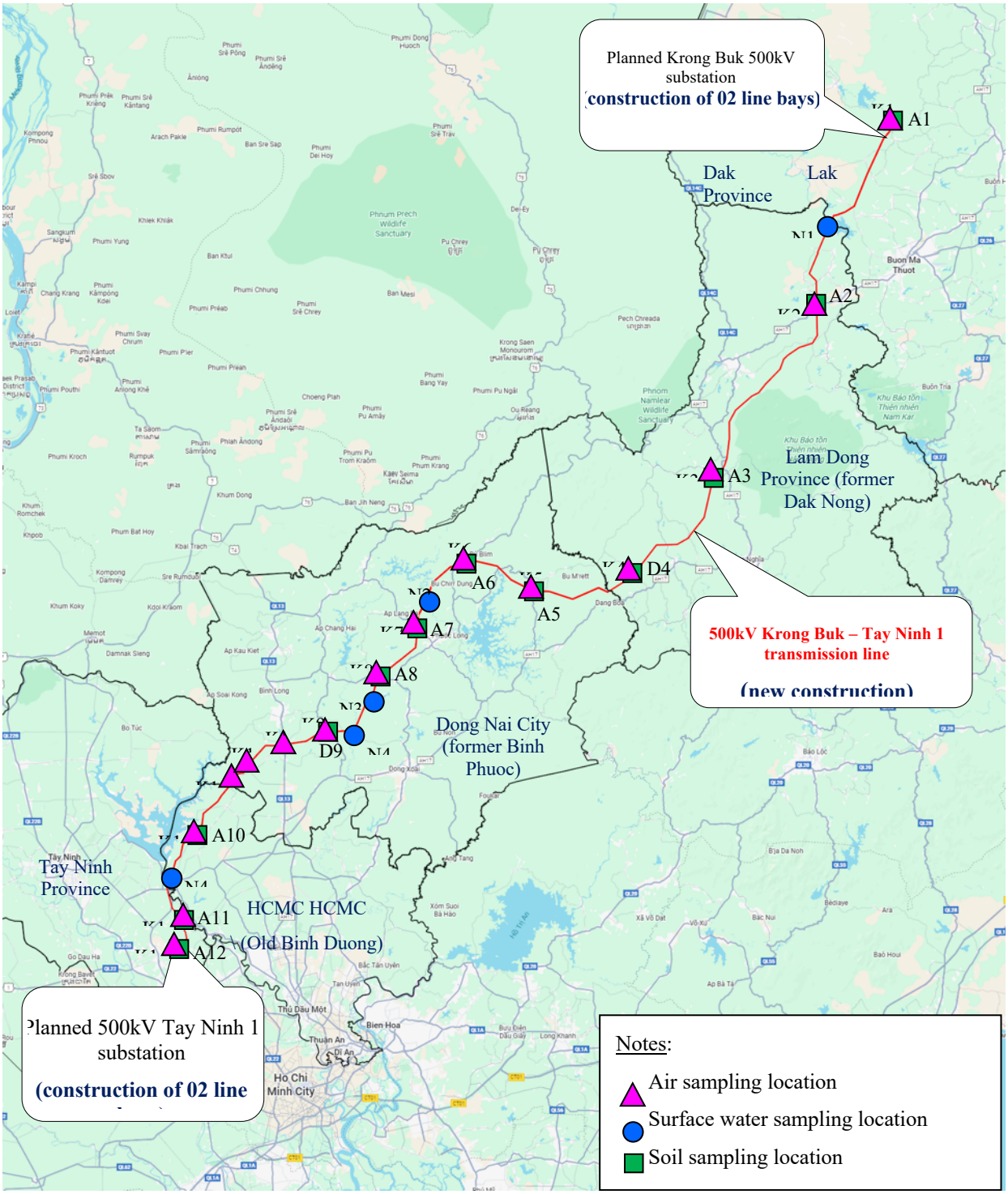


Figure 7: Diagram of air, surface water, soil sampling location

3.2.1. Air quality, noise

Fifteen five air samples along the transmission line route have been collected for the project. The selected sampling locations were sites potentially affected in terms of air quality by the Project's construction activities (road crossing points with medium to high traffic density) and accessible for sampling. The parameters measured and analyzed included noise, dust, CO, SO_2, and NO_2.

Monitoring results at the 15 locations within the project area show that the ambient air quality is relatively good and no signs of pollution have been recorded. Total dust concentrations ranged from 0.10–0.19 mg/m³, lower than the limit of 0.30 mg/m³ under QCVN

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05:2023/BTNMT. SO_2 concentrations ranged from 0.065–0.088 mg/m³, significantly below the limit of 0.35 mg/m³; while NO_2 concentrations ranged from 0.051–0.112 mg/m³, all below the limit of 0.20 mg/m³. CO concentrations were relatively stable, ranging from 5.06–5.81 mg/m³, lower than the limit of 30 mg/m³.

For noise, monitored values ranged from 54.5–60.1 dBA at locations K1–K15. These values are below the limit of 70 dBA under QCVN 26:2025/BTNMT, indicating that baseline environmental noise levels in the project area are currently within the prescribed limits. The variation among locations is not significant and may reflect differences in land use conditions, traffic, and community activities at each monitoring point.

Overall, all monitored air pollution parameters at all locations were within the allowable limits, indicating that baseline ambient air quality in the survey area has not been significantly affected by existing emission sources. This provides important baseline data for assessing changes in environmental quality during the construction phase, particularly with respect to potential impacts from excavation and filling activities, material transport, machinery, and construction works. Detailed monitoring results at each location are presented in Table A3.6, Appendix to Chapter 3.

3.2.2. Surface water quality

The Project collected surface water samples at five locations near the project area. The selected sampling locations were points where the transmission line runs near or crosses rivers and streams (where stringing activities would be carried out), which may be affected in terms of surface water quality by the Project's construction activities and are accessible for sampling. The measured parameters included pH, TSS, BOD_5, COD, total phosphorus (TP), total nitrogen (TN), and coliform.

The analytical results show that the indicators in the surface water samples along the project area generally comply with the National Technical Regulation on Surface Water Quality, QCVN 08:2023/BTNMT (Class B). However, the receiving water environment in the area shows signs of organic pollution from existing activities, as indicated by the biochemical oxygen demand (BOD_5) parameter, which exceeded the allowable standard in all five samples by 1.05 to 1.44 times, ranging from 6.31 to 8.65 mg/l (compared to the maximum limit of ≤6 mg/l). Therefore, surface water in the area shows signs of slight organic pollution in the sampled surface water, with moderate quality (Class B), and may be used for industrial and agricultural production purposes after application of appropriate treatment measures. Detailed monitoring results at each location are presented in Table A3.7, Appendix to Chapter 3.

3.2.3. Soil quality

The Project collected soil samples at 12 locations along the transmission line route. The selected sampling locations were at the beginning point, the end point, and along the transmission line, where soil quality may be affected by the Project's construction and operation activities, and which were accessible for sampling. The measured parameters included Pb, Zn, As, and Cd.

The results of the soil environmental quality analysis show that all indicators were below the allowable limits of QCVN 03:2023/BTNMT (Type I). Therefore, the soil environmental quality in the project area shows no signs of contamination. Detailed monitoring results at each location are presented in Table A3.8, Appendix to Chapter 3.

3.3. CURRENT STATUS OF FOREST RESOURCES AND BIODIVERSITY

3.3.1. Current status of biodiversity in the project area

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In the provinces of Dak Lak, Lam Dong (former Dak Nong), Dong Nai City (former Binh Phuoc), the project's line has several sections passing through forests and forest land. *By applying the Integrated Biodiversity Assessment Tool (IBAT) to the project area to support the screening of potential biodiversity risks. The results of the IBAT application show that the project area is not included in any of the protected areas under IBAT. See the image extracted from the IBAT tool when overlaying the location map of the project area.*

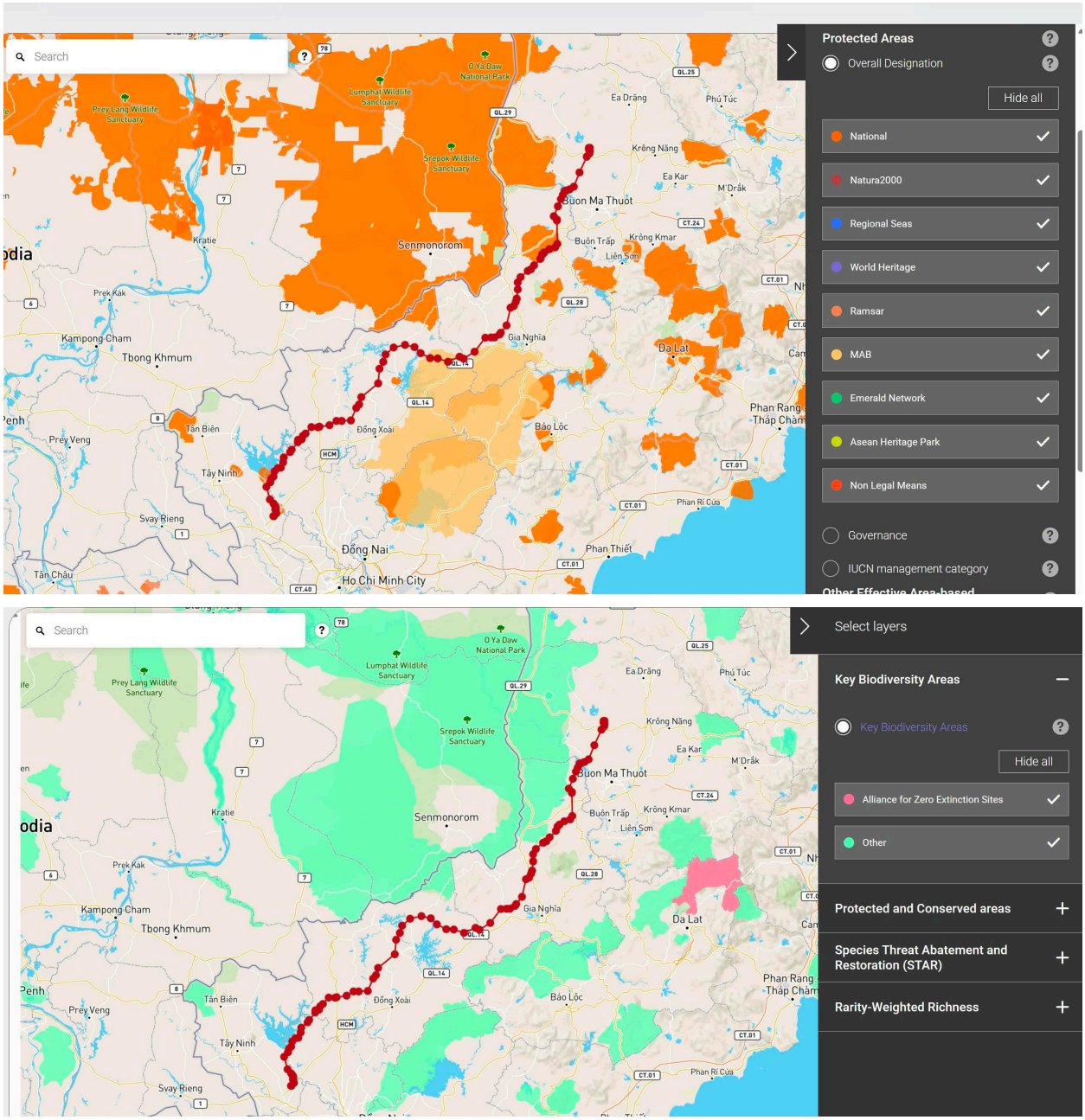


Figure 8: IBAT results in the project area

The distance from the 500kV transmission lines to the forest and biodiversity-sensitive receptors along the project area is statistically as follows:

Table 12: Distance from the line to sensitive receptors

No.	Sensitive receptors	Distance from 500kV transmission line to sensitive receptor
I	**Tay Ninh Province**	

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No.	Sensitive receptors	Distance from 500kV transmission line to sensitive receptor
1	Lo Go Sa Mat National Park	32 km
2	Canh Riec landscape protection area	24 km
3	Ba Den Mountain Landscape Protection Area	18 km
4	Landscape protection area of Dong Rum Base	32 km
5	Chau Thanh Base Landscape Protection Area	25 km
II	**Dong Nai City (former Binh Phuoc Province)**	
1	Cat Tien National Park	21 km
2	Bu Gia Map National Park	27 km
3	Ba Ra Mountain Landscape Protection Area	11 km
III	**Lam Dong Province (former Dak Nong Province)**	
1	Nam Nung Nature Reserve	6 km
2	Ta Dung National Park	42 km
3	Dray Sap – Gia Long Landscape Protection Area	6.5 km
IV	**Dak Lak Province**	
1	Yok Don National Park	6 km
2	Chu Yang Sin National Park	44 km
3	Ea So Nature Reserve	48 km
4	Thong Nuoc (Ea Ral) Species and Habitat Conservation Area	32 km
5	Trap Kso Species and Habitat Conservation Area	32 km
6	Lak Lake Landscape Protection Area	35 km

Notably, **Nam Nung Nature Reserve**, an area of high biodiversity value, is located approximately 6 km from the Project's transmission line to the reserve's forest area. The Management Board also stated that a biodiversity survey was completed in 2023; its findings are presented in a separate section below (Section 3.3.2.4).

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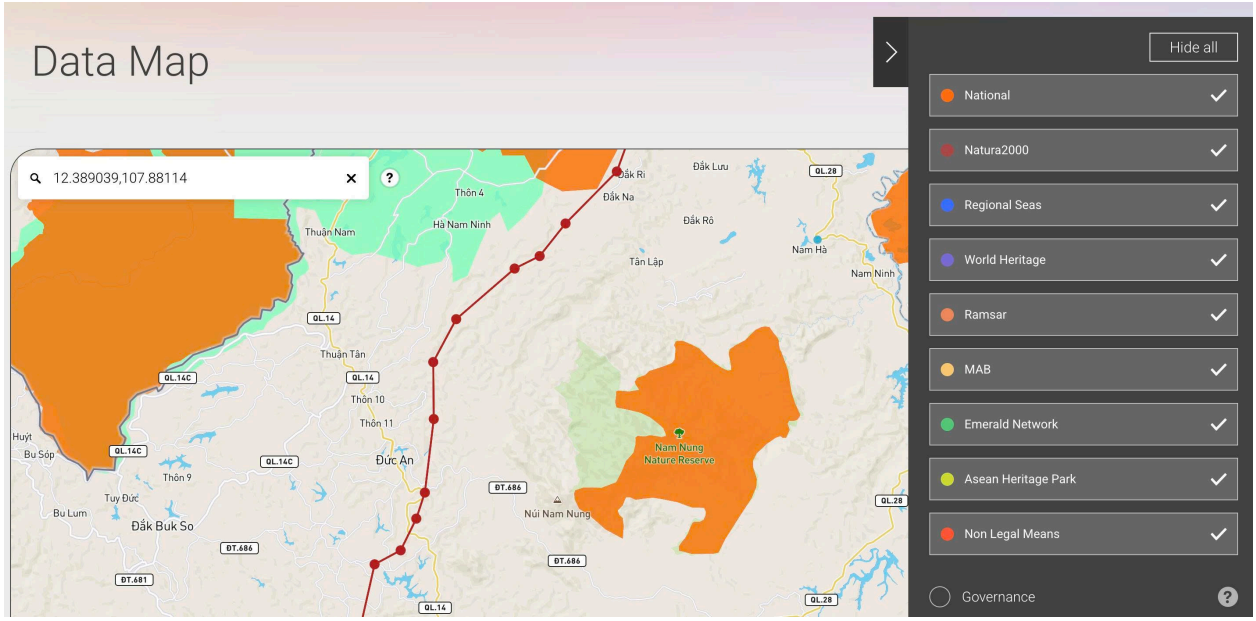


Figure 9: Results of IBAT at Nam Nung National Park

The current status of biological resources in the project area has been compiled based on the report on the investigation and assessment of the current status of forests and non-forested land prepared to support the application for approval of the conversion of forest land to other uses for project implementation, together with other relevant documents available for the areas traversed by the Project. The details are as follows:

3.3.1.1. Flora

Apart from some locations that pass through forests, the route mainly passes through areas where perennial trees such as acacia, rubber, cashew, pepper, coffee and fruit trees are grown. The route does not pass through any nature reserves or national parks.

a. Rice and annual crop cultivation area

Vegetation composition in these areas is relatively simple. In addition to rice, the cultivated crops include *cassava* (*Manihot esculenta*) and *maize* (*Zea mays*). Common naturally occurring herbaceous species include *Ludwigia octovalvis*, *Monochoria cyanea*, *Cynodon dactylon*, *Echinochloa crus-galli*, *Eragrostis pilosa*, *Eleusine indica*, and several representatives of the genus *Cyperus*.

b. Perennial crop gardens

Vegetation in these areas consists mainly of cultivated perennial species, including *Acacia auriculiformis*, *rubber (Hevea brasiliensis), cashew (Anacardium occidentale), pepper (Piper nigrum), coffee (Coffea arabica* and *Coffea robusta), jackfruit (Artocarpus heterophyllus), guava (Psidium guajava), mango (Mangifera sp.), banana (Musa sp.), mandarin (Citrus reticulata Blanco), orange (Citrus sinensis Osbeck),* and *lime (Citrus aurantiifolia).*

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Figure 10: Current status of plantation forest intercropped with industrial crops (pepper)

c. Plantation forest areas

The current status of planted forests in the project area was investigated by the Joint Venture of the Forest Science Institute of South Vietnam and Power Engineering Consulting JSC.3 in December 2024 and July 2025. The results show that vegetation in the planted forest areas of the Project includes three-needle pine, rubber, cashew, black siris, teak, and hybrid acacia, as follows:

❖ ***Current status of planted timber forests on hilly land and soil (TG)***

The current status of pure rubber plantations shows an average standing volume of 188.25 m³/ha, an average density of 885 trees/ha, an average D1.3 diameter of 17.8 cm, and an average Hvn[1] height of 15.2 m. This forest type is mainly distributed in the diameter classes of 18–22 cm (35.4%) and 14–18 cm (34.1% of density). The height distribution is relatively even in the classes of 13–15 m (47.2%) and 15–17 m (47.5%).

The current status of cashew plantations shows an average standing volume of 24.77 m³/ha, an average density of 227 trees/ha, an average D1.3 diameter of 15.7 cm, and an average Hvn height of 5.1 m. This forest type has diameter classes ranging from 6 to 38 cm, with the highest distribution in the 6–14 cm diameter classes (accounting for 27.3% and 25.5%, respectively). The height classes range from <5 to 9 m, with the highest distribution in the 5–7 m class (53.3%).

The current status of pure black siris plantations shows an average standing volume of 17.57 m³/ha, an average density of 560 trees/ha, an average D1.3 diameter of 10.5 cm, and an average Hvn height of 7.1 m. This forest type has diameter classes ranging from 6 to 18 cm and height classes ranging from 5 to 9 m. Trees are most concentrated in the 10–14 cm diameter class (71.4%) and the 5–7 m height class (78.6%).

The current status of pure teak plantations shows an average standing volume of 42.73 m³/ha, an average density of 740 trees/ha, an average D1.3 diameter of 13.3 cm, and an average Hvn height of 7.0 m. This forest type has diameter classes ranging from 6 to 22 cm and height classes ranging from 5 to 9 m. Trees are most concentrated in the 10–18 cm diameter classes (accounting for 54.1% and 21.6%, respectively) and in the 5–7 m height class (83.8%).

❖ ***Current status of three-needle pine plantations***

Three-needle pine planted in 1984 has an average density of 256 trees/ha, an average diameter

[1] **Hvn** denotes the total height of a tree (the distance from the base to the growing tip of the main stem) in forestry and timber measurement.

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at D1.3 of 31.4 cm, an average total height of 14.8 m, an average timber volume of 194.119 m³/ha, and an average canopy cover of 0.3.

Three-needle pine planted in 2011 has an average density of 136 trees/ha, an average diameter at D1.3 of 28.6 cm, an average total height of 11.5 m, an average timber volume of 53.797 m³/ha, and an average canopy cover of 0.2.



Figure 11: Current status of pine forest section crossing National Highway 14

❖ ***Current status of hybrid acacia plantations:***

Planting year 2021: the average density is 2,080 trees/ha, the average diameter at D1.3 is 8.1 cm, the average total height is 10.0 m, the average timber volume is 54.583 m³/ha, and the average canopy cover is 0.7.

Planting year 2022: the average density is 1,593 trees/ha, the average diameter at D1.3 is 7.6 cm, the average total height is 6.1 m, the average timber volume is 22.680 m³/ha, and the average canopy cover is 0.5.

❖ ***Current status of Khaya senegalensis plantations***

Planting year 2017: the average density is 420 trees/ha, the average diameter at D1.3 is 14.8 cm, the average total height is 8.2 m, the average timber volume is 36.986 m³/ha, and the average canopy cover is 0.5.

(Source: *Report on the results of investigation and assessment of the current status of forests and forestless land serving the preparation of the application for approval of the conversion of forest use purposes to other purposes for implementation of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project, by JV of Forest Science Institute of South Vietnam and Power Engineering Consulting JSC.3, 2025).*

d. Natural forest areas

The current status of natural forests within the project area was investigated by the Joint Venture of the Forest Science Institute of South Vietnam and Power Engineering Consulting JSC.3 in

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December 2024. The results indicate that the vegetation composition of the project's natural forest areas is as follows:

Based on the number of natural forest sample plots surveyed within the project's natural forest area (in Đak Lak Province), 31 tree species were recorded.

The Mixed Mountain Forest has a dominant species composition index of 71.1% and accounts for 70.1% of the stocking density, with dominant tree species including Da trâu (*Syzygium zeylanicum*), Căm xe (*Xylia xylocarpa*), Sơn rừng (*Melanorrhoea laccifera*), Cà chít (*Shorea obtusa*), and Cẩm liên (*Shorea siamensis*). Other tree species have a composition index of 28.9% and account for 29.9% of the stocking density.

The Poorly stocked broadleaf deciduous natural forest on mountain land has a dominant species composition index of 85.3% and accounts for 87.4% of the stocking density, with dominant tree species including Dầu lông (*Dipterocarpus intricatus*), Cẩm liên (*Shorea siamensis*), and Chiêu liêu (*Terminalia chebula*). Other tree species have a composition index of 14.7% and account for 13.3% of the stocking density.

The Poor broadleaf deciduous natural forest on mountain land has a dominant species composition index of 82.4% and accounts for 80.7% of the stocking density, with dominant tree species including Lim xẹt (*Peltophorum pterocarpum*), Dầu lông (*Dipterocarpus intricatus*), Cẩm lai (*Dalbergia oliveri*), and Chiêu liêu (*Terminalia chebula*). Other tree species have a composition index of 17.6% and account for 19.3% of the stocking density.

The broadleaf deciduous natural forest on mountain land without timber volume comprises dominant tree species including Chiêu liêu (*Terminalia chebula*), Dầu (*Dipterocarpus* spp.), Muồng đen (*Senna siamea*), and Cóc rừng (*Spondias pinnata*), with composition indices of 40.6%, 27.8%, 24.9%, and 6.8%, respectively.

3.3.1.2. Fauna

a. Rice and annual crop cultivation area

The most common are the White Stork *(Egretta garzetta),* Sparrow *(Passer montanus),* and *Centropus sinensis.* Some amphibian and reptile species were recorded in the survey such as: Domestic toad *(Bufo melanostictus),* Frog *(Hoplobatrachus rugulosus),* Water snake *(Xenochrophis piscator).*

b. Garden area

The most common species are the Sparrow *(Passer montanus),* the Centropus sinensis. Amphibians and reptiles include: House Toad *(Bufo melanostictus),* Frog *(Hoplobatrachus rugulosus),* Water Snake *(Xenochrophis piscator),* Green Snake *(Trimeresurus albolabris).* Long-tailed lizard *(Mabuya longicaudata),* Flower-shadowed lizard *(Mabuya multifasciata),* Tree frog *(Polypedates leucomystax),* Grasshopper *(Rana guentheri).*

c. Planted forest areas

At the time of the survey, no wild, rare, or valuable animal species were recorded in the planted forest areas within the project area. The fauna mainly comprises common species that are well adapted to the affected habitat conditions and human presence, including some rodents (mice, squirrels), small birds (sparrows), and insects (butterflies, ...).

d. Natural forest area

At the time of the survey, **no** wild, rare, or valuable animal species were recorded in the natural forest areas within the project area. The fauna mainly comprises common species that are well adapted to the affected habitat conditions and human presence, including some rodents (mice, squirrels), small birds (sparrows), insects (butterflies, ...), and reptiles. The ecosystem is a

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secondary forest ecosystem with a relatively low level of biodiversity and is less ecologically sensitive.

3.3.1.3. Biodiversity at Nam Nung Nature Reserve

According to the results of the site survey and discussions with the Management Board of Nam Nung Nature Reserve, the project does not pass through areas with high biodiversity value. According to the Management Board of Nam Nung Nature Reserve, the project route does not pass through the forest area under the management of the Nature Reserve. The closest distance to the forest area under its management is approximately 6 km, approximately 8–10 km to the biodiversity restoration area, and approximately 15–20 km to the core zone.

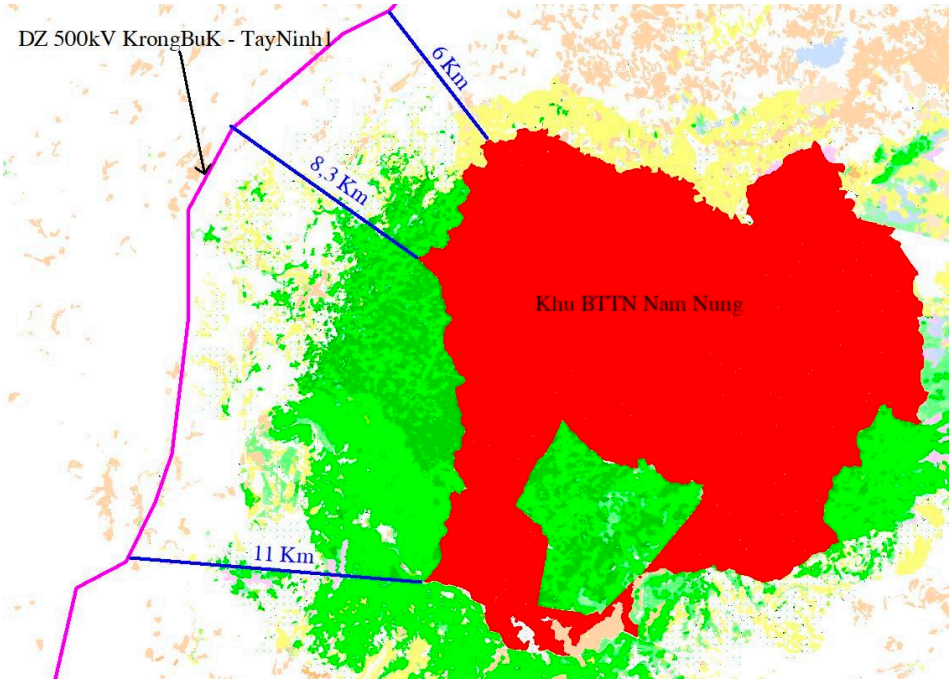


Figure 12: Distance from the project to Nam Nung Nature Reserve

According to the Sustainable Forest Management Plan for the period 2026–2035 of the Nam Nung Nature Reserve Management Board, prepared in May 2026, Nam Nung Nature Reserve has a total land area under management of 23,297.46 hectares *(including: forest and forestry land area of 23,296.47 hectares; non-agricultural land area of 0.99 hectares)*, located within the administrative boundaries of six communes, including Quang Son, Dak Song, Truong Xuan, Quang Phu, Nam Nung, and Nam Da. The terrain mainly consists of numerous low and medium mountain ranges, typically the Nam Nung range, with Nam JerBri peak reaching an elevation of 1,578 m. Although the area is relatively small compared with other protected areas in the Central Highlands region, it has a highly diverse and rich forest ecosystem, including closed evergreen forests, subtropical moist forests, and tropical moist evergreen closed forests, with a very high level of biodiversity. The Nature Reserve is home to many rare animal species listed in the Viet Nam Red Data Book, including *Gaur, Clouded Leopard, Yellow-cheeked Gibbon, Pygathrix nemaeus, Pig-tailed Macaque, and Red-faced Macaque*, as well as precious and rare plant species that are at risk of extinction, including *Dalbergia bariensis, Pterocarpus macrocarpus, Nageia wallichiana, Podocarpus neriifolius, Afzelia xylocarpa, Aquilaria crassna, and Keteleeria evelyniana*, etc.

1. Current status, area, status and quality of forests of Nam Nung Nature Reserve

The total area of forests and forestry land managed by the Management Board of Nam Nung Nature Reserve is 23,296.47 hectares (22,752.39 hectares of forested land; 544.08 hectares of non-forested land), including: Special-use forests: 16,570.60 hectares (16,391.14 hectares of forested land; 179.46 hectares of non-forested land); Protection forests: 6,696.03 hectares (6,332.25

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hectares of forested land; 501.20 hectares of non-forested land); Production forests, outside the forest planning: 29.84 hectares (29.00 hectares of forested land; 0.84 hectares of non-forested land).

Characteristics and distribution of forest types and forest states:

Nam Nung Nature Reserve is predominantly composed of secondary forests formed as a result of human impacts. The main forest types are evergreen and semi-deciduous broadleaf forests, with the following forest states:

- Rich evergreen forest: An area of 6,255.67 hectares, accounting for 26.85% of the total area. This forest type has not been significantly affected and is currently growing and developing well, with a stable canopy structure. The main species include Trám (*Canarium* spp.), Còng (*Calophyllum* spp.), Xương gà (*Garcinia hanburyi*), Chua khế, Trâm (*Syzygium* spp.), Dẻ (*Castanopsis* spp.), Sao (*Hopea* spp.), and Dầu gió (*Dipterocarpus* spp.), etc. This forest type has a high timber volume and relatively good quality.
- Medium evergreen forest: An area of 10,264.57 hectares, accounting for 44.06% of the total area. This forest type has been subject to relatively limited impacts in the past and is currently growing and developing well, with a stable canopy structure. The main species include Trâm (*Syzygium* spp.), Chò xót (*Schima wallichii*), Trám (*Canarium* spp.), Dẻ (*Castanopsis* spp.), Sao (*Hopea* spp.), and Kền kền (*Hopea pierrei*), etc. This forest type has relatively high timber volume and quality.
- Poor evergreen forest: An area of 1,841.18 hectares, accounting for 7.90% of the total area. This forest type has been heavily impacted in the past, with the canopy structure extensively disrupted in large patches. Some large trees of poor quality remain in the upper canopy layer, while numerous climbing vines and shrubs have encroached. The main species include Trâm (*Syzygium* spp.), Chò xót (*Schima wallichii*), Trám (*Canarium* spp.), Dẻ (*Castanopsis* spp.), and Cầy (*Irvingia malayana*), etc. This forest type has low timber volume and poor quality.
- Degraded evergreen forest: An area of 177.75 hectares, accounting for 0.76% of the total area. This forest type has been heavily impacted, with the canopy structure extensively disrupted in large patches. Some large trees of poor quality remain in the upper canopy layer, while numerous climbing vines and shrubs have encroached. The main species include Trâm (*Syzygium* spp.), Chò xót (*Schima wallichii*), Trám (*Canarium* spp.), Dẻ (*Castanopsis* spp.), and Cầy (*Irvingia malayana*), etc. This forest type has low timber volume and poor quality.
- Regenerating evergreen forest: An area of 14.32 hectares, accounting for 0.06% of the total area. This forest type has been heavily impacted or has developed on areas of shifting cultivation abandoned many years ago. The forest is currently regenerating, with light-demanding and fast-growing tree species, together with numerous climbing vines and shrubs.
- Medium semi-deciduous forest: An area of 110.57 hectares, accounting for 0.47% of the total area. This forest type has been relatively heavily impacted but without significantly altering the forest structure, with a canopy cover of 0.5–0.7. The main species belong to the families Dipterocarpaceae, Lythraceae, Combretaceae, Fabaceae, Sterculiaceae, Sapindaceae, Malvaceae, Fagaceae, Caesalpiniaceae, Meliaceae, etc.
- Poor semi-deciduous forest: An area of 928.13 hectares, accounting for 3.98% of the total area. This forest type has been heavily impacted, with the forest structure disturbed and extensively disrupted in large patches. The canopy structure is unclear, with a canopy cover of 0.3–0.4. The main plant families include Dipterocarpaceae, Clusiaceae, Combretaceae, Fabaceae, Sterculiaceae, Sapindaceae, Malvaceae, Fagaceae, Caesalpiniaceae, Meliaceae, etc.
- Degraded semi-deciduous forest: An area of 15.70 hectares, accounting for 0.07% of the total area. This forest type has been heavily impacted, with the canopy structure extensively

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disrupted in large patches. Some large trees of poor quality remain in the upper canopy layer, while numerous climbing vines and shrubs have encroached. The main species belong to the families Sapindaceae, Malvaceae, Fagaceae, Caesalpiniaceae, etc. This forest type has low timber volume and poor quality.

- Regenerating semi-deciduous forest: An area of 0.02 hectares, accounting for 0.00% of the total area. This forest type has been heavily impacted or has developed on areas of shifting cultivation abandoned many years ago. The forest is currently regenerating, with light-demanding and fast-growing tree species, together with numerous climbing vines and shrubs.
- Wood-bamboo mixed forest: An area of 2,318.36 hectares, accounting for 9.95% of the total area. This is a mixed forest of timber trees and bamboo, in which timber trees are dominant.
- Bamboo-wood mixed forest: An area of 479.43 hectares, accounting for 2.06% of the total area. This is a mixed forest of bamboo and timber trees, in which bamboo is dominant.
- Bamboo forest: An area of 75.10 hectares, accounting for 0.32% of the total area. This is a pure bamboo forest regenerated after areas of shifting cultivation were abandoned many years ago.
- Timber plantation forest: An area of 210.64 hectares, accounting for 0.90% of the total area. The main planted species include Sao đen (*Hopea odorata*), hybrid Acacia (*Acacia mangium* × *Acacia auriculiformis*), Bời lời đỏ (*Machilus odoratissima*), three-needle pine (*Pinus kesiya*), and Dầu rái (*Dipterocarpus alatus*), etc., which were planted many years ago. The planted forests have developed timber volume.
- Other planted forests: An area of 60.95 hectares, accounting for 0.26% of the total area. The main planted species is cashew, which was planted by local people many years ago. The origin of this land area is land recovered from relevant organizations and subsequently assigned to the Management Board of Nam Nung Nature Reserve for management.
- Forest plantation land not yet meeting forest criteria: An area of 15.05 hectares, accounting for 0.06% of the total area. This is land that has been planted with trees but does not yet meet the criteria for being classified as forest. The main planted species include Sao đen (*Hopea odorata*), Keo lai (*Acacia mangium* × *Acacia auriculiformis*), Bời lời đỏ (*Machilus odoratissima*), and Thông (*Pinus* spp.). The newly planted forest is currently under tending and has not yet developed timber volume.
- Vacant land with naturally regenerated timber trees: An area of 25.68 hectares, accounting for 0.11% of the total area. This is non-forested land with naturally regenerated timber trees contributing to forest regeneration, together with numerous climbing vines and shrubs.
- Vacant land: An area of 104.45 hectares, accounting for 0.45% of the total area. This is non-forested land, mainly covered by shrubs and herbaceous vegetation.
- Shifting cultivation land: There are currently 375.99 hectares of cultivated land on forestry land in the area, accounting for 1.61% of the total area. This land is currently cultivated by local people with short-term crops (cassava, maize, etc.) and some industrial crops, such as coffee and pepper. This land was encroached upon by local people before the expansion of the Nature Reserve. The origin of this land area is land recovered from relevant organizations and subsequently assigned to the Management Board of Nam Nung Nature Reserve for management.
- Other land and water bodies: An area of 22.91 hectares, accounting for 0.10% of the total area. This is non-forested land consisting mainly of rivers, streams, swamps, and rocky areas.

According to the functional zoning of the forest:

The Management Board of Nam Nung Nature Reserve manages a total area of forests and forestry land of 23,296.47 hectares, classified according to use purposes as follows: Special-use forests:

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16,570.60 hectares (*of which: Nature Reserve: 15,182.66 hectares; Dray Sap Waterfall Landscape Protection Forest: 1,387.94 hectares*); Protection forests: 6,696.03 hectares; Production forests and land for other non-forestry purposes: 29.84 hectares.

For the areas comprising the Dray Sap Waterfall Landscape Protection Forest of 1,387.94 hectares, Protection Forest of 6,696.03 hectares, and Production Forest and land for other non-forestry purposes of 29.84 hectares, these areas are not subject to functional zoning. The management and protection of forests, as well as forest use and development, shall comply with forest management regulations and relevant legal provisions.

For the 15,182.66 hectares of Special-use Forest within the Nature Reserve, the specific functional zoning is as follows:

Strictly protected zone: Area: 9,296.53 hectares. Location: sub-zones 1117, 1123, 1132, 1133, 1331, 1609, and 1618, and parts of sub-zones 1110, 1330, 1309, 1315, and 1316, within the administrative boundaries of Dak Song, Nam Nung, Quang Phu, and Quang Son communes. Current status: 9,295.55 hectares of forested land and 0.98 hectares of non-forested land.

Ecological restoration zone: Area: 5,289.59 hectares. Location: sub-zones 1303, 1314, and 1321, and parts of sub-zones 1110, 1330, 1309, 1315, 1316, and 1628, within the administrative boundaries of Dak Song, Nam Nung, Quang Phu, and Quang Son communes. Current status: 5,244.60 hectares of forested land and 44.99 hectares of non-forested land.

Administrative service zone: Area: 596.54 hectares. Location: compartments 2, 4, 6, 8, and 9 of sub-zone 1628, within the administrative boundaries of Quang Phu and Quang Son communes. Current status: 592.82 hectares of forested land and 3.72 hectares of non-forested land.

Buffer zone: Area and boundaries: The total natural area of the buffer zone is 5,115.7 hectares, within the administrative boundaries of five communes, including Quang Phu, Nam Nung, Dak Song, Truong Xuan, and Quang Son. Function of the buffer zone: The buffer zone serves as a belt and protective corridor for the core zone. Local communities and authorities, together with the Management Board of Nam Nung Nature Reserve, implement programs for the management and protection of forest resources in the core and buffer zones. Socio-economic development programs are implemented in the buffer zone through separate programs and projects designed for the buffer zone. Communities in the buffer zone are permitted to use natural resources in accordance with approved regulations and plans. Local people are also permitted to participate in contracts for the protection of natural forests and for annual forest planting and tending activities.

2. Biodiversity of Nam Nung Nature Reserve

a) Forest plant diversity

According to the results of the Forest Plant Diversity Survey Project in Nam Nung Nature Reserve conducted in 2022, a total of 891 plant species belonging to 522 genera and 145 families were recorded in Nam Nung Nature Reserve. Of these, dicotyledonous angiosperms accounted for the majority, with 674 species, followed by monocotyledonous angiosperms with 136 species. Ferns and other pteridophytes comprised 70 species, while gymnosperms comprised 11 species, as detailed in the following table:

Table 13: Summary a of plant composition of Nam Nung Nature Reserve[2]

No.	Plant Phylum		Family	Genus	Species
	Vietnamese name	Scientific name			
I	**Ngành Hạt kín Hai lá mầm**	**Angiosperms Eudicots**	**104**	**390**	**674**

[2] Source: Forest Plant Diversity Survey Project in Nam Nung Nature Reserve in 2022

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No.	Plant Phylum		Family	Genus	Species
	Vietnamese name	Scientific name			
II	**Ngành Hạt kín Một lá mầm**	**AngiospermsMonocots**	**20**	**89**	**136**
III	**Ngành Hạt trần**	**Pinophyta**	**4**	**8**	**11**
IV	**Các ngành Khuyết thực vật**		**17**	**35**	**70**
1	Ngành khuyết lá thông	Psilotophyta	1	1	1
2	Ngành Thông đất	Lycopodiophyta	2	3	8
3	Ngành Mộc tặc	Equisetophyta	1	1	2
4	Ngành Dương xỉ	Polypodiophyta	12	29	55
5	Dây Gắm	Gnetophyta	1	1	4
	Tổng cộng		**145**	**522**	**891**

- *Regarding the economic edge:*

+ Timber tree species: 192 species, accounting for 21.55% of the total number of species;
+ Plant species with medicinal uses: 508 species, accounting for 57.01% of the total number of species;
+ Plant species used as food: 143 species, accounting for 16.05% of the total number of species;
+ Plant species used for fiber products: 12 species, accounting for 1.35% of the total number of species;
+ Plant species used for extraction (oil, resin, etc.): 67 species, accounting for 7.52% of the total number of species;
+ Other products: 115 species, accounting for 12.91% of the total number of species.

b) Forest animal diversity

According to the results of the Project on Investigation and Assessment of Forest Fauna in Nam Nung Nature Reserve for Biodiversity Conservation and Monitoring in 2023, the forest fauna survey recorded 351 vertebrate species belonging to 31 orders, 101 families, and 251 genera. Invertebrate fauna, particularly butterflies, is highly diverse and requires further investigation. Specifically, the distribution of animal species by order and family is presented in the following table:

Table 14: Summary of animal composition of Nam Nung Nature Reserve[3]

No.	Animal phylum		Order	Family	Genus	Species
	Vietnamese name	Scientific name				
1	Thú	Mammalia	10	26	56	76
2	Bò sát	Reptilia	2	12	35	43
3	Cá	Actinopterygii	2	4	9	10

[3] Source: Project to investigate and assess forest fauna in Nam Nung Nature Reserve for biodiversity conservation and monitoring in 2023.

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No.	Animal phylum		Order	Family	Genus	Species
	Vietnamese name	Scientific name				
4	Chim	Anonymous	15	52	134	195
5	Lưỡng cư	Amphibia	2	7	17	27
Total			**31**	**101**	**251**	**351**

Currently, the Management Board of Nam Nung Nature Reserve has not yet established a center for the rescue, conservation, and development of biological resources. The Management Board focuses on the in-situ conservation and development of biological resources through species conservation programs and projects implemented as part of scientific research activities, such as the VCF project supporting communities in raising awareness of conservation activities, implemented in 2009–2010, and the species conservation project implemented in 2013–2014. The list of forest animal species, including endangered, precious, and rare animal species and endemic species, is presented in Table A3.9, Appendix to Chapter 3.

e) Resident bird species in Nam Nung Nature Reserve

Species composition and diversity of the bird fauna in Nam Nung Nature Reserve

During this survey, 103 bird species were recorded in Nam Nung Nature Reserve. Combined with the research findings published in 1994, a total of 173 bird species have been recorded in the Nature Reserve. Of these, 92 species were recorded through direct field observations and specimen records.

In terms of taxonomy, the 173 bird species recorded in Nam Nung Nature Reserve belong to 15 orders and 47 families. The order Passeriformes has the highest number of families, with 24 families, accounting for 46.8% of the total number of recorded families. Meanwhile, the orders Ciconiiformes, Galliformes, Charadriiformes, Columbiformes, Psittaciformes, Caprimulgiformes, Apodiformes, and Trogoniformes each comprise only one family, accounting for 2.13% of the total number of recorded families.

Among the recorded bird families, Timaliidae has the largest number of species, with 11 species, accounting for 6.36% of the total number of species. This is followed by Turnidae and Sturnidae, each with 8 species, accounting for 4.62% of the total number of species. Eight families have only one recorded species, namely Tytonidae, Upupidae, Turnicidae, Sittidae, Fringillidae, Ploceidae, Estrildidae, and Zosteropidae, each accounting for 0.58% of the total number of species.

Rare bird species of conservation and genetic resource value in Nam Nung Nature Reserve

A total of 13 rare bird species were recorded. Among the rare bird species identified in the area, some are at a very high level of conservation concern. There is a list of 13 rare bird species of conservation value in the area including two species requiring high conservation priority: Great Hornbill (Buceros bicornis) and Germain's Peacock-Pheasant (Polyplectron germaini).

According to discussions with the Management Board of Nam Nung Nature Reserve, these two rare bird species inhabit the core zone of Nam Nung Nature Reserve and are closely associated with their specific habitats, with no tendency to migrate or fly to surrounding areas. In addition, biodiversity protection in the Nature Reserve is currently being effectively implemented, with regular patrols and monitoring. Therefore, the risk of workers or local people from outside entering the area is controlled, and no incidents threatening biodiversity in the area have been reported.

3.3.2. Current status of forests by area to be recovered along the project route

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In order to determine in detail the current status of forests and forest land, including the areas of different land types, forest types, forest timber volume, plant composition, etc. within the project area, the Project Owner coordinated with the consulting consortium of the Forest Science Institute of South Vietnam and Power Engineering Consulting JSC.3 to conduct an investigation and assessment of the current status of forests and forest land in the project construction area (from December 2024 to August 2025).

According to the *Report on the Results of Investigation and Assessment of the Current Status of Forests and Unforested Land for the Application for Approval of the Policy on Conversion of Forest Use Purposes to Other Purposes for the Implementation of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project*, prepared by the JV of the Forest Science Institute of South Vietnam and Power Engineering Consulting JSC. 3 in February 2025 (Đak Lak Province, former Binh Duong Province, and Tay Ninh Province), March 2025 (former Đak Nong Province), and August 2025 (Đồng Nai Province), the current status of forests and unforested land in the project construction area is as follows:

3.3.2.1. Results of the survey of forest areas in the project area

Based on the maps attached to the decisions related to the planning of the three forest types, the results of the forest inventory, and data on the current status of forests and forestry land provided by the People's Committees of the five provinces/cities traverses by the project; and with reference to the results of the investigation and assessment of the current status of forests and unforested land of the project, the overall current status of the project area is as follows:

a. Project area by function (forest use purpose)

The total land use area (land to be recovered) of the project is 107.74 hectares, detailed by function as follows:

Table 15: Current status of forests within the project's land acquisition area – by function

Unit: ha

No.	Type of land/forest	Total area	Functions of 03 types of forests		
			Protection Forests	Production forests	Outside planning of 03 types of forests
1	**Natural forests**	**1.11**	**-**	**0.24**	**0.87**
1.1	Poor broadleaf deciduous natural forest on mountain land	0.61	-	-	0.61
1.2	Degraded broadleaf deciduous natural forest on mountain land	0.15	-	0.09	0.06
1.3	Mixed forest on mountain land	0.36	-	0.15	0.20
2	**Planted forests**	**41.27**	**3.83**	**3.00**	**34.44**
2.1	Timber plantation forest on mountain land	41.27	3.83	3.00	34.44
	Three-leaf pine planted in 1984	*0.12*	*0.12*	-	-
	Three-leaf pine planted in 2011	*0.17*	*0.17*	-	-
	Rubber	*26.70*	*0.74*	*0.83*	*25.14*
	Cashew	*12.46*	*2.80*	*1.99*	*7.67*

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No.	Type of land/forest	Total area	Functions of 03 types of forests		
			Protection Forests	Production forests	Outside planning of 03 types of forests
	Hybrid acacia	*0.31*	-	*0.19*	*0.12*
3	**Non-forested land**	**65.35**	**1.29**	**1.29**	**62.77**
3.1	Land with naturally regenerated trees	0.20	-	-	0.20
3.2	Land planted with forest trees but not yet meeting the criteria for forest classification	6.18	0.45	0.41	5.31
	Three-leaf pine planted in 1984	*0.10*	*0.10*	-	-
	Three-leaf pine planted in 2016	*0.22*	*0.22*	-	-
	Three-leaf pine planted in 2023	*0.02*	*0.02*	-	-
	Rubber	*5.21*	-	*0.41*	*4.79*
	Cashew	*0.38*	*0.12*	-	*0.26*
	Hybrid acacia	*0.26*	-	-	*0.26*
3.3	Other land Area	58.97	0.84	0.88	57.25
	Total	**107.74**	**5.12**	**4.53**	**98.08**

Source: Compiled from B report on the results of investigation and assessment of the current status of forests and unforested land, a joint venture of the Forestry Sciences Institute of South Vietnam and Power Engineering Consulting JSC.3, 2025.

Table 16: Summary of Forest Areas Requiring Conversion for Project

Unit: ha

Type of forest	Project				Dak Lak			Lam Dong			Dong Nai		
	Total	Prot. F	Prod. F	Out.	Prot. F	Prod. F	Out.	Prot. F	Prod. F	Out.	Prot. F	Prod. F	Out.
1. Natural forest	**1.11**	-	0.24	0.87	-	0.24	0.87	-	-	-	-	-	-
2. Plating forest	**17.17**	3.83	3.00	10.34	-	-	0.87	0.29	-	-	3.54	3.00	9.47
3. Area without forest cover	**2.58**	1.29	1.29	-	-	-	-	0.57	0.78	-	0.72	0.51	-
Planted but not yet established as forest	***0.87***	*0.45*	*0.41*	-	-	-	-	*0.33*	-	-	*0.12*	*0.41*	-
No forest cover	***1.72***	*0.84*	*0.88*	-	-	-	-	*0.24*	*0.78*	-	*0.60*	*0.10*	-
Total (1+2+3)	**20.86**	**5.12**	**4.53**	**11.21**	-	**0.24**	**1.74**	**0.86**	**0.78**	-	**4.26**	**3.51**	**9.47**
		20.86			**1.98**			**1.64**			**17.24**		

Note: Prot. F: Protection Forest; Prod. F: Production Forest; Out.: Outside he three forest categories under the forestry planning scheme

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Source: Power Engineering Consulting JSC.3, compiled from Official Letters No. 184/CCKL-QLBVR dated 26 February 2025 of the Dak Lak Provincial Forest Protection Department; No. 266/SNNMT-LNKL dated 20 March 2025 of the Dak Nong Department of Agriculture and Environment; No. 6936/SNNMT-CCKL dated 22 October 2025 of the Dong Nai Department of Agriculture and Environment; No. 26/SNNMT-NN dated 6 March 2025 of the Binh Duong Department of Agriculture and Environment; and No. 484/SNNMT-CCKL dated 17 March 2025 of the Tay Ninh Department of Agriculture and Environment.

According to inventory data in Table 15 and Table 16, to build power tower foundations, the project requires the conversion of use purposes of about 20.86 hectares, including: Dak Lak province: 1.98 hectares, Lam Dong province: 1.64 hectares, Dong Nai city: 17.24 hectares. In which:

❖ Classification by forest function (forest use purpose):

- Protection forests: 5.12 hectares; including 3.83 hectares of planted forests, 1.29 hectares without forests.
- Production forests: 4.53 hectares; including 0.24 hectares of natural forests, 3.00 hectares of planted forests, and 1.29 hectares without forests.
- In addition to the planning of 03 types of forests (special-use forests, protection forests and production forests): 11.21 hectares; including: 0.87 hectares of natural forests, 10.34 hectares of planted forests (this area has been assigned to localities for management but has not been repurposed as prescribed).

❖ Classification according to forest status and origin of formation:

- Natural forests: 1.11 hectares; including 0.24 hectares of functional production forests, 0.87 hectares of land outside the planning of 03 types of forests.
- Planted forests: 17.17 hectares; including 3.83 hectares of protection forests, 3.00 hectares of production forests, and 10.34 hectares of land outside the planning of 03 types of forests.
- Unforested area: 2.58 hectares, including: 1.29 hectares of protection forests, 1.29 hectares of production forests.

b. Forest area by locality

The table below shows the total land use area (land to be recovered) of 107.74 ha across the following localities:

- Đak Lak Province: 12.69 ha (natural forests: 1.11 ha (0.24 ha currently classified as production forests and 0.87 ha outside the planning of the three forest types); planted forests: 1.52 ha; non-forested land: 10.06 ha).
- Lam Dong Province (former Đak Nong Province): 40.68 ha (planted forests: 0.29 ha; non-forested land: 40.39 ha).
- Đồng Nai Province (former Bình Phước Province): 36.02 ha (planted forests: 25.81 ha; non-forested land: 10.22 ha).
- Ho Chi Minh City (former Bình Dương Province): 10.96 ha (planted forests: 8.53 ha; non-forested land: 2.42 ha).
- Tay Ninh Province: 7.39 ha (planted forests: 5.13 ha; non-forested land: 2.27 ha).

c. Forest area divided by management entity

The total land use area (land to be recovered) is 107.74 hectares, comprising the following management entities:

❖ ***In Đak Lak Province:***

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- Buon Ja Wam Forestry Co., Ltd.: 3.15 hectares, accounting for 2.92%; including: Production forests: 2.21 hectares (natural forests: 0.24 hectares, planted forests: 0.06 hectares, and non-forested land: 1.91 hectares); Outside the forestry planning: 0.94 hectares (natural forests: 0.20 hectares and non-forested land: 0.73 hectares).
- Households and individuals: 0.33 hectares of Production Forest, accounting for 0.31%; including: non-forested land: 0.33 hectares.
- Commune-level People's Committees: 9.20 hectares, accounting for 8.54%; including: Production Forest: 1.51 hectares (planted forests: 0.81 hectares and non-forested land: 0.70 hectares); Outside the forestry planning: 7.70 hectares (natural forests: 0.67 hectares, planted forests: 0.65 hectares, and non-forested land: 6.38 hectares).

❖ ***In Lam Dong Province (former Đak Nong Province):***

- Duc Hoa Forestry Company: 0.11 hectares of Production Forest, accounting for 0.10%; including: non-forested land: 0.11 hectares.
- 720th Regiment: 0.90 hectares of land outside the forestry planning, accounting for 0.84%; including: non-forested land: 0.90 hectares.
- Commune-level People's Committees and households: 39.67 hectares, accounting for 36.82%; including: Protection Forest: 0.86 hectares (planted forests: 0.29 hectares and non-forested land: 0.57 hectares); Production Forest: 0.67 hectares (non-forested land: 0.67 hectares); Outside the forestry planning: 38.13 hectares (non-forested land: 38.13 hectares).

❖ ***In Đồng Nai Province (former Bình Phước Province):***

- Loc Ninh Protection Forest Management Board: 1.12 hectares of Production Forest, accounting for 1.04%; including: planted forests: 0.61 hectares and non-forested land: 0.51 hectares.
- Bu Dang Protection Forest Management Board: 3.83 hectares, accounting for 3.56%; including: Protection Forest: 2.09 hectares (planted forests: 1.90 hectares and non-forested land: 0.20 hectares); Production Forest: 1.74 hectares (planted forests: 1.74 hectares).
- Dak Mai Protection Forest Management Board: 2.41 hectares, accounting for 2.23%; including: Protection Forest: 2.16 hectares (planted forests: 1.64 hectares and non-forested land: 0.52 hectares); Production Forest: 0.25 hectares (planted forests: 0.25 hectares).
- Provincial Social Security Fund: 0.41 hectares of Production Forest, accounting for 0.38%; including: planted forests: 0.41 hectares.
- Commune-level People's Committees and households: 28.25 hectares of land outside the forestry planning, accounting for 26.22%; including: planted forests: 19.27 hectares and non-forested land: 8.99 hectares.

❖ ***In Ho Chi Minh City (former Bình Dương Province):***

- Households and individuals: 10.96 hectares of land outside the forestry planning, accounting for 10.17%; including: planted forests: 8.53 hectares and non-forested land: 2.42 hectares.

❖ ***In Tay Ninh Province:***

- Households and individuals: 7.39 hectares of land outside the forestry planning, accounting for 6.86%; including: planted forests: 5.13 hectares and non-forested land: 2.27 hectares.

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3.3.2.2. Characteristics of forest structure in the project area

According to the report on the results of investigation and assessment of the current status of forests and unforested land conducted by the Joint Venture of the Forest Science Institute of South Vietnam and Power Engineering Consulting JSC.3 in 2025, the characteristics of the forest structure in the area are as follows:

❖ ***Current status of natural forests (Dak Lak province):***

Natural broadleaf deciduous forest on rocky mountain terrain, poor: the average growing stock is 68.91 m³/ha, the average density is 760 trees/ha, the average diameter at breast height (D1.3) is 14.3 cm, the average total height (Hvn) is 8.6 m, and the average canopy cover is 0.4. In this forest state, trees are concentrated mainly in the 10–14 cm and 6–10 cm diameter classes (accounting for 34.2% and 26.3%, respectively), followed by the 14–18 cm diameter class (19.3%); diameter classes from 18–38 cm each account for less than 8%. In terms of height, trees are concentrated mainly in the 5–7 m height class (accounting for 36.0% of the surveyed density), while the lowest proportion is in the <5 m height class (1.8%).

Natural broadleaf deciduous forest on rocky mountain terrain, without growing stock: the average growing stock is 4.32 m³/ha, the average density is 220 trees/ha, the average diameter at breast height (D1.3) is 9.9 cm, the average total height (Hvn) is 5.0 m, and the average canopy cover is 0.1. This forest state comprises three diameter classes, with trees concentrated mainly in the 6–10 cm diameter class (63.6%), followed by the 10–14 cm diameter class (18.2%). In terms of height, trees are concentrated mainly in the <5 m height class (81.8% of the surveyed density), followed by the 5–7 m height class (18.2%).

Natural broadleaf deciduous forest on rocky mountain terrain, exhausted: the average growing stock is 32.17 m³/ha, the average density is 675 trees/ha, the average diameter at breast height (D1.3) is 11.5 cm, the average total height (Hvn) is 7.3 m, and the average canopy cover is 0.2. This forest state comprises three diameter classes, with trees concentrated mainly in the 6–10 cm diameter class (51.9%), followed by the 10–14 cm diameter class (27.4%) and the 18–22 cm diameter class (8.9%). In terms of height, trees are concentrated mainly in the 5–7 m height class (53.3% of the surveyed density), followed by the 7–9 m height class (33.3%), while the lowest proportion is in the <5 m height class (1.5%).

Mixed forest on rocky mountain terrain: the average growing stock is 39.88 m³/ha, the average density is 770 trees/ha, the average diameter at breast height (D1.3) is 10.1 cm, the average total height (Hvn) is 8.7 m, and the average canopy cover is 0.5. This forest state comprises three diameter classes, with trees concentrated mainly in the 6–10 cm diameter class (68.8%), followed by the 10–14 cm diameter class (18.2%), while the lowest proportion is in the 22–42 cm diameter class (1.3%). In terms of height, trees are concentrated mainly in the 5–7 m height class (53.3% of the surveyed density), followed by the 7–9 m height class (35.1%) and the 5–7 m height class (23.4%); the lowest proportion is in the 15–17 m height class (1.3%).

❖ ***Current status of planted forest on rocky mountain terrain (Dak Lak Province):***

Current status of planted pure stands of rubber: the average growing stock is 188.25 m³/ha, the average density is 885 trees/ha, the average diameter at breast height (D1.3) is 17.8 cm, and the average total height (Hvn) is 15.2 m. Trees are distributed mainly in the 18–22 cm diameter class (35.4%) and the 14–18 cm diameter class (34.1% of the density); in terms of height, trees are distributed almost evenly between the 13–15 m height class (47.2%) and the 15–17 m height class (47.5%).

Current status of cashew plantations: the average growing stock is 24.77 m³/ha, the average density is 227 trees/ha, the average diameter at breast height (D1.3) is 15.7 cm, and the average total height (Hvn) is 5.1 m. Trees occur in diameter classes from 6 to 38 cm, with the highest concentrations

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in the 6–10 cm and 10–14 cm diameter classes (27.3% and 25.5%, respectively). Height classes range from <5 to 9 m, with the highest concentration in the 5–7 m height class (53.3%).

Current status of planted pure stands of black acacia (Muồng đen): the average growing stock is 17.57 m³/ha, the average density is 560 trees/ha, the average diameter at breast height (D1.3) is 10.5 cm, and the average total height (Hvn) is 7.1 m. Trees occur in diameter classes from 6 to 18 cm and height classes from 5–9 m. Trees are concentrated mainly in the 10–14 cm diameter class (71.4%) and the 5–7 m height class (78.6%).

Current status of planted pure stands of teak: the average growing stock is 42.73 m³/ha, the average density is 740 trees/ha, the average diameter at breast height (D1.3) is 13.3 cm, and the average total height (Hvn) is 7.0 m. Trees occur in diameter classes from 6 to 22 cm and height classes from 5–9 m. Trees are concentrated mainly in the 10–18 cm diameter classes (54.1% and 21.6%, respectively) and the 5–7 m height class (83.8%).

- ***Non-forested area (Dak Lak Province):***

Current status of areas with naturally regenerated trees: the average density is 54 trees/ha, the average diameter is 10.2 cm, the average height is 4.5 m, and the average growing stock is 1.07 m³/ha. This forest state comprises diameter classes from 6–18 cm and height classes from <5–7 m. The indicators do not yet meet the criteria for classification as forest.

- ***Current status of planted three-needle pine forest (Lam Dong Province – former Dak Nong):***

Planted in 1984: the average density is 256 trees/ha, the average diameter at breast height (D1.3) is 31.4 cm, the average total height is 14.8 m, the average growing stock is 194.119 m³/ha, and the average canopy cover is 0.3.

Planted in 2011: the average density is 136 trees/ha, the average diameter at breast height (D1.3) is 28.6 cm, the average total height is 11.5 m, the average growing stock is 53.797 m³/ha, and the average canopy cover is 0.2.

3.3.2.3. Composition of tree species in the natural forest area of the project

Based on the number of forest inventory plots surveyed within the natural forest area of the project (in Dak Lak Province, Ea Kiet Commune has 0.24 ha of natural forest land according to the land management records), a total of 31 timber tree species were recorded. This area was previously natural forest but has now been converted to land for industrial crop production for approximately 15–20 years, currently mainly used for growing coffee, rubber, and cashew. No wild animals were recorded in the area.

The mixed forest on rocky mountain terrain has a species composition index of 71.1% for dominant species and accounts for 70.1% of the density, with dominant tree species including Sp, Da trau, Cam xe, Son rung, Ca chit, and Cam lien. Other tree species have a composition index of 28.9% and account for 29.9% of the density. The growing stock of dominant species accounts for 77.5%, with an average of 30.9 m³/ha, while other tree species account for 22.5%, with an average of 9.0 m³/ha.

The natural broadleaf deciduous forest on rocky mountain terrain, exhausted, has a species composition index of 85.3% for dominant species and accounts for 87.4% of the density, with dominant tree species including Dau long, Cam lien, and Chieu lieu. Other tree species have a composition index of 14.7% and account for 13.3% of the density. The growing stock of dominant species accounts for 82.7%, with an average of 26.6 m³/ha, while other tree species account for 17.3%, with an average of 5.6 m³/ha.

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The natural broadleaf deciduous forest on rocky mountain terrain, poor, has a species composition index of 82.4% for dominant species and accounts for 80.7% of the density, with dominant tree species including Lim xet, Dau long, Cam lai, and Chieu lieu. Other tree species have a composition index of 17.6% and account for 19.3% of the density. The growing stock of dominant species accounts for 86.7%, with an average of 59.7 m^3/ha, while other tree species account for 13.3%, with an average of 9.2 m^3/ha.

The natural broadleaf deciduous forest on rocky mountain terrain, without growing stock, has dominant tree species including Chieu lieu, Dau, Muong den, and Coc rung, with species composition indices of 40.6%, 27.8%, 24.9%, and 6.8%, respectively.

3.4. SOCIO-ECONOMIC CONDITIONS

3.4.1. Socio-economic conditions of the provinces/cities in the project area

The 500kV transmission lines project passes through 34 communes/wards in five provinces and cities, including Dak Lak, Lam Dong — the former Dak Nong area, Dong Nai — the former Binh Phuoc area, Ho Chi Minh City — the former Binh Duong area, and Tay Ninh. The project's socio-economic setting transitions from the Central Highlands, where agricultural and forestry livelihoods and perennial industrial crop production predominate, to the Southeast region, which has a higher level of industrialization, infrastructure development, and urbanization.

3.4.1.1. Dak Lak Province

Dak Lak is an area with an economy closely associated with agriculture, particularly coffee, pepper, durian, livestock production, and forestry. In 2024, the agricultural sector grew by approximately 4.83% and continued to play a supporting role in the provincial economy. The value and output of several key agricultural products increased, with coffee, pepper, and durian making important contributions to exports and local incomes. Industry is mainly based on agricultural processing, materials production, and electricity generation; trade, services, and consumption continued to grow alongside improvements in household incomes.

According to statistical results for 2025, the province's GRDP increased by approximately 6.68%; the size of the economy at current prices reached approximately VND 229,550 billion, and GRDP per capita reached approximately VND 80.6 million/person. Total social investment capital reached approximately VND 61,203 billion, while state budget revenue in the province reached approximately VND 18,208 billion.

By economic sector in 2025, agriculture, forestry, and fisheries grew by 4.53%; industry and construction grew by 9.19%; and services grew by 7.48%. The service sector contributed approximately 49.12% to the increase in total added value, while industry and construction contributed approximately 28.21%, and agriculture, forestry, and fisheries contributed approximately 22.67%. These figures show that although the economic structure is shifting, agriculture and related sectors continue to play an important role in people's incomes, employment, and livelihood stability.

The province's population in 2024 was approximately 1.95 million, of which the rural population accounted for nearly 73.9%. The labor market was generally stable, but the proportion of workers engaged in irregular or precarious employment remained relatively high. This indicates that some households have limited resilience to the loss of productive land, disruption of agricultural production, or temporary reductions in income. Groups likely to be directly affected in Dak Lak include households growing coffee, pepper, durian, and other perennial industrial crops; households using agricultural land or production forest land; households with houses or auxiliary structures located near the transmission line corridor; and people using rural roads for production

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activities. Losses of perennial crops may result in prolonged livelihood impacts because re-establishing plantations and restoring productivity generally require a relatively long period.

3.4.1.2. Lam Dong Province (former Dak Nong Area)

The former Dak Nong area has an economy that relies significantly on agriculture, forestry, mineral extraction and processing, hydropower, and renewable energy. The main crops include coffee, pepper, durian, and cassava. In 2024, agricultural production and livestock production continued to expand; the area of newly planted forests reached nearly 1,695 ha, and total fishery production reached approximately 8,253 tons. Industrial activities include alumina production, cassava starch processing, hydropower generation, wind power, and solar power.

The population of the former Dak Nong area in 2024 was approximately 695,685 people, of which the rural population accounted for 82.75%. The labor force aged 15 and above was approximately 397,452 people, with nearly 82.9% of the labor force concentrated in rural areas. Ethnic minority students accounted for approximately 31.65% of the total number of students, reflecting the significant presence of ethnic minority communities in the area.

Due to changes in administrative boundaries, the 2025 GRDP data for the new Lam Dong Province does not separately reflect the former Dak Nong area. Therefore, this ESIA continues to use the 2024 data for the former Dak Nong area as the regional baseline, while also updating commune- and district-level data based on the household survey conducted at the time of the assessment. Using data for the entire new Lam Dong Province without separately identifying the former Dak Nong area could distort the assessment, as Da Lat, coastal areas, and service centers have economic structures that differ substantially from those of the project area. Social groups potentially vulnerable to impacts in Lam Dong Province include households growing coffee, pepper, and durian; households allocated, using, or cultivating forestry land; ethnic minority households; people living in remote and isolated areas; and households with limited access to information, legal services, and grievance mechanisms.

3.4.1.3. Dong Nai province (former Binh Phuoc area)

The former Binh Phuoc area has an economic structure combining large-scale agriculture, farm-based livestock production, forestry, agricultural product processing, and manufacturing industry. In 2024, Binh Phuoc's GRDP reached approximately VND 61,293 billion, an increase of 9.32% compared with 2023. The area of perennial industrial crops and fruit trees reached approximately 436,565 ha, indicating a high degree of dependence of local land use and livelihoods on rubber, cashew, pepper, and fruit trees.

Industry and construction grew strongly, with the industrial production index increasing by approximately 17.79% in 2024; the processing and manufacturing industry alone increased by 18.21%. Total retail sales of goods and consumer service revenue reached approximately VND 89,700 billion, an increase of 15.3%. The population of the former Binh Phuoc area in 2024 was approximately 1.06 million, of which the rural population accounted for more than 70.5%.

Following the consolidation, Dong Nai Province's GRDP in 2025 reached nearly VND 677,932 billion, an increase of 9.63%; GRDP per capita reached approximately VND 150.86 million/person. The province's economic structure comprised industry and construction at 54.97%, services at 26.42%, agriculture, forestry and fisheries at 12.13%, and taxes less subsidies on products at 6.48%.

However, the above 2025 indicators reflect the entire Dong Nai Province following the consolidation and are strongly influenced by the industrial parks, urban areas, and logistics centers of the former Dong Nai area. Therefore, when assessing the impacts of the project section passing through the former Binh Phuoc area, priority should be given to local data from 2024 and

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commune- and household-level survey data, rather than directly applying the average GRDP of the entire new province. In Dong Nai Province, the groups primarily affected by the project include households growing rubber, cashew, pepper, and fruit trees; households whose production land is divided by the locations of tower foundations or construction access roads; poor households and ethnic minority households; and small-scale production establishments located near transportation routes. The loss of rubber trees, cashew trees, or fruit trees in the productive stage may result in long-term loss of income and incur replanting costs.

3.4.1.4. Ho Chi Minh City (former Binh Duong area)

The former Binh Duong area is a highly industrialized and urbanized area, where processing and manufacturing industries, industrial parks, logistics, trade, and services play a dominant role. In 2024, Binh Duong's industrial production index increased by approximately 7.6%; total retail sales of goods and service revenue reached approximately VND 351,640 billion, an increase of 13.3%. Industrial parks attracted most foreign investment and contributed a large proportion of the locality's exports.

According to the 2025 growth plan and scenario prior to the consolidation, Binh Duong's economic scale was estimated at over VND 572,442 billion, with GRDP per capita exceeding VND 195 million/person. The expected economic structure comprised industry and construction at approximately 65.01%, services at 25.20%, agriculture, forestry and fisheries at 2.61%, and taxes less subsidies on products at approximately 7.18%.

After the consolidation, the GRDP of the new Ho Chi Minh City in 2025 was estimated at approximately VND 3.03 quadrillion, accounting for about 23.5% of the country's GDP; GRDP per capita was approximately VND 220 million. However, these are aggregate figures for the entire city after the consolidation and should not be used to represent the Dau Tieng area or the suburban areas through which the transmission line passes. Compared with the project sections in the Central Highlands, the social impacts in the former Binh Duong area tend to be more closely related to traffic, technical infrastructure, industrial production activities, and community safety. Potentially affected groups include households using agricultural land or rubber land in suburban areas; enterprises and workers in industrial parks and clusters; road users; road management units; and owners of intersecting infrastructure facilities.

3.4.1.5. Tay Ninh Province

Tay Ninh has an economic structure combining commercial agriculture, concentrated livestock production, processing industry, trade, services, and tourism. In 2024, the total cultivated area reached approximately 259,948 hectares; the average product value per hectare of cultivated land reached approximately VND 112 million. The province has 468 livestock farms and 120 poultry farms, showing a trend toward a shift from small-scale production to concentrated production.

The industrial production index increased by 14.2% in 2024; the share of the processing and manufacturing industry in GRDP reached approximately 37.1%. Export turnover reached approximately USD 6.65 billion, while the number of visitors to tourist areas and attractions reached approximately 5.6 million, and tourism revenue was estimated at VND 2,500 billion.

Data published for the 2020–2025 period for the new Tay Ninh Province show that the average GRDP growth rate was approximately 6.73% per year, the economic scale in 2025 was estimated at nearly VND 352 trillion, and GRDP per capita was approximately USD 4,776. However, these data reflect the situation after the administrative boundary rearrangement and cover a broader economic area; therefore, they should only be used to describe the general development context. Potentially affected groups in Tay Ninh Province include households growing annual and perennial crops, livestock-raising households, farm owners, land users located within the

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electricity safety corridor, poor households, and households whose incomes depend primarily on agriculture. In areas where the transmission line intersects roads, irrigation canals, or concentrated production areas, construction activities may affect the transportation of agricultural products, access to agricultural land, irrigation water supply, and traffic safety.

3.4.2. Socio-economic conditions of households affected by the project

The socio-economic conditions of households affected by the Project will be determined through the SES, Social Assessment.

3.5. CURRENT ENVIRONMENTAL AND SOCIAL CONDITIONS AND SPECIFIC SENSITIVE RECEPTORS ALONG THE ROUTE

3.5.1. Current Environmental and Social Conditions and Sensitive Receptors

The project mainly passes through areas of agricultural land planted with perennial crops, with some sections passing through protection forest land, production forest land, rice cultivation land, irrigation land, etc. Except for some locations where the route crosses roads with residential houses, the project does not pass through concentrated residential areas.

A specific characteristic of the project is that the overhead transmission line and the tower foundation locations (where construction and other building activities will take place) are all located on agricultural land planted with perennial crops, annual crops, and forest land. These areas have been cultivated or planted by local people and agencies/organizations for many years. The transmission lines are located away from residential areas and do not pass through concentrated urban areas. Therefore, there are almost no underground facilities (water supply systems, drainage systems, etc.) along the project's transmission line.

According to the results of the review of the current land use status and population distribution, existing residential areas around the project are located approximately 0.45–5.2 km from the project components. Most residential areas are located approximately 1 km or more from the project; therefore, the level of direct impact is expected to be relatively low. Some residential areas located closer to the project include the residential area along DT681 in Ea Wer commune, approximately 450 m from the nearest project component; the residential area of Hamlet 1 in Loc Ninh commune, approximately 600 m away; and the residential area of Hung Thuan commune, approximately 750 m away. In particular, some households along DT681 are located within the safety corridor and need to be considered during the implementation of construction activities, particularly with regard to traffic safety, dust and noise generated by the transportation of materials and equipment, construction vehicles, and construction activities.

Detailed information on the names of residential areas, distances to the project, nearest project components, and expected levels of impact is presented in Table A3.10 and Figure A3.1, Appendix to Chapter 3.

3.5.2. Characteristics of sensitive receptors along the route

From a social perspective, the route does not pass through urban areas or concentrated residential areas. Within a radius of 3 km, there are no ranked cultural, religious, belief-related, or historical-cultural relics, or established scenic spots. In general, there are no sensitive receptors such as communal houses, pagodas, schools, or health stations along the project's transmission route.

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From an environmental perspective, identifying the crossing locations provides a basis for considering technical and safety requirements during construction, as well as for identifying and assessing potential environmental and social impacts that may arise at the crossing areas. According to the results of the topographic survey and the review of the existing conditions along the route, the project transmission line has crossing locations with various types of technical infrastructure and natural features, including power transmission lines, transportation systems, rivers, streams, and canals, specifically as follows:

Crossings with power transmission lines:

Within the G10–G11 span, the project transmission line crosses the existing 500kV Pleiku – My Phuoc – Cau Bong transmission liness once, within the existing T330–T329 tower span. Approximately two-thirds of the length of the project's transmission line runs parallel to this existing 500kV Pleiku – My Phuoc – Cau Bong transmission liness. This is a receptor with potential risks associated with electromagnetic field interactions during both the construction and operation phases.

In addition, the project transmission line crosses 15 transmission lines at voltage levels of 110 kV and 220 kV, with a total of 18 crossings. The crossed transmission lines include the 110 kV Cu M'Gar – JPO transmission line; 220 kV Srepok 4 – Krong Buk; 220 kV Buon Kop – Serepok 3; 220 kV Dak Hoa – Dak Nong; 220 kV Dak Nrung Wind Power Plant – Dak Nong 500kV Substation; 110 kV Dak Glun Hydropower Plant; 110 kV Thac Mo – Loc Ninh; 220 kV Dak Nong – Phuoc Long – Binh Long; 220 kV My Phuoc – Binh Long; and several 110 kV transmission lines in the Binh Long, Dau Tieng, and Tay Ninh areas. In addition, the project transmission line has 707 crossings with medium- and low-voltage lines. These locations require strict control of electrical safety corridors, clearances between facilities, construction plans, and measures to prevent electrical safety risks to workers and communities.

Crossings with the transportation system:

The transmission line crosses 25 groups of routes/types of roads, with a total of 1,581 crossings. Important transportation routes crossed include DT967, the Serepok 3 Hydropower Dam access road, National Highway 14, DT683, the planned Binh Phuoc – Dak Nong – Dak Lak Expressway, TL681, DT760, National Highway 14C, DT759, Hoang Ngoc Thuc Street, DT757, DT758, DT756, National Highway 13, DT749B, DT744, DT710, Tran Van Lac Street, DH603, DT789, DT782, Soc Lao Road, canal-bank roads, and Tan Thuan Street. In addition to the main roads, the project also has a large number of crossings with paved roads, dirt roads, stone roads, and rural roads with widths of ≤10 m, totaling 1,581 crossings. These crossing locations may result in impacts related to traffic safety, temporary disruption or restriction of local traffic, dust, and noise during construction. Therefore, appropriate signage, traffic diversion, and traffic safety measures should be arranged at each crossing location.

Crossings with rivers, streams, and water bodies:

The project route crosses 11 main groups of rivers, streams, canals, and water bodies, with a total of 17 crossings. Major water bodies crossed include Suoi Duc, the Serepok 3 Hydropower canal, Serepok River, Dak N'Đrung Stream, Dak R'Tih Stream, Dak R'Lấp River, a branch of the Thac Mo Hydropower Reservoir, Be River, Saigon River, and Dong Canal. Some of these water bodies are relatively wide, including Serepok River at approximately 217 m, a small branch of the Thac Mo Hydropower Reservoir at approximately 244 m, Be River at approximately 88–110 m, and Saigon River at approximately 64–200 m. In addition, the route crosses 879 streams, gullies, ditches, and ponds with widths of less than 30 m. Crossing locations over water bodies need to be

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considered in the design and construction arrangements to minimize impacts on water flow, water quality, bank erosion, and aquatic ecosystems, while ensuring the safety of workers and construction vehicles.

In general, the relatively large number of crossings and their distribution along the entire route are factors that need to be considered during detailed design and construction planning. Crossing locations involving power lines, roads, rivers, and streams need to be specifically identified in the design documents, supplemented by additional surveys where necessary, and subject to safety management measures appropriate to each type of crossing. In particular, at crossings with high-voltage power lines and major transportation routes, coordination with the relevant infrastructure management units is required to agree on construction arrangements, ensure safe clearances, and maintain the normal operation of existing facilities. A detailed table of each crossing location, including the name of the intersected facility/infrastructure, number of crossings, tower span location, and other relevant information, is presented in Table A3.12, Appendix to Chapter 3.

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CHAPTER 4. ALTERNATIVES ANALYSIS

The analysis of alternatives in the ESIA is conducted to demonstrate that the selected investment and technical options not only meet power transmission requirements but are also more appropriate from environmental and social perspectives. Following the approach of the World Bank ESF/ESS1, the assessment considers the "without-project" and "with-project" alternatives, as well as technically feasible route alignment options, based on technical, economic, environmental, social, constructability, operation, and risk criteria.

4.1. WITH-PROJECT AND WITHOUT-PROJECT ALTERNATIVES

The FS Report identifies the transmission line as an important 500kV link between the Central Highlands/Central Region and the South. The Southern region has a reserve margin of less than 5% during the 2025–2030 period; if the existing Central–South transmission limit of approximately 4,000 MW is maintained through 2028–2030, there is a risk of transmission congestion, localized power shortages, and the need to dispatch higher-cost power sources. The project is expected to be completed in 2028 and involves the construction of a new approximately 330-km double-circuit 500kV transmission line to facilitate power evacuation, increase transmission capacity, improve reliability, and reduce transmission losses.

Table 17: Analysis of the "with-project" and "without-project" alternatives

Affected factors	"Without-project" alternative	"With-project" alternative
Power Systems and Energy Security	No additional 500kV double-circuit transmission line is added to the Central–South link. The existing transmission limit of approximately 4,000 MW would remain a bottleneck as demand in the South increases and the reserve margin remains low. The ability to meet safety, reserve, and operational flexibility requirements would be lower as inter-regional power flows increase.	Construction of the Krong Buk – Tay Ninh 1 double-circuit 500kV transmission line would increase the capacity of the Central–South link, support N-1 operation, improve power supply reliability and energy security. The calculation results indicate that the transmission line can carry a high load under both normal and single-circuit outage conditions.
Power evacuation and renewable energy	The ability to evacuate power from wind, solar, and hydropower sources in the Central Highlands – South Central Coast region, as well as imported electricity from Laos, would be constrained by transmission congestion; there would be a risk of curtailment or suboptimal utilization of low-cost power sources.	Increased capacity to receive and transmit power from power source clusters in the Central Highlands and Central Region to the national grid and the South; support for renewable energy integration and reduction of the risk of transmission congestion.
Socio-economic development	No investment capital, construction costs, or compensation costs associated with the project would be incurred in the short term. However, the system may need to dispatch higher-cost power sources in the South, particularly oil-fired	Construction of the transmission line, optical-fiber repeater stations, feeder bays, compensation, and environmental and social management costs would be incurred. The FS Report indicates that the project is economically and

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Affected factors	"Without-project" alternative	"With-project" alternative
	generation, and incur higher operating losses/costs due to transmission constraints.	financially viable, with NPV > 0 and B/C > 1; the scenarios of a 10% increase in investment costs and a 10% reduction in electricity demand still meet the required indicators.
Socio-economic development	The risk of power shortages or limitations on power supply capacity in the South could reduce the reliability of electricity supply for production, services, and daily life, while constraining the ability to attract investment and develop electricity-intensive industries.	Improved power supply reliability and capacity, creating favorable conditions for socio-economic and industrial development; at the same time, generating demand for labor, transportation, and services during the construction period, although most employment benefits would be temporary.
Land, livelihoods and resettlement	No additional land acquisition, new power safety corridor, land-use restrictions, or impacts on crops/assets associated with this project would occur.	Land acquisition would be required for tower foundations and ancillary works, with restrictions on land use within the power safety corridor and impacts on perennial crops and assets. The route passes through areas with substantial agricultural land, production forests, rubber plantations, coffee plantations, fruit trees, and some residential areas; therefore, ESS5 and livelihood restoration measures would need to be applied where necessary.
Natural environment and biodiversity	No vegetation clearance within the corridor, foundation excavation, opening/use of access roads, or habitat fragmentation associated with the project would occur. However, there would be no direct environmental benefits if there is insufficient capacity to evacuate renewable energy.	Localized construction impacts would occur due to vegetation clearance, foundation excavation, erosion, dust, noise, waste, and crossings of rivers and streams; there would be potential impacts on habitats/forests in sensitive sections. An indirect positive impact would be support for renewable energy integration. These impacts would be managed in accordance with the mitigation hierarchy and ESS6.
Environment & Climate Change	Increased greenhouse gas (GHG) emissions due to increased local dispatch of fossil-fuel-based thermal power generation.	- Significant reduction in GHG emissions through the transmission of clean energy: avoidance of 2,129.34 million kg CO_2e in 2030 and 5,535.00 million kg CO_2e in 2035. - EIRR increases significantly to

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Affected factors	"Without-project" alternative	"With-project" alternative
		33.3% when carbon reduction benefits are included.
Traffic and community safety	No transportation of towers, conductors, machinery, or construction-related safety risks associated with the project would occur.	A temporary increase in heavy vehicles, road crossings, and community safety risks during construction may occur; these can be controlled through traffic management plans, traffic diversion, warning measures, and coordination with local authorities.
Long-term operational impact	No electromagnetic fields, safety corridors, risks of bird collisions with transmission lines, or vegetation management requirements associated with the new project would occur.	Typical operational impacts of a 500kV transmission line would remain, including corridor management, electromagnetic fields within applicable standards, fire risks, and bird collision risks in sensitive sections; appropriate monitoring and management would be required.
Overall Assessment	Avoids most direct environmental and social impacts of the facility, but does not meet the strategic objective of increasing Central–South transmission capacity and entails significant risks to electricity supply security and system costs in the medium term.	Generates identifiable environmental and social impacts that can be managed through design, compensation, the ESMP, and monitoring, while also providing significant benefits to the power system and socio-economic development. Therefore, the "with-project" alternative is preferred, subject to the full implementation of the required ESS measures.

4.2. ANALYSIS OF THE PROJECT ALTERNATIVES

4.2.1. Analysis and selection of route orientation options to avoid sensitive points

According to the FS of the project, only one route alignment option has been selected for the 500kV transmission line, and the route alignment has been fully agreed upon in principle. The selected option meets the following criteria:

- The route alignment must be consistent with the national and local power grid master plans and ensure economic and technical efficiency.
- Priority is given to facilitating construction, management, repair, and maintenance, as well as meeting the project schedule; and facilitating compensation and site clearance.
- Minimize impacts on permanent houses, densely populated areas, planned areas, and industrial parks; minimize impacts on special-use forests, protection forests, production forests, and high-value crops; avoid historical relics and minimize impacts on tourism and recreational areas.
- Priority is given to routes located close to existing transmission lines in order to make use of existing operation and maintenance access roads and facilitate operation and maintenance.

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- The selected route is approximately 330km long and passes through 5 provinces/cities. Several sections run parallel to the existing 500kV Pleiku - My Phuoc - Cau Bong transmission line, while some sections have been adjusted to avoid planned wind power areas, military areas, and residential areas.

Overall, the option selected in the FS has a stronger technical and planning basis by making use of existing transmission corridors, facilitating access, having received agreement from local authorities, and having been adjusted to avoid a number of planned wind power areas, military areas, and residential areas.

Table 18: Comparison of three route alignment alternatives for selecting the optimal corridor across 5 provinces/cities

Criteria of Comparison	Option 1 (Optimal Parallelism)	Option 2 (Independence Corridor Separation)	Option 3 (Local control G23-G27 in Dak Nong)
Length & Economy	- Approximately 330 km long. - Maximum savings in compensation and site clearance costs by closely following the existing corridor.	- The length of the route has increased significantly (exceeding 330 km). - Compensation and site clearance costs increase substantially due to the need to establish an entirely new corridor.	- The G23-G27 route is 11.4 km long (0.6 km longer than the selected option). - Additional investment costs are incurred for tower foundations on steep slopes.
Impacts on Natural Forests (ESS6)	- Maximum avoidance: Proactively adjust the route alignment to avoid crossing the core zone of Nam Nung Nature Reserve (the separation distance from the boundary is up to 6.0 km).	- Cutting across many areas of special-use forests and sensitive protection forests of the Central Highlands. - Causing great habitat loss.	- The route is required to cross the steep protection forest sub-zone in Dak Nong Province, resulting in clear-cutting along the ROW.
Resettlement & Social Impact	- Minimum impact: Proactively adjust the alignment at G1-G6 and G11-G12A.4 to avoid densely populated areas and eliminate the risk of a second round of resettlement for households located close to the existing transmission line.	- Passing through many newly developed residential areas, disturbing life and creating large-scale resettlement pressure along the 330 km route.	- The social impact is equivalent to the option selected in Dak Nong locally, but causes erosion, landslides, steep hills, and affects adjacent agricultural land.
Taking advantage of existing infrastructure	- Maximize the use of existing forestry roads, operation and maintenance roads, and temporary storage yards established for the existing 500kV transmission line.	- Requires entirely new grading and construction of temporary access roads through forest areas, increasing the fragmentation of wildlife habitats.	- Existing operation and maintenance roads can be utilized, but grading and widening would be required due to the steep terrain and deeply dissected rocky topography along the route.
Selection conclusion	**SELECTED**	**NOT SELECTED**	**NOT SELECTED**

4.2.2. Comparison of transmission voltage level options

Table 19: Comparison of transmission voltage level options

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Criteria of Comparison	Theoretical Transmission Voltage Option (750 kV)	Selected Option: 500kV Extra-High Voltage
Theoretical technical arguments	- The Zalesski calculation indicates that the theoretical optimum voltage for transmitting 3,220 MW over a distance of 330 km is 774.4 kV.	- Slightly lower than the theoretical optimum level, but fully capable of transmitting the required power without causing transmission congestion.
National grid synchronization	- Completely incompatible with the existing extra-high-voltage grid structure of Vietnam. - Require the development of entirely new technical operation standards.	- 100% compatible with the existing North–South 500kV transmission backbone. - Facilitates grid connection, balancing, and flexible operation of the inter-regional power system.
Economics & CAPEX	- Manufacturing and import costs for 750 kV substation equipment, transformers, and steel towers would be extremely high, and such equipment is scarce.	- Optimizes equipment investment costs by utilizing the domestic 500kV supply chain and established local technology.
Selection conclusion	**NOT SELECTED**	**SELECTED**

4.2.3. Comparison of conductor configuration and cross-section

Table 20: Comparison of conductor configurations to ensure capacity to withstand the maximum fault current (n-1)

Criteria of Comparison	Small-Capacity Conductor Configuration Option (e.g., 2× or 3× ACSR-400)	Large Four-Conductor Bundle Configuration Option (4×ACSR-400/51)
N-1 Fault Current Capacity	- The allowable continuous thermal current is lower than the maximum fault current when one circuit is disconnected in 2035 (Isc = 2,747.2 A) - Risk of overheating and excessive conductor sag, potentially resulting in ground contact and safety hazard.	- The allowable continuous thermal current reaches 3,365 A (significantly higher than the fault current Isc = 2,747.2 A). - Ensures safe operation under the N-1 contingency condition.
Corona Losses and Noise	- High surface electric field intensity of the conductors, resulting in significant corona discharge losses and corona-generated audible noise exceeding the applicable standards in the buffer zone.	- The 4-conductor bundle configuration helps distribute the surface electric field intensity, minimizing corona losses and reducing discharge noise to below the permissible threshold.
Mechanical Loading on Steel Towers	- Lower weight, thereby reducing the mechanical load on the tower structures and foundations.	- Higher mechanical loading on the tower structures, requiring the design of high-strength steel towers; however, the loading has been optimized by controlling the specified breaking tensile stress.
Selection conclusion	**NOT SELECTED**	**SELECTED**

4.2.4. Comparison of series capacitor compensation system installation options

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Table 21: Comparison of series capacitor compensation installation scenarios to improve the transmission stability limit

Criteria of Comparison	**Option 1:** No series capacitor installation	**Option 2:** Installation of 21.5-ohm capacitor banks at both ends	**Option 3: i**nstallation of 30.5-ohm capacitor banks (80% compensation)
Steady-state transmission limit	- Failing to meet the requirements for inter-regional capacity transmission of 3,220 MW. - Risk of static system instability under large power fluctuations.	- Increases the steady-state transmission limit but does not reach the optimal level to provide sufficient capacity for future renewable energy sources.	- Optimizes the overall system steady-state transmission limit, fully meeting the maximum power transfer requirements from the Central Highlands to the Southern region.
Power Flow Balancing	- Highly uneven power flow distribution among the parallel circuits, resulting in local congestion.	- Power flow distribution is relatively stable, but differences remain between the existing and new transmission lines.	- Achieves optimal power flow balance between the new parallel circuit and the existing 500kV circuit (in coordination with the existing capacitor removal scenario)
Total system transmission losses	- Very high technical losses due to uneven power flow distribution.	Reduces technical losses but does not achieve the minimum level.	- Reduces overall system technical losses to the lowest level **(**down to 2,562.3 MW**)**
Selection conclusion	**NOT SELECTED**	**NOT SELECTED**	**SELECTED**

4.2.5. Comparison of shunt reactor installation options

Table 22: Comparison of solutions for controlling open-circuit terminal voltage under switching and fault

Criteria of Comparison	**Case 1: No shunt reactor installation**	**Case 2: Installation of a 120 MVAr shunt reactor (67% compensation)**
Open-circuit terminal voltage control	- Open-circuit terminal voltage rises beyond the allowable safety limit **(**>525 kV**)** when switching or faults occur on the 330-km transmission line.	Successfully controls the open-circuit terminal voltage, maintaining it at approximately 500kV and never exceeding 525 kV under all operating conditions.
Substation equipment safety	- Risk of overvoltage directly damaging the insulation of high-value equipment at the terminal 500kV substations.	- Ensures the safety of switching equipment, insulation systems and transformers at the substations.
Operational economic efficiency	- Saves the initial investment cost of the shunt reactor but entails the risk of equipment failure and damage costing millions of USD, potentially resulting in widespread power outages	- Requires an initial investment in a 120 MVAr shunt reactor but ensures long-term sustainability and operational safety throughout the project life.
Selection conclusion	**NOT SELECTED**	**SELECTED**

4.2.6. Comparison of insulation material selection options

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The FS directly compares the options for selecting insulation materials and provides a relatively detailed life-cycle analysis of composite/polymer insulators (PA1) and glass/ceramic insulators (PA2). The FS ultimately recommends the use of the conventional option, PA2. Details are presented in the table below:

Table 23: Analysis of insulation material selection options

Criteria	Composite/Polymer (PA1)	Glass/Ceramic (PA2)
Technical	Lightweight, with a small wind-exposed area; less susceptible to damage from external forces; good hydrophobicity/self-cleaning properties, suitable for areas with high pollution levels.	Conventional technology with long-term operating experience; individual discs can be replaced when damaged; heavier and potentially longer strings.
Construction and O&M	Approximately 6–8 times lighter according to the FS; reduces transportation and installation costs; no periodic cleaning required. However, specialized ladders are required for maintenance, and the entire insulator string must be replaced if damaged.	Heavier for transportation and installation; requires periodic cleaning, but individual discs can be maintained and replaced more flexibly.
Lifespan/life cycle	The FS considers service-life scenarios of 15, 20, 25 and 30 years; replacement may be required during the 40-year project life.	The FS adopts a 40-year analysis period and cites operating experience with 500kV transmission lines since 1994.
Initial Cost	Approximately VND 69.147 billion based on the reference data in the FS.	Approximately VND 105.829 billion for insulators, plus the potential cost impact of increased tower height/cross-arm spacing for certain configurations.
Life Cycle Costs	Depends on service life; the present-value cost calculated in the FS varies significantly, particularly if the service life is only 15 years.	The FS estimates the present-value cost at approximately VND 137.154 billion, assuming O&M costs of 1% and a 40-year service life.
Social Impact	Lower weight → reduces lifting requirements and shortens construction time; however, full replacement during operation may increase intervention time and the risk of service disruption if the service life is short.	Heavier installation, but lower risk of requiring replacement of the entire string due to end-of-life failure during the analysis period.
Environmental Impact	Lower initial transportation and material quantities; however, replacement once or twice during the life cycle may increase equipment waste and transportation/maintenance requirements.	Greater initial material quantity and requires periodic cleaning; in return, it has a longer service life and allows individual discs to be replaced.
Selection conclusion	**NOT SELECTED**	**SELECTED**

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CHAPTER 5. ENVIRONMENTAL AND SOCIAL IMPACT AND RISK ASSESSMENT

5.1. POSITIVE IMPACT

The "500kV Krong Buk – Tay Ninh 1 Transmission Lines" Project will bring about the following positive impacts:

- Ensure the full evacuation of power generated from power sources in the Central and Central Highlands regions (hydropower plants, solar power plants, gas turbines, and wind power plants) to the National Power System, thereby enhancing the power supply capacity for the Southern, Central, and Central Highlands regions.
- Ensure energy security.
- Enhance transmission capacity and reduce power losses in the regional power grid.

5.2. CLASSIFICATION OF POTENTIAL NEGATIVE IMPACTS AND RISKS

Potential negative environmental and social impacts and risks are classified into four levels: Substantial, Moderate, Low, and Negligible, based on three interrelated dimensions: the duration and geographical extent of the impacts; the severity of impacts on the physical and biological environment; and the degree of harm to communities and human health. The risk levels are determined based on a combination of baseline data collection, field surveys conducted throughout the project area, and consultations with government agencies and affected stakeholders. These inputs are assessed against the nature and scope of the proposed works under Component 1 (in five provinces/cities), including the construction of a new 500kV transmission lines route with a total route length of approximately 330 km; the construction and installation of two new feeder bays within the available land reserves at two substations; the construction of two optical repeater stations and access roads to the stations with a width of approximately 10 m; together with the specific sensitive characteristics of the Central Highlands and Southeastern regions of Vietnam, particularly forest ecosystems (protection forests and production forests), livelihoods dependent on land resources and production forests, etc., and the risk of unexploded ordnance (UXO).

This classification reflects the Project's overall ESF risk level as "Significant" and serves as the basis for the mitigation hierarchy and management measures specified in the ESMP and related instruments.

Table 24: Definition of environmental and social impact

Classification	Time/Scale	Environmental criteria	Social/Health Criteria	Manageability
Substantial (S)	Large to moderate scale; not overly complex or located in a particularly sensitive area; substantial risks that can be reliably mitigated, with no substantial	Substantial but mitigable changes to hydrology, salinity regimes, sediment transport, or aquatic biodiversity; exceedance of applicable standards or permissible thresholds in specific areas; transboundary or cumulative impacts	Serious occupational health and safety (OHS) risks, including the risk of unexploded ordnance (UXO) and impacts associated with migrant labor influx.	Requires robust mitigation plans, specialized management tools, and close monitoring.

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	residual impacts; limitations in the Borrower's capacity and implementation can be addressed through established mechanisms.	on shared aquatic resources, species migration corridors, or receiving water quality, which can be addressed through proven mitigation measures.		
Moderate (M)	Local impact; lasts from 6 months to 2 years.	Short-term ecological disturbances (e.g., turbidity and disturbance of the benthic environment due to dredging) with good recovery potential, but may result in cumulative impacts if not properly managed.	Impacts of land acquisition and resettlement on affected people and organizations. Temporary disruption to water supply, waterway transportation, and canal-dependent livelihoods; impacts on public health, noise, dust, or access.	Requires proactive mitigation measures and regular monitoring.
Low (L)	Low; less than 6 months, or insubstanital changes over a period of less than 2 years.	Impacts remain within applicable permissible standards or limits; minor impacts on water, soil, or air that are self-recovering or can be readily mitigated.	Negligible impact on public health, livelihoods, or daily activities.	Fully controllable with standard ESMP measures.
Negligible (N)	Not applicable	No substantial impact on the physical or biological environment.	There is no substantial impact on socio-economic conditions.	Confirmed through baseline analysis, field surveys, and stakeholder consultations.

Indirect impact: An impact caused by a project that occurs later in time or farther away in space than a direct impact and can be reasonably predicted, but does not include induced impacts.

Cumulative impact: The incremental impact of a project when combined with impacts from other projects or activities that have occurred in the past, are occurring in the present, or are reasonably foreseeable in the future, including unplanned but predictable activities that are induced by the project.

Residual impact: Negative environmental, social, or economic impacts that remain after all feasible mitigation measures have been implemented — i.e., the unavoidable portion of the impact that persists despite mitigation efforts to minimize adverse effects.

Induced impact: Secondary consequences extending beyond the scope of the project's direct impacts, often resulting from development-inducing effects such as the construction of new infrastructure, population growth, or changes in land use, which create new environmental pressures that were not initially anticipated but are induced by the project.

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The Environmental and Social Impact Assessment is conducted for each proposed work item in the five provinces/cities and as an overall assessment for the entire project area (the Central Highlands and Southeastern regions of Vietnam). This assessment aims to identify, predict, and analyze direct, indirect, and cumulative impacts, thereby providing a basis for proposing appropriate mitigation measures and management plans to avoid, minimize, mitigate, or offset adverse impacts and risks. The assessment complies with national legislation, ESS1 and other applicable ESSs, as well as the World Bank Group (WBG) Environmental, Health, and Safety (EHS) Guidelines and Good International Industry Practice (GIIP).

Based on the analysis of baseline data, field surveys, and consultations with stakeholders, the potential adverse impacts of the project on the physical, biological, and socio-economic environment have been identified and assessed. The types and extent of adverse environmental impacts and risks are classified in Table 25.

Table 25: Types and scales of negative environmental and social impacts and risks [will be continuously updated]

No.	Impact	Project Phase		
		Preparation	Construction	Operation
I	**Physical environment & Waste**			
I.1	Air quality	N	M	N
I.1	Noise and vibration	N	M	N
I.3	Erosion, landslides, and surface water sedimentation	N	M	L
I.4	Impacts on shallow groundwater aquifers	N	L	N
I.5	Generation of domestic wastewater and concrete wastewater	N	M	N
I.6	Waste management (domestic waste, construction waste, and hazardous waste)	L	M	N
II	**Biological environment & Biodiversity**			
II. 1	Repurposing of land for protection forests and production forests	M	M	L
II.2	Cutting down agricultural and forestry crops along the route	M	M	L
II.3	Canopy-flying birds and bats	N	L	M
II.4	Aquatic ecosystems at the intersection of creeks, rivers and streams	N	L	N
II.5	Invasion of harmful alien species	N	L	L
III	**Social environment & Heritage**			
III. 1	Permanent land acquisition and land use restrictions	S	M	M
III.2	Relocation of houses and permanent structures	S	L	N
III.3	Livelihood impacts and long-term livelihood restoration	M	M	L
III.4	Tangible cultural heritage and chance find procedure	L	L	N
IV	**Health, Safety & Incident Risk**			
IV.1	Occupational health and safety (OHS)	M	S	M

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IV.2	Accident risks due to unexploded ordnance (UXO)	L	L	N
IV.3	Community health and safety (CHS)	L	S	M
IV.4	Electromagnetic fields (EMF) and electrical safety during operation	N	N	M
IV.5	Fire and explosion incidents and forest fires caused by outdoor activities	L	S	M
IV.6	Extreme natural disasters and SF6 leak emissions	L	S	M

Notes: L = Low → Low Impact; M = Moderate → Moderate Impact; N = Negligible → Negligible/Very Small Impact.

5.3. NEGATIVE IMPACTS AND RISKS DURING THE PREPARATION PHASE

Activities in this period are mainly geological surveys for the development of pre-feasibility study reports and/or feasibility study reports and detailed designs; planting land recovery clearance markers; mine clearance. These activities take place continuously and intermittently during the preparation process. Therefore, the negative impacts mainly arise from (1) Land occupation, (2) risks related to mine clearance and explosives.

5.3.1. Impact of land acquisition

a. Impact of land acquisition

The Project will require permanent land acquisition for tower foundations, optical repeater stations and associated facilities, and may require temporary occupation of land for construction access, material storage, worker facilities, pulling and tensioning sites and other construction activities. The transmission line right-of-way may also impose restrictions on land use, construction, tree height and certain livelihood activities for safety purposes. These impacts may result in loss of land, houses or other structures, standing crops and trees, disruption of access, and temporary or permanent effects on household livelihoods and income sources. At this stage, the available impact estimates are preliminary because the detailed design, final alignment, tower locations, access arrangements and construction methods have not yet been finalized. The current estimates of affected land, households, organizations, houses, secondary structures, crops, trees and livelihood activities will therefore be verified and updated during Phase 2 through the final design, updated census and inventory of losses, cadastral review, replacement cost survey and further consultation with affected people and relevant authorities. The Phase 2 ESIA and RP updates will present a consistent set of verified data and clearly distinguish permanent acquisition, temporary occupation, right-of-way restrictions, physical displacement and economic displacement. The potential severity of impacts will vary according to the type and extent of loss, the affected household's dependence on the affected asset or livelihood, the availability of remaining productive land, and household vulnerability. Particular attention will be given to households that may be physically displaced, lose a significant share of productive assets or income, experience prolonged access restrictions, or face cumulative impacts from several Project activities. Vulnerable affected people, including poor and near-poor households, female-headed households with dependents, persons with disabilities, older persons living without effective support, landless households and ethnic minority households, will be identified through the Phase 2 social assessment and census and provided with differentiated assistance, as appropriate. Livelihood impacts may include loss or reduced productivity of agricultural land; loss of perennial and annual crops and trees; disruption of farming during

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foundation construction and conductor stringing; restrictions on planting tall trees or constructing buildings within the right-of-way; and temporary interruption of access to fields, local roads or community facilities. Phase 2 will assess these impacts in greater detail, including the duration of temporary impacts, the extent of residual landholdings, the viability of remaining livelihoods and the need for livelihood restoration measures.

The Project will manage land acquisition, restrictions on land use and involuntary resettlement in accordance with applicable national law and ESS5 through the RP. The Project will seek to avoid or minimize displacement through design and construction planning. Where impacts cannot be avoided, affected people will be compensated for eligible losses at replacement cost and provided with assistance necessary to restore, and where possible improve, their livelihoods and living standards. No civil works causing land acquisition, displacement or restrictions on land use will commence in the relevant site until the applicable RP requirements have been completed and compensation and assistance have been provided in accordance with the RP, except where otherwise agreed in accordance with ESS5.

b. Impact on ethnic minority people

Preliminary screening indicates that ethnic minority communities are present in parts of the project area. The number of affected ethnic minority households, the nature and magnitude of impacts, and the need for culturally appropriate support measures will be determined through the Social Assessment, SES, DMS and consultations.

5.3.2. Safety risks associated with unexploded objects (UXO)

Before commencing construction activities, the project will contract a specialized military unit to carry out the detection and clearance of bombs, mines, and unexploded ordnance (UXO) at the construction sites of tower foundations, optical repeater stations, and along the safety corridor. The total area subject to bomb, mine, and UXO clearance for the project is approximately 173.74 ha. The project will carry out UXO clearance in accordance with applicable regulations before construction commences. Therefore, the risk of accidents caused by residual bombs, mines, and UXO is LOW.

5.4. IMPACTS AND RISKS DURING THE CONSTRUCTION PHASE

5.4.1. General impacts and risks

5.4.1.1. Impact on ambient air quality

During the construction process, air quality in the areas surrounding the project may be affected by transportation and construction vehicles, excavation and earthwork activities, and the transportation of construction materials. The main pollutants are dust and exhaust gases containing CO, SOx, NOx, and hydrocarbons.

- *Dust from excavation and earthwork activities for the construction of tower foundations*

The total excavation volume of the project is 545,673 m³, equivalent to approximately 851,250 tonnes (assuming an average soil bulk density of 1.56 tonnes/m³). All excavated soil will be used for backfilling the foundation pits and covering the foundation surfaces within the areas of the permanently acquired land for the foundations. The estimated duration for completing one foundation pit is approximately 17 days, including 10 days of continuous excavation and 7 days of backfilling and site restoration. The suspended dust emission load from these mechanical excavation and earthwork activities is calculated using the World Bank standard emission factor of E = 0.054 kg/tonne of excavated and backfilled soil. Under the influence of wind and dry climatic conditions, the simulated average one-hour dust concentrations at the

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boundary of the tower foundation construction site range from a minimum of 0.26 mg/m³ for foundation type MCĐ522-91(+3)A to a maximum of 2.60 mg/m³ for foundation type 4T48-100. For most common foundation types, dust concentrations range from 0.31 mg/m³ to 2.60 mg/m³. All of these values are higher than the permissible value specified in QCVN 05:2023/BTNMT (0.3 mg/m³). However, excavation and earthwork activities will be carried out progressively, and the project area is mainly located on agricultural land and forest land. Therefore, the impact from dust generation is assessed as MODERATE, temporary, and will cease upon completion of the excavation and earthwork for the tower foundations.

- *Transportation of construction materials*

Sand, stone, and cement for construction will be procured locally. The transportation distance for these materials is approximately 15 km, using motorized transport (15-ton trucks). The main transportation routes include National Highway 14, National Highway 14C, National Highway 13, provincial roads, and inter-commune roads in the area. According to the construction calculations, the volume of construction materials required for the project is approximately 42,730 m³. Assuming an average material bulk density of 1.4 tonnes/m³, the estimated number of material transport trips using 15-ton trucks is: 42,730 × 1.4 tonnes / 15 tonnes = 3,988 loaded trips

It is estimated that two empty-truck trips are equivalent to one loaded-truck trip. Therefore, the total transportation distance for construction materials is calculated as follows: (3,988 loaded trips + 3,988/2 empty trips) × 15 km = 89,730 km

According to Document No. 1074/BTNMT-KSONMT dated February 21, 2024, issued by the Ministry of Natural Resources and Environment on technical guidance for emission inventories of dust and exhaust gases from point, area, and mobile sources, the emission factors for diesel-powered trucks with a load capacity of 7.5–16 tonnes were applied. The total cumulative emission loads and average daily emission loads (over the 12-month construction period, equivalent to 312 actual working days) are estimated as follows: PM2.5 is 30,005.7 g (average 96.2 g/day), sulfur dioxide (SO_2) is 17,766.5 g (average 56.9 g/day), nitrogen dioxide (NO_2) is 800,391.6 g (average 2,565.4 g/day), and carbon monoxide (CO) is 191,124.9 g (average 612.6 g/day).

The above calculation results indicate that the dust and exhaust gas emission loads generated by the transportation of construction materials are relatively low. In addition, the transportation distance is approximately 15 km, and wind conditions (including natural wind and wind generated by vehicle movement) facilitate the dispersion of pollutants along the transportation routes. Therefore, the impact of dust and exhaust gas emissions from the transportation of construction materials is assessed as MODERATE. The Project Owner will apply appropriate measures to minimize these impacts.

- *Dust and exhaust gases caused by construction machinery and equipment on the construction site*

The DO oil fuel burning activities of 125 specialized construction vehicles and machinery operating simultaneously on the entire route include 44 trucks of 5–15 tons, 22 excavators, 22 bulldozers/levelers, 22 table compactors/stick compactors and 15 specialized cranes. According to the waste norms of Decision 1134/QD-BXD of the Ministry of Construction, the total amount of DO oil fuel consumed in a shift (8 hours/day) of the entire equipment is 3,501.96 kg, generating an exhaust gas flow equivalent to 9,893.03 m³/hour. The emission concentration of pollutants at the mouth of the exhaust pipe was calculated to be 31.42 mg/m³ for Dust, 221.24 mg/m³ for SO2, 425.66 mg/m³ for NOx and 96.90 mg/m³ for CO. When discharged into the ambient air on an average construction area of about 2,270 m² per column foundation, the actual diffusion concentration reached a very low level, including 0.014 mg/m³ for Dust, 0.099 mg/m³ for SO2, 0.192 mg/m³ for NOx and 0.044 mg/m³ for CO. Concentrations of dust and exhaust

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emissions are lower than the permitted Regulation (QCVN 05:2023/BTNMT). Besides, the calculation only assumes that the source of pollution is the point source. In fact, the construction equipment is not used at the same time and not in the same location, so the actual concentration of pollutants will be lower than calculated and easily dispersed. The project owner will also apply construction vehicle control solutions to minimize the impact of emissions on the quality of the surrounding air environment. Therefore, this impact is rated as LOW.

5.4.1.2. Impact of noise and vibration

a. Noise

During the construction of the project, noise may occur due to: (i) Construction equipment and machinery (concrete mixers, generators, compactors, cranes, etc.); (ii) Means of transporting materials and equipment. Referring to some technical documents, the noise level generated by construction vehicles and machinery is as follows:

Table 26: Noise levels from construction vehicles and machinery

No.	Machinery and equipment	Noise level (dBA), 1.5 m from the source	
		Documents (1)	Documents (2)
A	**Excavation process**		
1	Compactor		72 – 74
2	15 Ton Dump Truck	93	82 – 94
3	Site inspection vehicles	77	-
B	**Construction of items**		
1	250 L Capacity Concrete Mixer	75	75 – 88
2	Compactor		72 – 74
3	Water Pump		80 – 83
4	Generator (concrete mixer equivalent)		75 – 88
C	**Erecting towers and pulling wires**		
1	Crane		76 - 87
2	Conductor core head press (compressor equivalent)	80	75 - 87

Notes: Document (1): Nguyen Dinh Tuan et al.; Document (2): Mackernize L.Da, 1985.

The impact level can be estimated using the following formula: P1 – P2 = 20log(D2/D1). Where: Pi: Noise level at distance i (dBA); Di: Distance from the noise source to the receptor (m).

According to the table above, the noise level generated by construction vehicles and machinery ranges from 72–94 dBA at a distance of 1.5 m from the noise source. Based on the above formula, the maximum noise levels generated by the construction of tower foundations at distances of 30 m, 50 m, and 100 m from the project area can be estimated as follows: P30 = 94 – 20 log[30/1.5] = 67.9 dBA; P50 = 94 – 20 log[50/1.5] = 63.5 dBA; and P100 = 94 – 20 log[100/1.5] = 57.5 dBA.

These noise levels are lower than the limit specified for Area E (mixed-use and industrial areas, including transportation hubs and industrial parks) under QCVN 26:2025/BTNMT (6:00–18:00: 70 dBA). The above calculation results show that the noise level at the construction site (1.5 m from the noise source) is relatively high, ranging from 72–94 dBA, and exceeds the permissible limit specified in QCVN 24:2016/BYT (88 dBA for an exposure duration of 4 hours). Therefore, there will be certain impacts on construction workers at the construction site. The areas along the transmission line are mainly agricultural land used for perennial crops and other crops, as well as forest land. In particular, the tower foundation locations are generally far from residential houses, with the nearest distance being >50 m. According to the above

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calculations, the maximum noise level at a distance of 50 m from the tower foundation construction site is 63.5 dBA, which is lower than the limit specified for Area E under QCVN 26:2025/BTNMT (6:00–18:00: 70 dBA). Therefore, the impact of noise from tower foundation construction activities on workers and local residents is assessed as LOW to MODERATE, short-term, controllable, and manageable through mitigation measures.

b. Vibration

Vibration is mainly generated by the operation of compactors, excavators, and material transport trucks on construction access roads, forestry roads, and rural roads, with residential houses located near transport routes being the main sensitive receptors. The impacts are localized, short-term, and intermittent, with the pre-mitigation impact level assessed as LOW due to the limited transportation volume (approximately 3,988 trips by 15-ton trucks over 12 months) and the dispersed construction sites along the transmission line. The impacts will be controlled through speed limits of less than 20 km/h in residential areas, optimization of transportation routes, avoidance of sensitive structures, and periodic vehicle maintenance. Following mitigation, the residual vibration impacts are assessed as NEGLIGIBLE.

5.4.1.3. Impact of wastewater

a. Domestic wastewater

As presented in Chapter 1, in order to ensure the construction schedule, the project will organize 20 construction teams. The number of construction workers in each construction team will depend on the respective construction stage, including excavation and earthwork, foundation reinforcement, foundation concreting, tower erection, equipment installation, conductor stringing, etc., with a maximum of 20 workers/day/team. The maximum number of construction workers per day is 400 workers (20 workers/day × 20 teams).

According to the National Technical Regulation on Construction Planning, QCVN 01:2021/BXD, the domestic water supply demand is 80 liters/person/day. The total volume of domestic water used and discharged during the construction phase is 32 m^3/day, distributed along the 330-km transmission line corridor. Untreated domestic wastewater is characterized by very high concentrations of organic matter, suspended solids, grease and pathogenic microorganisms, exceeding the permissible limits specified in the National Technical Regulation QCVN 14:2025/BTNMT (Column B). Typical concentrations include BOD_5 of 400–480 mg/L (compared with the permissible limit of 35 mg/L), COD of 640–907 mg/L (compared with the permissible limit of 90 mg/L), suspended solids (SS) of 622–1,289 mg/L (compared with the permissible limit of 60 mg/L), grease of 89–267 mg/L (compared with the permissible limit of 15 mg/L), and Coliform bacteria of 10^6–10^9 MPN/100 mL (compared with the permissible limit of 5,000 MPN/100 mL). The affected receptors include surface water, small rivers and streams crossed by the transmission line corridor, and agricultural land surrounding worker camps and construction areas. This impact is temporary, short-term, and localized, occurring for approximately 1–2 months at each construction site before the construction teams progressively move to the next tower section. This impact is assessed as LOW to MODERATE.

b. Wastewater from construction activities

The main sources of construction wastewater are water seeping into foundation pits, due to shallow groundwater infiltrating typical foundation excavations approximately 3.90m deep, and wastewater from washing concrete aggregates and cleaning concrete mixer drums. The volume of groundwater seeping into the foundation pits that needs to be temporarily pumped and drained is up to approximately 3m^3 per tower foundation. This wastewater is characterized

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by sand and soil particles and readily settleable suspended solids, with no hazardous constituents. Wastewater from concrete mixers (using mixers with a capacity of 250 liters and a capacity of 2m³/h) is generated at an average rate of 0.78m³/day at each construction site, after applying a recirculation and reuse measure that reuses 80% of the aggregate-washing water. This concrete wastewater is characterized by an alkaline pH due to cement and a high concentration of SS. The directly affected receptors are the water quality of streams, aquatic ecosystems in small natural streams, and agricultural land surrounding the tower foundation locations. This impact is localized and short-term, occurring intermittently during the 10–12-day period required for foundation excavation and concrete casting at each tower location. The impact level is assessed as LOW.

5.4.1.4. Solid waste impact

a. Domestic solid waste

The concentration of the workforce will generate domestic solid waste. According to the National Technical Regulation on Construction Planning, QCVN 01:2021/BXD, the average per-capita generation rate of domestic solid waste in the project area (Region V) is 0.8kg/person/day. With a maximum of 20 construction workers per construction site (one construction team) and up to 400 workers per day for the entire project (20 construction teams), the maximum amount of domestic solid waste generated by the project is 320kg/day, distributed along the 330-km transmission line. The main components of domestic solid waste include vegetables, fruits, leftover food, food packaging, plastics, glass, etc. If not properly managed, this waste may locally affect soil, surface water, and environmental sanitation in worker camp areas and nearby residential areas. As the construction teams move progressively along the transmission line according to the construction schedule, the impact is temporary, short-term, and dispersed. Before mitigation, the impact is assessed as MODERATE. Management measures include prioritizing accommodation in residential areas where the existing waste collection system can be utilized; providing covered waste containers and implementing waste segregation at source in areas away from residential communities; and signing contracts with licensed service providers for waste collection, transportation, and treatment. With the full implementation of these measures, the residual impact is assessed as LOW to NEGLIGIBLE.

b. Construction solid waste

❖ *Biomass from vegetation clearance*

Site clearance, removal of the surface cover within the permanent column foundation areas (107.74 hectares), and selective clearance of the 36m-wide ROW safety corridor for wire stringing will generate discarded plant biomass. Based on the calculation method of Ogawa and Kato for the typical vegetation types along the route (applying dry biomass coefficients ranging from 15.009tons/ha for restoration forests, 41.0tons/ha for planted forests, 49.289 tons/ha for poor natural forests, to 7.5tons/ha for perennial industrial orchards), the total volume of fresh biomass from vegetation cleared and periodically pruned during the construction preparation period is estimated at 4,128.04 tons. The directly affected receptors include the litter layer and surface soil structure along the ROW, forest owners managing protection forests and production forests, and households owning perennial orchards adjacent to the corridor. In particular, fallen branches and leaves that accumulate and dry out if not cleared in a timely manner may become a source of combustible material, especially under the prolonged dry-season conditions in the Central Highlands and Southeast region (from November to April of the following year).

The impacts associated with biomass generation occur over a concentrated and short-term period during the pre-construction stage but may lead to long-term fire-spread risks. The impacts are assessed as MODERATE to SUBSTANTIAL in sections of the route passing

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through sensitive protection forest areas due to the risk of fire.

❖ *Organic soil from removal of surface vegetation soil*

To prepare the construction sites for the transmission line components, the project will remove the surface vegetation soil, with an estimated volume of 10,773.5m³ (1,077,353m² × 0.01–0.02m). This organic soil mainly consists of the topsoil of perennial crops (rubber, acacia, cashew, pepper, coffee, etc.), fruit trees, and other crops, and does not contain hazardous components. The entire volume of this soil will be reused by the project to cover the foundation surfaces within the areas for which permanent compensation has been provided; therefore, the project will not generate surface organic soil requiring transportation outside the project area. The directly affected receptors are the quality of the agricultural topsoil surrounding the column foundation locations and adjacent natural drainage channels, which may be susceptible to sediment deposition and sediment runoff during rainfall. However, this impact is localized, short-term, and intermittent, occurring over 2 to 3 days during site preparation at each foundation pit location along the 12-month construction schedule. This impact is assessed as LOW to NEGLIGIBLE.

❖ *Earthwork*

The total volume of excavated soil generated by the project is 545,673m³, of which 488,108m³ will be reused for backfilling foundation pits and constructing foundation embankments, while the surplus volume of 57,565m³ will be compacted on the foundation surface within the areas for which permanent compensation has been provided. The project will not transport surplus excavated soil outside the project area. The directly affected receptors are the stability of the local geological formations around foundation pits on the hilly and mountainous terrain of the Central Highlands, vegetation and crops adjacent to the foundation sites, and rural natural drainage systems. The impacts from foundation excavation and earthwork will occur over a short period, concentrated within 17 days at each column foundation location (including 10 days of continuous excavation and 7 days of backfilling and compaction) during the construction cycle. The impact is assessed as MODERATE because the large cumulative volume of excavated soil may readily cause erosion and slope instability on hilly and mountainous slopes during the rainy season.

❖ *Construction solid waste*

The main sources of conventional construction solid waste are the erection of steel columns, wire stringing, and casting of concrete foundations. Waste components include scrap iron and steel, bricks, stones, dry concrete mortar, cement packaging, and excess formwork pieces. This construction waste will be generated intermittently, with an estimated volume of approximately 500–800 kg/day across all active construction sites. Construction solid waste is chemically inert and does not contain hazardous or toxic components. The directly affected receptors are the aesthetics of the rural landscape along the ROW corridor and the quality of agricultural land adjacent to temporary foundation construction sites. This impact will occur continuously but intermittently throughout the 12-month construction and installation phase. The impact is assessed as LOW because the amount generated at each individual column foundation is very small and dispersed.

c. Impacts from hazardous waste

Hazardous waste will be generated from the operation, maintenance, and washing of vehicles, machinery, and specialized construction equipment at construction sites. The volume of hazardous waste generated is relatively small, estimated at approximately 75–90 kg/month depending on the intensity of machinery use. The main types of hazardous waste include oil- and grease-contaminated rags, empty oil containers, and waste paint. The most sensitive receptors at risk of exposure are the health of construction workers directly involved in the works (OHS risks), the quality of the basaltic topsoil, which is highly permeable beneath

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machinery, shallow groundwater, and natural streams around the construction sites. Hazardous waste impacts will occur intermittently and on a small scale throughout the 12-month construction period. All hazardous waste generated will be collected, segregated, and stored in covered, labeled containers at safe locations within the construction sites. Therefore, this impact is assessed as LOW.

5.4.1.5. Impact on surface and groundwater quality

a. Rainwater runoff carrying soil, sand, construction materials, oil and grease, and waste from the construction site

Excavation of foundation pits, removal of vegetation cover, and temporary material storage areas at construction sites may generate highly turbid stormwater runoff. Based on the climatic data specified in QCVN 02:2022/BXD, the maximum rainfall intensity over a 60-minute period recorded at Buon Ma Thuot meteorological station was 65.3mm. Applying the rainwater drainage flow calculation formula in accordance with TCVN 7957:2023 ($Q = 0.278 \times 10^{-3} \times I \times F \times \beta \times \psi$), with a calculated rainfall intensity of I = 65.3mm/h, a surface runoff coefficient of $\psi = 0.4$, and a rainfall distribution coefficient of $\beta = 1.0$ (as the catchment area F is less than 500 ha), the stormwater runoff at each column foundation site is estimated to range from a minimum of 4.30 L/s for foundation type 4T37-46 to a maximum of 61.47 L/s at foundation type 8T46-10034. This surface runoff may carry suspended solids (SS) from eroded soil and spilled cement mortar, posing a risk of directly affecting surface water quality and aquatic ecosystems in river and stream catchments crossed by the 330-km transmission line, such as the Bé River, Saigon River, Sêrêpôk River, Đắk R'Lấp River, Đục Stream, Đắk N'Đrung Stream, Đắk R'Tih Stream, Đông Canal, and small tributaries of Thác Mơ Hydropower Reservoir. This impact is temporary, short-term, and intermittent, occurring only when heavy rainfall events take place during the foundation construction period, which lasts from 1 to 2 months at each tower section. The impact is assessed as LOW to MODERATE because the column foundations are mainly located on forestry land, production forest land, or agricultural land planted with perennial crops, and are not located within river or stream beds or on sensitive stream banks.

b. Foundation excavation at locations with weak ground conditions that may affect shallow groundwater

Mechanical excavation for in-situ reinforced concrete construction of the four independent foundation legs at 657 tower locations along the transmission line corridor is a direct source of potential leakage and impacts on shallow groundwater aquifers. The project's technical cross-section drawings indicate that the depth from the natural ground surface to the bottom of a typical foundation pit can reach 3.90m. At sections of the transmission line crossing valleys, low-lying areas, areas near rivers and streams, or areas with weak geological conditions where seasonal shallow groundwater occurs at depths of less than 3.90m below ground level, foundation excavation may directly intersect the shallow aquifer. This may result in continuous groundwater seepage into the foundation pit, requiring the contractor to operate a temporary dewatering system to keep the foundation pit dry for concrete placement. The receptors directly affected by this risk include the local shallow aquifer, the mechanical stability of the foundation pit walls (including the risk of wall collapse or internal erosion causing deformation of the excavation), and, indirectly, the quality of water in dug wells used by nearby residents. This impact is localized, short-term, and intermittent, occurring only during the approximately 10-day foundation excavation period at each tower location before the excavation is fully backfilled and restored. Therefore, the impact is assessed as LOW because the exposed area of

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each individual foundation pit is very small, ranging from approximately 20 to 40 m².

5.4.1.6. Impacts on agricultural production activities (industrial crops and production forests)

The project stretches along 330 km of transmission lines and is constructed mainly on agricultural land. The locations for land acquisition for the construction of column foundations are selected, designed, and constructed mainly in areas of agricultural land planted with perennial crops, annual crops, and forest land, while avoiding residential land to the maximum extent possible.

For households whose houses/works are relocated, people are allowed to use the land under the safety corridor for agricultural cultivation (with crop heights maintained to ensure the required safety clearance). In addition to the relocated houses and the land within the safety corridor, the majority of households still have land outside the corridor to rearrange their accommodation.

Stabilizing the production activities of affected households during the initial period is relatively difficult; therefore, the project owner and local authorities will pay attention to these households and provide appropriate support policies. In addition to the impacts caused by the project, improper use of compensation payments by affected people may potentially lead to social problems in the locality. The level of impact is assessed as MODERATE.

5.4.1.7. Impact on local road traffic activities

The movement of heavy motor vehicles (such as 15-ton trucks transporting cement, sand, stone, and steel towers) along National Highways 14, 13, and 14C, provincial roads (DT760, DT789, DT967, etc.), and the rural inter-commune road network will increase local traffic density. The most substantial impact during this stage will be associated with wire stringing across major roads, including National Highways 14, 13, and 14C, provincial roads (DT760, DT789, DT967, etc.), and major rivers (Saigon River, Be River, and Serepok River), which may cause localized traffic disruption or congestion. Directly affected receptors include rural road infrastructure (with risks of subsidence and damage to asphalt or unpaved road surfaces), road users, and communities living along the transportation routes. The impact is assessed as LOW to MODERATE because construction will be carried out on a rolling basis and dispersed along the 330 km-long route. Heavy vehicles will only be concentrated locally for short periods at individual foundation locations. Traffic congestion during wire stringing across national highways and major rivers will also be temporary, lasting only a few days and ending immediately after completion of the works.

In addition, the erection of temporary scaffolding and the stringing of conductors and OPGW lightning protection wires across road intersections may pose traffic safety risks. The project route has a high number of road crossings, including 4 crossings of National Highway 14, 1 crossing of National Highway 13, 1 crossing of National Highway 14C, 2 crossings of provincial road 760, 3 crossings of provincial road 789, and 801 crossings of rural roads with widths of ≤10 m. Directly affected receptors include road users, traffic flows passing through the crossing points, and workers directly involved in overhead construction. The impact is localized, very short-term, and intermittent (limited to several hours to a few days for wire stringing at each specific span). The traffic safety risk is assessed as MODERATE to SUBSTANTIAL but can be mitigated because, during wire stringing works, the contractor will install warning barriers, implement traffic diversion and control measures from a safe distance, install protective scaffolding with a robust load-bearing safety net over the road, and carry out rolling wire stringing operations during off-peak hours.

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5.4.1.8. Impact on cultural resources (tangible and intangible)

The project does not approach or cross any cultural or historical heritage sites. The transmission line mainly passes through agricultural land, with most sections running parallel to the existing 500kV Pleiku - My Phuoc - Cau Bong transmission line (for the sections passing through Dak Lak, Lam Dong, and Dong Nai provinces). Part of the project also passes through production forests and protection forests. There are no identified landscapes or areas requiring protection within the project area.

However, excavation of foundation pits (with an average depth of 3.9m) may pose a potential risk of damaging previously undiscovered archaeological sites or artifacts. This risk is assessed as LOW because the project will strictly implement the Chance Find Procedure in accordance with the World Bank's ESS8 requirements, including immediate suspension of construction, demarcation and protection of the discovery site, and notification to the Department of Culture, Sports and Tourism within 24 hours upon discovery of any archaeological or cultural relics. These measures will ensure that the residual impact is controlled at a NEGLIGIBLE level.

5.4.1.9. Environmental risks

- **Landslides, subsidence, erosion and river/stream bank erosion**

With a length of 330 km, the transmission line passes through areas with varying terrain. The majority of the line corridor (98.5%) passes through agricultural land with relatively flat terrain, where the risk of landslides and erosion is low. However, some sections of the line pass through rolling and high hilly terrain with slopes of 15–35° and weak geological conditions, where the construction of 657 tower foundations may give rise to the following risks:

Soil landslides due to steep terrain: the risk of directly threatening the lives of construction workers, burying equipment, deforming or displacing tower foundations under construction, and potentially disrupting local roads below (if any).

- Erosion during rainstorms: causing sedimentation, blockage of natural drainage flows, and impacts on surface water sources if the construction areas are located near rivers and streams.
- Subsidence due to weak geological conditions.

The pre-mitigation risk level ranges from LOW to MODERATE for sections with flat terrain, and from MODERATE to SUBSTANTIAL for sections with steep terrain and weak geological conditions. These risks can be effectively mitigated through drainage control, management of excavated materials, and foundation reinforcement measures specified in the ESMP.

- **Lightning strikes, fire and explosion, and forest fires**

Lightning strikes

The 330 km transmission line passes through the Central Highlands, one of the regions with the highest lightning frequency in Vietnam, with a lightning density of up to 20–25 strikes/km²/year and a thunderstorm season lasting approximately 10 months (February to November). During the construction phase, the erection of 50–80 m high towers and wire stringing in hilly terrain may create a risk of direct lightning strikes on workers, equipment and power towers under installation. Potential consequences include:

- Casualties to workers working at height or outdoors under adverse weather conditions.
- Damage to construction equipment and materials.
- Fire and explosion at areas where fuel and flammable materials are stored near construction sites.

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Pre-mitigation risk level: MODERATE to SUBSTANTIAL. This risk can be effectively mitigated through occupational safety measures, work stoppage procedures during thunderstorms, and the provision of appropriate personal protective equipment as specified in the ESMP.

Fire and explosion:

Along the 330 km route, the project will establish 16 temporary construction sites for the storage of fuel, equipment and construction materials. Fire and explosion incidents may arise from temporary fuel storage areas (paint, gasoline and oil); heating equipment used during construction activities (metal cutting and welding); and electrical short circuits involving construction equipment. Potential consequences include worker casualties, property damage, and soil and water pollution caused by the release of chemicals and fuels at the site.

The risk level ranges from LOW to MODERATE. This risk can be effectively mitigated through fire and explosion prevention measures and fuel storage management measures specified in the ESMP.

Forest fires:

Along sections of the route passing through or near forest areas, construction activities may create a risk of forest fires due to the following causes: electrical short circuits during the use of construction equipment and vehicles; negligence in the daily activities of workers at camps; unauthorized burning of vegetation after clearing the line corridor instead of collecting and disposing of it in accordance with regulations; and construction during the Central Highlands dry season (November to April), when accumulated ground vegetation and dry biomass have a high risk of ignition. Notably, the total amount of vegetation biomass generated from vegetation clearing activities is estimated at approximately 4,128.04 tons, representing a substantial potential source of combustible material if not properly managed. In areas with dry vegetation or along sections near forests, a construction-site fire may spread to surrounding vegetation or forest within 0–5 minutes if not promptly controlled, causing environmental and property damage and posing a threat to local communities.

Pre-mitigation risk level: MODERATE to SUBSTANTIAL in sensitive sections. This risk can be effectively mitigated by strictly prohibiting the burning of vegetation, fully equipping each construction site with fire prevention and firefighting equipment, and coordinating with local forest rangers as specified in the ESMP.

Material spills and chemical leaks

The operation of construction equipment at 657 tower foundation locations and 16 temporary construction sites along the route may result in oil leaks and spills from construction equipment, chemical spills (paint and detergents), and leaks of hazardous waste, estimated at approximately 75–90 kg/month for the entire project. If not promptly addressed, these incidents may cause soil and surface water pollution. The risk is particularly high along sections where wire stringing crosses rivers and streams, where rainwater runoff during the rainy season may spread pollutants beyond the immediate area. The extent of impacts at locations far from water sources is generally localized and reversible.

The pre-mitigation risk level ranges from LOW to MODERATE — LOW for construction sites far from water sources and MODERATE for sections where wire stringing crosses rivers and streams. This risk can be effectively controlled through hazardous waste management and oil spill response measures specified in the ESMP.

- **Natural disasters and flash floods**

The project area is located in the Central Highlands and Southeast regions, which have a pronounced seasonal rainfall regime, with average annual rainfall of 1,800–2,400 mm, mainly

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concentrated from May to November. During the construction phase, extreme weather events, including heavy rainfall, thunderstorms, strong winds and heat, may cause the following incidents:

- Flooding of foundation pits at construction sites during the rainy season, disrupting construction progress and affecting the quality of foundation concrete.
- Landslides along sections with steep terrain, particularly when foundation pits are under excavation.
- Destabilization of cranes and power towers under erection during strong winds or thunderstorms.
- Flash floods at river and stream crossings, which may wash away materials and equipment and endanger workers.

As the construction sites extend over 330 km and pass through areas with varying terrain and weather conditions, the probability of at least one natural disaster incident occurring during the construction period is high.

Risk level: MODERATE to SUBSTANTIAL, depending on the specific activities and weather conditions at each section of the route. These risks can be effectively mitigated through weather monitoring mechanisms, emergency response plans, and authority for each construction team to suspend work as specified in the ESMP.

5.4.1.10. Occupational health and safety (OHS) risks

- **Foundation excavation and working in excavation pits:** Deep excavation activities pose risks of excavation sidewall collapse, sudden flooding, falling soil and rocks, instability due to weak ground conditions/heavy rainfall, and accidents during the operation of construction machinery. Workers inside foundation pits face the risk of injury from falling objects or inadequate safe means of emergency egress.
- **Tower erection and work at height**: This is a substantial OHS risk with potentially serious or fatal consequences, arising from the risk of falls from height, falling equipment/components, lifting cable failure, crane instability, failure of temporary working platforms, or difficulties in emergency rescue under adverse weather conditions (strong winds).
- **Wire stringing and tensioning**: Potential risks include wire breakage, clamp release, loss of tension control, accidents involving stringing and tensioning equipment, and electrical flashover/induction risks when working near existing power networks. These risks are particularly serious at crossings of roads, rivers and streams, and technical infrastructure, posing threats to both workers and third parties.
- **Operation of lifting equipment, machinery and material transportation**: The transportation of oversized/overweight components on temporary, narrow or slippery roads during the rainy season may result in vehicle overturning, collisions, crane cable failure, and mechanical crushing/pinching due to blind spots or the operation of equipment by personnel without the required competency certificates.
- **Noise, dust, vibration and emissions**: Prolonged exposure to dust from earthworks, diesel exhaust, and noise/vibration from generators, drilling machines and stringing equipment without adequate PPE may result in respiratory diseases, hearing loss, visual impairment and reduced concentration, indirectly increasing the risk of occupational accidents.
- **Electricity, welding, cutting and fire/explosion**: Temporary electrical systems, welding and cutting equipment, and fuel storage tanks at construction sites pose a high risk of electric

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shock, burns, fire and explosion. These risks increase substantially under wet working conditions, in cases of damaged electrical conductors, improper electrical connections, or improper fuel storage.

- **Accommodation, living conditions and psychological health**: Temporary camps or rented accommodation along the route, if not adequately provided with clean water, sanitation, food safety and medical care, may result in outbreaks of gastrointestinal and communicable diseases. In addition, prolonged periods of working away from home and overtime work may cause stress, substance abuse and internal conflicts.
- **Heat, thunderstorms, lightning and extreme weather**: Most construction activities are conducted outdoors. Prolonged heat may cause dehydration and heat exhaustion; heavy rainfall may make access roads slippery and destabilize foundation pits; and strong winds may increase risks during crane lifting and work at height. In particular, steel towers, cranes and conductors create high-risk points during thunderstorms; therefore, relevant activities must be suspended when weather conditions exceed safe operating limits.

Directly affected subjects are workers of contractors and subcontractors at 16 transmission line sections, workers constructing 02 optical repeater stations and line bays; drivers, crane operators and equipment operators; engineers, supervision personnel and environmental and social staff who regularly access the construction sites. Workers of material suppliers and transportation companies may also be indirectly exposed to risks during the delivery of materials.

Level assessment: The pre-mitigation OHS risk is assessed as SUBSTANTIAL. The assessment is based on: (i) the construction of a 500kV transmission line involving numerous activities with potentially severe consequences, such as working at height, lifting and handling components, wire stringing and tensioning, and working near energized power sources; (ii) the approximately 330 km long route and dispersed construction teams, which increase the challenges of supervision and monitoring; (iii) up to 20 construction teams and approximately 400 workers may be operating simultaneously during peak periods; and (iv) certain incidents may result in serious injury or fatalities, although their likelihood is not high. Following the implementation of the OHS management system, approved construction method statements, work permits, contractor management and control, PPE, work-at-height rescue arrangements, and emergency response measures, the residual risk can be reduced to MODERATE.

5.4.1.11. Public health and safety risks

Risks to public health and safety during the construction of the project may arise from the following sources/activities

- Transportation of materials, column components, and equipment can increase truck traffic on local roads, causing collisions, road surface damage, dust generation, and traffic obstruction. The risk is higher on narrow roads, at bends, near schools/markets/residential areas, and at locations where construction vehicles enter public roads.
- Open foundation pits, crane operation areas, material storage areas, and temporary cables/wires, if not properly fenced, can cause accidents to local residents or livestock. During wire pulling a cross roads, the risk of cables/wires sagging, breaking, or falling objects can directly affect people and vehicles if road closures, warning/flagging, and traffic regulation are not properly implemented.
- Dust, noise, exhaust emissions, and construction lighting can cause nuisance to households near foundation locations and transportation routes. Impacts are generally short-term and move along with the construction progress, but may be noticeable at construction locations close to houses or when transportation activities take place early in the morning or at night.

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- Fire hazards arising from welding and cutting activities, fuel, electrical incidents, or construction activities during the dry season may spread to nearby vegetation, crops, or property. At sections passing through or near forest areas, the potential consequences of fire may be greater and should be integrated into the forest fire prevention and control plan.
- The concentration of workers may increase the risk of infectious diseases and public health issues; however, the concentration at each construction team is relatively small (up to approximately 20 people/team). The risk mainly arises through interactions at accommodation facilities, restaurants, and local services rather than from a large-scale worker camp.

Affected subjects include households living near foundation locations and construction corridors; local residents and road users along transportation routes; agricultural households whose access roads are used for construction activities; road users at crossing locations; children, elderly people, and people with disabilities in communities near construction sites; and residents near the 02 optical repeater stations. At sections of the route passing through forests or production land, forest users, crop caretakers, and landowners are also potentially affected.

Level Assessment: The overall pre-mitigation CHS risk is assessed as MODERATE. The impacts are dispersed, temporary, and largely manageable; however, localized high-risk points occur at road crossings, residential areas, public facilities, locations where wires are pulled across existing infrastructure, and sections with a risk of forest fires. With the implementation of barriers, traffic management, community notification, wire-pulling controls, vehicle speed management, fire prevention and firefighting measures, and the GRM, the residual impacts are expected to be LOW to MODERATE.

5.4.1.12.Social impact

- The construction phase may generate adverse social impacts associated with land access, temporary occupation, labor influx, construction traffic, community health and safety, disruption of livelihoods and services, and interaction between workers and local communities. Most impacts are expected to be site-specific and manageable through careful planning, contractor controls, stakeholder engagement and implementation of the Project environmental and social instruments. However, impact locations and magnitude remain preliminary and will be further assessed and updated in Phase 2 when the detailed design and construction arrangements are available.
- Temporary land access and livelihood disruption

Construction of tower foundations, access routes, stringing areas and associated facilities may temporarily restrict access to agricultural plots, residential areas, local roads, water sources or community facilities. Construction may damage standing crops and trees, compact soils, affect drainage or interrupt normal farming activities. Contractors will minimize the area and duration of occupation, agree access arrangements in advance, document pre-construction conditions, compensate eligible temporary losses in accordance with the RP, restore affected land and access routes promptly, and address complaints through the Project grievance mechanism.

- Labor influx and worker-community interaction

The presence of non-local workers may increase demand for accommodation, food, transport, water and local services and may create risks of nuisance, misconduct, conflict, communicable disease transmission, sexual exploitation and abuse and sexual harassment (SEA/SH), and pressure on community infrastructure. The scale and location of worker accommodation are not yet confirmed and will be assessed in Phase 2. Contractors will prepare and implement labor

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and worker accommodation arrangements proportionate to the identified risks, enforce worker codes of conduct, provide induction and periodic training, establish a worker grievance mechanism, coordinate with local authorities and communities, and apply disciplinary measures for violations.

- Ethnic minority communities and culturally appropriate engagement

Ethnic minority communities may face barriers to receiving information, participating in consultation or accessing Project benefits and grievance channels because of language, location, cultural practices or limited familiarity with formal administrative processes. Construction may also affect land-based livelihoods, community access routes or resources of local importance. The Phase 2 social assessment and EMDP update will verify the presence and circumstances of affected ethnic minority communities, assess differentiated impacts and define culturally appropriate engagement and mitigation measures. Consultations will be undertaken in accessible forms and languages, with separate or targeted discussions where needed to support meaningful participation by women, vulnerable people and community representatives. Any determination regarding FPIC will be made through the Phase 2 social assessment in accordance with ESS7 and will not be presumed at this stage.

- Gender and vulnerable groups

Women and vulnerable people may have less access to Project information, employment opportunities, compensation processes and grievance channels, and may be disproportionately affected by disruption of care responsibilities, local access or informal livelihoods. Consultation, disclosure, livelihood support, recruitment communication and grievance arrangements will therefore include targeted and accessible measures. Participation and affected-person data will be disaggregated by sex, ethnicity and vulnerability, where feasible, and gaps will be addressed during Phase 2.

- Community health, safety and access.

5.4.1.13. Social risks

- Construction traffic, open excavations, lifting and stringing activities, temporary road closures, electrical hazards, noise, dust and interaction with heavy equipment may create risks for nearby residents and road users. The contractor will prepare site-specific traffic and community health and safety measures, install warning signs and barriers, maintain safe access, notify communities before disruptive activities, secure work sites and coordinate emergency preparedness with relevant local services. Special consideration will be given to schools, health facilities, markets, places of worship and locations used by children, older persons and persons with disabilities
- The Project's key social risks arise from the geographic scale of the transmission line, the number and diversity of potentially affected communities, land acquisition and right-of-way restrictions, construction labor and traffic, and the need to coordinate implementation across multiple jurisdictions. The risk assessment is preliminary and will be refined during Phase 2 based on the detailed design, updated social assessment, confirmed workforce and construction strategy, and meaningful consultations.
- Land acquisition and resettlement risks

Risks include inaccurate or incomplete impact data; inconsistencies between design information and the RP; delayed census, inventory, replacement cost survey, compensation or assistance; inadequate livelihood restoration; disputes over eligibility, land status or asset valuation; and commencement of works before site-specific RP requirements are completed. These risks will be managed through design coordination, updated surveys, transparent

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disclosure and consultation, adequate budget and staffing, implementation monitoring, and application of the RP and ESCP requirements.

- Labor and working-condition risks

Risks include occupational injuries, non-compliance with terms and conditions of employment, discrimination, child labor or forced labor in the workforce or supply chain, inadequate worker accommodation, and ineffective handling of worker complaints. Measures will be specified through the LMP, contractor environmental and social management plans, contracts, supervision and the worker grievance mechanism.

- Community health and safety risks

Risks include road traffic accidents, unauthorized access to work sites, open excavations, falling objects, conductor stringing across roads or settlements, communicable disease transmission, emergency incidents and conflict between workers and communities. Site-specific controls will be developed and disclosed before relevant activities begin.

- SEA/SH and misconduct risks

Worker-community interaction may create SEA/SH, harassment, exploitation or other misconduct risks. The Project will apply proportionate prevention and response measures, including codes of conduct, worker training, confidential and survivor-centered referral arrangements, accessible reporting channels and sanctions. Detailed arrangements will be confirmed in Phase 2 and incorporated into procurement and contractor requirements.

- Ethnic minority and social inclusion risks

Risks include insufficient assessment of ethnic minority circumstances, culturally inappropriate communication, exclusion of women or vulnerable groups from consultation and benefits, and inadequate consideration of differentiated livelihood or cultural impacts. The EMDP and SEP will establish tailored engagement, disclosure, benefit and monitoring measures. Any ESS7 FPIC determination will be evidence-based and completed through the Phase 2 social assessment.

- Stakeholder engagement and grievance risks

Risks include late or inconsistent information disclosure, consultation that does not reach directly affected or vulnerable groups, inadequate documentation of feedback, and delayed resolution of complaints. The SEP will guide continuous engagement, disclosure, documentation, feedback and operation of an accessible Project grievance mechanism throughout preparation and implementation.

5.4.2. Specific Impacts and Risks during construction

5.4.2.1. Impacts on biodiversity and forest ecosystem services during site preparation and construction

(a) Site preparation and site clearance phase

a1. Loss of vegetation and habitat due to clearing of the right-of-way corridor (ROW)

During the construction phase, the main impacts on vegetation and terrestrial habitats arise from clearing vegetation at 657 foundation pit locations and along two vegetation strips (2 strips × 2m) during the preparation for wire stringing over a total length of approximately 330 km, including the removal of woody trees and clearing of undergrowth within the necessary areas. Sensitive receptors include 1.11 ha of poor deciduous broadleaf natural forest in Dak Lak and 5.12 ha of planted forest designated for protection in Dak Lak, Lam Dong, Dong Nai City, and Tay Ninh provinces. In addition, site clearance activities are expected to affect forestry and

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perennial industrial crops, including approximately 2,715,258 acacia trees and 318,135 rubber trees, over a total area of approximately 131.85 ha (FS, 2026).

Impacts on woody trees within the ROW are long-term and, in some areas, irreversible due to the requirement to maintain the safety clearance from the transmission line throughout its operation. Meanwhile, impacts on understory and grass vegetation can be partially restored after construction is completed. In terms of terrestrial habitats, the impact is assessed as MODERATE. Vegetation loss may temporarily reduce the structure and ecological functions of affected forest strips, reduce vegetation biomass and carbon stocks, and result in partial loss of feeding, shelter, and nesting habitats for some animal species, particularly common bird species. However, the impact is substantially reduced because most of the route passes through modified habitats and agricultural production areas, while the line is located approximately 6.0km from Nam Nung Nature Reserve and does not occupy land within the core zone of the reserve.

a2. Terrain, soil and rock disturbance and erosion

Leveling, topsoil removal and foundation excavation activities at 657 tower locations, with an average volume of about 350 m³ of rock/foundation pit during the construction phase, can impact soil and surface water sources in the project area. These activities can temporarily lose the surface protective cover, change the soil structure and increase the risk of erosion and rock leaching, especially in the steep terrain areas of Dak Lak and Lam Dong. Sensitive objects include topsoil, vegetation on slopes, small streams and aquatic ecosystems in downstream areas.

Impacts are short-term and temporary, mainly during the construction period at each foundation location, with a temporary construction site usage period of about 15–20 days, especially occurring in heavy rain conditions in areas with steep terrain. If left unchecked, excavated soil and rock can be washed away into small streams, causing an increase in turbidity and local sedimentation. However, during the construction process, the contractor will arrange suitable temporary drainage ditches and sedimentation pits at locations with high risk of erosion; reinforce the roof and slope foot with sandbags or appropriate technical solutions; and it is strictly forbidden to dump waste soil and rock onto slopes, stream beds or natural drainage areas. Excavated soil will be utilized for site return, leveling and compaction after the completion of foundation construction; disturbed soil surfaces will be greened or restored suitable vegetation to quickly restore the soil protective cover. Therefore, the impact level is assessed as MODERATE. With a distance of about 6 km between the line and Nam Nung Nature Reserve, the direct impact from erosion and sedimentation arising at the construction sites to the reserve is assessed to be limited.

a3. Noise disturbance and wildlife evasion

Noise and vibration mainly arise from the operation of heavy machinery and equipment such as excavators, bulldozers and material transport vehicles, as well as from rock blasting activities at tower foundation sites with hard rock geological conditions. These impacts can affect wildlife groups living in and around the line corridor, especially small animals (rodents, civets, foxes), reptiles, amphibians and birds with large wingspans that travel over a wide range.

Impacts are forecast to be short-term and intermittent, mainly during the construction of the tower foundation and during the day shift. The impact level is assessed as Low to Moderate. Because the route is located about 6.0 km from the boundary of Nam Nung Nature Reserve, all high-intensity construction noise will be naturally attenuated through the agricultural buffer space, completely below the natural background noise threshold of Nature Reserve. Therefore, wild animals with high conservation value residing in the core area of the reserve such as *Bos gaurus*, *Nomascus gabriellae* or endemic birds (*Polyplectron germaini*) living in the lower strata are completely free from sensory disturbances, and the direct effects of noise and

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vibration of the construction site to the reserve are expected to be LOW. However, for small mammals and birds that inhabit strips of production forests and protective forests adjacent to the ROW corridor, construction noise can cause a temporary habitat avoidance response, causing some species to avoid the construction site and move to adjacent habitats.

(b) Construction Phase

b1. Habitat fragmentation due to the opening of temporary access roads and excavation of tower foundations

The establishment of a temporary public road network (occupying about 42.33 hectares of agricultural and forestry land fund) to serve the transportation of heavy equipment and materials (steel towers, coils, measuring transformers and heavy foundation casting equipment to the support tower locations) is determined to have a certain impact on the continuity of the protection forest ecosystem and the ground movement corridor of slow-moving wildlife species (amphibians, reptiles, small land animals). However, this ecological risk is assessed at a LOW to MODERATE (lasting about 12 months in the construction and installation cycle). The basis of this assessment comes from the fact that the project has optimized the design of the line, running parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines corridor and cross-utilizing rural transport infrastructure to minimize the opening of new roads. Immediately after completing the erection at 657 tower positions, the entire area of temporary roads must be dismantled, restored, loosened and replanted with native vegetation to ensure sustainable reconnection of ecological corridors. In addition, the safe distance of 6km from Nam Nung Nature Reserve ensures that there is no division of any ecological corridors in the core area; the phenomenon of habitat fragmentation is only localized at temporary road strips with a width of 3m to 4m).

b2. Risk of illegal hunting and trapping of wildlife by the workforce

The concentration of the workforce at the construction site, consisting of 1 to 20 construction teams of 20 workers each, living in temporary encampments along the line corridor, was identified as a source of ecological risk to be managed. Although construction crews do not operate simultaneously at the same location, the presence of this workforce in the area may give rise to the risk of hunting birds and small animals such as civets, squirrels, squirrels, and hares for illegal consumption or trade.

Subjects that may be affected include wildlife in the production forest strips adjacent to the line and the habitat around Nam Nung Nature Reserve, about 6 km from the line. This impact is temporary during the construction phase and is assessed as MODERATE if there is no appropriate control mechanism in place.

However, this risk is completely manageable through: enforcing the Code of Conduct for Workers with specific sanctions included in contractor contracts; absolutely prohibiting acts of trapping, storing, trading and consuming wildlife products; and periodic biodiversity awareness training programs for the entire workforce.

b3. Localized water pollution affecting aquatic ecosystems

During the construction phase, the risks to the water environment mainly arise from three sources: domestic wastewater at workers' camps, foundation pit wastewater containing high levels of sludge and pH from cement mortar when pouring concrete, and the risk of fuel or grease leakage from motor machinery. The susceptible to these impacts is surface water quality and aquatic ecosystems (including fish, benthic macroinvertebrates and aquatic macrophytes) in small streams that cross the line corridor. Although foundation pit wastewater has the potential to degrade water quality and affect the respiratory capacity of stream fish if discharged directly, the overall impact level is rated as Low. The basis for this assessment is that the impact time is only short-term and the scope of impact is completely local during the foundation casting

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construction period. These risks are limited to the scale of the construction site and are completely unlikely to spread to the main river basin of Nam Nung Nature Reserve located 6km away.

5.4.2.2. Indirect impact of induced access

a. Habitat fragmentation due to the opening of temporary access roads and excavation of power tower foundations

The establishment of a temporary access road network (occupying approximately 42.33 ha of agricultural and forestry land) to facilitate the transportation of heavy equipment and materials (steel towers, wire coils, and foundation construction equipment) to the tower locations is expected to have some impact on the continuity of protection forest ecosystems and the terrestrial movement corridors of slow-moving wildlife species (amphibians, reptiles, and small terrestrial animals). However, this ecological risk is assessed as LOW to MODERATE (lasting approximately 12 months during the construction and installation cycle), for the following reasons:

First, the project has optimized the line alignment, running parallel to the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines corridor and making use of existing rural transport infrastructure to minimize the need for opening new roads. Second, large wild mammals are completely absent along the line corridor due to previous habitat fragmentation and forest clearance for cultivation; therefore, the habitat fragmentation impact from the temporary access roads is expected to primarily affect slow-moving species (such as amphibians, reptiles, and small terrestrial animals). Third, the 6 km distance from Nam Nung Nature Reserve ensures that no core ecological corridors are fragmented; habitat fragmentation is limited to localized temporary road strips with a width of 3 to 4 m.

Impact level: LOW, temporary, and reversible. This risk can be effectively mitigated by minimizing the development of access roads through natural and protection forests and restoring the affected areas immediately after completion of construction at each location, in accordance with the ESMP.

b. Risk of illegal hunting and trapping of wildlife by the workforce

The concentration of the workforce at construction sites — comprising 1 to 20 construction teams, with approximately 20 workers per team, accommodated in temporary camps along the line corridor — is identified as a potential ecological risk requiring management. Although the construction teams do not operate simultaneously at the same location, the presence of the workforce in the area may give rise to the risk of illegal hunting and trapping of wildlife.

According to the results of field surveys, wildlife along the line corridor consists mainly of small mammals adapted to agricultural environments (field rats, squirrels, and small wild boars) and common resident bird species. Large mammals of high conservation value are completely absent from the ROW because 98.5% of the habitat consists of agricultural land (coffee, rubber, and cashew plantations) lacking closed-canopy natural forest structure. Species of high conservation value, such as Gaur and Yellow-cheeked Gibbon, have only been recorded in the core area of Nam Nung Nature Reserve, at least 6 km from the line corridor. However, the risk of increased hunting pressure on wildlife populations in the adjacent production forest (4.53 ha) and protection forest (5.12 ha) strips still needs to be controlled, particularly for small mammals that may be trapped for local consumption or trade.

Risk level before mitigation: LOW to MODERATE — LOW in sections of the line passing through agricultural land due to the low density of wildlife; MODERATE in sections adjacent to production and protection forests. The impact is temporary during the construction phase and can be effectively mitigated through: enforcement of the Worker Code of Conduct, with

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specific sanctions incorporated into contractor contracts; strict prohibition of trapping, possession, trading, and consumption of wildlife products; and periodic biodiversity awareness training for the entire workforce.

5.4.2.3. Road and waterway traffic risks during stringing operations

a. Impacts of stringing operations across roads

According to the Topographic Survey Report dated December 2025, the transmission line crosses a total of 849 roadways of various types, including high-traffic national highways (National Highway 14 at 4 crossings, National Highway 13 at 1 crossing, and National Highway 14C at 1 crossing), 20 provincial and district roads, and 801 crossings of asphalt, dirt, stone, and rural roads less than 10 m wide. In addition, the line crosses the planned Binh Phuoc – Dak Nong – Dak Lak expressway at 2 locations.

Table 27: Summary of project's crossings with roads

No.	Description	Number of crossovers (times)	Road Width (m)	Pavement structure	Traffic Density	Notes
1	Provincial Road 967	1	15	Asphalt	High	G8-G9
2	Road along the Sere Pok 3 Hydropower Dam route	4	6,7-8,5	Asphalt	low	G12-G12A-G12A.1
3	NH14	4	11	Asphalt	High	G12A.3-G12A.4, G24-G25, G25-G26
4	Provincial Road 683	1	5	Asphalt	High	G13-G14
5	Planned Binh Phuoc – Dak Nong – Dak Lak Expressway	2	-	-	-	G13-G14, G17-G18
6	Provincial Road 681	1	6	Asphalt	High	G30A-G31
7	Provincial Road 760	2	7-9	Asphalt	High	G36-G37, G38-G39
8	NH14C	1	10	Asphalt	High	G40-G41
9	Provincial Road 759	1	9	Asphalt	High	G43-G45
10	Hoang Ngoc Thuc Road	1	8	Asphalt	High	G45-G45A
11	Provincial Road 757	1	8	Asphalt	High	G45-G45A
12	Provincial Road 758	1	6	Asphalt	High	G47-G47A
13	Provincial Road 756	1	7	Asphalt	High	G47A-G47B
14	NH13	1	23,7	Asphalt	High	G48A-G49
15	Provincial Road 749B	1	7	Asphalt	Medium	G53C-G54
16	Provincial Road 744	1	7	Asphalt	High	G55B-G56B
17	Provincial Road 710	1	7	Asphalt	Medium	G58C-G59
18	Tran Van Lac Road	1	6	Asphalt	High	G59-G60
19	District Road 603	1	7	Asphalt	High	G59-G60

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No.	Description	Number of crossovers (times)	Road Width (m)	Pavement structure	Traffic Density	Notes
20	Provincial Road 789	3	6-12-22	Asphalt	High	G60-G61, G62-G63, G64-G65
21	Provincial Road 782	1	7	Asphalt	High	G60-G61
22	Soc Lao Road	1	8	Asphalt	Medium	G64-G65
23	Canal bank road	6	4-5	Asphalt	Medium	G65A-G66-G67
24	Tan Thuan Road	1	7,5	Asphalt	High	G66-G67
25	Crossings with asphalt roads, earth roads, stone roads, and rural roads (width ≤ 10 m)	801	-	-	-	

Source: Topographic survey report, PECC2-PECC3-PECC4, 12/2025.

Note: The Project only involves conductor stringing across road corridors and does not place tower foundations within the road protection corridor, in compliance with Articles 10 and 11 of Decree No. 165/2024/ND-CP dated 26 December 2024, as amended and supplemented by Decree No. 241/2026/ND-CP dated 26 June 2026, as well as other applicable laws, regulations, and technical standards.

During conductor stringing at road crossings, localized traffic disruption may occur for the duration of works at each crossing point. Specific risks include conductors or pilot wires falling onto the road surface and causing accidents to passing vehicles, complete temporary traffic interruption at certain high-traffic national highway sections, and occupational safety risks for workers operating on scaffolding at major road crossings.

This impact is temporary, occurs only at individual crossing locations during conductor stringing, and is non-cumulative. The impact significance is assessed as LOW to MODERATE, depending on the road class and traffic density at each crossing point: LOW for low-traffic rural roads, and MODERATE for high-traffic national and provincial roads, as each crossing point is affected for only a very short period of time, typically less than one working day. Vehicles may be diverted to alternative routes or delayed for a short period, and the impact is immediately reversible once conductor stringing is completed. This risk can be effectively controlled through the installation of protective scaffolding, traffic management measures, and coordination with road management authorities, as specified in the ESMP.

b. Impact associated with conductor stringing across rivers

According to the Topographic Survey Report of December 2025, the Project transmission line crosses the following water bodies: Bé River twice (88–110 m wide), Sài Gòn River twice (64–200 m wide), Đăk R'Lấp River six times (31–126 m wide), Đục Stream once (38.5 m wide), Sêrêpok 3 hydropower canal once (94.8 m wide), Sêrêpok River once (217 m wide), Đăk N'Đrung Stream once (36 m wide), Đăk R'Tih Stream once (18 m wide), a small branch of Thác Mơ hydropower reservoir once (244 m wide), and East Canal once (35 m wide). Waterway traffic density is moderate.

During conductor stringing at river and stream crossings, potential impacts may include temporary disruption to inland waterway traffic for boats, ships, and barges; overturning of construction boats/vessels, posing risks to workers; conductors becoming entangled with obstructions on the riverbed and breaking; leakage or spillage of oil from construction equipment into the aquatic environment; and drowning accidents.

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The impact significance is assessed as LOW to MODERATE, as the impact is temporary, site-specific at each crossing location, and non-cumulative. These risks can be mitigated through prior notification to inland waterway authorities and vessel operators, the use of non-water-contact conductor stringing methods, prioritization of construction during the dry season, installation of river navigation warning lights in accordance with QCVN 39:2020/BGTVT, and coordination with the waterway police throughout conductor stringing, as provided for in the ESMP.

5.4.2.3. Risks of electric arcing and accidents during conductor stringing across existing transmission lines

According to the Topographic Survey Report of December 2025, the Project transmission line crosses several existing transmission lines, as follow

Table 28: Summary of project's crossings with existing transmission lines

No.	Contents	Unit	Total	Notes
1	Cu M'gar 110kV Transmission Line – JPO	times	1	G7-G8
2	220kV Srepok 4 transmission line – Krong Buk	times	1	G9-G10
3	500kV Pleiku - My Phuoc - Cau Bong transmission line	times	1	G10-G11
4	220kV Buon Kop - Serepok 3 transmission line	times	1	G12-G12A
5	220kV Dak Hoa - Dak Nong transmission line	times	1	G21-G22
6	220kV Dak Nrung Power Plant Transmission Line - Dak Nong 500kV Substation	times	1	G28-G29
7	Dak Glun 110kV Hydropower Line	times	1	G37-G38
8	110kV Thac Mo - Loc Ninh transmission line	times	1	G43-G45
9	220kV Dak Nong – Phuoc Long – Binh Long transmission line	times	1	G45A-G45B
10	220kV My Phuoc – Binh Long transmission line	times	1	G48-G48A
11	110kV Binh Long 2 – Minh Hung transmission line	times	1	G48-G48A
12	110kV Binh Long 2 – Binh Long transmission line	times	1	G48-G48A
13	110kV Binh Long – Tay Ninh Cement Transmission Line	times	1	G49A-G50
14	110kV Binh Long – Tay Ninh 2 transmission line	times	3	G52-G52B, G55B-G56B, G58C-G59
15	110 kV Dau Tieng - Minh Hung transmission line	times	2	G53C-G54, G55B-G56B
16	110kV Dau Tieng - Tay Ninh 2 transmission line	times	1	G58C-G59
17	Medium voltage and low voltage lines	times	448	

Source: Topographic survey report, PECC2-PECC3-PECC4, 12/2025.

During conductor stringing at 19 crossing points with existing transmission lines, comprising 1 500kV line, 6 220 kV lines, and 12 110 kV lines, there is a risk of electric arcing if the required

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safe clearance between the two lines is not maintained during the stringing process. Potential consequences include arcing incidents causing equipment damage, power supply interruptions on the existing lines, and injury or fatality risks to construction workers. The risk is particularly high at the crossing with the 500kV Pleiku – My Phuoc – Cau Bong transmission line, which is currently energized and in operation, due to its higher voltage level and the more severe consequences of any incident compared with the 220 kV and 110 kV lines.

The pre-mitigation risk level is assessed as MODERATE to SUBSTANTIAL at the 500kV crossing, and MODERATE at the 220 kV and 110 kV crossings. This risk can be effectively mitigated through the full application of electrical safety measures in accordance with Electrical Equipment Code 11 TCN-19-2006 and the applicable work permit procedures, including: (i) installation of scaffolding and protective netting in combination with hotline insulation covering along the phases of the crossed line; (ii) induced grounding to eliminate electrostatic induction voltage and electromagnetic field effects on the stringing conductor; (iii) coordinated planned outages of 3–6 hours for the existing line to install and remove the protection system; (iv) strict implementation of the work permit procedure, under which construction may only proceed after the operation management unit has de-energized the line, verified the absence of voltage, discharged residual electrical charge, and fully grounded the system; and (v) preparation of a detailed construction method statement in coordination with the relevant power grid management authority for each crossing point, as specified in the ESMP.

5.5. IMPACTS AND RISKS DURING THE OPERATION PHASE

5.5.1. Noise, ozone, and corona effects

Impact from dust and exhaust emissions

Once in operation, the transmission line will only transmit electricity and will not involve any activities that generate dust or air emissions affecting ambient air quality. This impact is therefore assessed as NEGLIGIBLE.

Noise and ozone generated by corona discharge

Corona discharge is a localized electrical discharge phenomenon that occurs when the electric field intensity at the conductor surface exceeds the air ionization threshold, resulting in the generation of noise, light, and ozone. For a 500kV transmission line using a four-conductor bundle configuration *(*4 × ACSR-400/51 per phase), the bundle design reduces the electric field intensity at the surface of each sub-conductor to below the ionization threshold. Therefore, corona discharge is not expected to occur under normal operating conditions.

For this Project, the four-conductor bundle design (4 × ACSR-400/51) has been confirmed not to generate corona under normal operating conditions. Under certain unusual weather conditions, such as light rain, high humidity, or contamination on the insulator string, localized corona may occur at some line fittings or accessories; however, its extent and spatial coverage would be negligible.

With regard to cumulative impacts in combination with the existing parallel 500kV Pleiku – My Phuoc – Cau Bong transmission line, which also uses a four-conductor bundle configuration, any cumulative impact would likewise be negligible and would not require additional mitigation measures.

The impact significance is assessed as LOW to NEGLIGIBLE.

5.5.2. Electromagnetic Fields (EMF)

a. Basis for electric field calculation and results

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Electric Field Standards

QCVN 25:2016/BYT (National Technical Regulation on Industrial Frequency Electromagnetic Fields) stipulates the permissible limit of exposure to electric fields as follows:

Electric Field Strength E (kV/m)	<5	5≤E≤20	20≤E≤25	≥25
Allowable exposure time (minutes)	No restrictions	(50/E-2).60	10	Do not contact

The parameters affecting the electric field strength include:

- the distance from the conductors to the ground;
- the geometric arrangement of conductors on the tower, including phase spacing, number of circuits, and conductor configuration (horizontal, vertical, triangular, etc.);
- the number of circuits: 02 circuits;
- conductor cross-section and number of sub-conductors per phase; and
- the number of shield wires and the distance between the phase conductors and the shield wires.

Calculation method and results

The Report uses the Electromagnetic Transients Program (EMTP) to calculate electric field strength beneath the high-voltage transmission line. The calculation basis is as follows:

- the power grid safety corridor is 36 m wide (18 m from the transmission line centerline on each side);
- for sections passing through areas of perennial crops and fruit trees, the minimum conductor-to-ground clearance is designed to be ≥ 12 m;
- for sections passing through rice fields and annual cropland, the minimum conductor-to-ground clearance is designed to be 8 m.

Electric field strength is calculated at points 1 m above ground level, corresponding to the minimum conductor clearance above ground of Hat = 8 m and Hat = 12 m.

Calculation results

The graph of electric field strength at 1 m above ground level is presented in the figure below, in which:

- the vertical axis represents electric field strength, E (kV/m);
- the horizontal axis represents the horizontal distance (m) from the transmission line, with X = 0 m located at the transmission line centerline; and
- the plotted curves correspond to the conductor-to-ground clearances of Hat = 8 m and Hat = 12 m.

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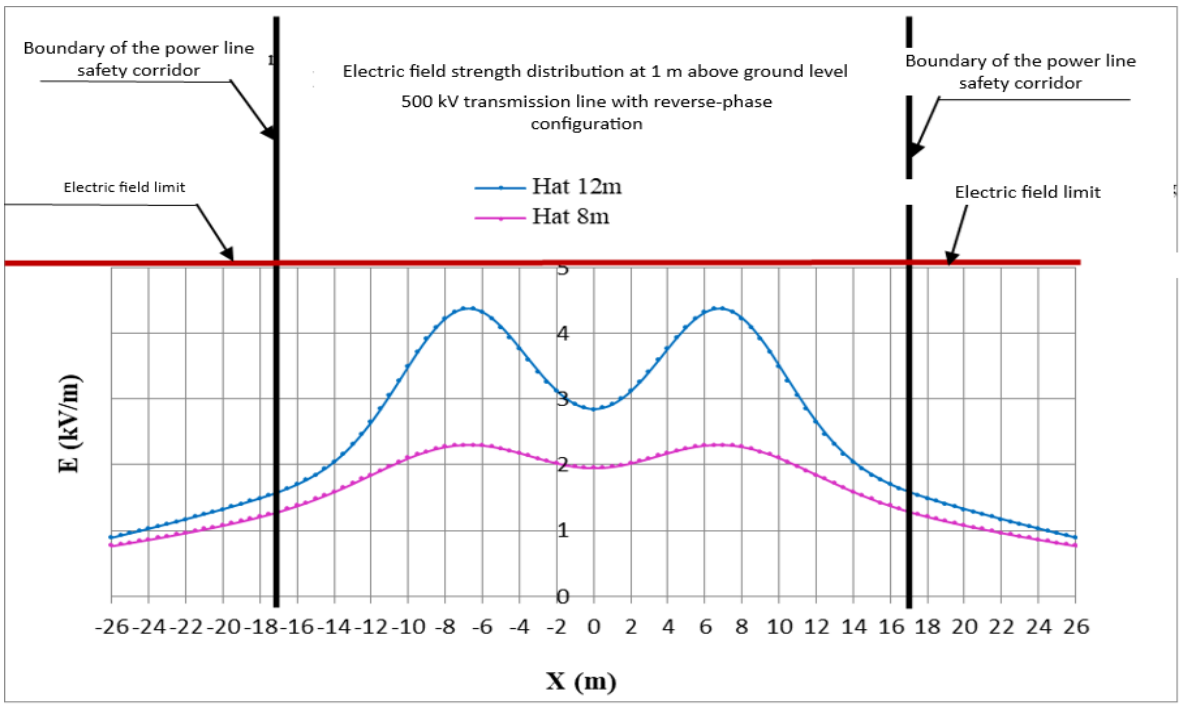


Figure 13: Distribution of electric field strength 1m from the ground level - 500kV transmission line with reverse-phase arrangement

Note: This line section is designed with a 36 m safety corridor (18 m from the transmission line centerline on each side). The minimum conductor-to-ground clearance is designed to be 8 m when passing through rice fields and annual cropland, and 12 m when passing through areas of perennial crops, orchards, and residential areas (with relocation of houses and structures located within the corridor).

b. Assessment of electric field impacts on households with houses or structures located within the safety corridor

According to Article 68 of the Electricity Law No. 61/2024/QH15, "houses and structures where people live or work are not permitted to exist within the safety protection corridor of overhead power lines with a voltage of 500kV or higher, except for specialized structures serving the operation of that power grid." Therefore, any houses or structures located within the safety corridor of the 500kV transmission line will be relocated and, as such, will not be subject to electric field impacts.

c. Assessment of electric field impacts on households cultivating land inside and outside the safety corridor

- The 500kV Krong Buk – Tây Ninh 1 transmission line is designed with a minimum conductor-to-ground clearance of ≥ 8 m when passing through rice fields and annual cropland, and ≥ 12 m when passing through areas planted with perennial crops and fruit trees.
- According to the results presented in Figure 13, the electric field strength at 1 m above ground level beneath the transmission line corridor is always ≤ 5 kV/m. Therefore, people may carry out cultivation and farming activities both inside and outside the safety corridor without any restriction on exposure duration, in accordance with QCVN 25:2016/BYT.

Accordingly, the Project complies with applicable electric field safety requirements and does not impose any limitation on exposure time for people living under or near the transmission line.

The impact is assessed as LOW — the electric field complies with QCVN 25:2016/BYT and

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does not restrict the exposure time of people farming inside or outside the corridor.

With regard to the magnetic field, the magnetic flux density beneath the 500kV transmission line is in the range of 20–40 μT, and is below 10 μT at the corridor boundary. These values are significantly lower than the permissible exposure limit under QCVN 25:2016/BYT and the public exposure reference level under ICNIRP *(200 μT)*. Therefore, people farming inside and outside the corridor will not be adversely affected by the magnetic field generated by the transmission line. The magnetic field impact on the community is assessed as NEGLIGIBLE.

d. Impact on operation and maintenance workers

During the operation phase, the group more likely to be regularly exposed to electric fields than the general community comprises the personnel responsible for transmission line management, operation, and maintenance, with an estimated workforce of approximately 50 people. Their tasks may include corridor patrols, inspection of towers, foundations, and conductors, vegetation clearance within the corridor, technical measurements, and fault repair. Actual exposure levels will depend on the working position relative to the conductors, the conductor height at each span, and the amount of time workers remain in areas subject to electric fields.

According to the Project's electric field calculations *(Technical Appendix)*, at a height of 1 m above ground level:

- **at a minimum conductor-to-ground clearance of 8 m (cultivated areas),** the electric field strength does not exceed 5 kV/m; therefore, exposure time is not restricted under QCVN 25:2016/BYT;
- **at a minimum conductor-to-ground clearance of 12 m (agricultural areas without residents),** the electric field strength within the corridor may reach up to 6.45 kV/m, exceeding the 5 kV/m threshold; therefore, exposure time for ground patrol workers must be limited in accordance with QCVN 25:2016/BYT.

Accordingly, for routine patrol and inspection activities conducted at ground level, electric field impacts are predicted to range from LOW to MODERATE, depending on conductor clearance in each section of the route.

However, the calculation results at 1 m above ground level do not represent all occupational health and safety *(OHS)* situations for workers. When climbing towers, working at height, carrying out inspections, or performing maintenance near conductors, workers may enter areas with higher electric field strength and may also be exposed to other electrical hazards, such as electric shock, electrical discharge, and induced currents, particularly from an adjacent energized transmission line. Depending on the nature of the work, two situations should be distinguished.

- **For work near energized parts without de-energization (e.g. ground patrol),** the WBG EHS Guidelines for Electric Power Transmission and Distribution recommend controlling occupational exposure to electromagnetic fields and specify minimum working distances for trained personnel. For voltage levels of 500–552 kV, the reference minimum working distance is 3.35 m. Workers must limit exposure time whenever the actual electric field exceeds 5 kV/m, in accordance with QCVN 25:2016/BYT.
- **For direct work on the line under complete de-energization, such as tower climbing, repair, and replacement of fittings or conductors**, all work at height or near electrical components must be managed in accordance with electrical safety procedures and a permit-to-work system. This includes de-energization, testing to confirm absence of voltage, discharge of residual electrical charges, installation of portable grounding at both ends of the line section to eliminate induced voltage from the parallel line, use of appropriate PPE and insulated tools, limitation of exposure time where measured values exceed the allowable threshold, and performance only by trained and authorized personnel.

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With regard to the magnetic field, the technical assessment indicates that magnetic flux density beneath the 500kV transmission line is in the range of 20–40 μT, and is below 10 μT at the corridor boundary. These values are far below the permissible occupational exposure limit under QCVN 25:2016/BYT (approximately 500 μT for workers) and the public exposure reference level under ICNIRP (200 μT). Therefore, magnetic field impacts on operation workers are assessed as NOT SUBSTANTIAL.

e. Assessment of cumulative electric field impacts from two parallel 500kV transmission lines

When the 500kV Krong Buk – Tây Ninh 1 transmission lines are operated in parallel with the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines (with a centerline-to-centerline distance of 50 m), the electric fields generated by the two lines interact with each other. According to the calculation results presented in Appendix xx of the FS Consultant's report:

Electric field strength inside and outside the safety corridor of the 500kV Krong Buk – Tây Ninh 1 transmission lines

- In the case where the line passes through an uninhabited area, assuming a minimum conductor-to-ground clearance of 12 m, the electric field strength at 1 m above ground level within the safety corridor ranges from 2.95 to 6.81 kV/m. Outside the safety corridor (on the side farther from the existing 500kV line), the electric field strength at 1 m above ground level is up to 2.95 kV/m, which complies with the requirement of less than 5 kV/m.
- In the case where the line passes through an area requiring enhanced electrical safety and construction control measures under applicable regulations (with a minimum conductor-to-ground clearance of 16 m), the electric field strength at 1 m above ground level within the safety corridor ranges from 2.26 to 3.87 kV/m. Outside the safety corridor (on the side farther from the existing 500kV line), the electric field strength at 1 m above ground level is up to 2.2 kV/m.

Electric field strength in the space between the two 500kV line corridors

- For the case of 12 m conductor clearance, the electric field strength at 1 m above ground level in the space between the two corridors ranges from 3.31 to 4.55 kV/m, which complies with the requirement of less than 5 kV/m.
- For the case of 16 m conductor clearance, the electric field strength at 1 m above ground level in the space between the two corridors ranges from 2.61 to 3.53 kV/m, which also complies with the requirement of less than 5 kV/m.

Allowable working time without electric field protective equipment

According to the regulations on allowable working time within a 24-hour period where workers do not use equipment to protect against electric field exposure:

Electric field strength (kV/m)	<5	5	8	10	12	15	18	20	20 < E < 25	≥25
Allowable working time in 24 hours (minutes)	Unlimited	480	255	180	130	80	48	30	10	0

Remarks: For the case where the line passes through an uninhabited area (12 m conductor clearance) and the case where it passes through an area requiring enhanced safety measures (16 m conductor clearance), the electric field strength at 1 m above ground level in the space

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between the two 500kV corridors remains below 5 kV/m. Therefore, there is no restriction on working time in this area.

At locations directly beneath the conductors within the new line corridor (12 m conductor clearance), where E > 5 kV/m, exposure time must be restricted. However, this area does not contain any houses, in accordance with Article 68 of the Electricity Law No. 61/2024/QH15.

Accordingly, the cumulative impact significance is assessed as LOW. The entire area between the two corridors, as well as areas outside the corridor, complies with QCVN 25:2016/BYT with no restriction on exposure time. Only the area directly beneath the conductors within the corridor at 12 m conductor clearance requires exposure time limitation, and this is an area where residential occupation is not permitted under applicable regulations.

5.5.3. Waste and pollution in operation

- ***Domestic wastewater generated by operation workers***

During the operation phase, the transmission line itself will not generate wastewater that affects the surface water environment in the Project area. The total number of personnel involved in management and operation of the line is approximately 50 people, and the estimated volume of domestic water supplied and discharged is: 50 people × 80 litres/person/day = 4 m³/day. This wastewater volume is generated in two different settings, as follows.

- *In the centralized working area (office headquarters)*, management personnel will spend most of their time working at the office headquarters of the transmission teams under Power Transmission Company No. 3 and Power Transmission Company No. 4 (the operation and maintenance entities under the National Power Transmission Corporation). Therefore, most domestic wastewater generated by these personnel will be discharged and managed through the existing wastewater systems of those office premises, which are outside the scope of the Project.
- *In the mobile working area (along the 330 km transmission line route)*, according to operational procedures, Power Transmission Company No. 3 and Power Transmission Company No. 4 will assign transmission teams to conduct periodic inspection and maintenance along the route. During these inspection and maintenance activities, operation personnel will generate a small amount of domestic wastewater along the line.

With a maximum mobile workforce of 2–3 persons per team × 5 teams, the amount of domestic wastewater generated in the field is estimated at only about 1.2 m³/day *(for 4–6 days/month)* and is intermittent in nature, occurring only on days when patrol or maintenance activities are scheduled. During these mobile inspection and maintenance activities, personnel will use and discharge domestic wastewater through existing sanitation facilities available in local areas along the route.

- ***Domestic solid waste generated by operation workers***

During the operation phase, the transmission line corridor itself is not a location where people reside on a regular basis. The total number of personnel involved in management and operation of the line is approximately 50 people, and the amount of domestic solid waste generated is estimated at about: 50 people × 0.8 kg/person/day = 40 kg/day. This quantity of solid waste is also distributed in two different settings, as follows.

- *In the centralized working area (office headquarters)*, management personnel will spend most of their time working at the office headquarters of the transmission teams under Power Transmission Company No. 3 and Power Transmission Company No. 4. Therefore, most domestic solid waste generated will be collected and managed through the existing waste collection and disposal systems of these office premises *(outside the scope of the Project)*

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- *In the mobile working area (along the 330 km transmission line route)*, Power Transmission Company No. 3 and Power Transmission Company No. 4 will assign transmission teams to travel along the route for periodic inspection and maintenance. During these activities, operation personnel will generate domestic solid waste along the route, including drinking water bottles, foam food containers, plastic packaging, and leftover food.

With a maximum mobile workforce of 2–3 persons per team × 5 teams, the amount of domestic solid waste generated in the field is estimated at only about 12 kg/day (for 4–6 days/month) and is intermittent, occurring only on scheduled patrol and maintenance days.

All waste generated along the route will be collected in personal bags and transported to areas served by local waste collection services, or back to the office headquarters of the transmission teams under Power Transmission Company No. 3 and Power Transmission Company No. 4 for combined disposal. No waste will be discarded along the transmission line route. Therefore, this impact is assessed as small, localized, and fully controllable.

- ***Biomass generated from transmission line corridor maintenance***

For a 500kV transmission line, the protection corridor is defined by two vertical planes parallel to the line, each located at a distance of 7 m from the outermost conductor in its static position.

Vegetation located inside and outside the safety corridor may fall onto the line, cause conductor breakage, damage the transmission system, or lead to fire or explosion hazards, thereby interrupting electricity transmission and posing risks to nearby communities. Therefore, during the operation phase, vegetation inside and outside the safety corridor will be subject to clearing, topping, or pruning, as appropriate, as follows:

- For sections passing through natural forest, protection forest, production forest, and rubber plantation land, the line has been designed to clear the full height of the vegetation, with a minimum safety distance of ≥ 6 m from the lowest point of the conductor (at maximum sag) to the maximum mature tree height. Accordingly, no tree cutting is required within the safety corridor in these sections, as the design already accounts for the maximum growth height of forest and rubber trees.
- For sections passing through perennial cropland, vegetation inside and outside the safety corridor that does not maintain the required safety distance will be cleared, topped, or pruned.
- For sections passing through annual cropland and paddy land, safe clearance has already been ensured; therefore, no vegetation clearing or tree cutting is required.

Estimated biomass generated from vegetation maintenance

As noted above, the Project will carry out clearing, topping, pruning, or removal of vegetation that does not meet safety clearance requirements in sections passing through perennial cropland. The area of perennial cropland located within the Project's safety corridor is approximately 550.62 ha. According to studies on biomass generation and maintenance norms for agricultural and forestry vegetation, the number of branches, leaves, and cut vegetation generated from annual pruning is estimated at approximately 0.5–1.0 tone of fresh biomass/ha/year in areas with well-developed perennial crops. Depending on vegetation growth rates, it is estimated that each year approximately 5–10% of the corridor area through perennial crop zones (about 27.5–55.1 ha) will require pruning. Accordingly, the total amount of vegetation biomass generated along the route is estimated at approximately 27.5–55.1 tones/year.

- ***Solid waste from line inspection and maintenance activities***

During inspection and maintenance activities, the solid waste generated consists mainly

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of cleaning rags used for insulator wiping (approximately 50 kg/year, not contaminated with hazardous oil or grease), as well as damaged equipment, conductors, and accessories (such as insulators and support porcelain components). The quantity of such waste is not fixed and depends on the service life of the facilities and the actual extent of damage. This waste is generally inert, non-biodegradable, and non-hazardous.

- ***Impacts related to hazardous waste***

Inspection and maintenance of the transmission line will generate hazardous waste in the form of oil- and grease-contaminated gloves (hazardous waste code 18 02 01), with an estimated quantity of approximately 30–50 kg/year, based on experience from existing 500kV transmission lines in operation.

All hazardous waste generated will be collected by inspection and maintenance personnel and transported to the hazardous waste storage area at substations managed by Power Transmission Company No. 3 and Power Transmission Company No. 4 (the operation and maintenance entities under National Power Transmission Corporation). It will then be managed together with hazardous waste generated at those substations, which is outside the scope of the Project.

- ***SF_6 leakage from switchgear***

During the operation phase, sulfur hexafluoride (SF_6) may be used as an insulating medium and arc-quenching gas in certain high-voltage switchgear associated with the 500kV line bays at the Project's terminal substations (Krong Buk and Tây Ninh). SF_6 leakage may occur in small quantities through gaskets, joints, or valves during long-term operation, or in larger but less frequent quantities in the event of equipment damage, maintenance activities, improper gas filling or recovery, or operational incidents. SF_6 is an inert and non-flammable gas and, under normal operating conditions, does not cause significant local air pollution impacts. However, it is a greenhouse gas with a very high global warming potential. Therefore, SF_6 leakage is considered a source of direct fugitive greenhouse gas emissions and should be controlled throughout the equipment life cycle. The World Bank Group EHS Guidelines for Electric Power Transmission and Distribution also recommend minimizing SF_6 use and emissions, and using equipment with low leakage rates for high-voltage applications.

The primary receptor of this impact is the global climate, rather than households located along the transmission line corridor, because equipment containing SF_6 is concentrated only at the two terminal substations and is not distributed continuously along the full route. In the event of a major leak in an enclosed or poorly ventilated space, SF_6 may displace oxygen and create an occupational safety risk for operation and maintenance personnel. In addition, decomposition products of SF_6 generated after electrical arcing must be handled in accordance with specialized safety procedures. Given the localized nature of the emission source, the low probability of major leakage, and the fact that 500kV equipment is subject to regular management and periodic inspection, the impact under normal operating conditions is assessed as LOW.

This risk can be mitigated through periodic equipment inspection, SF_6 recovery and reuse in accordance with specialized procedures, and the use of low-leakage equipment, as specified in the ESMP.

5.5.4. Impacts on biodiversity

a. Risk of collision and electric shock for the bird and bat system at high altitude

Throughout the project operation life (from 30 to 50 years), the permanent physical presence of the dual 500kV transmission infrastructure, including the 54-107m high power tower system,

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the low-recognition Optical Ground Wire (OPGW), and the area affected by electromagnetic fields and corona noise was initially determined to create long-term risks to the aerial ecosystem. However, the four-conductor bundle design of the 500kV transmission line according to Vietnamese standards has been tested and confirmed that there is no halo under normal operating conditions. Therefore, the corona noise risk for the bird and bat system is technically excluded. The addition of a second line with the same design does not change this conclusion because the cumulative noise from the two sources is still INSUBSTANTIAL.

The main susceptibility is the population of 195 species of birds in the landscape adjacent to the Nam Nung Nature Reserve, especially large wingspan canopies such as the *Buceros bicornis* (VU) and nocturnal fruit bats. For bats, the main risks are physical collisions with OPGW wires during night flight conditions and electromagnetic interference within the line corridor — however, the electromagnetic field degrades rapidly with distance and only has a latent effect within 50-100 m around the corridor, not affecting the protected area 6 km away.

The distance of 6 km from the route corridor to the boundary of the Reserve, along with the low-lying settlement characteristics and inability to fly through the agricultural gaps of the *Polyplectron germaini* (VU) and *the Arborophila davidi* (EN), completely exclude a direct impact on this species group. However, the aerial risk still needs to be considered because the *Buceros bicornis* has a feeding flight radius of up to 10-15 km and can go beyond the boundaries of the protected area. The fact that the project line runs parallel to and is about 50 m from the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines along the 130 km of the line is at risk of creating a dual spatial barrier effect. This effect narrows the travel corridor, which can increase the accumulated risk of collisions when birds fly across the route corridor**,** especially when birds are disoriented during extreme weather conditions (dense fog or Central Highlands thunderstorms). Although theoretically, the potential risk to high-flying species such as the *Buceros bicornis* is rated at the MODERATE due to increased infrastructure density, the actual risk of collision and electric shock for the *Buceros bicornis* remains at the LOW.

The reason is that the line corridor is located up to 6 km from the boundary of the Nam Nung Nature Reserve; this distance significantly reduces the frequency of the *Buceros bicornis* flying over the line corridor to feed. In addition, the feeding behavior of the *Buceros bicornis* depends mainly on the canopy layers of primeval or restored forests (where there are large fruit-bearing trees such as banyans, figs, and crocodiles); these species are not found in industrial orchards (coffee, rubber, cashews) along the route corridor. Although some studies have documented that the *Buceros bicornis* can use the coffee garden in the transformed landscape, the possibility of this species flying frequently over the line corridor is low. In the actual project, the severity of the impact is strictly controlled based on internal technical designs; in which the risk of basic electric shock is eliminated by designing the minimum phase distance between the conductors (10 m) greater than the maximum wingspan of the *Buceros bicornis* (1.5 m). The basis for this assessment is supported by practical evidence: the results of investigations and interviews with residents and local authorities show that no collisions or electric shocks have occurred after more than 10 years of the existing 500kV Pleiku – My Phuoc – Cau Bong transmission lines being put into operation (consultation in August 2026). Therefore, the risk of collision and electric shock for the overhead bird and bat ecosystem is assessed at an average level, which tends to be lower in actual operation based on evidence from the existing line. This risk will be monitored through a periodic environmental monitoring program in the first year of operation, and additional mitigation measures will be considered if monitoring detects problems.

b. Forest edge effects and microclimatic changes along the route

When the project is completed, the restoration of natural trees and plants at the two luminescent trails for wire tensioning will be carried out after completion; only tall trees that exceed the electrical safety threshold will need to be trimmed running through the natural production forest and protection forest sections, which will bring certain changes in the landscape. The main

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susceptible objects affected are the structure of the under-canopy vegetation in the area adjacent to the corridor edge, along with moisture-loving plants and small wildlife groups that are adapted to the deep forest habitat. However, due to the small width of the two luminescent trails (2m x 2 streaks) and the low-lying vegetation maintained in the corridor, the actual forest edge effect is significantly narrower than in the case of full ROW clearance. This effect mainly arises in sections of the route that pass through natural forests and protection forests, where direct sunlight falls on the decayed carpet, increasing heat radiation, promoting water evaporation and deteriorating air humidity, thereby leading to the risk of secondary ecological evolution—replacing moisture-loving plants with light-loving shrubs and weeds. However, based on the current situation, when the forest cover along the route corridor has largely been heavily degraded and fragmented, and the 6 km safety distance ensures that Nam Nung Nature Reserve is completely unaffected by this risk. In addition, the maintenance process will apply the principle of selective pruning, only treat the tops of trees that violate the discharge distance, and strictly prohibit the act of whitewashing shrubs or using chemical herbicides. The mandatory maintenance of the vegetation layer as before the implementation of the project has automatically formed a soft transitional habitat strip, which serves as a natural ecological stepping stone to help minimize the microclimate slope and protect the integrity of the adjacent forest structure. Therefore, the risk of forest edge effect and microclimate change along the route is assessed as LOW.

c. Risk of forest fire due to electrical faults or technical incidents

During the operation phase, the Project presents potential risks of unexpected incidents related to grid safety, such as arcing when trees encroach into the transmission corridor, short circuits caused by lightning strikes, system overload, or tower collapse under extreme weather conditions during the Central Highlands storm season. Such incidents may generate sparks that fall onto dry vegetation within the right-of-way (ROW), thereby directly threatening surrounding sensitive receptors, including degraded natural forest patches, protection forest (including nearby acacia and rubber plantations), and community agricultural land along the route. Although these events are intermittent and short in duration, their ecological consequences could become serious if a fire were to spread.

This risk is assessed as MODERATE during the prolonged dry season in the Central Highlands (from November to April), when litter layers in plantation forests accumulate large amounts of dry biomass (branches and fallen leaves), creating highly combustible fuel loads. For ecologically sensitive areas, the Project's 6 km separation distance from Nam Nung Nature Reserve effectively establishes a safety buffer, thereby reducing the risk of fire spreading directly into the core special-use forest area. The possibility of fire spreading to the reserve is further limited by two factors. First, the 6 km buffer zone between the corridor and the reserve boundary includes agricultural land, residential areas, and roads, which create natural firebreaks. Second, the patrol road system along the route and local forest fire prevention and response forces can intervene in a timely manner before any fire spreads beyond the corridor.

d. Risk of invasive alien species introduction

Vegetation clearing for conductor stringing, including two temporary strips each 2 m wide and areas surrounding tower foundations, together with the movement of construction vehicles and machinery across regions during construction and periodic maintenance during operation, has been identified as a potential pathway for the spread of seeds or spores of invasive alien plant species. The main sensitive receptors are the diversity of native low-growing plant species in protection forest strips and regenerating vegetation adjacent to the ROW.

From an ecological perspective, this is a long-term risk with a tendency to become self-propagating once establishment occurs. In particular, the creation of open and moist ground around foundation pits located near natural stream systems may inadvertently create a favorable ecological niche for *Mimosa pigra*, a highly aggressive invasive alien species that is widespread

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in wetland areas in Viet Nam. Once established, this species can spread rapidly by seed, compete aggressively for space and resources, and outcompete native grasses and shrubs, thereby degrading the diversity and structure of low-strata vegetation along the corridor. This ecological impact is assessed as LOW to MODERATE. However, the risk can be effectively mitigated through the control measures specified in the ESMP.

5.5.5. Landscape/visual impacts

During the operation phase, the system of steel towers, conductors, shield wires, and the safety corridor of the 500kV Krong Buk – Tây Ninh 1 transmission lines will become permanent man-made features in the landscape. With a total length of approximately 330 km, the Project passes through a wide range of landscape types, including highlands, hilly areas, forestry land, perennial industrial crop areas, agricultural land, rural areas, and existing infrastructure corridors. The large scale and height of the 500kV towers, together with the conductors suspended between tower locations, may be visible from relatively long distances, especially in open terrain, on hillsides, at river crossings, along roads, or in locations with open views. The maintenance of the safety corridor, where tall vegetation must be controlled or trimmed, may also create a distinct linear band in vegetation structure and alter landscape continuity in certain sections.

The main receptors of visual impacts are households and communities living or carrying out production activities near the transmission corridor; road users at locations where the line runs close to or crosses roads; users of agricultural and forestry land; and visitors at viewpoints or areas of landscape value, where such locations exist within the viewshed of the Project. The level of visual perception will depend strongly on viewing distance, topography, vegetation cover, the density of existing structures, and the landscape value of each area. Impacts are expected to be LOWER in areas already substantially modified by agriculture, roads, or existing power infrastructure, particularly where the line is routed close to or parallel with existing transmission corridors. Conversely, impacts may be more noticeable in open terrain, natural or semi-natural landscapes, forest areas, and visually sensitive viewpoints. The WBG EHS Guidelines for Electric Power Transmission and Distribution also identify visual amenity as a specific operational impact and recommend that route alignment and facility siting should take into account important landscape views and environmental and community features.

Landscape and visual impacts are direct, long-term, and fundamentally irreversible over the lifetime of the Project. However, these impacts are not expected to result in a widespread loss of landscape function, and the sensitivity of most areas along the route is considered relatively low because the line mainly passes through agricultural landscapes, industrial crop areas, production land, and areas already significantly influenced by human activities. On this basis, the overall landscape and visual impact during the operation phase is assessed as MODERATE before mitigation. In sections located close to or parallel with existing transmission lines, or where the landscape has already been heavily modified, the impact level may be LOW.

SOCIAL IMPACTS

5.5.6. Land use restrictions and long-term livelihood impact within the transmission line corridor

Building height restrictions within the transmission line corridor will adversely impact households whose houses are fully affected or whose remaining land is no longer viable for continued safe habitation, requiring them to physically relocate to new places of residence.

For crops and trees that must be pruned or felled to maintain safe vertical clearance, harvest yields will be reduced, compelling local residents to transition to low-canopy crops. This

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agricultural transformation—particularly for perennial crops—will lead to an income gap for affected households during the transition period while waiting for newly established crops to yield stable production.

Furthermore, the extensive length and width of the transmission line corridor traversing agricultural production areas may bisect household land plots. This land fragmentation poses operational obstacles to crop management and cultivation, especially when farmers are required to convert to new plant varieties with compliant growth heights.

To mitigate long-term livelihood risks arising from land-use restrictions within the safety corridor, the Project will provide a one-off cash allowance for the restricted land area in accordance with local regulations and ESS5. Targeted assistance packages under the Livelihood Restoration Program (LRP) will also be delivered to affected households until their income is stabilized and their livelihoods are fully restored. For households requiring physical relocation, the Project will closely coordinate with local authorities to arrange resettlement options that align with household preferences and local absorption capacity.

RISKS AND INCIDENTS

5.5.7. Risks of technical and natural incidents

a. Risk of forest fires due to electrical faults or technical incidents

During the operation phase, the Project presents potential risks of unexpected incidents related to grid safety, such as arcing caused by vegetation encroachment into the transmission corridor, short circuits due to lightning strikes, system overload, or tower collapse under extreme weather conditions during the Central Highlands storm season. These incidents may generate sparks that fall onto the dry vegetation beneath the right-of-way (ROW), thereby directly threatening surrounding sensitive receptors, including degraded natural forest patches, protection forests (including adjacent acacia and rubber plantations), and agricultural ecological areas used by local communities along the route. Although these risks are intermittent in nature and involve only short-duration physical effects, the consequences for landscape ecology could become particularly severe if a fire were to spread. This risk is assessed as MODERATE during the prolonged dry season in the Central Highlands (from November to April of the following year), when litter layers in plantation forest areas accumulate large amounts of dry biomass (branches and fallen leaves), creating highly combustible fuel loads. In particular, for ecologically sensitive areas, the Project's 6 km separation distance from Nam Nung Nature Reserve effectively creates a safety buffer, thereby reducing the risk of direct fire spread into the core special-use forest area of the Reserve. The likelihood of fire spreading to the Reserve is further limited by two factors: (i) the 6 km buffer zone between the transmission corridor and the reserve boundary includes agricultural land, residential areas, and road networks that create natural firebreaks; and (ii) the patrol road system along the route and local forest fire prevention and response forces can intervene in a timely manner before any fire spreads beyond the corridor.

Spread of external forest fires: During operation, fire or explosion incidents may also occur as a result of adverse weather, conductor breakage, tower collapse, or encroachment by vegetation and human activities that violate safety clearance requirements. Such incidents could result in substantial loss of life and property, disrupt power supply in the area, and consequently affect local production activities and socio-economic conditions. In particular, in sections with dense vegetation or forest land, fire or explosion incidents could trigger large-scale fire spread, causing environmental damage and affecting local ecosystems. However, the transmission line has been designed in compliance with applicable regulations and with full consideration of the geological and climatic conditions at each tower foundation location. In addition, during

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operation, the line and its safety corridor will be subject to periodic inspection and maintenance. On this basis, the likelihood of fire and explosion incidents is assessed as MODERATE.

On the contrary, during operation, sections of the transmission line passing through forested areas (including production forest, protection forest, and natural forest) may themselves be affected by forest fire incidents, particularly during the dry season. In such cases, the following impacts may occur: **(i)** fire spreading to vegetation and surrounding areas; **(ii)** conductor breakage or tower collapse, resulting in interruption of power transmission; and **(iii)** damage to, or deterioration in the condition of, conductors, optical fiber cables, and associated fittings, thereby affecting transmission performance. The Project will implement appropriate measures to respond to such incidents and to minimize their impacts to the greatest extent practicable.

b. Ability to increase the rate of corrosion of electrical equipment and electrical conductors

The Project area is located in a tropical monsoon climate, and the transmission line will therefore operate under hot and humid conditions. If temperature, humidity, and the concentrations of dust, SO_2, NO_2, H_2S, and NH_3 increase as a result of industrial activities near the transmission line corridor, the corrosion rate of the Project's electrical equipment and conductors may increase accordingly. Elevated temperature and humidity, together with higher concentrations and loads of dust and these gaseous pollutants, may promote chemical reactions that form acidic and saline compounds such as H_2SO_4, HNO_3, and NH_4NO_3. Dust, SO_2, NO_2, H_2S, NH_3, and the resulting acidic and saline compounds may all affect electrical equipment and conductors, thereby accelerating corrosion.

However, the Project is designed and constructed using imported electrical equipment that complies with international IEC standards and is suitable for the hot and humid climatic conditions of the area. In addition, during operation, the transmission line will be subject to periodic inspection and maintenance. Therefore, the potential for increased corrosion of electrical equipment and conductors is considered small, controllable, and can be minimized.

c. Lightning, thunderstorms, tornadoes

Lightning Strikes:

The transmission line may be affected by direct or indirect lightning strikes, which could cause operational incidents. The very high current associated with lightning may result in conductor breakage or damage to the transmission line. To protect the conductors from direct lightning strikes, the line has been designed with shield wires installed along the entire route. All towers are grounded in accordance with the soil resistivity conditions of the areas crossed by the line, and grounding resistance is designed to comply with applicable technical regulations.

The Project has been designed with lightning protection measures in accordance with current standards and regulations; therefore, under normal conditions, such incidents are not expected to occur. However, equipment may deteriorate over time or be affected by adverse weather conditions, in which case such incidents may still arise. For this reason, the Project places strong emphasis on periodic inspection and on additional inspections after thunderstorms, whirlwinds, or other abnormal weather events.

Risks due to adverse weather, thunderstorms, whirlwinds

According to QCVN 02:2022/BXD, the sectoral standards applicable to overhead transmission line design, and the meteorological and hydrological data collected in the area, the climatic parameters used for Project design are as follows:

- ***Air temperature:*** the calculation and verification of conductors, as well as tower and foundation structures, are based on the following temperature conditions*:*
  - Lowest air temperature: 7°C
  - Average annual air temperature: 23.6°C

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+ Temperature for maximum external load condition: 25°C
+ Temperature for atmospheric overvoltage condition: 20°C
+ Maximum air temperature: 43.4°C

- ***Wind pressure:*** according to QCVN 02:2022/BXD on natural condition data used in construction, the wind pressure applied for design calculations is for Wind Zone I, as follows:
  + Maximum wind pressure: 65 daN/m²
  + Wind pressure under emergency condition: 55 daN/m²
  + Wind pressure under atmospheric and internal overvoltage conditions: 6.25 daN/m²
  + Topographic category of the route area: B

(Source: Feasibility study report, PECC2-PECC3-PECC4, March 2026)

During operation, when adverse weather, thunderstorms, or whirlwinds occur, actual air temperature and wind pressure may differ significantly from the design assumptions, potentially causing incidents such as conductor breakage, tower collapse, or equipment damage. Therefore, the Project pays particular attention to routine inspection and post-event inspection following thunderstorms, whirlwinds, or other unusual weather conditions.

And on the line system with automatic protection relays installed, when bad weather, thunderstorms, whirlwinds cause conductor breakage or tower collapse, these relays will automatically disconnect the power supply. Therefore, the resulting impacts on surrounding areas and local communities are assessed as VERY LOW.

e. Flash floods, erosion, subsidence of foundations/tower

Subsidence of foundations/tower:

Structural subsidence, foundation sliding, and tower collapse may occur due to: weak geology at the tower foundation location; steep terrain in the foundation area; and errors in the foundation design and construction process.

However, the geological survey for the project was fully carried out during the preparation of the feasibility study and technical design; the design was reviewed and based on the geological survey results; specifically, slab foundations were designed for areas with weak geology, and foundation embankments/retaining structures were designed for areas with sloping terrain; and the construction of tower foundations complies strictly with technical codes and regulations. In particular, the tower foundations are excavated to the required dimensions and designed with due consideration of the local geological conditions. Therefore, the likelihood of subsidence, foundation sliding, and tower collapse is very LOW.

Risks of flood overflow and erosion during the rainy season in areas where the transmission line crosses rivers and streams

As presented, the project transmission line crosses a number of major rivers and streams as follows:

- Crossing Duc Stream once within the G7-G8 span, with a width at the crossing location of approximately 38.5 m.
- Crossing Serepok 3 hydropower canal once within the G12-G12A span, with a width at the crossing location of approximately 94.8 m.
- Crossing Serepok River once within the G12A-G12A.1 span, with a width at the crossing location of approximately 217 m.

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- Crossing Dak N'Drung Stream once within the G26-G27 span, with a width at the crossing location of approximately 36 m.
- Crossing Dak R'Tih Stream once within the G30-G30A span, with a width at the crossing location of approximately 18 m.
- Crossing Dak R'Lap River six times within the G32-G33-G34-G35 spans, with widths at the crossing locations ranging from approximately 31 m to 126 m.
- Crossing a small branch of Thac Mo hydropower reservoir once within the G38-G39 span, with a width at the crossing location of approximately 244 m.
- Crossing Be River twice within the G42A-G43 and G47-G47A spans, with widths at the crossing locations ranging from approximately 88 m to 110 m.
- Crossing Saigon River twice within the G59-G60 and G63-G64 spans, with widths at the crossing locations ranging from approximately 64 m to 200 m.
- Crossing East Canal once within the G66-G67 span, with a width at the crossing location of approximately 35 m.

The project's tower foundations are not located in rivers, streams, or along river/stream banks. The design of the tower foundations has taken into account the area's climatic, meteorological, topographical, geological, and hydrological conditions, as well as the results of historical flood investigations in the area. In addition, the project's tower foundations are not situated within river or stream channels or on their banks. Therefore, the risk of impacts from flood overflow and erosion during the rainy season is LOW.

5.5.8. OHS risks and grid safety

- ***Occupational accidents (electrical risks during maintenance due to direct exposure to high-voltage electricity and induced voltage; working at height during maintenance)***

Inspection, maintenance, and repair of the transmission line during operation involve potential occupational accident risks, including falls from high towers, electric shock due to direct contact with live parts or induced voltage from parallel lines, and accidents when working with mechanical equipment. The potential consequences may be serious, including casualties and property damage.

Pre-mitigation risk level: MODERATE to SUBSTANTIAL. This risk can be effectively mitigated through the work permit process, portable grounding, and PPE as specified in the ESMP.

- ***Risks of fire, explosion, and electrical short circuit***

During operation, fire, explosion, and short-circuit incidents may arise due to: arc discharge when conductors break or sag excessively; short circuits caused by insulation damage or violations of safety clearance distances; trees or human activities encroaching on corridor safety clearances; and direct lightning strikes on the line. Consequences include damage to people and property, interruption of power supply in the area, and disruption of production activities. In particular, for route sections passing through or near forested areas, fires and explosions may spread over a large area, causing damage and affecting the local ecology. The dry season in the Central Highlands (from November to April) significantly increases the risk of fire spread.

Pre-mitigation risk level: MODERATE to SUBSTANTIAL in sensitive sections near forests. This risk can be mitigated through periodic corridor inspections and coordination with forest rangers as specified in the ESMP.

- ***Transmission line breakage***

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During operation, the transmission line may sag or break due to weather-related incidents (storms causing conductor breakage, short circuits, or tower explosions) or surrounding vegetation. In the event of conductor breakage, the automatic relay system will cut off the power supply in a timely manner, so the impact on surrounding areas is very low. At the same time, vegetation within the line corridor is periodically cleared during operation, and weather factors were taken into account during the detailed design stage; therefore, this impact is INSUBSTANTIAL.

However, conductor breakage at crossing points or near roads may still have an impact, cause unsafe conditions and posing danger to vehicles and people in the area.

Pre-mitigation risk level: LOW to MODERATE — the automatic relay system that shuts off power in a timely manner minimizes the consequences but does not completely eliminate the risk. This risk can be controlled through routine inspection and maintenance as specified in the ESMP.

- ***Risks of crane contact/collision with the transmission line***

During economic activities along the line corridor, cranes and truck-mounted cranes from nearby construction works may accidentally come into contact with the energized line. Potential consequences include serious electric shock to operators and nearby people, as well as conductor breakage and tower collapse causing transmission interruptions. This risk increases in urbanized and industrialized areas along the route, particularly in the sections passing through Ho Chi Minh City and Tay Ninh.

Pre-mitigation risk level: MODERATE. This risk can be mitigated through installation of safety corridor markers, warning signs, and coordination with local authorities as specified in the ESMP.

5.5.9. Public safety risks

- ***Power cuts, working at height near residential areas***

Emergency repairs or routine maintenance may require power outages, the mobilization of specialized vehicles, and workers to work on towers near roads, production land, or residential areas. Public safety risks include: people entering dangerous areas, materials/tools falling from height, traffic obstruction, and contact with construction equipment. Power outages of the transmission line may also affect the reliability of the system's power supply in the short term.

The direct safety risk is assessed as MODERATE. This risk can be mitigated through the establishment of exclusion zones, barriers and watch personnel, advance notice to the community, traffic control, and preventing unauthorized persons from accessing areas where there is a risk of falling objects, as specified in the ESMP.

Community electric shock due to contact with conductive objects near the line

The community may be exposed to danger when bringing long or conductive objects such as metal pipes, ladders, fishing rods, trees, or irrigation/agricultural equipment close to the conductors. Hazards may also arise from climbing towers, flying kites or other airborne objects, or approaching a broken conductor that has fallen to the ground. Direct contact with the conductor is not necessary for electric discharge to occur if the safe distance to live parts is violated. Because electric shock may result in fatal consequences, the pre-mitigation risk level is assessed as MODERATE — with serious consequences but a relatively LOW probability for each individual.

This risk can be mitigated through maintaining safety corridors, installing warning signs and anti-climbing devices, conducting periodic communication with the community and land users, establishing a mechanism for reporting dangerous trees/objects, and strictly instructing people

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not to approach fallen conductors, as stipulated in the ESMP.

Collision of cranes and lifting equipment with the line

Cranes, truck-mounted cranes, and machinery with elevated booms operating beneath or near the line may violate safety clearances and cause electrical discharge, leading to conductor breakage or tower collapse. Consequences for the community include conductors falling into residential areas or onto roads, endangering human life; prolonged power outages in the area; and widespread fires or explosions at the incident location. The risk is higher in areas with construction and industrial development along the route, particularly in the sections passing through Binh Duong and Tay Ninh.

Pre-mitigation risk level: MODERATE. This risk can be mitigated through the installation of corridor markers and warning signs at access points, communication with landowners and neighboring construction units, and coordination with the operator before any work that may violate the required safety clearance, as specified in the ESMP.

Table 29: Summary of risk and incident assessment during the operation phase

No.	Risks and incidents	Probability of occurrence	Consequences
1	Occupational accidents	Low	Affecting the health of line operation, inspection, and maintenance personnel.
2	Risk of fire, explosion, and electrical short circuit	Moderate	Causing major damage to people and property, affecting the power supply to the area, and consequently affecting production and daily life in the area. In particular, for route sections with ground vegetation and forest land, fire and explosion may spread over a large area, causing damage and affecting the local ecology.
3	Risk of conductor breakage	Low	Conductor breakage causes power grid safety risks, affects power supply to the area, and consequently affects production and daily life in the area.
4	Risk of subsidence, foundation sliding, and tower collapse	Low	Subsidence, foundation sliding, and tower collapse cause power grid safety risks, affect power supply to the area, and consequently affect production and daily life in the area.
5	Risks from lightning strikes	Moderate	Direct or induced lightning strikes may cause incidents to the line; the very high current intensity of lightning may result in conductor breakage and conductor damage. This in turn creates power grid safety risks, affects power supply to the area, and consequently affects production and daily life in the area.
6	Risks due to adverse weather, thunderstorms, and whirlwinds	Moderate	Incidents such as conductor breakage, tower collapse, equipment damage, etc. may occur, causing power grid safety risks, affecting power supply to the area, and consequently affecting production and daily life in the area.
7	Risk of flooding and erosion during the rainy season in areas	Low	It may cause erosion and subsidence, leading to tower collapse, conductor breakage, etc., thereby causing power grid safety risks,

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No.	Risks and incidents	Probability of occurrence	Consequences
	where the line crosses rivers and streams		affecting power supply to the area, and consequently affecting production and daily life in the area.
8	Risks and incidents of forest fire in sections of the route passing through forests	Moderate	Fire may spread to vegetation cover and surrounding areas; cause conductor breakage and tower collapse, resulting in power transmission interruption; and damage or reduce the quality of electrical conductors, fiber optic cables, and accessories, thereby affecting power transmission.
9	Risks and incidents of crane and truck-mounted crane contact with the transmission line	Moderate	Electric shock may cause harm to human health, property, and life, particularly to crane and truck-mounted crane operators; conductor breakage and tower collapse may also occur, causing power transmission interruption.

5.6. CUMULATIVE IMPACT

The project crosses a number of existing transmission lines (500kV, 220 kV, and 110 kV) along the route. The scope of cumulative impact assessment is defined within a 1.6 km buffer zone on both sides of the route. As presented, the project crosses the following transmission lines:

- 500kV Pleiku - My Phuoc - Cau Bong transmission line: once
- 220 kV Srepok 4 - Krong Buk transmission line: once
- 220 kV Buon Kop - Serepok 3 transmission line: once
- 220 kV Dak Hoa - Dak Nong transmission line: once
- 220 kV Dak Nrung Wind Power Plant - Dak Nong 500kV Substation transmission line: once
- 220 kV Dak Nong - Phuoc Long - Binh Long transmission line: once
- Existing 220 kV My Phuoc - Binh Long transmission line: once
- 110 kV Cu M'Gar - JPO transmission line: once
- 110 kV Dak Glun hydropower transmission line: once
- 110 kV Thac Mo - Loc Ninh transmission line: once
- 110 kV Binh Long 2 - Minh Hung transmission line: once
- 110 kV Binh Long 2 - Binh Long transmission line: once
- 110 kV Binh Long - Tay Ninh Cement transmission line: once
- 110 kV Binh Long - Tay Ninh 2 transmission line: three times
- 110 kV Dau Tieng - Minh Hung transmission line: twice
- 110 kV Dau Tieng - Tay Ninh 2 transmission line: once

The main cumulative impacts include: (i) electromagnetic field (EMF) resonance at locations where the project crosses existing transmission lines, resulting from the combined effect of multiple lines; and (ii) cumulative noise impacts from multiple high-voltage transmission lines in the same area. The cumulative impacts are assessed as follows:

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a. Assessment of electric field impact at the crossing position:

Crossing with transmission lines can cause combined effects such as electromagnetic resonance at the crossover site. Similar to the above, to evaluate the electric field at the crossover site, the report uses the Electric Field Transient Calculation (EMTP) program.

Calculation Basis:

- At the crossing point with the existing 500kV transmission line, the project is designed with an undercrossing solution beneath the existing 500kV line and ensures a crossing clearance between conductors, or between conductors and shield wires, of ≥ 5 m in accordance with the electrical equipment code.
- At crossing points with the existing 220 kV and 110 kV transmission lines, the project is designed with an overcrossing solution above the 220 kV and 110 kV lines, and ensures a safe clearance between the two lines of ≥ 7 m, meeting the requirements of the electrical equipment code (> 5 m).
- The minimum conductor clearance above ground is designed to be ≥ 12 m.
- The power grid safety corridor, measured from the centerline to each side, is 18 m for the 500kV line, 12 m for the 220 kV line, and 7.5 m for the 110 kV line.
- Reverse-phase circuit arrangement is applied.

Calculation result:

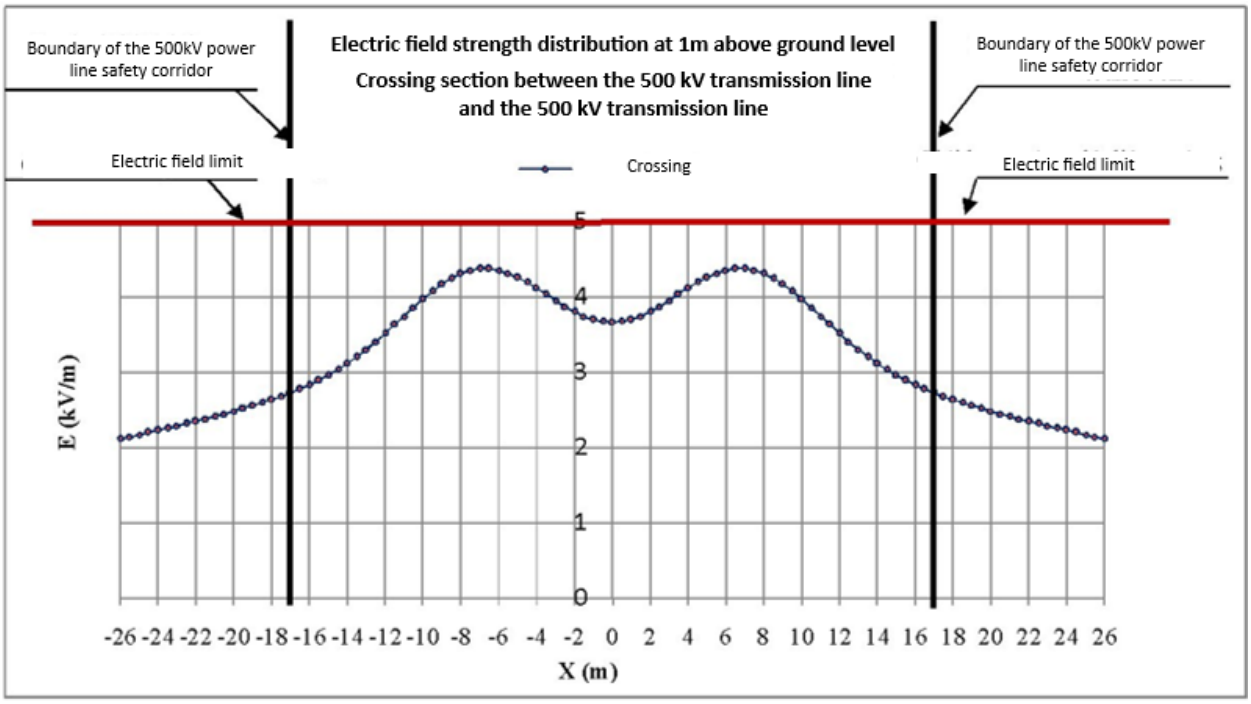


Figure 14: Electric field strength distribution at 1m from the ground – crossing section between the 500kV transmission line and the 500kV transmission line

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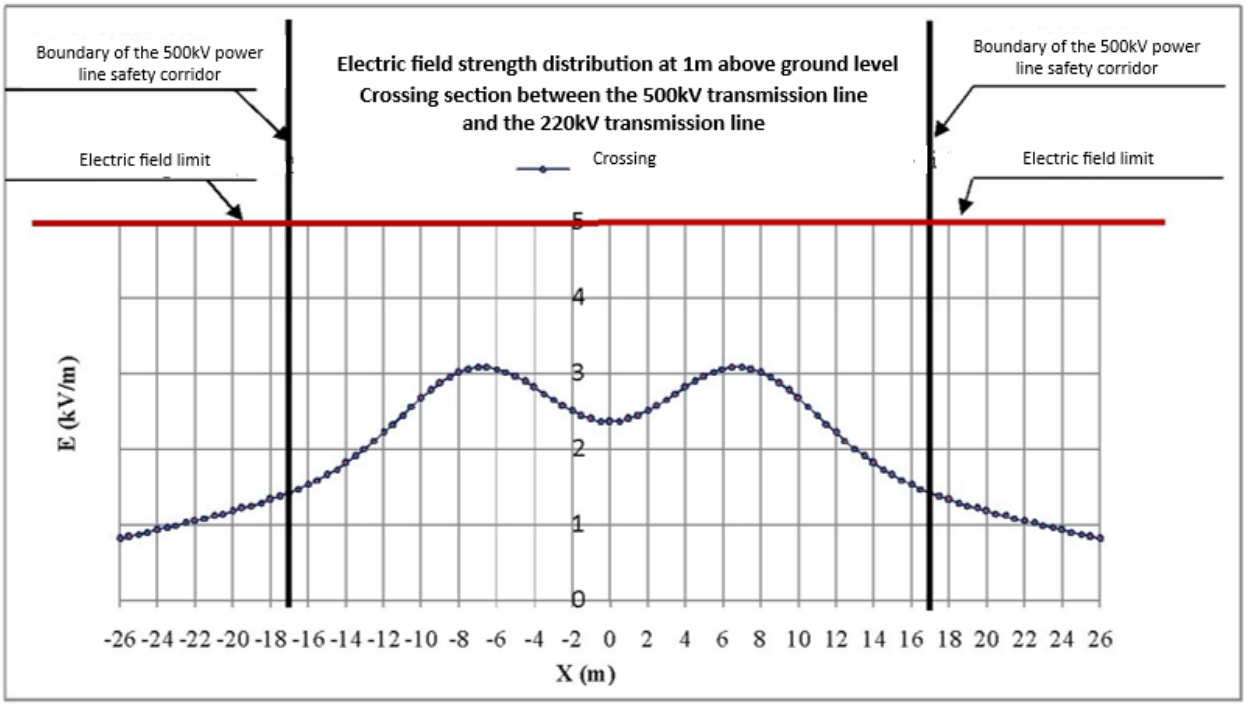


Figure 15: Electric field strength distribution at 1m from the ground – crossing section between the 500kV transmission line and the 220kV transmission line

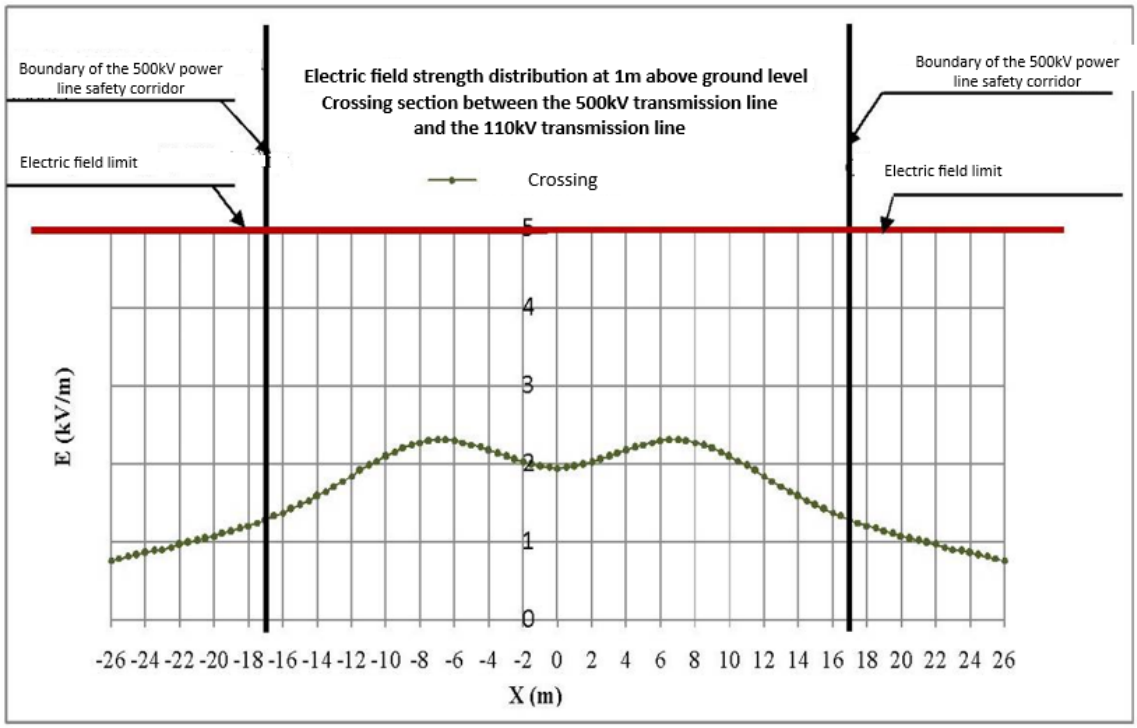


Figure 16: Electric field strength distribution at 1m from the ground – crossing section between the 500kV transmission line and the 110kV transmission line

Comments and assessment: The above calculation results show that with the following design solutions: (1) undercrossing the 500kV transmission line at the crossing location; (2) overcrossing the 220 kV and 110 kV transmission lines at the crossing locations; (3) ensuring a safe clearance between the two lines; (4) ensuring the prescribed ground clearance of the transmission line; and (5) applying reverse-phase arrangement, the electric field intensity beneath the line remains below 5 kV/m. Therefore, local people may cultivate and grow crops

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both within and outside the transmission line safety corridor without restriction on exposure time (in accordance with QCVN 25:2016/BYT).

b. Cumulative impact due to corona noise resonance when operating two parallel 500kV transmission lines

As analyzed in Section 5.3.1, the four-conductor bundle design has technically eliminated the corona phenomenon. Therefore, the cumulative impact of corona noise from the two parallel transmission lines is assessed as negligible and no additional mitigation measures are required.

c. Assessment of the cumulative impact of the electric field when two 500kV transmission lines operate in parallel

When the 500kV Krong Buk - Tay Ninh 1 transmission lines are put into operation in parallel with the existing 500kV Pleiku - My Phuoc - Cau Bong transmission lines (the distance between the centerlines of the two routes is 50 m), the electric fields from the two sources interact with each other. According to the calculation results presented in Appendix xx of the FS Consultant, and as analyzed in Section 5.5.2, the cumulative impact level is assessed as LOW — the entire space between the two safety corridors and the area outside the corridors complies with QCVN 25:2016/BYT without restriction on exposure time; only the area directly beneath the conductor within the corridor, at a ground clearance height of 12 m, is subject to exposure time restrictions, but this is an area where housing is not permitted under the regulations.

Impacts on households in the inter-corridor zone between the two safety corridors

In addition to the electromagnetic field impacts analyzed above, households with residential structures and ancillary works located in the inter-corridor zone between the two safety corridors — that is, outside the individual safety corridor of each line but within the area between the two lines — are considered under Decree 62/2025/NĐ-CP and the Electricity Law 61/2024/QH15.

The project owner is responsible for preparing an inventory, notifying and conducting consultations with these households to ensure they are able to exercise their full entitlements under applicable law.

Cumulative impact level: LOW — households in the inter-corridor zone are subject to combined electromagnetic field exposure from both lines, though electric field levels remain within QCVN 25:2016/BYT limits; impacts are primarily psychological and relate to land-use restrictions, and can be addressed through compensation and support measures in accordance with applicable regulations.

5.7. ASSESSMENT OF CLIMATE CHANGE IMPACTS

The climate change assessment for the 500kV Krong Buk - Tay Ninh 1 Transmission Line Project is conducted along two dimensions: (i) assessment of the project's exposure, vulnerability, and risk to climate hazards throughout its service life; and (ii) assessment of the Project's contribution to climate change through greenhouse gas (GHG) emissions, depletion of carbon sinks, and its capacity to support renewable energy integration and reduce power system losses. This approach is consistent with the principles of ESF/ESS3 and Good International Industry Practice (GIIP).

5.7.1. Impacts of climate change on the project

The transmission line is approximately 330 km long and traverses a wide range of terrain and land-use conditions, from highlands, steep hills, and forest land in the Central Highlands to agricultural areas, industrial crop zones, and lower-lying terrain in the Southeast region. Given

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the long service life of the infrastructure, future extreme meteorological and hydrological conditions may differ from the historical data series used for design. The World Bank considers the transmission system to be one of the most climate-vulnerable components of the power sector, as climate change may increase the frequency, intensity, and duration of extreme weather events. Therefore, the assessment should not rely solely on historical probabilities, but should also consider extreme scenarios appropriate to the service life of the infrastructure.

- **Extreme rainfall and flash floods causing landslides and erosion of tower foundations**

Heavy rainfall of high intensity may increase surface runoff, erosion, and soil saturation on slopes; in small catchments, stream valleys, and dissected terrain, flash floods or concentrated flow may occur, particularly in the hilly and mountainous terrain of the Central Highlands. For tower foundations, potential consequences include scouring at the foundation base, damage to drainage systems, failure of cut/fill slopes, reduced bearing capacity of the foundation soil, differential settlement, or localized instability. Particular attention should be paid to hilly and mountainous sections in the Central Highlands, locations near streams or drainage convergence zones, steep slopes, weathered soils, and areas that have already shown signs of erosion. Damage to foundations or access roads not only increases repair costs but, in extreme cases, may lead to tower tilting or collapse and interruption of power transmission. Before adaptive design requirements are considered, the risk is assessed as MODERATE to SUBSTANTIAL at geotechnical hotspots; after applying drainage design, erosion protection, slope stabilization, appropriate foundation siting, and post-heavy-rain inspection, the residual risk is expected to be LOW to MODERATE.

- **Storm winds and whirlwinds causing conductor breakage, tower collapse, and line instability**

The 500kV towers and conductors are of substantial height, span long distances, and are directly exposed to wind, thunderstorms, and lightning. Extreme winds may increase lateral loads on towers, cause conductor oscillation, damage fittings and accessories, bring trees down into the right-of-way, and in very rare cases lead to structural instability. Lightning may cause overvoltage, flashover of insulator strings, or equipment failure. Climate change may alter the characteristics of extreme events; therefore, the wind, lightning, and meteorological parameters used in design should include appropriate safety factors and be checked against updated climate data. Given the potential consequences, including conductor breakage, tower collapse, and widespread power outages, the pre-mitigation risk is assessed as MODERATE; locally, it may be higher in exposed terrain, on hilltops or hillsides, or in corridor sections with risk of tree fall.

- **High temperatures, drought, and forest fire risk**

High temperatures and prolonged heatwaves may increase conductor temperature, affecting sag and load-carrying capacity; at the same time, prolonged drought increases the flammability of vegetation within and near the transmission corridor. In sections passing through natural forest, plantation forest, or areas where agricultural residues are burned, fires originating outside the corridor may spread into the corridor and affect the transmission line. This impact is seasonal and unevenly distributed along the route. The overall risk is assessed as LOW, but may be MODERATE in sections with a high forest fire danger rating. Vegetation management, maintenance of safe clearances, coordination on forest fire prevention and control, dry season monitoring, and checks on temperature and sag are important adaptation measures.

In general, the Project's climate risk is assessed as MODERATE, but it is not spatially uniform. Foundation locations on slopes, near streams, in areas with a history of landslides or erosion, in exposed terrain subject to strong winds, and in sections passing through forests with high fire risk should be identified as climate-risk hotspots. The engineering design should use updated topographic, geological, hydrological, and meteorological data; verify design parameters

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against extreme events with appropriate return periods; and, where possible, consider future climate scenarios consistent with the service life of the infrastructure.

5.7.2. The project's impact on climate change

The Project's greenhouse gas *(*GHG) emissions arise primarily during the construction phase from fossil fuel consumption by machinery, transport vehicles, and construction equipment; emissions associated with construction materials; changes in carbon stocks due to vegetation clearing and land cover conversion; and during the operation phase from power losses and SF_6 leakage if switchgear uses this gas. Conversely, transmission projects may generate climate benefits at the system level by enabling renewable energy evacuation, reducing grid congestion, and lowering technical losses. As the ESIA does not yet contain complete data on fuel consumption, cleared area/biomass, transmitted electricity, with-project/without-project losses, and SF_6 charge volumes, the following section provides a qualitative assessment and defines the quantification approach to be applied once the design data are finalized.

- **GHG emissions during construction (CO_2, CH_4, N_2O from machinery)**

CO_2 is the main emission resulting from the combustion of diesel and gasoline by excavators, bulldozers, cranes, generators, trucks, and construction vehicles; CH_4 and N_2O are also generated in small quantities from fuel combustion. As transmission line works are carried out in a dispersed manner at individual foundation locations and do not involve a continuous industrial fuel-combustion process, the intensity of direct emissions at each construction site is expected to be LOWER than that of industrial or thermal power projects.

- **Loss of carbon sinks due to right-of-way (ROW) clearing**

The clearing of foundation sites, access roads, and maintenance of the safety corridor may result in loss or reduction of vegetation biomass. The route mainly passes through agricultural land, industrial crop areas, and already modified landscapes; therefore, carbon loss along most of the route may not be as significant as in the case of natural forest conversion. However, the Project still includes sections involving forestry land/forest areas and perennial crops. It is therefore necessary to disaggregate the cleared area by land cover type (natural forest, plantation forest, perennial crops, shrubs/agricultural land), determine the biomass removed, and assess the regeneration potential or maintenance of low vegetation cover. Only after this step will there be a sufficient basis for concluding the level of emissions due to land-use change. Micro-siting of towers, use of existing access roads, and limiting clearing to the minimum technically necessary area will both reduce biodiversity impacts and minimize the loss of carbon sinks.

- **SF_6 leakage from switchgear, a potent greenhouse gas requiring monitoring within the project area**

If high-voltage circuit breakers or switchgear at line bays use sulfur hexafluoride (SF_6), leakage during installation, operation, maintenance, and end-of-life recovery constitutes a direct source of fugitive GHG emissions. SF_6 has a very high global warming potential and remains in the atmosphere for a long time; therefore, even a small leakage volume may generate a substantial amount of CO_2 equivalent. The Project should prepare an inventory including equipment type, initial SF_6 charge, annual refill/recovery volumes, and annual losses; prioritize sealed equipment with low leakage rates; conduct periodic leak detection; and use gas recovery systems instead of venting. Annual SF_6 emissions should be converted into tCO_2e and included in the environmental report/ESMP once the final equipment data are available.

- **Positive impact: integration of approximately 543 MW under construction and unlocking approximately 2.3 GW of renewable energy, replacing coal-fired electricity, and reducing technical grid losses**

According to currently available project information, the 500kV transmission line is expected to support the integration of approximately 543 MW of generation capacity under construction

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and enable the evacuation/unlocking of approximately 2.3 GW of renewable energy capacity. This represents an important potential climate benefit because increased transmission capacity may reduce renewable energy curtailment, ease grid congestion, and facilitate the partial displacement of more carbon-intensive electricity in the power system. The Project may also reduce technical losses if the new grid configuration decreases load flow on existing corridors. However, the entire 543 MW or 2.3 GW should not be directly attributed as coal-fired electricity "replaced." Avoided emissions should be determined on the basis of the actual incremental renewable electricity transmitted (MWh/year), the reduction in curtailment, and/or the reduction in losses relative to the without-project scenario, multiplied by the appropriate marginal emission factor or grid emission factor.

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CHAPTER 6. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Based on the impacts and risks discussed in Chapter 5, this Chapter presents an Environmental and Social Management Plan (ESMP) for the project. The ESMP outlines detailed procedures for implementation, monitoring, inspection and reporting to ensure effective management of identified and assessed impacts and risks. The ESMP also includes a capacity building program to enhance the skills and knowledge of stakeholders, as well as cost estimates for all proposed measures. The main content of Chapter 6 includes:

- Measures to mitigate environmental and social risks and impacts.
- Implementation plan
- Project Compliance Framework
- Environmental Monitoring Program
- Capacity building programs.
- Cost estimates.
- Complaint settlement mechanism
- The plans include the Occupational Health and Safety (OHS) Plan, Emergency Response Plan (ERP), etc. are presented in the Appendix.

In addition, the Relocation Plan (RP), Labor Management Process (LMP), Stakeholder Engagement Plan (SEP), and Environmental and Social Commitment Plan (ESCP) are closely related to this ESMP and have been cross-referenced in the ESIA/ESMP.

6.1. MITIGATION MEASURES

This section proposes key mitigation measures of the projected project during the feasibility study, detailed design, site preparation, construction and commissioning phases.

This section focuses on proposing appropriate mitigation measures to prevent, avoid, or mitigate negative impacts and risks on the natural and human environment in the project's area of influence.

Based on the negative impacts and risks identified and analyzed in Chapter 5, mitigation measures have been proposed for three phases of project implementation including pre-construction, construction, and operation. A hierarchical approach has been adopted during the development of mitigation measures:

- Avoid risks and impacts;
- Where it cannot be avoided, reduce or limit the risks and impacts to an acceptable level;
- After the risks and impacts have been mitigated or limited, if significant impacts remain, offset or offset them, if technically and financially feasible.

6.1.1. Measures are integrated in the feasibility study and detailed design phase

Key measures taken at the base design stage to mitigate the social and environmental impacts and risks of the project include:

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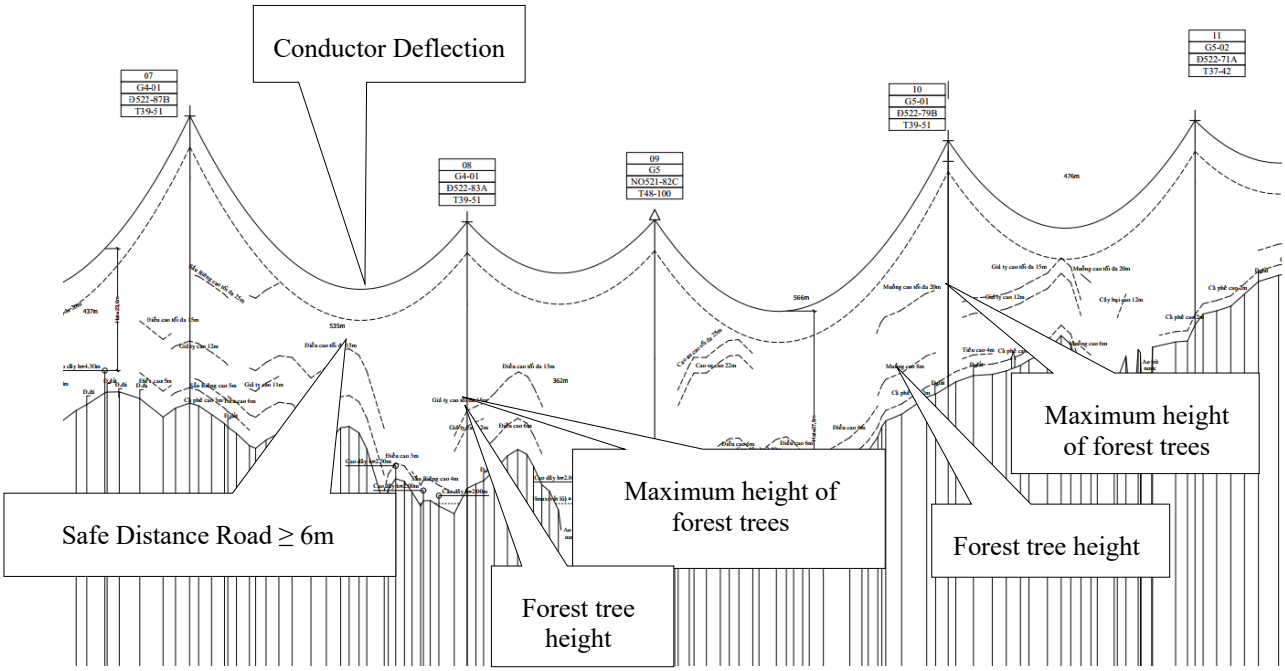
- For the route orientation and position of the columns selected and fine-tuned to minimize passage through concentrated residential areas, houses/works, forests and habitats with biodiversity value, socio-cultural sensitive areas, mineral areas and areas with high geological risks; prioritize the use of existing infrastructure corridors when appropriate.
- Safety corridor widths (ROWs) and site clearance should be limited to technically necessary levels, avoiding unnecessary clearing of entire vegetation, especially in sensitive forest and habitat sections.
- For the intersections of existing roads, rivers/streams and power lines, the position of towers, overpasses, deflection and safety distances must be designed to ensure technical regulations, and at the same time facilitate the pulling of safety belts and reduce traffic disruptions as well as community activities.
- The design of column foundations must be based on the results of specific topographical, geological and hydrological surveys at each location; priority should be given to avoiding unstable slopes, erosion areas, water congestion, flash floods and weak grounds. In unavoidable locations, the design should integrate surface water drainage, foundation protection, erosion prevention, slope stabilization, and post-construction vegetation restoration. The design parameters of columns, foundations and conductors should consider climate resistance, including extreme rainfall, strong winds/cyclones, lightning, high temperatures, and the risk of forest fires throughout the life of the building.
- Corridor design must maintain electrical safety distances, control electric fields/EMFs in areas accessible to humans; and arrange lightning protection systems, grounding, warning signs and solutions to prevent unauthorized access. At sections through/near forests, the design must facilitate the maintenance of a safe distance between conductors and trees, limit dangerous trees that are likely to fall into the line and support access when forest fires occur.
- For access roads and construction sites, the design should prioritize the use of existing roads, existing agricultural/forestry roads and arrange construction sites within the area of recovered or affected land, thereby reducing the opening of new roads, deforestation and temporary land occupation. The location of two optical repeater stations and 500kV output compartments have made full use of the planned land/infrastructure or existing land fund of the power project, and integrated drainage, fire protection, electrical safety, oil control and safe operation requirements.

Measures to minimize impacts on forests and forest land

As mentioned, the project has a number of routes in Dak Lak, Lam Dong, Dong Nai provinces (G1-G43) that pass through forests and forest land. To minimize the impact on forests and forest land, the project applies the following solutions:

- Select and design the direction of the line to avoid passing through forests and forest land.
- On the section of the route passing through natural forests and protection forests: design the pillar foundation so that the area of recovery and conversion of forest use purposes to project construction purposes is the lowest.
- On the section of the route passing through natural forests, protection forests, production forests, and rubber plantations: the design ensures a safe distance from the lowest point of the conductor (when the conductor at maximum sag is maximum) to the point where the maximum height of the forest trees grows is ≥ 6m, exceeding all forest trees to avoid affecting and not cutting down forest trees in the safety corridor.

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Design plan beyond all forest trees:

- The project uses the solution of towers and high-rise electrical conductors to design over trees and ensure a safe distance of discharge (>6m according to the voltage level of 500kV) (only compensation and permanent land use repurposing at the positions of pillar foundations); with this solution, it is convenient for production activities, tree planting, creating development space, convenient for construction and compensation because there is no need to cut down trees in the route corridor. Thus, the forest area that must carry out procedures for changing the use purpose to another purpose according to the provisions of the Forestry Law is only limited to the area of the pillar foundation, not the entire length of the route corridor passing through the forest.
- The project applies the solution of large overpasses, high columns, and long columns to minimize the number of pillar foundation locations located within the forest planning boundary, and at the same time reduce the number of locations that must be opened to construction approaches.
- In the process of survey and design, the route is studied to follow the boundaries of poor forest plots and production forests, minimizing the cutting through areas with high conservation value (strictly protected subdivisions) under permitted topographic conditions.
- For forest areas subject to forest use purpose change (scope of pillar foundations): fully carry out procedures according to the Forestry Law and relevant regulations; implement plans on replacement afforestation or pay for replacement afforestation as prescribed.
- For temporary construction areas (official roads, material gathering yards): apply the mechanism of temporary forest use according to Decree No. 227/2025/ND-CP dated August 16, 2025, commit to minimize the area and level of impact, do not cut down forest trees with a diameter of 20 cm or more (measured at a position 1.3 m from the root) unless necessary, and return the current status quo after completion of construction.
- For route corridors (without repurposing): coordinate with forest owners and local forest rangers in the management and supervision of trees inside and outside the safety protection corridor according to Points 1.4.1.3–1.4.1.5 QCVN 26:2025/BCT during the operation process.

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- Implement and complete all legal procedures for changing the forest use purpose and planting replacement forests in accordance with the provisions of the Forestry Law.
- Planting markers of the scope of construction, clearly stipulating the scope of lsite clearance; it is strictly forbidden to expand the scope of construction, temporary roads and cut down trees outside the design permitted by the competent authority.
- Formulate forest fire prevention and fighting plans for localities.
- Coordinate with forest owners/forest management units throughout the project implementation process.

6.1.2. Measures in the pre-construction stage

6.1.2.1. Measures to mitigate the impact of land acquisition

The Project will apply the mitigation hierarchy to avoid and minimize land acquisition, physical displacement, economic displacement and restrictions on land use. During design finalization, tower locations, access routes, construction areas and associated facilities will be reviewed to reduce impacts on houses, productive land, businesses, community facilities, culturally important sites and vulnerable households. Where avoidance is not feasible, impacts will be addressed through the RP in accordance with applicable national law and ESS5.

The RP will define eligibility, entitlements, compensation, assistance, livelihood restoration, consultation, disclosure, grievance redress, implementation responsibilities, budget, schedule and monitoring arrangements. Compensation for eligible land and non-land assets will be provided at replacement cost. Transitional and livelihood restoration assistance will be designed according to the nature and severity of impacts and the circumstances of affected people, with additional support for vulnerable households. Detailed rates, allowances and assistance amounts will be based on the updated legal framework, replacement cost survey, verified census and inventory data, and consultations. They will be finalized in the Phase 2 RP and should not be treated as final in the present ESIA.

Before land acquisition or restrictions on land use are implemented, the Project will complete the updated census and inventory of losses for affected areas, verify land and asset information, conduct the replacement cost survey, consult affected people on impacts and entitlements, disclose the updated RP in an accessible manner, allocate sufficient budget, and establish implementation and grievance arrangements. Cut-off dates will be established, communicated and applied in accordance with the RP and ESS5.

Livelihood restoration measures will be based on an assessment of affected income sources, severity of loss, remaining productive assets, household preferences, market conditions and vulnerability. Measures may include support to restore agricultural production, vocational or skills training, employment information, assistance to re-establish businesses, and transitional support, as appropriate. Phase 2 will define the eligible groups, delivery arrangements, indicators and completion criteria. Livelihood restoration will be monitored until the agreed outcomes are achieved or corrective measures are put in place.

Temporary land occupation and construction damage will be minimized through agreed access and work areas, pre-construction recording of land and assets, timely compensation for eligible losses, maintenance of access and drainage, and restoration of land to its prior condition or an agreed condition. Contractors will not expand work areas beyond approved boundaries and will address accidental damage promptly.

The Project grievance mechanism will be available without cost or retaliation to affected people and will not prevent access to judicial or administrative remedies. Complaints related to land, assets, compensation, access, construction damage and livelihood restoration will be recorded,

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tracked and resolved within the timeframes set out in the RP and SEP. Monitoring reports will include implementation progress, outstanding issues, grievances and corrective actions.

Civil works in each affected area will be sequenced with RP implementation. The Project will confirm that compensation and assistance due for the relevant site have been provided and that displacement-related conditions have been met before allowing works that cause the corresponding impacts, consistent with ESS5 and the ESCP.

6.1.2.2. Measures to mitigate the risk of unexploded ordnance

In order to ensure safety during the construction process, the project detects and disposes of all types of bombs, mines, ammunition and explosives at the foundation construction sites, optical repeater stations according to the depth of the foundation pit and along the safety corridor. The volume of the project's area for clearing bombs, mines and explosives is 173.74 hectares, specifically as follows:

- Area of clearance of bombs and mines, explosives - detection of foundation holes: 107.74 hectares.
- Area of clearance of bombs and mines, explosives - detection of the corridor of the line: 66 hectares.

Prior to the implementation of UXO clearance activities, SPMB must inform communities in all affected areas of UXO clearance activities prior to commencement, including the location and timing of the work, the safety extent that has been established, and the measures people should take if suspicious objects are detected, especially in canal and riverside communities where children can play near the water. This safety warning should be communicated in writing to the commune/ward People's Committee, and through reliable local information channels such as commune loudspeaker systems, community meetings, or in coordination with the commune/ward People's Committee.

The SPMB will sign a contract with the military construction unit or the Provincial Military Command to conduct mine clearance at construction works in the project area. Mine clearance will be carried out immediately after the completion of land compensation and site clearance. Mine clearance and unexploded ordnance (UXO) will be carried out by detection equipment according to the following steps:

• Land Mine Clearance:

- Marking mine detection and disposal areas and UXOs;
- Clearing vegetation;
- Detected at a depth of 0.3m;
- Marking and digging for signal testing and processing at a depth of 0.3m;
- Detection at a depth of 5m (device settings at a high sensitivity level);
- Digging, testing and processing signals at a depth of 5m.

• Underwater mine clearance: For works/pillars across streams (if any)

- Detected at a depth of 0.5m from the bottom of the water;
- Mark the signal at a depth of 0.5m from the bottom of the water;
- Diving to check, dig and process signals at a depth of 0.5m from the bottom of the water;
- Detected at a depth of 0.5m to 3m or up to 5m from the bottom of the water;
- Signal marking at a depth of 0.5m to 3m or up to 5m from the bottom of the water;

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- Diving to check, dig and process signals at a depth of 0.5m to 1m from the bottom of the water;
- Plan and organize the excavation and processing of underwater signals from 1m to 3m or up to 5m from the bottom of the water.

In flooded areas with a depth of <0.5m, embankments must be built to pump out water before conducting bomb and mine detection and clearance to avoid missing ammunition. When conducting bomb and mine detection, warning signs must be installed and security forces must be arranged to prevent people, animals and vehicles from passing through the working area to avoid accidents.

The collection, classification, transportation and disposal of detected bombs, mines and explosives shall comply with safety standards on preservation, transportation and use of explosives (QCVN 01:2019/BCT - National technical regulations on safety in the preservation, transportation, use and handling of industrial explosives and precursors preservation; Regulations on explosives promulgated by the Engineer Command and relevant current regulations).

The contractor responsible for mine clearance must inform the Provincial Military Command of the progress of the task and any necessary matters, such as the location of the demolition, the contractor's implementation plan and the time of deployment in the area. The project also allocates a fund to carry out the clearance of remaining ordnance/explosive ordnance before commencing construction.

When UXO is detected at the Material Repository, the actions are:

- Stop construction immediately, relocate workers and protect the area, preventing public access.
- Notify the SPMB and local authorities, who will then contact the local Military Force to conduct an investigation, design and execution of the UXO relocation, transport it to a safe location to neutralize the UXO, and
- Only continue to construct and approach the area according to the decision of the Army Force in charge.

6.1.3. Measures during the construction phase

The mitigation measures proposed for the Construction phase include the Worker Code of Conduct, Labor Management Procedures, Environmental Code of Practices and Specific Mitigation Measures and sub-plans. Relevant elements will be included in the Terms of Reference for Consulting Services and/or Civil Construction Contracts. In addition, SPMB and CSCs will be responsible for coordinating work between contractors performing different construction contracts at the same time, sharing construction sites and access... will be cooperating with each other to ensure that the works are implemented synchronously, the potential impacts and risks of ESHS are mitigated or under control.

6.1.3.1. General Impact Mitigation Measures

The general impacts and risks defined/assessed in Chapter 5 are mitigated through measures defined in ESCOPs, including:

(i). Dust and exhaust gases;

(ii). Noise and vibration;

(iii). Wastewater management;

(iv). General solid waste management;

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(v). Hazardous waste management;

(vi). Impacts on surface and groundwater quality;

(vii). Impacts on agricultural production activities (industrial trees, production forests);

(viii). Traffic safety risks;

(ix). Impacts on cultural and historical resources and procedures for accidental finds;

(x). Environmental risks;

(xi). Occupational health and safety (OHS) risks;

(xii). Public health and safety;

(xiii). Labor influx management

- The Project will manage labor and worker-community risks in accordance with the LMP, ESS2, ESS4, procurement documents and contractor environmental and social management plans. The size, composition, location and accommodation arrangements of the workforce are preliminary and will be confirmed in Phase 2. Each contractor will assess site-specific labor influx risks and prepare proportionate management measures before mobilization.
- All workers will receive written information on employment conditions and will be subject to a code of conduct covering respectful behavior, non-discrimination, prohibition of SEA/SH, prohibition of child labor and forced labor, community interaction, protection of natural resources and sanctions for non-compliance. Codes of conduct will be signed and explained during induction, reinforced through periodic training and enforced by contractors and subcontractors.
- Contractors will maintain worker records, comply with applicable requirements for worker registration and permits, provide adequate accommodation and sanitation where accommodation is required, and ensure access to safe drinking water, health services, emergency arrangements and transport. Worker accommodation will be located and operated to minimize impacts on nearby communities and sensitive locations.
- A worker grievance mechanism will be established, communicated and accessible to direct and contracted workers, including confidential channels for sensitive complaints. The mechanism will allow complaints without retaliation and will include clear referral procedures for SEA/SH allegations using a survivor-centered approach. It will operate separately from, but coordinate as appropriate with, the community grievance mechanism.
- Contractors will engage with local authorities and nearby communities before mobilization and throughout construction to communicate workforce arrangements, working hours, traffic movements, community safety measures and complaint channels. Recruitment communication will be transparent and will avoid unrealistic expectations. Local recruitment may be encouraged where skills and fair recruitment requirements can be met, without discrimination or informal fees.
- Compliance will be monitored through contractor reporting, supervision, incident reporting and audits. Non-compliance will trigger corrective actions and contractual remedies proportionate to the severity of the issue.

(xiv). Social risks and impacts: Social risks and impacts will be managed through coordinated implementation of the ESIA/ESMP, RP, EMDP, SEP, LMP, ESCP and contractor environmental and social management plans. These instruments will be updated and harmonized during Phase 2 using the finalized design, updated social assessment, verified impact data and further consultations. In the event of inconsistency, the updated Project instruments and ESCP commitments will guide implementation in accordance with the applicable Environmental and Social Standards.

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- Stakeholder engagement and disclosure: Engagement will continue throughout design, land acquisition, construction and operation. Information on design changes, land impacts, construction schedules, safety risks, entitlements, livelihood measures, employment processes and grievance channels will be disclosed early, in accessible formats and through locally appropriate channels. Feedback will be documented and used to refine mitigation measures. Phase 2 consultations will specifically address data gaps and proposed measures before the instruments are finalized.
- Ethnic minority communities: The Project will implement culturally appropriate engagement and mitigation measures through the EMDP. Where language or accessibility barriers exist, information and consultations will be adapted, including interpretation, local facilitators, suitable timing and venues, and separate discussions where appropriate. The Phase 2 social assessment will determine differentiated impacts, culturally appropriate benefits and whether any circumstances requiring FPIC under ESS7 are present. No conclusion on FPIC applicability is made at this preliminary stage.
- Women and vulnerable groups: Targeted engagement will be undertaken to enable meaningful participation by women, poor and near-poor households, persons with disabilities, older persons, landless households and other vulnerable groups identified during the social assessment. Measures may include separate consultations, accessible venues, appropriate timing, support for communication needs, tailored livelihood assistance and monitoring of access to compensation, benefits and grievance mechanisms.
- Grievance management: The Project grievance mechanism will receive and resolve community concerns related to land acquisition, construction impacts, worker conduct, safety, access, livelihoods, information disclosure and other Project matters. Multiple intake channels will be communicated locally. Complaints will be registered, acknowledged, assessed, assigned, tracked and closed with feedback to complainants. Confidential channels and referral arrangements will be maintained for sensitive complaints, including SEA/SH. Grievance trends and unresolved issues will inform corrective action and management reporting.
- Monitoring and adaptive management: Social performance will be monitored using disaggregated indicators covering consultations, land acquisition, compensation, livelihood restoration, vulnerable households, ethnic minority engagement, grievances, worker issues, incidents and contractor compliance. Phase 2 will define baselines, targets, responsibilities and reporting frequency. Where monitoring identifies unanticipated impacts or ineffective measures, the Project will update mitigation and implementation arrangements in consultation with affected stakeholders.

In addition to the mitigation measures listed below, contractors are also required to use clean water, electricity, fuel, and building materials efficiently to meet the requirements outlined in the WBG ESHG and ESS3 regarding pollution control, energy efficiency, and natural resource conservation.

The following measures will be implemented by the Contractors along with detailed mitigation measures according to each specific location of the project.

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Table 30: General Environmental and Social Impact Mitigation Measures for Construction Activities (ESCOPs)

Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
1. Dust and exhaust gas generation	**1. AVOID** - The dust and emission control plan in the Contractor's Environmental and Social Management Plan (C-ESMP) prepared by the Contractor must be approved by the Construction Supervision Consultant (CSC) before commencing construction. - The contractor is responsible for complying with Vietnam's laws related to ambient air quality. - All construction vehicles and machinery must comply with Viet Nam's regulations on the control of permissible emission limits. - Means of transport must be periodically inspected according to Circular No. 16/2021/TT-BGTVT of the Ministry of Transport on inspection of technical safety and environmental protection for road motor vehicles. - Do not burn waste or construction materials (such as wood, rubber, oily rags, cement bags, paper, plastic, asphalt, etc.) at the construction site. - Earthwork materials must be transported to nearby material gathering yards for leveling and must not be stored at the construction site. - Use of means and machinery that have been periodically inspected for quality. - The list of equipment to be put into the construction site must be submitted to the construction supervision consultant for consideration, inspection and approval before mobilization. - Construction activities are only carried out within the cleared ground. - Do not allow the machine to start when it is not in operation. - Do not overload during transportation. - The material must be transported directly to the site of use. - Material storage yards must be located far away from sensitive objects; limit overnight storage at construction sites. - For main route sections, due to upgrading on the existing roadbed, loading and	- Law on Environmental Protection No. 72/2020/QH14 - TCVN 6438-2005: Road vehicles - Limits of maximum permissible exhaust gas emissions - Circular No. 16/2021/TT-BGTVT of the Ministry of Transport: Regulations on technical safety inspection and environmental protection of road motor vehicles - QCVN 05: 2023/BTNMT: National technical regulation on ambient air quality; - WBG EHS Guidelines for Construction and Dismantling - ESS 3.	- SPMB CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	unloading and transporting materials and waste must be carried out outside peak traffic hours (from 6–8 am and 17–18 pm). **2. MITIGATE** - For residential areas, especially households located within 50 m from the source of dust, the Contractor must notify the construction plan at least one week in advance. - Construction activities must minimize dust generation and avoid complaints from the local community. The contractor must implement a Dust Control Plan to maintain a safe working environment and reduce the impact on nearby residential areas. - The contractor must take measures to reduce dust as required (e.g. spraying water on the road, covering the material storage area, etc.). - Vehicles transporting waste or bulk materials must be covered before leaving the site or material mine to prevent spillage along the transportation route. - Storage grounds for soil, rock and building materials must be protected from wind erosion; storage locations must take into account the prevailing wind direction and distance to sensitive structures. - Use a dust mask when the dust concentration exceeds the permissible limit. - Construction activities must be carried out on a rotational basis. - Clean the site before digging up new sections. - Soil compaction by pouring, compaction and watering meets technical requirements. - Fully equip workers with personal protective equipment (masks/dust masks). - Regularly clean and maintain vehicles and equipment. - Building materials such as cement, sand, and stone must be covered during transportation and storage at the construction site. - Comply with the maximum speed for vehicles transporting materials to the construction site (5 km/h in the construction site). - Cover storage areas with tarpaulin to reduce dust dispersion and ensure aesthetics.		

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	3. RESTORE These measures are remedialative, including site cleaning, responding to spills or unintended dispersal, and receiving and handling community feedback in case the above prevention and mitigation measures are not fully effective (i.e. not 100% effective). - The contractor must arrange a contact phone number at each construction site so that people can report dust-related problems, and at the same time ensure that all reports are recorded, checked and responded to within 48 hours. - Materials and waste must be neatly arranged. Workers must collect and gather construction materials and waste in the right place at the end of each day or shift. - Soil and stones spilled during transportation must be cleaned up immediately. - The construction site must be cleaned regularly every day before and after construction.		
2. Impact due to noise and vibration	**1. AVOID** The contractor is responsible for complying with Viet Nam's laws and regulations related to noise and vibration. - Means of transport must be periodically inspected according to Circular No. 16/2021/TT-BGTVT of the Ministry of Transport on inspection of technical safety and environmental protection for road motor vehicles. - Construction activities are only carried out during the day (from 6:00 to 18:00), construction is limited to night. The construction plan must be notified to the local authorities and people in the construction area. - Do not transport waste and construction materials through residential areas at night (from 21:00 to 6:00). - Choose equipment with lower noise emissions. - Limit the operating time of construction equipment or activities that generate loud noise and vibration, especially for mobile sources operating in residential areas. - Position noise sources away from more sensitive areas to take advantage of distance and shielding. - Choose worker housing away from residential areas if possible.	- Law on Environmental Protection No. 72/2020/QH14 - QCVN 26:2025/BNNMT: National technical regulation on noise - QCVN 27:2025/BNNMT: National technical regulation on vibration - Circular No. 24/2016/TTBYT stipulates national regulations on noise levels – permissible exposure levels of noise	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- Consider using natural terrain as a noise reduction buffer during the design phase. - Consider reducing the use of transportation routes of the project with large traffic flows through residential areas. **2. MITIGATE** The contractor must take measures to reduce noise, including**:** - Install the silencer for the operator. - Install the right muffler for the engine exhaust and air compressor parts. - Install soundproofing materials for noise-generating device housings. - Install a soundproof fence with no gaps and a continuous surface mass of at least 10 kg/m² to minimize sound transmission through the fence. - Arrange soundproof fences near noise sources or at affected locations to increase efficiency. - Install a vibration insulator for mechanical equipment. - Workers operating generators and other loud noise equipment (such as concrete chisels, concrete sprayers, etc.) must be fully equipped with personal protective equipment. - The local community must be fully informed of the construction plan and specific working time; at the same time, it must notify directly to each household within 100 m from the construction site. - The contractor must conduct a pre-construction structural survey of all houses, religious works and other sensitive works within 20 m from the construction area where the vibration occurs, and at the same time ensure that the survey results are documented and shared with the work owner before starting construction. **3. RESTORE** - Establish a mechanism for receiving and handling complaints. The contractor must arrange a contact phone number at each construction site so that people can report noise and vibration problems affecting daily life, and ensure that all complaints are recorded, checked and responded to within 48 hours.	in the workplace. - WBG EHS Guidelines for Construction and Dismantling.	
3. Wastewater	**1. AVOID**	- Law on	SPMB, CSC,

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
Management	- Priority is given to recruiting local workers who are able to arrange their own accommodation to minimize the amount of domestic wastewater generated in each construction area of the project. - Limit or avoid earthwork activities on rainy days to prevent surface pollutants from being washed into water sources, affecting water quality and landscape. - Do not arrange temporary storage areas for building materials on land near ponds, lakes, or canals. Materials gathering areas should be carefully covered with geotextiles or use temporary earthen barriers/sandbags if necessary to minimize mud runoff into canals and rivers. - Collect, collect and transport dredged sludge and waste generated during excavation from the construction site to storage locations agreed with local authorities. Do not temporarily store bulk construction materials, waste or concrete mixing within 50 m of rivers or other water sources. - Waste oil and grease: This is liquid hazardous waste generated from machinery operating at the construction site (trucks, excavators, bulldozers, rollers, etc.). In order to limit the generation of this type of waste and minimize the impact on the environment, the Employer will require contractors to carry out maintenance and repair work outside the construction site. **2. MITIGATE** - Wastewater from the kitchen and laundry areas at the workers' camps must be treated before being discharged into the environment through a drainage ditch system with settling pits. The drainage ditches around the camp must be dredged and cleared weekly. - Construction wastewater, car wash water, construction tool sanitation water, rainwater overflowing from construction sites and foundation pits must be settled before being discharged into the water source. - Install at least one portable toilet or build a septic toilet at each construction site with a total tank volume of about 2–3 m^3. The location of the portable toilet must ensure a distance of at least 200 m from the workers' camp.	Environmental Protection No. 72/2020/QH13; - Law on Water Resources No. 28/2023/QH15 dated 27/11/2023; - Decree No. 45/2022/ND-CP dated July 7, 2022 stipulating penalties for administrative violations in the field of environmental protection; - QCVN 08:2023/BTNMT – National technical regulation on surface water quality	IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- Sign contracts with functional units to collect, transport and treat wastewater periodically in accordance with regulations. - Cleaning the construction site, thoroughly collecting spilled materials and waste oil from equipment during construction. - Arrange drainage ditches and preliminary sedimentation pits for rainwater overflowing at construction sites; periodically dredge sedimentation pits (once a week or when necessary), ensuring that soil and waste do not flow into drainage ditches, causing blockage or local flooding. - Wastewater from car washing, cleaning of construction tools, foundation pits, etc. must be settled before being discharged into the drainage system around the project area through temporary sedimentation pits measuring 0.8 × 1 × 1 m and 1.5 × 1.5 × 1.5 m. The investor will periodically request contractors to dredge and clear the drainage ditch system and sedimentation pits. - Used or unused petroleum products must be stored on an impermeable, covered surface with a dike for control and easy collection in the event of a leak. The petroleum storage area must not be located within 25 m of the river. - Maintenance of vehicles and equipment, including oil change or grease, must only be carried out in designated areas. Trays containing rags and maintenance supplies must be used. Waste must be collected and disposed of in accordance with hazardous waste management regulations. - Car wash water at the entrance and exit of the construction site must be collected into sedimentation tanks, then led through a sand filter tank to create sediment and separate oil before being discharged into the environment. - The quality of treated wastewater must be monitored at discharge points, and the monitoring results must be communicated to local authorities and affected communities during the construction period. **3. RESTORE** - After completing the construction work, the wastewater collection tanks and septic tanks must be safely disposed of or thoroughly cleaned and cleaned.		

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- After completing the construction, sign contracts with functional units to dismantle and return the site.		
4. Solid Waste Management	**1. AVOID** - It is strictly forbidden to burn, bury or dispose of solid waste at the construction site. - In case it is not allowed to be collected, transported and disposed of off-site, solid waste or waste shall only be disposed of at locations that have been identified, approved and included in the solid waste management plan by the Construction Supervision Consultant. Under no circumstances shall contractors dispose of any materials in environmentally sensitive areas such as natural habitats or surface water sources. - Bentonite management and spill prevention: During the construction of bored piles, standard bentonite must be used to avoid the use of additional additives. Containment barriers must be arranged to prevent bentonite from leaking into the surrounding area. **2. MITIGATE** - Measures to reduce common solid waste: - Contractors must take advantage of earthwork materials for leveling or planting trees if possible. - Before construction, contractors must develop solid waste control procedures (including storage, container layout, site cleaning schedules, waste collection schedules, etc.) and strictly follow them throughout the construction process. - Before construction, contractors must have all necessary permits or approvals related to waste treatment as prescribed. - Mitigation measures must be taken to reduce the risk of indiscriminate littering and improper disposal. At all workplaces (construction sites and worker camps), contractors must arrange garbage bins, containers and waste collection equipment. - Solid waste can be temporarily stored at the construction site in an area that has been approved by the Construction Supervision Consultant and the relevant local authorities before being collected and treated by a unit with a waste collection and treatment license.	- Law on Environmental Protection No. 72/2020/QH14 - Decree 08/2022/ND-CP guiding the law on environmental protection - Decree 05/2025/ND-CP dated 06/01/2025 of the Government on amending and supplementing a number of articles of Decree 08/2022/ND-CP; - Decree 48/2026/ND-CP dated 29/01/2026; - Decree No. 45/2022/ND-CP dated July 7, 2022 stipulating penalties for administrative violations in the field of environmental protection; - Circular No. 02/2022/TT-BTNMT dated January 10,	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- Waste containers must be covered, watertight, and labeled for waste segregation. - Recyclable materials such as wood formwork, steel, scaffolding, reinforcement, material packaging, etc. must be collected and sorted separately at the construction site with other types of waste for reuse as protective or semi-recyclable materials. - Waste management in accordance with the Law on Environmental Protection 2020 and guiding documents. - Domestic solid waste: - Arrange 150–240 L capacity trash cans with lids and wheels in the worker camp area (a minimum of two bins must be arranged at each construction site), with trash cans located at the camp site and on the construction site. - Domestic solid waste must be collected at designated locations and contracted with an environmental company for collection, transportation and treatment. - Construction solid waste (waste), dredged materials, excavated soil: - Mixing of concrete must be carried out on an impervious surface; waste and wastewater containing cement must be collected through a drainage system with sedimentation pit at the construction site before being discharged into the receiving source. - Reuse topsoil, wood, and bricks for useful purposes such as leveling; wood chips can be used as fuel. Metal, steel, roofing, packaging, and other recyclable materials must be shipped to scrap procurement facilities. - Excavated land suitable for leveling, planting trees or other uses must be utilized; the remaining land must be collected, transported and used to fill low-lying areas (deep pits). Locals can be encouraged to use 100% of this land to reduce transportation costs.	2022 of the Ministry of Natural Resources and Environment - Circular No. 07/2025/TT-BTNMT dated February 28, 2025 of the Ministry of Natural Resources and Environment on amendments and supplements to a number of articles of Circular No. 02/2022/BTNMT; - Circular No. 09/2026/TT-BNNMT dated 29/01/2026 - WBG EHS Guidelines for Construction and Dismantling ESS3.	
5. Management of hazardous waste and hazardous materials	**1. AVOID** - Do not store highly volatile fuels: Gasoline must not be stored at a construction site. - Prohibited activities: It is strictly forbidden to carry out vehicle maintenance at the construction site (oil change and filter change) outside the specifically designated areas. - Eliminate Sources of Ignition: Prohibit any sources of ignition near the combustible	- Law on Environmental Protection No. 72/2020/QH14 - Decree 08/2022/ND-CP guiding the law on	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	material tank area. - Prevention of chemical reactions: Do not reuse containers for different products without testing for material compatibility. Incompatible materials (acids, bases, flammables, oxidizers) must be stored in strictly segregated areas. - Reduce waste at source: Return unused or discarded asphalt/bitumen products directly to the supplier's manufacturing plant. **2. MITIGATE** - Safe storage infrastructure: Store hazardous waste (waste oil, batteries, etc.) in compatible, dedicated and appropriately labelled containers (e.g. 500 L capacity). The storage area must be covered, waterproof concrete, surrounded by dikes/drains, adequately ventilated and located away from water sources. - Safe transfer and transport techniques: Use specialized connectors, pipes, and transport equipment. Equip tanks with automatic shut-off valves, float valves, and internal volumetric meters to prevent overfilling. Pump fuel at a level below maximum capacity. - Secondary Storage Tank Controls: Arrange secondary storage tanks, catch trays, or other spill controls at all connection points and locations at risk of leaks. - Fire Control: Installation of fire alarm systems, fire extinguishers, and lightning protection/grounding systems for tanks and transfer stations. - Process control and monitoring: Implement written procedures for transshipment activities. Perform weekly reports, inventory, and periodic inspections/maintenance of pipes and equipment. Ensure waste containers are securely sealed and have adequate transportation documentation. - Training and public awareness: Provide specialized safety training for workers on chemical hazards and operational procedures. Inform potentially affected communities about safety measures in place, potential risks, and emergency response actions. **3. RESTORE** - Immediate Response to Spills: In the event of a spill (e.g., diesel), the injury must	environmental protection - Decree 48/2026/ND-CP dated 29/01/2026; - Decree No. 45/2022/ND-CP dated July 7, 2022 stipulating penalties for administrative violations in the field of environmental protection; - Circular No. 02/2022/TT-BTNMT dated January 10, 2022 of the Ministry of Natural Resources and Environment - Circular No. 09/2026/TT-BNNMT dated 29/01/2026 - WBG EHS Guidelines for Construction and Dismantling ESS3.	

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	be immediately checked, the parties involved (Contractor, CSC, SPMB) must be immediately checked, and trained personnel along with personal protective equipment (PPE) must be mobilized to implement the remediation plan. - Perform spill treatment: Use sawdust for small spills or sandbags for large spills. Use a shovel to dig up and remove contaminated topsoil if the incident occurs on bare ground. - Professional treatment and disposal: Sign contracts with units with appropriate licenses and certifications to collect, transport and treat hazardous waste, waste oil/grease and materials arising from spill treatment at approved facilities. After completion of construction, temporary hazardous waste storage areas must be dismantled and treated appropriately. Incident and Compliance Report: Prepare a formal incident report, which details the spill, remedial measures taken, contamination issues, and future precautions. This report must be submitted to the provincial Department of Agriculture and Environment and stored in the project file.		
6. Impact on surface and groundwater quality	**1. AVOID** - Avoid carrying out earthwork activities during rainy periods. - Petroleum storage areas must not be located within 25 m of rivers/canals/streams. - Do not perform maintenance on vehicles and equipment, including oil changes and grease, at the construction site. - Make sure not to allow chemicals, fuels, oils, or grease to leak into the soil, drainage system, or water source. **2. MITIGATE** - Monitoring water quality at receiving sources (canals, rivers) located adjacent to construction sites. - Used or unused petroleum products must be stored on impermeable, covered surfaces and embankments for control and easy collection in the event of a leak. Access to these temporary storage areas is permitted only by authorized personnel. - Concrete mixing must be carried out on an impervious surface, at least 20 m away	- Law on Environmental Protection No. 72/2020/QH14 - QCVN 14:2025/BNNMT: National technical regulations on domestic wastewater and wastewater in urban and concentrated residential areas; - QCVN 40: 2025/ BNNMT: National technical regulation	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	from the water source. Waste and wastewater containing cement must be collected through a drainage system with a sedimentation pit at the construction site before being discharged into the receiving source. - Maintenance of vehicles and equipment, including oil changes and grease, must only be carried out in designated areas. Trays containing rags and maintenance supplies must be used. Waste must be collected and disposed of in accordance with hazardous waste management regulations. - Arrange portable toilets for workers at the construction site. - Collect, collect and transport materials and waste generated during excavation from the construction site to approved disposal sites as soon as possible.	on industrial wastewater - Decree 08/2022/ND-CP guiding the law on environmental protection - Decree 48/2026/ND-CP dated 29/01/2026; - Circular No. 02/2022/TT-BTNMT dated January 10, 2022 of the Ministry of Natural Resources and Environment; - Circular No. 09/2026/TT-BNNMT dated 29/01/2026 - WBG EHS Guidelines for Construction and Dismantling ESS3.	
7. Impacts on agricultural production activities (industrial trees, production forests)	**1. AVOID:** - Continue to optimize the position of tower foundations, access roads and construction sites to minimize the recovery or occupation of agricultural land, especially land for perennial crops, industrial trees and production forests; prioritize the use of existing roads and production roads. - Clearly mark the scope of construction and do not allow the Contractor to expand beyond the handed over boundary. - Make a construction plan in accordance with the season, prioritize post-harvest construction when feasible and notify in advance so that people can actively harvest	- Law on Environmental Protection No. 72/2020/QH14 - WBG EHS Guidelines for Construction and Dismantling ESS3.	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	and organize production. **2. MITIGATE:** - Limit machinery, vehicles and construction activities within the permitted scope; minimize the area and time of temporary occupation. - Cut and prune trees only within the scope really necessary for construction and ensure line safety; apply appropriate rope pulling plans to limit damage to coffee, rubber, pepper, cashew, fruit trees and planted forests. - Do not accumulate excavated soil, materials or waste on cultivated land; maintain production roads, irrigation ditches and drainage. - Fully compensate for land, crops and construction damages; support the restoration of livelihoods for significantly affected households and maintain a complaint settlement mechanism (GRM) to promptly handle damages incurred. **3. REMEDIATION:** - Immediately after completing the construction at each location, collect materials, level and return the site; restore the topsoil, production roads, irrigation ditches, drainage and temporarily affected land areas so that people can soon continue farming. - Additional compensation for unexpected damages caused by construction; monitor the restoration of production and livelihoods of significantly affected households, and provide additional support when necessary.		
8. Traffic safety risks	**1. AVOID** - Avoid transporting construction materials during peak hours. - Avoid stopping and parking vehicles on the road for an unnecessary long time. - Avoid encroaching on construction machinery and construction materials on the heart and curb. - Route planning, especially for heavy trucks/equipment, must consider construction sites located near sensitive structures such as schools, hospitals, and markets. - Limit the use of car horns; do not dump garbage or wastewater into existing residential areas.	- Law on Road Traffic Order and Safety No. 36/2024/QH1; - WBG EHS Guidelines for Construction and Dismantling	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	2. MITIGATE - Planning and compliance: - Prepare and implement a Traffic Management Plan (TMP) as part of the Contractor's Environmental and Social Management Plan (C-ESMP). - Any significant increase in vehicle turns must be included in the previously approved construction plan. - Comply with traffic laws when traveling on the road. Only use vehicles with valid inspection certificates. Perform periodic maintenance of vehicles to ensure compliance with the State's emission standards. - Site Controls & Infrastructure: - Install and maintain a system of traffic signs, barriers, safety warning signs and signal lights to ensure the safety of people and vehicles during construction. - Install speed limit signs within 200 m from the construction site. - Ensure lighting for all construction sites at night and install lighting systems along transport routes if necessary to ensure traffic safety. - Sanitize the transport vehicle before leaving the construction site. - Loading and unloading materials in an orderly, organized manner and in accordance with the construction plan. - Water the road to reduce dust; limit the speed of the truck. - Arrange personnel to regulate traffic during the transportation of materials and waste. **3. RESTORE** - Repair the road surface if it is damaged during construction. Collect soil and spilled materials daily at the construction site to avoid slippery vehicles. Clean up any waste or materials spilled on roads.		
9. Control of influences on cultural works	**1. AVOID** - Immediately stop construction activities in the detection area. - If the discovery area includes cultural and/or high-value relics, and is recommended for conservation by experts, and required by the cultural/historical management	- Law on Cultural Heritage No. 45/2024/QH15; - ESS8	SPMB, CSC, IESMC, local communities and local

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	agency, the Project Owner must adjust the design as necessary to meet the conservation requirements. - It is only allowed to resume construction activities in the area after the approval of the local authority and the relevant SPMB for the protection of such heritage has been obtained. **2. MITIGATE** - Ensure that the notification process in the event of the discovery of relics includes direct contact with the commune-level People's Committee and the provincial Department of Culture within 24 hours; this obligation is included in the construction contract as a binding clause. - Provides an initial description of the area or location discovered. - Zoning and protection of the detection area. In case of detection including removable relics or sensitive remains, night guards must be arranged until the local authorities, the Department of Culture, Sports and Tourism or the Institute of Archaeology receive and handle them. - Notify the construction supervision consultant, which must immediately notify the Investor, local authorities and the Institute of Archaeology (within 24 hours or earlier). **3. RESTORE** - The local authority is responsible for the protection and preservation of the discovery area before deciding on appropriate further disposal procedures. In some cases, the Institute of Archaeology may be required to carry out a preliminary assessment of the finds. The importance and value of the finds will be assessed according to various criteria related to cultural heritage, including aesthetic, historical, scientific/research, social and economic value. - Decisions on handling plans for findings issued by the competent authority. These decisions may include adjustments to the layout design (e.g., in the case of discovery of immovable or archaeologically valuable cultural relics), conservation, preservation, restoration, and excavation. - The implementation of decisions of competent agencies related to the management		governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	of findings must be notified in writing by the concerned local agencies.		
10. Environmental risks	***a. Occupational accidents, electricity and lightning strikes*** - Do not use explosive solutions in construction; give priority to manual and mechanized measures in accordance with field conditions. - Do not work at height when it is about to get dark, fog, rain, thunderstorm or lightning; do not arrange people under the crane's operating range and areas where there is a risk of falling objects. - Ensure a safe distance from the live line when hoisting, installing and operating vehicles and equipment; install warning/prohibition signs at necessary locations. - Before de-energizing the power grid or equipment, stop all related work and remove people from the danger area; operate only when people are already in a safe position. - Do not use tools, equipment or vehicles that do not meet safety requirements; people working at height must be healthy enough and use appropriate fall protection equipment. - Remove victims from the danger zone when it is safe to do so; provide first aid and transfer to appropriate medical facilities; notify the Site Steering Board, the contractor and the project owner. - Inspect, repair or replace damaged equipment, structures and electrical systems; Resume construction/operation only after confirmation of safety conditions. - Record and investigate the cause of the incident/near-miss to update construction measures, safety instructions, and training to prevent recurrence. ***b. Fires and wildfires*** - At the route through the forest, do not use mines/explosives; absolutely do not burn vegetation, dry branches or garbage at the site, especially in the dry season. - Do not set up tents and do not organize cooking in the construction area in the forest or near the edge of the forest; it is strictly forbidden to light fires and smoke in areas at risk of fire. - For welding/cutting work at tower foundations in forests, clear the combustible	- Law on Environmental Protection No. 72/2020/QH14 - Labor Law No. 45/2019/QH14 dated November 20, 2019 - Law on Natural Disaster Prevention and Control No. 21/VBHN-VPQH dated 02/08/2023 - WBG EHS Guidelines for Construction and Dismantling	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	materials within a radius of at least 10–15 m, arrange fire-retardant tarpaulins and fire-fighting equipment on site. - Manage post-lsite clearance vegetation by collecting and transporting it outside the forest boundary or disposing of it at a prescribed place; do not allow the accumulation of combustible materials around the construction area. - Coordinate in advance with forest owners, forest rangers and commune-level People's Committees; establish contact points before implementing construction in forest areas. - Equip sand, fire extinguishers, shovels, knives, water bottles, pumps and appropriate fire fighting equipment; post firefighting rules and criteria. - Generators and construction machinery in forest areas must have solutions to limit sparks at exhaust pipes; hang signs "No fire"/"Beware of forest fires" at construction locations. - When detecting a fire: alarm, disconnect the power supply, relocate flammable fuels/supplies, extinguish the fire initially and zone the fire prevention zone; immediately notify the local forces and fire protection. - For forest fires, coordinate with forest rangers, forest owners and local authorities; clearly provide the location, scale, wind direction and access route for the firefighting force. - After complete extinguishing, check for the risk of smoldering fire/re-fire; clean up the combustible materials and restore safe conditions at the construction area. - Coordinate with forest owners, forest rangers and local administrations in assessing the area and extent of damage and carry out environmental restoration after fire according to applicable requirements. - Repair/replace damaged equipment and works; review the effectiveness of rescue and supplement means/processes if deficiencies are detected. ***c. Oil spills, hazardous waste, and spilled materials*** - Check the condition of the machinery before putting it on the construction site; do not use equipment that shows signs of oil and fuel leakage or does not ensure technical safety.		

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- Perform controlled maintenance/refueling, use anti-spill trays; manage waste oil, rags and oily packaging according to hazardous waste management requirements. - Transporting soil, sand and construction materials with shielding; controlling and cleaning up spilled materials and metal scrap at the scene. - Equipped with an oil spill response kit at the scene including oil-absorbent materials, collection tools and hazardous waste containers. - When a leak is detected: immediately stop the engine/spill source; use a crank buoy or soil bank to isolate; use permeable/adsorption materials and collect oil-contaminated soil and rock into a suitable container. - Tension the warning wire, control the fire source in the incident area, and arrange a fire extinguisher at the ready. - If oil spills into rivers/streams or spreads to people's land, immediately notify local authorities to coordinate control and assessment of impacts. - Completely collect adsorbent materials, soil/rock and oil-contaminated waste, store and transfer for treatment according to hazardous waste management requirements. - Clean the oil-contaminated area and monitor the current situation after treatment; in case of affecting rivers/streams, water sources or productive land, it is necessary to assess the scope of impact to determine appropriate remedial measures. - When the incident affects crops, water sources or people's property, coordinate with local authorities to verify the damage and provide compensation/support according to the applicable mechanism of the Project. ***d. Landslides and erosion caused by natural disasters or flash floods*** - Fully survey the terrain and geology along the route before designing and constructing the tower foundation. - In sloping terrain of 15–35°, arrange an embankment to protect the foundation and drainage system appropriately to prevent the concentration of erosion flows into the ground/undergrowth.		

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- In weak geological locations, use foundation solutions with appropriate load-bearing capacity, such as pile foundations according to design; construct foundations in accordance with technical regulations. - When there are signs of landslides, stop work, zone dangerous areas and evacuate people from areas at risk of continuing to slide. - Mobilize emergency reinforcement materials such as gabions, sacks, tarpaulins, steel piles and motorized equipment to temporarily stabilize the scene. - Arrange warnings, checkpoints and when necessary, coordinate with local authorities to relocate people in downstream areas at risk of being affected. - Clearing landslides, restoring access and stabilizing slopes/foundations; repairing drainage systems, embankments and damaged items. - Restoration of land/paddy areas or adjacent structures affected by erosion flows, landslides, or rescue/remedial construction activities. - Review geological conditions, drainage and design/construction solutions before continuing work at the location of the incident. **Disaster Response:** - Each construction site needs to identify risks that are common in its geographic area, including whether the area has a history of major hurricanes or flooding. - The contractor shall ensure that emergency response plans are shared with the commune-level People's Committee and the community head prior to the commencement of construction, and that the community is informed of evacuation procedures appropriate to their area. Organize at least one community communication session for each project area to explain the disaster risks associated with construction activities and the measures taken to protect the people. - Contractors should communicate and consult with local communities and then develop an emergency response plan to help mitigate the risks associated with these threats. - Site managers must ensure that all team members are adequately trained on the actions required in the event of a natural disaster.		

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- The investor will develop an emergency response plan to minimize environmental impacts and damage to assets and buildings in extreme natural disaster conditions (storms, floods).		
11.Occupational Safety and Health (OHS)	**1. AVOID** - Selection of primary suppliers. When sourcing construction materials from primary suppliers, contractors will require those suppliers to identify the risk of child labor/forced labor and the risk of unsafety during the production of construction materials. SPMB and construction supervision consultants will review and approve the purchase of primary materials from suppliers after identifying/assessing such risk and any other relevant due diligence (such as reviewing material extraction permits). Contractors will be required to include specific requirements for child labor/forced labor and occupational safety issues in all purchase orders and purchase contracts with key suppliers. - Heavy manual labor: Plan the layout of the construction site to minimize the need for manual loading and unloading of heavy objects. - Slipping, tripping, and falling: Limit the creation of slopes and deep pits at the construction site. - Confined spaces: Avoid prolonged operation of fuel-burning appliances in enclosed spaces. - Electrical safety: Establish "no-access zones" around or below high-voltage power lines. Identify and mark underground infrastructure structures prior to excavation. - Eye Hazard: Provide additional protection or restrict access in areas where there is a risk of impacting workers or passers-by. - Thermal stress (working temperature): Monitor the weather forecast in extreme conditions and adjust the work schedule accordingly. Avoid alcohol use. - Fire and explosion: Store flammable materials away from sources of fire and oxidizing materials. Storage areas must be located away from residential areas and shacks. Identify and label fire and explosion risk areas with appropriate restrictions (e.g., smoking ban, cell phone use). - Corrosive, Oxidizing and Reactive Chemicals: Store separately from flammable	- Labor Code No. 45/2019/QH14 dated 20/11/2019 - Decree No. 144/2021/ND-CP on administrative sanctions in the field of security, social order and safety; prevention and control of social evils, fire prevention and fighting; rescue and rescue; prevention and control of domestic violence; - Circular No. 16/2021/TT-BXD dated December 20, 2021 of the Ministry of Construction promulgating QCVN18:2021/BXD: National technical regulation on safety in construction - WBG EHS Guidelines for	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	materials and incompatible substances, in a well-ventilated area and in suitable containers to prevent mixing when a leak occurs. **2. MITIGATE** **Apply the project's Labor Management Plan (LMP).** **OHS Planning & General Regulations:** - The Contractor must prepare an Occupational Health and Safety Management Plan as part of the Contractor's Environmental and Social Management Plan (C-ESMP). - Equip personal protective equipment (PPE): Use PPE in cases where hazards cannot be eliminated or cannot be adequately mitigated. Identify and provide appropriate PPE. Store PPE properly, sanitize when contaminated, and replace when damaged. The use of PPE should be included in routine training. - Structural collapse risk: Assess the condition of neighboring buildings in each construction area to prevent the risk of collapse. Ensure that all lifting, supporting and transporting systems are stable and safe and must be approved by the Construction Supervision Consultant (CSC) and SPMB before use. **Ergonomics, slip/fall hazard and falling objects**: - Heavy manual labor: Train workers in lifting, carrying, and transporting materials during the construction and dismantling phases, including the provision of weight limits on which motorized support or multiple people must be performed together. Provide occupational safety training to workers. Apply administrative controls in the work process such as job rotations and breaks. - Slips, trips, and falls: Provide adequate personal protective equipment (PPE). Regularly clean and clean up spilled garbage and liquids. Identify and mark electrical cables and cables/zippers in common areas and walkways. Use non-slip shoes. - Working at height: Install guardrails or barriers that are capable of bearing loads, or use safety belts when working at a height of 2 meters or more, or at any height where there is a risk of falling onto operating machinery, water or other liquids, hazardous substances, or through openings in work surfaces. Install warning signs and safety monitoring systems to warn workers of the risk of falls or deep holes, and ensure to	Construction and Dismantling - ESS2. -	

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	shield, mark, and warn openings in floors, roofs, or dug pits along walkways. - Risk of falling/impacting objects: Limit the speed of movement on the construction site. Provide adequate PPE such as goggles with side shields, face shields, helmets, and safety shoes. **Machinery, electricity and specialized operations:** - Moving machinery: Plan and manage the flow of traffic, set speed limits, and arrange trained personnel, wearing reflective clothing to regulate traffic. Use lifting equipment that has been inspected, fully maintained, and suitable for the load. - Confined spaces: Before entering the workforce, ensure workers are adequately trained in risk control in confined spaces, check air quality, use PPE, and have rescue plans and equipment in place. Apply safety measures such as ventilation. - Electrical Safety: Mark all equipment and power lines that are in power with warning signs. Inspect all cords, cables, and hand tools for damage and follow the manufacturer's recommendations for voltage limits. Insulate/ground all electrical equipment used in wet conditions and use an aptomat to prevent electrical leakage. Protect electrical cables from damage by shielding or hanging high over areas with vehicle traffic. Clearly label areas with high voltages ("electrical hazards"). - Eye & Welding Hazards: Use of mechanical shielding equipment, splash shields, and eye/face protection such as safety glasses, goggles, or face shields. Apply Safe Operating Procedures (SOPs) for grinding, sanding, or working with liquid chemicals. Periodically inspect protective equipment before use. Provide outerwear for workers who use proximity glasses. Appropriate eye protection such as welding glasses or full face shields for all personnel involved in welding work. Implement fire protection measures, including equipping fire extinguishers and training. **Harmful environmental and chemical factors:** - Heat Shock: Adjust the work/rest cycle. Provide a temporary rest area. Equip appropriate protective clothing. Provide adequate drinking water or electrolyte water. - Fire: The storage area must have natural ventilation or passive ventilation at floor and ceiling locations, and use spark-proof equipment. Organize training on		

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	flammable material handling and fire prevention/fighting. - Corrosive, oxidizing and reactive chemicals: Workers working with these chemicals must be specially trained and fully equipped with appropriate personal protective equipment (gloves, aprons, protective clothing, face shields, goggles). **3. RESTORE** **Rescue in confined spaces**: - Arrange an approach for rescue work when possible. The area near the entrance to the confined space must have sufficient space for rescue and emergency response operations. Safety measures must include independent breathing apparatus, seat belts/lifelines, and personnel on duty outside the confined space area with adequate rescue and first aid equipment ready. **Chemical and Fire** Incidents: - Ensure adequate first aid facilities, including eyewash and emergency shower equipment located near the work area. Storage areas (flammable materials) must be equipped with fire protection equipment. **Compensation for** damages: - Establish a basis for making compensation in the event of damage (related to the risk of structural unsafety). **Report a problem**: - The Contractor shall immediately notify the SPMB and CSC of any complaints, incidents, or accidents that have occurred or are likely to have a significant negative impact on the environment, the affected community, the public, the Employer's personnel, or the Contractor's personnel, including but not limited to: + Any incident that causes death or serious injury; + Significant damage to private property; + Severe environmental impacts (air, soil, water); Any allegations related to Sexual Exploitation, Abuse and Harassment (SEA/SH). **Remediation Process**. If child labor/forced labor and/or serious safety incidents involving key supply workers are found in the Project, SPMB and construction supervision consultants will require the contractor to require their key suppliers to take		

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	appropriate steps to remedy them. Such mitigation measures will be monitored periodically to determine their effectiveness. When mitigation measures are found to be ineffective, SPMB will replace the main suppliers of the project with suppliers who can demonstrate that they are meeting the relevant requirements.		
12. Public Health and Safety	**1. AVOID** - Avoid standing water and stagnant puddles. - Prevent the development of larvae and adult flies by improving sanitary conditions and eliminating breeding areas near residential areas. - Coordinate with public health officials to assist in the elimination of pathogen reservoirs. **2. MITIGATE** **Site hazards & traffic safety:** - The project must implement risk management strategies to protect the community from physical, chemical, and other hazards associated with construction sites. - Site access restriction measures such as barriers, signage and fencing must be installed at all sites prior to commencement, and the adequacy of these measures must be checked and confirmed by the Construction Supervision Consultant (CSC) at the time of mobilization. - Ensure public health and safety information sessions—including site hazards, emergency contact numbers, and complaint resolution mechanisms—are held in each affected commune prior to the start of construction, focusing on households within 100 meters of the construction site. - The rate of traffic accidents involving project vehicles during the construction phase must be reduced through a combination of training, awareness raising and implementation of the procedures described in the traffic safety management section mentioned above. **Surveillance and preparation for epidemic prevention:** - Implement active surveillance and health screening for employees.	- Law on People's Health Protection No. 21-LCT/HDNN8 - Decree No. 144/2021/ND-CP on administrative sanctions in the field of security, social order and safety; prevention and control of social evils, fire prevention and fighting; rescue and rescue; prevention and control of domestic violence. - WBG EHS Guidelines for Construction and Dismantling - Guidance of the Ministry of Health. ESS4.	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- Organize periodic health check-ups. - Monitor the community during high-risk seasons to detect cases. - Prepare emergency response plans for outbreaks with high risk of spreading. **Prevention and control:** - Implement vaccination programs for workers and in local communities to improve health and prevent infection. - Use prophylactic drugs for workers who are not immune. - Use insect repellents, protective clothing, mosquito nets, and other protective measures to prevent mosquito and insect bites. - Consider the use of pesticides; follow safety guidelines for the storage, transportation, and distribution of pesticides to minimize misuse, leakage, and unintended exposure to humans. **Raise awareness and education:** - Prevent disease transmission between workers and in local communities through health awareness and education programs. - Provide communication information about risks, precautions, and available treatments to officers, employees, and workers. **3. RESTORE** - Provide aggressive treatment to workers. - Ensure that workers have access to medical treatment services, information security and appropriate care, especially for migrant workers. - Monitor and treat endemic and migrant populations to prevent the spread of pathogen reservoirs. - Treating cases detected in the community during high-risk seasons. - Strictly follow the guidelines of the Ministry of Health during outbreaks.		
13. Labor Influx Management	**1. AVOID** - The minimum age of employees who are eligible to work is 18 years old. - Contractors may not use child labor or forced labor, including any work or services	- Labor Law No. 45/2019/QH14 dated November 20, 2019	SPMB, CSC, IESMC, local communities and

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	that are not performed on a voluntary basis but are required to be performed under the threat of force or punishment, nor include any form of compulsory or involuntary labor such as forced contract labor, debt repayment labor, or similar forms of labor. - To prevent the use of underage workers, all contracts must include provisions confirming the age of workers, including penalties for non-compliance. Contractors must maintain a list of contractual workers with their ages. - Contractors must ensure that there is no act of retaliation or discrimination against the complainant. 2. **MITIGATE** - Apply the project's Labor Management Plan (LMP). - Contractors must comply with the Labor Code No. 45/2019/QH14 dated November 20, 2019. - Contractors must inform workers of their rights in accordance with labor laws. Contractors must clearly explain their rights and obligations to all workers and respect the agreed terms. - Contractors must provide reasonable working conditions and recruitment conditions, at a minimum in compliance with the provisions of labor law. - The employee's representative must have access to the Management Board. - Trade unions are expected to represent the workforce to ensure fairness. - Contractors must establish a transparent process so that workers can voice their opinions and submit complaints, including anonymous complaints. - Any complaint settlement mechanism must not replace other channels in accordance with the law or collective labor agreements. - The recruitment of workers for the project must be based on the principles of gender equality and non-discrimination in recruitment, working conditions (including jobs, wages and benefits), termination of employment contracts and access to training courses. - To address the risk of vulnerable groups (such as women and people with disabilities) being excluded from employment opportunities, contractors are required to recruit these groups into unskilled labor positions.	- Decree No. 145/2020/ND-CP dated December 14, 2020 of the Government detailing and guiding the implementation of a number of articles of the Labor Code No. 45/2019/QH14 - ESS2.	local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- Contractors must comply with gender equality requirements in the workplace, including adequate and appropriate maternity and childcare leave; toilets must be arranged separately according to gender. - Contractors must also address potential risks of sexual exploitation or harassment in the process of recruiting or employing skilled female workers or unskilled workers for the project. - Ensure that workers' grievances are operational and accessible from the first day of mobilization, including those who may be reluctant to lodge a complaint through formal channels. Confirm that all workers — including subcontractors and seasonal workers recruited locally — receive initial training in the Code of Conduct, grievance resolution mechanisms, and their rights under Vietnamese labor laws within 48 hours of commencement of employment. Establish a confidential reporting channel—separate from the general grievance resolution mechanism—dedicated to reports related to sexual exploitation, abuse and harassment (SEAH), ensuring that workers and the community are accessible. Confirm that female workers are represented in worker consultation processes and that gender-aggregated employment data is collected, reported monthly to the Construction Supervision Consultant (CSC). **3. RESTORE** - Take actions to address issues, compensate for violations, and restore a fair work environment once complaints or violations have been identified. - Management must handle complaints seriously and take timely and appropriate measures.		
14. Social risks & Impacts	**1. AVOID** - Limit construction activities at night. - Recruitment must be based on the principle of gender equality and non-discrimination in all aspects related to employment, recruitment, working conditions (including work, wages and benefits), termination of employment contracts and access to training. - Contractors must also address potential risks of sexual abuse or harassment in the	- Law on Environmental Protection No. 72/2020/QH14 - Labor Code No. 45/2019/QH14 dated November 20, 2019	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	process of recruiting or retaining skilled female workers or unskilled workers for the project. **2. MITIGATE** - Community Consultation & Disclosure (ESS10): - Ensure 2 weeks' notice to the community before commencement through multiple channels – including the commune loudspeaker system, written notices to household heads, and coordination with commune-level People's Committees. Notification documents are prepared in simple language that is easy to understand for illiterate people. - Organize at least one community information meeting in each affected commune prior to the start of construction and be confirmed by a consultation record. - Vulnerable households – including women-headed households, elderly people living alone and people with disabilities – must be identified in each project commune and directly informed of impactful construction activities. - If overnight construction or service interruptions (electricity, water supply, etc.) are unavoidable, the community must be notified at least 2 days in advance and reminded 1 day prior to implementation. - Organizing training to raise awareness of road participation among local people to reduce risks and accidents. - Ensure the dissemination of information that takes into account the needs of ethnic minorities, including the timing of festival-related works, appropriate language materials, etc. (refer to the project's Ethnic Minority Development Plan). - Labor Migration & Worker Management Stream (ESS2 & ESS4): - Implement the project's Labor Management Plan (LMP). - Register with the local authorities a list of workers temporarily residing in tents or rented houses. - Develop a Code of Conduct and require employees to comply by signing a commitment between the contractor and the employee.	- Decree No. 144/2021/ND-CP on sanctioning administrative violations in the fields of security, social order and safety; prevention and control of social evils; fire prevention and fighting; rescue and rescue; and prevention and control of domestic violence - Worker Housing Standards: Processes and Standards (IFC and EBRD)	

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- Employ local workers for simple jobs. Organize environmental, safety and health training for workers before job placement. Migrant workers must be introduced to local customs, practices and lifestyles to avoid conflict with the community. - Ensuring that training on Gender-Based Violence (GBV) prevention for workers is mandatory, documented and repeated at least quarterly throughout the construction period – not just in the early stages. **Gender Equality & Vulnerable Groups:** - To reduce the risk of excluding vulnerable groups (such as women and people with disabilities) from employment opportunities, contractors must recruit these groups into the general workforce. - Contractors must comply with national legislation on gender equality in the workplace, including adequate and appropriate maternity and breastfeeding leave; and toilets and restrooms must be arranged separately for men and women. - Prioritize the recruitment of local workers. - Ensure that labor recruitment is carried out in accordance with current regulations.		
15. Communication to the local community	**1. AVOID** - Contractors must coordinate with local authorities (commune/ward leaders, village heads) to agree on construction schedules and plans in sensitive areas or during sensitive times (e.g. religious festivals). **2. MITIGATE** - Ensure communication and consultation activities comply with the principles of the project's Stakeholder Consultation Plan. **Disclosure of Information &** Documentation: - Vietnamese copies of the Environmental Code of Practice (ESCOPs) and other relevant safety and environmental documents must be made available to the local community and workers at the construction site. - Ensure the dissemination of information that takes into account the needs of ethnic minorities, including the timing of construction related to festivals, appropriate language documentation, etc. (refer to the project's Ethnic Minority Development	- Law on Environmental Protection No. 72/2020/QH14 - Decree No. 144/2021/ND-CP on administrative sanctions in the field of security, social order and safety; prevention and control of social evils, fire prevention and fighting; rescue and rescue; prevention	SPMB, CSC, IESMC, local communities and local governments.

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	Plan). - Provide technical documents and drawings to the community-level People's Committees, especially site layout drawings and area-specific Environmental and Social Management Plans (ESMP). - Notice boards must be installed at all construction sites to provide information about site managers, environmental officers, safety and protection officers, contact phone numbers and other relevant information, including details of the complaint resolution mechanism (GRM). These noticeboards must be maintained throughout the construction period with up-to-date contact information, and must be updated when there is a change in site managers or safety officers. - The information provided to the community includes technical and monitoring results translated into Vietnamese (due to the absence of ethnic minority households among the people affected by the project) and provided in appropriate and accessible forms for illiterate people. - Provide information to the community about the complaint resolution mechanism (GRM), including contact information and how to submit comments, questions, or complaints. **Community Consultations & Meetings:** - Maintain open channels of communication with local authorities and affected communities. - Ensure that pre-commencement community meetings are fully documented, including attendee lists, meeting minutes, and recording of questions and answers; all of these documents must be provided to the World Bank. - Hold periodic community information sessions (follow-up) at least every 6 months throughout the construction phase to update the affected community on progress, upcoming activities, and any changes to the schedule or scope of construction that may affect them. - Inform locals of construction plans, work schedules, service disruptions, bypass routes, temporary bus routes, as well as blasting and demolition activities as appropriate.	and control of domestic violence	

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Environmental-social issues	Mitigation measures	Applicable Standards, Regulations and Guidelines	Supervisory unit
	- Monitor the concerns and requests for information from the community during the implementation of the project. **3. RESTORE** - Respond to requests and complaints by phone and text in a timely and appropriate manner. - Ensure complaints are documented and reported as part of the project's periodic reports.		

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Worker Code of Conduct:

The Code of Conduct, which forms part of the Labour Management Plan (LMP) and is detailed below, is one of the measures aimed at addressing the environmental and social risks associated with the Work Items. As stated in the LMP, this Code applies to all officers, workers and other personnel working at the Work Item site or at other locations where the Work Item is performed. The Code also applies to the personnel of each subcontractor and any other personnel involved in supporting the implementation of the Work Items. All of the above-mentioned subjects are collectively referred to as "Contractor Personnel" and are subject to this Code of Conduct. The Code of Conduct for Workers includes but is not limited to the following measures:

The Contractor's personnel must:

- Perform their duties competently and conscientiously;
- Comply with this Code of Conduct, all applicable legal regulations and other relevant requirements, including requirements for the protection of the health, safety and welfare of other Contractor Personnel and any other individuals;
- Maintain a safe working environment, including:
  + Ensure that the workplace, machinery, equipment and processes under the control of each individual are safe and do not pose a health risk;
  + Fully use personal protective equipment as prescribed;
  + Apply appropriate measures to chemical, physical and biological substances and agents;
  + Comply with applicable emergency response procedures;
- Report work situations that they believe are unsafe or unhealthy, and leave a work situation where they have reasonable grounds to believe there is a serious and immediate risk to their life or health;
- Treat others with respect and do not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
- Do not commit Sexual Harassment, including unwanted sexual outreach, requests for sexual intercourse, and verbal or physical acts of a sexual nature towards Contractor or Employer Personnel;
- Do not commit Sexual Exploitation, including any abuse or intentional abuse of vulnerable position, power disparity, or trust for sexual purposes, including but not limited to financial, social, or political gain from the sexual exploitation of others;
- Do not commit Sexual Abuse, including physical penetration of a sexual nature, whether by force or under unequal or coercive conditions;
- Do not engage in any sexual activity with a person under the age of 18, except in the case of a pre-existing marriage;
- Participate in training courses related to the environmental and social aspects of the Contract, including health and safety issues, Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH);
- Reporting violations of this Code of Conduct;
- Do not retaliate against any individual who reports a violation of the Code of Conduct, whether to the Employer or through the Contractor Personnel complaint mechanism or the project's Complaint Resolution Mechanism.

The following activities are strictly prohibited at the construction site or project vicinity:

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- Cutting down trees for any reason outside of the approved construction range;
- Hunting, fishing, catching wildlife, or gathering plants;
- Purchase of wild animals for food;
- Use of non-approved toxic materials, including lead-based paints, asbestos, etc.;
- Affect objects of architectural or historical value;
- Lighting a fire;
- Use of weapons (except for licensed security forces);
- Alcohol use during working hours;
- Gambling is strictly prohibited;
- Washing vehicles or machinery in rivers, streams, canals;
- Perform maintenance (oil change, filtering) of vehicles and equipment outside the permitted area;
- Littering in areas that are not allowed;
- Unsafe driving on local roads;
- Keeping wild animals (especially birds) in enclosures;
- Work without the use of safety equipment (including boots and helmets);
- Causing nuisance and affecting the surrounding community;
- Using rivers and streams for laundry;
- Disposal of domestic waste, construction waste or indiscriminate waste;
- Disposing of garbage in the wrong place;
- Leakage and spillage of contaminants such as petroleum products;
- Collecting firewood;
- Illegal hunting in any form;
- Fishing with explosives and chemicals;
- Make toilets outside the designated area;
- Incineration of waste and/or luminescent vegetation.

Any construction worker, office worker, Contractor employee, or any other person involved in the project who is found to be in violation of the prohibition provisions will be subject to disciplinary measures that can range from a simple reprimand to termination of their work depending on the severity of the violation.

6.1.3.2. Specific impact mitigation measures

1. Measures to minimize impacts on biodiversity and ecosystem services

1.a. Site clearance and construction phase:

a1. Loss of vegetation and habitat due to the clearing of the safety corridor (ROW)

Cutting down trees and clearing will cause economic losses to households farming in the area. At the same time, the clearing of crops will have a certain impact on the ecosystem in the area. To minimize these impacts, some measures need to be taken as follows:

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Avoid:

- For the section of the route passing through natural forests, protection forests, production forests and rubber plantations, the line shall be designed, built and installed beyond the forest trees and ensure the distance from the lowest point of the conductor (in the state of maximum sagging) to the maximum height of the forest trees ≥ 6m to exceed all forest trees and not cut down forest trees in the safety corridor. For forest trees cut down at the foundation position and affected during the construction and pulling of wires: the project shall fully carry out legal procedures to change the forest use purpose and plant replacement forests in accordance with the provisions of the Forestry Law.
- The route has been adjusted to isolate the boundary of Nam Nung Nature Reserve at least 6.0 km.
- Design to raise the height of power towers/towers from 80m to 107m at the steep slope section through the protection forest of Lam Dong province and Dong Nai city to ensure static and unsafe discharge (>6.0m) beyond the natural forest canopy below, significantly reducing the ROW clearance range compared to the standard tower design.
- To minimize the arrangement of material gathering yards, camps and official-duty roads in natural forests and protection forests. In case it is unavoidable, a plan on temporary use of forests must be formulated and submitted to competent agencies for approval in accordance with regulations and restoration measures must be applied immediately after completion of construction.

Minimize:

- Insert the boundary marker of tower foundation construction and two stretch streaks to spread the wire along the route before ROW clearance.
- Strictly control the boundaries of vegetation clearing in the field by means of a system of staking pegs, prohibiting the ROW clearance from spreading to adjacent protection forests.
- Use manual/handheld equipment instead of heavy machinery in the slope of the protection forest strip to avoid breaking adjacent trees.
- Strictly prohibit the burning of cleared vegetation / slash.

Restore:

- Restoring regional crops or native vegetation, shrub layers, and grasses that cover the surface below the ROW strip completely in segments.
- Restoring the micro-habitat around the base of tower foundation after the end of pouring concrete.

Offset:

- Planting replacement forests for direct compensation for 1.11 hectares of Dak Lak natural forest at the ratio of 3:1 and 5.12 hectares of permanently recovered protection forests at the ratio of 1:1.
- Fully pay the replacement afforestation fund to the Provincial Forest Protection and Development Fund as prescribed in Circular 25/2022/TT-BNNPTNT.

a2. Terrain disturbance, rock and erosion

Avoid:

- Avoid large-scale leveling on steep slopes (>25 degrees); position the tower foundation on a strip of land with a low slope and a more stable geological base.

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Minimize:

- Build dikes and temporary retaining walls with sandbags around the foot of the foundations of sloped hills to prevent soil and rock erosion.
- Build a mud sedimentation pit at the base of the foundation to settle and filter the sludge before discharging and draining rainwater flowing into the stream.
- Minimize the digging of foundation holes in the rainy and stormy months (August to October).
- Develop a contingency plan for rapid response to local landslides, including the assignment of responsible units, resources and treatment time, in order to minimize the impact on neighboring forestry land if an incident arises.

Restore:

- Compact and compact the topsoil to dig the foundation immediately after dismantling the formwork.
- Plant native grass (such as vetiver grass or thatch) to cover the surface around the tower foundation immediately after completing the foundation concrete pouring to stabilize the surface and prevent erosion.

A3. Noise disturbances and evasion of wildlife

Avoid:

- Absolutely do not operate the motorized construction machine that generates loud noise at night (18:00 to 06:00 a.m.).
- - Develop specific construction plans and schedules, minimize the activities of emitting maximum sounds in the breeding and nesting season of sensitive bird fauna (from March to July every year).

Minimize:

- Request the contractor to periodically maintain the sound-absorbing exhaust system of the construction motor vehicle.
- Limit the number of motorized equipment operating simultaneously on sections adjacent to protection forests to minimize the accumulated noise intensity.

Restore:

- The suspension of motorized construction will automatically put an end to sound disturbances. Vegetation under the reconstituted corridor will attract birds and small animals back to their habitat.

1.b. Construction phase:

b1. Fragmentation of habitats due to the opening of temporary official roads and digging foundations of electric towers

Avoid:

- Make the most of the available system of forestry roads and rural dirt roads to access tower foundations. Minimize the opening of new official roads through protection forests; in case of unavoidability, it must be approved by competent agencies and apply restoration measures immediately after completion of construction.
- Use overhead cable winch technology to pull and spread high-voltage conductors without crushing the vegetation under the ROW.

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Minimize:

- Control the width of the temporary official road surface of less than 3.0 m.
- Limit the number and frequency of transport vehicles moving in a day through the protection forest segment.
- Limit the load of vehicles on official roads in accordance with the terrain and ground conditions to avoid slope landslides.
- It is strictly forbidden to dump waste land into streams or forest areas adjacent to the route corridors.
- Control the speed of vehicles on official roads to minimize dust and noise in sections adjacent to protection forests.

Restore:

- Dismantle temporary camps, clean up all construction waste and foundation scraps.
- To loosen the compacted land, reclaim the terrain and plant and restore native grass and bushes on the entire area of the temporary road immediately after completing the erection of steel columns to re-establish the movement corridor.
- To plant strips of indigenous trees connecting the divided forest plots adjacent to the route corridors at the locations of temporary official roads that have been dismantled and reclaimed, giving priority to the use of indigenous tree species suitable to local ecological conditions according to the list approved by the provincial forestry agency.

b2. Risks of illegal hunting and trapping of wild animals from the labor force

Avoid:

- Absolutely do not place temporary tents of construction workers within protection forests, natural forests or close to the boundaries of the buffer zones of conservation zones (maintain a distance of at least 1.0 km).
- Workers are prohibited from going into natural forests outside of working hours.

Minimize:

- 100% of acts of cutting firewood, hunting, trapping, storing, trading or consuming wild animals are strictly prohibited.
- It is strictly forbidden to bring weapons, traps and hunting nets into the construction site and the camp area.
- Binding financial responsibility to the contractor contract; immediately dismissing the violating worker.
- Consulting, supervising, coordinating with the Forest Rangers to organize irregular patrols of camps (every 6 months) at the place where construction activities are carried out.
- Organize weekly training sessions for workers before entering their shifts.

Restore:

- Clean up and destroy all types of wire traps, homemade bird catching net traps detected around the construction site.
- Plant strips of shrub carpets (in areas where needed) to create a natural layer of protection to hide the paths of forest animals.

b3. Local water pollution affecting aquatic ecosystems

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Avoid:

- Do not arrange garbage dumps, temporary worker camps, workers' toilets, fuel/material gathering yards or concrete mixing plants within a radius of 100m from the edge of the spring water.

Minimize:

- Equip mobile septic toilets at temporary camps; thoroughly collect daily household waste.
- Build a sedimentation pit to treat the water to wash the concrete mixing tank, neutralize the pH before discharging into the stream.
- Install oil catcher trays under the generator and equip the oil spill response kit at the construction motorcycle parking lot.

Restore:

- Carry out the excavated soil, clean up waste rock and clear the status quo of the affected stream flow immediately after completing the foundation construction.
- Plant native shrubs along the stream banks to stabilize the stream banks to prevent erosion within 2 weeks after completing the construction at each stream crossing point.

2. Minimizing indirect impacts due to the opening of official roads

a. Habitat fragmentation due to the opening of temporary public roads and digging of power tower foundations

- Strictly manage temporary roads for construction and restore and return temporary road sites after construction.
- Propagating and raising the awareness of environmental protection of construction workers.
- Do not cut down trees below the grid safety height limits.
- Use manual methods to luminesce plants, limit mechanical clear cutting and do not use herbicides to protect the ecosystem to the maximum.
- Carry out replacement afforestation or pay for replacement afforestation to the provincial forest protection and development fund in accordance with current regulations.
- Coordinate with local authorities and forest management units to jointly supervise forest protection during the construction process.
- Carry out propaganda and dissemination to raise awareness of construction workers about regulations on forest protection and forest fire prevention.
- Apply necessary measures to limit the separation of habitats and protect forest animals: planting markers within the scope of construction, strictly prohibiting construction units from expanding the site outside the licensed scope; controlling the noise of equipment at the construction site; limiting lighting at the construction site; shielding construction foundation pits; waste management at the construction site, ...
- Control people and vehicles entering and exiting forests. Propagating to workers not to cut down and exploit forest products, exploit, hunt and trade forest animals. Violators will be handled according to current regulations.

b. Risk of illegal hunting and trapping of wild animals from the workforce

Avoid:

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- Before mobilizing personnel, the project owner requires all contractors to include biodiversity protection requirements in the Worker Code of Conduct and labor contracts.
- It is strictly forbidden for workers to hunt, trap, catch, collect, transport, store, trade, or consume wildlife and wildlife products. Violations must be subject to explicit sanctions, including suspension of work or removal from the construction site.
- Workers' tents and living areas are arranged to avoid protection forests, production forests and biodiversity habitats when possible; workers are not allowed to enter forests outside the construction scope on their own.
- All employees must receive pre-employment and periodic training on wildlife protection, prohibited acts and reporting responsibilities when violations are detected.

Minimize:

- Strengthen control at sections adjacent to protection forests and production forests, which are areas with higher risks than agricultural land.
- The contractor must strictly manage access to construction sites and shacks, control the activities of workers outside of working hours, and prohibit the bringing of guns, traps, hunting tools or wild animals into the project area.
- Coordinate with the Forest Management Board, forest rangers and local authorities to patrol, exchange information and promptly handle cases of hunting or trading of wild animals. Do not buy or use food derived from wild animals at the construction site kitchen.
- Arrange warning signs at camps and construction areas near forests; maintain a feedback channel so that workers and communities can report violations.

Restore

- When detecting acts of hunting, trapping or storing wild animals, the Contractor must immediately stop the violation, recover the traps and related tools, and report to the Project Owner and the competent forest protection agency/administration for handling according to regulations. Live animals must be handed over to the authorities for rescue and release into a suitable environment.
- In case of detecting an increase in hunting activities or an abnormal decline of animals in an area, it is necessary to increase patrols, retrain workers, review the arrangement of camps and adjust management measures in that area.
- Cases and remedial measures must be recorded in the socio-environmental management dossier and monitored until the case is closed.

3. Minimizes the impact caused by wire pulling

a. Minimizing the impact of pulling wires across roads

As assessed above, the project has 04 crossings of National Highway 14, 02 crossings of DT760, 03 crossings of DT789, 01 crossing of DT967, DT683, DT681, National Highway 14C, DT759, DT757, DT758, DT756, National Highway 13, DT749B, DT744, DT710, DH603, DT789, DT782, Hoang Ngoc Thuc street, Tran Van Lak, Soc Lao, canal shore road, Tan Thuan road, 02 crossings of Binh Phuoc – Dak Nong – Dak Lak expressway (expected) with medium to high traffic density. In addition, the line also repeatedly crosses asphalt, dirt roads, stone roads and rural roads in the locality. The process of stretching and spreading wires at the intersection with traffic roads will apply the following measures:

- The project only pulls wires across, does not arrange tower foundations in the road protection corridor, ensuring compliance with the provisions of Articles 10 and 11 of Decree

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165/2024/ND-CP dated December 26, 2024, amended and supplemented by Decree 241/2026/ND-CP dated June 26, 2026 and other current regulations and regulations.

- Contact the specific road management agencies for each location and the time of pulling the rope through these locations to ensure that it does not affect the vehicles participating in the traffic much and proceed in the shortest possible time. The contractor shall only perform the rope pulling through these sections with the consent of the managing units and the presence of their representatives within the agreed time.
- In order to shorten the construction time of the overpasses, when spreading and stretching the wires in these intervals, the contractor applies the method of stretching the conductors without lowering the wires to the ground, preparing in advance the wire sections to be measured and cut accurately according to the length of the column span. Construction over the traffic road using the plan to install scaffolding over the road, the steps are as follows:
  + Install scaffolding at road crossing locations with a scaffolding height of ≥ 8m.
  + Arrange signboards at the position of pulling the rope across national highways and provincial roads.
  + The construction unit shall appoint a traffic regulator when pulling the rope across the road.
  + Use a pilot wire to pull each rope placed on the scaffolding, pull each rope over the road and place the rope on the scaffolding, make sure the rope is ≥ 8m away from the road surface of the car and do not let the rope slip into the road surface.
  + Tension the wire to get the deflection of the conductor for each phase of the deflection.
  + Recruit professional contractors with many years of experience in transmission line construction.
- In the stage of designing construction drawings, the project will make detailed construction measures for each intersection location, make construction safety measures, design detailed scaffolding for wire pulling, etc.

b. Minimizing the impact of pulling wires across rivers and streams

The project has 02 crossings of Be River (width 88-110m), 02 crossings of Saigon River (width 64m-200m), 06 crossings of Dak RL River (width 31-126m), 01 crossing of Duc stream (width 38.5m), Serepok 3 hydropower channel (width 94.8m), Serepok river (width 217m), Dak N'Đrung stream (width 36m), Dak R'Tih stream (width 18m), small branch of Thac Mo hydropower reservoir (width 244m), East canal (width 35m); average traffic density. The process of stretching and spreading wires at the intersection with rivers and streams will apply the following measures:

- At the intersection, the project only pulls the rope across, does not arrange tower foundations on rivers and streams.
- Contact the river and stream management unit (if any) in advance to agree on construction measures, vigilance measures, construction progress and widely notify all vessels before implementing construction.
- Arrange enough manpower and construction facilities as quickly as possible. For these sections of the route, construction is organized in the dry season to minimize the generated volumes. The sequence of proceeding is through the following steps:
  + Spreading pilot wire across rivers and streams
  + Connect the primer cable to the wire to be pulled and pull the wire through the primer

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cable using a wire puller.

+ When pulling, the rope is kept from touching the water by the brake.
+ Pulling order: Lightning protection wires, fiber optic cables, and conductors in order from top to bottom. After pulling, proceed to assemble the accessories at 1 end of the wire and install them on the brake post.
+ Stretch the rope, aim for deflection, deflection is checked with a sight.
+ Carry out the operations of measuring, marking, cutting the wire, connecting the zipper lock, assembling accessories and putting the wire up and installing it in the opposite brake post.
+ Switching wires, installing cord support locks, anti-vibration dumbbells...

- In the stage of designing construction drawings, the project will make detailed construction measures for each intersection location, make construction safety measures, etc.

4. Minimize the impact of pulling wires through existing transmission lines

The project has a number of crossovers with transmission lines such as 500kV Pleiku - My Phuoc - Cau Bong, 220kV Srepok 4 - Krong Buk, 220kV Buon Cop - Serepok 3, 220kV Dak Hoa - Dak Nong, 220kV Dak Nrung Power Plant - Dak Nong 500kV substation, 220kV Dak Nong - Phuoc Long - Binh Long, Existing 220kV My Phuoc – Binh Long Station, 110kV Cu M'gar – JPO, 110kV Dak Glun Hydropower Station, 110kV Thac Mo – Loc Ninh, 110kV Binh Long 2 – Minh Hung, 110kV Binh Long 2 – Binh Long, 110kV Binh Long – Tay Ninh Cement, 110kV Binh Long – Tay Ninh 2, 110kV Dau Tieng – Minh Hung, Dau Tieng - Tay Ninh 2 110kV substation and many times crossing with medium and low voltage lines. In order to prevent the impact of wire pulling at the intersection with the transmission line, the project applies the following solutions:

- At the intersection with the 500kV line: the project is designed with a solution to overtake under the existing 500kV line and ensure the cross distance between the conductors or between the conductors and the lightning protection wire is ≥5m according to the electrical equipment regulations.
- At the intersection with the existing 220kV and 110kV lines: the project is designed with a solution to overcome the existing 220kV and 110kV lines and ensure the cross distance between the conductors or between the conductors and the lightning protection wires of ≥5m according to the electrical equipment regulations.
- Formulate detailed construction plans and measures for the intersection with 500kV, 220kV, 110kV transmission lines. General construction measures at this location are as follows:
  + Construction of foundations and erection of complete columns for the gap at the intersection position.
  + Only cut off power for 3 hours and 6 hours of existing lines to serve the tension of the grid, unloading the wires and removing the wire support nets.
  + Complete rope tension for the intersection at the cross position.
- Setting up scaffolding and applying safety measures to serve construction.
- For medium-voltage lines: erect scaffolding to weave wire barriers and insulate (hotline) along the phases of the intersecting medium-voltage lines.
- Recruiting professional consultants and contractors, with extensive experience in the design and construction of transmission lines.

6.1.4. Mitigation measures during the operation phase

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A. MEASURES TO MITIGATE ENVIRONMENTAL IMPACTS

6.1.4.1. Measures to minimize the impact of noise and ozone from the halo

As mentioned, when the line is put into operation, noise can arise due to corona discharge when there is light rain, humid air, and porcelain chain dust. Since corona noise (AN – audible noise) and radio interference (RI) both arise directly from the phenomenon of corona discharge, when the → E conductor phase is reduced, → both AN and RI are reduced. Although the noise generated is very low and negligible, the project will take the following mitigation measures to limit and minimize the occurrence of corona noise:

- Design, procurement of materials, construction and installation of transmission lines in accordance with the techniques and provisions of electrical regulations. The design of discharge horns (arc discharge horns), corona combined discharge rings installed on the insulation chain to protect the insulation from breakage (for ceramic/glass insulation), damage to the accessory ends on the conductor side (for composite/silicone insulation) due to overvoltage in the following cases: Lightning strikes on the line or surface discharge due to contaminated insulation, by discharging through arc protection devices installed on the line side and tower side.
- Corona ring for suspended insulation chain: installed at the phase wire side of the insulation chain or on both sides of the insulation chain depending on the voltage level, in order to improve the working process of the insulation chain, reduce the halo discharge, as well as reduce the level of radio noise and interference.
- Operate the line at the right load and in accordance with regulations.
- Cleaning the porcelain chain combined with periodic technical inspection and timely replacement of porcelain chains in accordance with the regulations of the electricity industry.

6.1.4.2. Measures to minimize electromagnetic field strength

The impact of electric fields caused by the line is assessed in detail above. Accordingly, the project ensures electric field safety for local people inside and outside the safety corridor. The project will apply the following measures:

- Applying the method of conductor separation → increasing the equivalent radius of the wire bundle → decreasing the electric field gradient on the surface of the E conductor (according to the Peek/Markt-Mengele formula) → reducing the possibility of ionizing the air around the wire (corona).
- Relocation of houses and works in the safety corridor (500kV power grid).
- The design, construction and installation of the line comply with current standards and regulations.
- Install safety signs at power towers so that people know the safe distance when working near power towers and transmission lines.
- Periodic inspection and maintenance of the safety corridor of the line: Daily inspection: once every 01 month; Night inspection: 1 quarter/time; Unscheduled inspection: 12 times/year inspection when the line has abnormalities or incidents on the line, thunderstorms, cyclones or abnormal weather phenomena.
- At the location where the electric field strength is not guaranteed, the project will have technical solutions to promptly handle it.

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- Coordinate with local authorities in propagating regulations on power grid corridor safety, incident prevention and response plans.
- Closely coordinate with the People's Committees of communes and relevant agencies in information and timely handling when incidents occur or affect people's lives and production.

6.1.4.3. Measures to minimize the impact of wastewater and solid waste

a. Minimizing the impact of domestic wastewater:

- In the concentrated working area (office office): domestic wastewater is collected and treated according to the existing system at the office of the transmission teams of Power Transmission Company 3 and Power Transmission Company 4 (the operation management unit, under the National Power Transmission Corporation) (not within the scope of the project).
- In the mobile working area (along the 330km long transmission line): about 1.2 m3/day (4-6 days/month), the operator uses and disposes of domestic wastewater according to the existing sanitation system in the locality, without defecating indiscriminately.

b. Minimizing the impact of domestic solid waste:

- In the concentrated working area (office office): domestic solid waste is collected and treated according to the existing system at the office of the transmission teams of Power Transmission Company 3 and Power Transmission Company 4 (the operation management unit, under the National Power Transmission Corporation) (not within the scope of the project).
- In the mobile working area (along the 330km long transmission line): about 12 kg/day (4-6 days/month), apply and comply with the principle of "bring in as much, as much as you bring". All amount of garbage generated on the route is collected into personal bags, brought to the area where the garbage collection unit is located or the headquarters of the transmission teams of Power Transmission Company 3 and Power Transmission Company 4 for general treatment, not disposed of at the route.

c. Minimizing the impact of solid waste from the inspection and maintenance of the line:

During the inspection and maintenance process, solid waste generated mainly insulator cleaning rags (50kg/year), equipment and accessories (wires, insulators, suspension insulators) are damaged with a volume that depends on the operating life of the line. The process of sorting, collecting, transporting and handling is as follows:

- Sorting in the field: operators carry special bags/bags when traveling the route. Waste is sorted at the tower location: reusable, recyclable group (wires, accessories) and non-recyclable, recyclable group (insulator cleaning rags).
- Collection and transportation: applying the principle of "as much as you bring, as much as you bring". All recovered materials and equipment are loaded onto specialized vehicles of the transmission teams and transported to the warehouses of Power Transmission Company 3 and Power Transmission Company 4 (the operation management unit, under the National Power Transmission Corporation).
- Treatment: recovered materials and equipment will be carried out through inventory procedures, bidding for liquidation or utilized for minor repairs. Inert waste that is not utilized is hired by a unit with the function of transportation for treatment.

d. Minimizing the impact of vegetation from tree pruning:

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- Principles of vegetation cutting and pruning: absolutely comply with the design solution to overtake forest trees. For the section of the route passing through protection forests, natural forests, production forests and rubber plantations: because the line has ensured a safe distance from the lowest point of the conductor (when the wire is at its maximum) to the maximum tree height of ≥ 6m, the operating unit shall not cut down forest trees. Tree pruning activities are only carried out periodically for perennial crops (cashews, acacia, coffee, fruit trees of all kinds) that do not ensure a safe distance.
- Collection and Disposal:
  + Reuse: encourage and create conditions for local households to take advantage of the vegetation after cutting down to make firewood, wood for cooking or fertilizer.
  + Handling: cutting pieces and piling piles at a well-ventilated location, the transmission teams of Power Transmission Company 3 and Power Transmission Company 4 (the operation management unit, under the National Power Transmission Corporation) hire a unit with the function of transporting them for handling.
- Risk control: it is strictly forbidden to set fire to vegetation at the scene, especially at sections bordering protection forests and natural forests.

e. Minimizing the impact of hazardous solid waste:

- The process of inspection and maintenance of the line will generate hazardous waste, which is grease-stained gloves with a volume of about 30-50kg/year (estimated to be similar to operating 500kV lines).
- Collection and transportation: applying the principle of "bring in as much, as much as you bring". All grease-stained gloves are collected into separate bags and transported to hazardous waste storage rooms at substations under the management of Power Transmission Company 3 and Power Transmission Company 4 (the operation management unit, under the National Power Transmission Corporation).

f. Minimizing the impact of SF_6 gas leakage from switchgear:

- Only applicable to actual equipment that uses SF_6 at the project's 500kV outline compartments.
- Selecting switchgear with a low SF_6 leakage rate, meeting the manufacturer's technical standards and applicable IEC standards; prioritizing equipment with a closed system, high reliability, and the ability to monitor gas density/pressure.
- Perform tightness, pressure/density SF_6 and the condition of valves, flanges, gaskets, and connectors before accepting and putting the equipment into operation.
- Equipped with SF_6 pressure/density monitoring equipment and low gas level warnings for equipment on request; abnormal signals must be included in the operator's inspection and handling procedures.
- Develop an SF_6 inventory for each device, including: initial recharge, replenishment, recovery, reuse/transfer amount, and estimated loss.
- Personnel performing loading, recovery, or servicing of SF_6 equipment must be trained in SF_6 characterization, leak testing techniques, gas recovery, and work safety.

6.1.4.4. Measures to mitigate impacts on biodiversity

a. Minimizing the risk of collision and electric shock for the bird (Single Line):

Avoid

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- The phase distance design of the insulation chain ensures the safety technique of transmission voltage, minimizing the risk of birds with a large wingspan (the largest wingspan of ~1.5m) to eliminate the risk of causing a short circuit between the wire and the grounded pole causing an electric shock.
- Consider the selection of a reflective fiber integrated lightning protection cable (OPGW) in combination with the installation of warning equipment and bird touching at towers with high bird density, based on actual monitoring results.

Minimize

- Install insulation chains about 5m to 6m long at the locations of support towers and anchor towers to prevent electric shock incidents for birds.

Adaptive Management

- The line operator during periodic patrols of the line shall record and report any significant incidents or risks of bird collisions detected along the route. In case of high-risk locations, coordinate with specialized units to agree on handling solutions.

b. Forest edge effect and microclimate change along the ROW corridor

Avoid

- Avoid clear-cutting of low-level vegetation under the corridor of the line; only prune trees with high risks of violating the safe distance.
- Avoid designing ROW corridors that cut perpendicular through watershed protection slope forests to reduce the exposed area of forest boundaries.

Minimize

- Design the height of the column to ensure a safe distance from the lowest sagging point between the two towers to the maximum height of >6m of growing forest trees: do not cut down forest trees. Apply the method of selective pruning: only cut down the tops of fast-growing trees in the section passing through agricultural land to ensure a safe distance from the lowest sagging point between the two towers to the maximum height of the growth tree of 6m; maintain the vegetation structure.
- It is absolutely forbidden to use chemicals and herbicides in the clearing of corridors.

Restore

- Maintain forest trees and crops under the line corridor and/or maintain native grasses and low shrubs to support shielding from solar radiation, wind barrier and protection of moisture-loving microclimate structures.
- At locations disturbed by ROW clearance or transportation of equipment, it is necessary to level, return the soil to the natural site and compact it with sufficient compaction and replant the plants as before the impact.

c. Risk of forest fires due to electrical shorts or discharge incidents during the dry season

Avoid

- Using modern lightning protection fiber optic cables combined with a digital relay system that automatically shuts off the electricity extremely quickly when an electrical discharge incident hits the ground in the corridor.

Minimize

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- Periodically clean up combustible materials (dry firewood carpets, rotten leaves) within the line safety corridor before and during the annual dry season (from November to April of the following year).
- Formulate and implement forest fire prevention and fighting plans along the route; actively coordinate with the Forest Protection District and local forest management boards in fire prevention and fighting work.

Restore

- When a forest fire incident occurs, coordinate with the forest ranger force and local authorities in deploying rapid response; coordinate with the plan to restore the vegetation cover after the incident.

d. Minimizing the risk of invasion of invasive alien plant species

Avoid

- Avoid leveling the ground with harmful foreign origins and seeds; avoid moving motor vehicles directly from areas with foreign pests to the construction site.

Minimize

- The mandatory process of spraying and washing tires of construction motor vehicles to clear the route before entering the protection forest - applicable to both construction vehicles and periodic maintenance vehicles.
- Plant native grasses that cover the surface of moist bare soil around the base of the tower foundation immediately after reclaiming the soil for ecological competition, preventing foreign seeds from germinating.

Restore

- Take advantage of native grass to cover the surface of the bare soil around the base of the tower foundation after reclamation to prevent landslides and prevent the spread of foreign seeds.
- In the course of patrolling and periodically inspecting the route corridor, if detecting invasive tree species (such as Mimosa pigra, Lantana camara, Mikania micrantha, etc.), the operating unit shall organize ROW clearance, manual removal, drying and thorough destruction before the tree bears fruit.

e. Biodiversity Offset Program

Biodiversity Offset Program

Although the project has proposed measures to mitigate the impact on biodiversity, the permanent recovery and conversion of part of the natural forest area and protection forest for tower foundation sites still creates an impact that cannot be completely eliminated on site. Therefore, the Investor will develop and implement a Biodiversity Offset Program to offset the remaining losses in habitat and ecological functions and towards the goal of "No Net Loss (NNL)" for natural habitats and species prioritized for conservation. The Biodiversity Offset Program will include the following main components:

(i) Replacement afforestation and habitat restoration

The investor will fully fulfill the obligation **to plant replacement forests** for the entire converted forest area in accordance with the provisions of the 2017 Forestry Law and current guiding documents (ratio of 3:1 for the recovered area of natural forests and 1:1 for planted forests). In addition to the legal requirements for replacement afforestation, the project will prioritize supporting the restoration of degraded forest areas in the buffer zone of Nam Nung

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Nature Reserve with native tree species suitable for local ecological conditions in order to improve habitat quality, enhance landscape connectivity and improve the resilience of ecosystems.

(ii) Coordinate in collecting information with local forest management agencies

During both the construction and operation phases, the investor and the operator maintain regular contact with the Management Board of Nam Nung Nature Reserve and the Forest Protection Sub-Department of the provinces with protection forests along the route (Dak Lak, Lam Dong, Dong Nai). Specifically:

- During the construction phase: notify the construction schedule, location of workers' camps and construction activities near protection forests and protected areas so that management agencies can actively strengthen patrols, control of hunting and illegal encroachment activities if necessary;
- During the operation phase: collect periodic information from management agencies on the status of protection forests, biodiversity in the buffer zone of the protected area, detect invasive alien species and any abnormal developments along the route corridor;
- Coordinate with the Forest Protection Sub-Department and the local forest fire prevention and fighting force to develop an emergency response plan for forest fire incidents along the corridor, especially during the dry season of the Central Highlands (November to April). When detecting abnormal heat points through patrols, the operator immediately notifies the local forest rangers for timely response.

(iii) Adaptive management

The operator records and reports EVNNPT any anomalous developments related to biodiversity along the line corridor during routine patrols, including bird collisions, invasive alien species detection, or vegetation degradation in the ROW boundary. EVNNPT/PTC3 and PTC4 consult with an ecologist and implement appropriate remediation within 3 months of discovery."

6.1.4.5. Measures to minimize landscape/visual impacts

Avoid:

- In the detailed design, continue to optimize the direction of the route and the position of the columns in order to avoid or reduce the presence of works in areas with landscape value or sensitive viewpoints; prioritize the arrangement of routes close to or parallel to existing traffic corridors, power lines and infrastructure when feasible.
- Limit the placement of columns at prominent topographic locations such as hilltops, skylines or points with wide views; take advantage of existing terrain and vegetation to reduce the ability to observe the works.
- Minimize the area of clear cutting and open new access roads, especially at sections passing through or adjacent to forest areas and semi-natural landscapes.

Minimize:

- Strictly limit clear cutting to the extent really necessary for construction and ensure electrical safety; prioritize selective pruning instead of total clear cutting at suitable locations.
- Limiting the removal of trees and vegetation has the effect of shielding the landscape but does not affect the safe distance of the line.
- Public roads, gathering yards and temporary construction areas must be neatly arranged, limiting the occupied area and avoiding creating large gaps in the vegetation.

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- Promptly collect soil, rocks, excess materials and waste, not to leave them in residue causing a deterioration in landscape quality along the route.

Restore

- Immediately after completing the construction at each location, dismantling the temporary works, clearing materials and returning the temporarily occupied areas, the access road is no longer needed.
- Leveling, restoring topsoils and re-establishing vegetation with native species or trees of height suitable for line safety requirements, prioritizing restoration in forest areas, hillsides, and locations with sensitive visibility.
- During the operation phase, maintain vegetation management in the direction of selective pruning and limit unnecessary expansion of luminescent corridors to reduce the contrast between the ROW and the surrounding landscape.

MEASURES TO MITIGATE SOCIAL IMPACTS

6.1.4.6. Measures to restrict land use and affect livelihoods under the route corridor

Since land within the safety corridor is subject only to long-term restrictions on land-use rights rather than permanent acquisition, land users retain their land-use rights and Land Use Right Certificates while receiving a one-off financial allowance for reduced earning capacity and diminished commercial value of the land plot. Households whose residual residential land area is no longer viable for continued habitation or who must relocate will receive compensation for their assets and land, along with full relocation and resettlement allowances.

For agricultural land planted with perennial crops and production forest land subject to plant height restrictions, land users will receive a one-off allowance in accordance with local regulations for the corresponding land type.

Compensation for affected trees and crops: All timber trees, rubber trees, fruit trees, and perennial industrial crops that must be felled or cleared to create safe electrical clearances will be compensated in cash at 100% full replacement cost, based on market prices and actual growth stage/productivity, without deduction for salvage value.

For crops that can be retained through pruning, compensation will cover the actual yield loss along with the labor costs incurred for tree trimming.

Households whose agricultural production activities are affected will be eligible to participate in the project's Livelihood Restoration Program to restore household production and income. The progress and status of their livelihood restoration will also be tracked and monitored periodically according to the schedule of the independent monitoring consultant. In the event that monitoring data indicate certain households continue to face prolonged income deficits or encounter obstacles in converting crops under the corridor, SPMB will promptly initiate corrective measures and supplementary adaptive support packages to fully achieve the objectives of ESS5 prior to project completion. All inquiries, feedback, and complaints regarding corridor restrictions will be received and resolved free of charge through the project's Grievance Redress Mechanism (GRM).

6.1.4.7. Measures to mitigate and respond to technical and natural risks and incidents

a. Risk of *forest fires due to electrical shorts, or technical problems*

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a.1. Measures for design, construction and organization of management

- The design and construction of the line ensure the regulations on power line safety, fully considering the geological and weather conditions of the project location.
- Install automatic relays on the line system to automatically shut off power when a problem occurs.
- Hang lightning protection wires over the entire line to protect against lightning strikes directly on the conductors.
- All towers of the transmission line are grounded, in accordance with the ground resistivity of the area where the line passes, and the ground resistance is ensured according to current regulations.
- Periodic inspection and inspection after thunderstorms, tornadoes or abnormal weather phenomena to prevent incidents.
- Coordinate with local authorities in propagating regulations on power grid corridor safety, incident prevention and response plans.
- Closely coordinate with the People's Committees of communes and relevant agencies in information and timely handling when incidents occur or affect people's lives and production.

a.2. Response measures in case of fire incidents

- Rescue forces:
  + Technical personnel operating the line: early detection (via monitoring/patrol system), isolation of electrical incidents (emergency power cuts if necessary), organization of initial fire fighting on site.
  + Local authorities, commune/ward police: directly fight fires, zone fire prevention zones, divide traffic flows.
  + Fire and rescue police force: firefighting.
- Fire fighting equipment, means and tools: fire extinguishers, water tanks, engine pumps, etc.
- Mobilization time:
  + Detection and alarm: 0-5 minutes. Smoke/fire detection (via automatic alarm/patrol/public notification), report to the transmission team, power dispatching center, local authorities.
  + Handling power problems: 5-15 minutes. Performing power cuts on the line.
  + Rescue of technical staff operating the line, local authorities: 15-30 minutes. Forces were present at the scene, deploying zoning.
  + Response of the fire and rescue police force: 30-60 minutes. Forces approaching the fire.
- Mechanism for coordination with local authorities:
  + As soon as the relay reported the problem, the transmission team activated the emergency communication channel and sent the location of the incident coordinates to the local authorities and commune/ward police.
  + Local authorities and commune/ward police shall direct local forces to block the scene, evacuate neighboring residents (if necessary), and ensure security and order.

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+ The commune/ward police coordinated with the scene protection transmission team to determine the cause of the incident.
+ Transmission team troubleshooting.
+ After completing the troubleshooting, the transmission team and the local government made a record of confirming the safety of the area before allowing the power to be restored.

b. ***Possibility of increasing the rate of corrosion of electrical equipment and electrical conductors***

To prevent the possibility of increasing the rate of corrosion of electrical equipment and electrical conductors in the hot and humid climate of the area. The project applies the following measures:

- Design and build the project on the basis of the Vietnamese Regulation QCVN 02:2022/BXD, the industry standard used for the design of the line and hydrometeorological data collected in the region.
- Invest in the construction of the project with imported electrical equipment that meets IEC international standards and is suitable for the hot and humid climate of the region.
- Periodically inspect and maintain the line, especially the cleaning of the porcelain chain.
- Replace equipment that shows signs of corrosion or damage to ensure stable and safe operation of the line.

c. ***Lightning, thunderstorms, cyclones***

To prevent lightning risks, the project will:

- Install automatic relays on the line system to automatically shut off power when a problem occurs.
- Hang lightning protection wires over the entire line to protect against lightning strikes directly on the conductors.
- All towers of the transmission line are grounded, in accordance with the ground resistivity of the area where the line passes, and the ground resistance is ensured according to current regulations.
- Periodic inspection and inspection after thunderstorms, tornadoes or abnormal weather phenomena to prevent incidents.
- Coordinate with local authorities in propagating regulations on power grid corridor safety, incident prevention and response plans.
- Closely coordinate with the People's Committees of communes and relevant agencies in information and timely handling when incidents occur or affect people's lives and production.

Response measures in case of incidents:

- Rescue forces:
  + Technical staff operating the transmission line: locating the fault point, inspecting the scene.
  + Local authorities, commune/ward police: support to protect the scene, support to extinguish small fires caused by sparks/lightning discharges at the foot of the tower vegetation.

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+ Power Transmission Company 3, Power Transmission Company 4, Power Construction and Installation Company: repair and replace broken accessories.

- Mobilization equipment and means: specialized tower climbing equipment, hoists, cable winches, safety ropes, specialized communication radios in the electrical industry, wire clamp accessories, zippers, lightning protection wires, ...
- Mobilization time:
  + Determine the incident coordinates: 0-5 minutes.
  + Relay closure/isolation operation: 1-15 minutes.
  + Force mobilization: 15-30 minutes.
  + Survey Approach: 30-90 minutes.
  + Fixing, replacing accessories: 2-5 hours or longer depending on the problem.
- Mechanism for coordination with local authorities:
  + In case of lightning strikes that break the lightning protection cord or the wire swoops down near the ground/roads, the transmission team shall send personnel to block the emergency blockade, and at the same time request the police and local authorities to assist in sending people to divide the channel, not allowing people and livestock to approach the dangerous area.
  + If the lightning current transmits through the tower foundation grounding system, affecting the adjacent works or electrical equipment of households close to the corridor, the transmission team shall coordinate with the People's Committee of the commune/ward to conduct an inspection, make a record of verifying the cause and implement support/remedial policies in accordance with the law.

d. ***Flash floods, erosion, subsidence of foundations/towers***

- The design of the tower foundation is based on the results of topographic and geological surveys and with reference to the geological documents of the surrounding area. Specifically, the design of the tower foundation is the type of slab foundation for weak geological areas, and the construction of foundation embankments for sloping terrain areas.
- The construction process strictly complies with the design and regulations and technical processes on foundation construction.
- Periodically inspect the quality of works, promptly remedy subsidence incidents that occur.
- Inspect and maintain the safety corridor of the line to ensure that surrounding plants and works do not fall, causing breakage of conductors and unsafety.
- Install automatic relays on the line system so that when there is a line breakage, the relays automatically shut off the power in time and the alarm system will work. At that time, the operation workers quickly came to the scene to solve it.
- Coordinate with local authorities in propagating regulations on power grid corridor safety, incident prevention and response plans.
- Closely coordinate with the People's Committees of communes and relevant agencies in information and timely handling when incidents occur or affect people's lives and production.

Response measures in case of incidents:

- Rescue forces:

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+ Technical staff operating the transmission line: immediately approach the scene, confirm the status of the incident, set up an electrical safety protection belt, and directly handle technical problems.
+ Local authorities, commune/ward police: blockade dangerous areas, block people/livestock from entering areas with step voltage, support traffic flow (if the wire is broken to cross the road).
+ Power Transmission Company 3, Power Transmission Company 4, power construction and installation company: erect temporary towers, re-pull wires, replace broken accessories.

- Equipment and means of mobilization: high-voltage electrical test pens, voltage measuring equipment, danger warning signs, wire rope winches, self-propelled cranes, ...
- Mobilization time:
  + Detection and alarm: 0-3 minutes.
  + Alarm and Emergency Notification: 3-15 minutes.
  + Scene blockade: 15-45 minutes.
  + Survey Approach: 30-90 minutes.
  + Deployment of support and construction: 2-6 hours or longer depending on the incident.
- Mechanism for coordination with local authorities:
  + As soon as the relay reported a broken wire, a tower fell off, etc., the transmission team activated the emergency communication channel and sent the location of the incident coordinates to the local authorities and commune/ward police.
  + Local authorities and commune/ward police shall direct local forces to block the scene, evacuate neighboring residents (if the tower falls into a house or breaks the cord in a crowded area), ensuring security and order.
  + The commune/ward police coordinated with the scene protection transmission team to determine the cause of the incident.
  + Transmission team troubleshooting.
  + After completing the troubleshooting, the transmission team and the local government made a record of confirming the safety of the area before allowing the power to be restored.

6.1.4.8. Measures to mitigate and respond to OHS risks and grid safety

a. ***Occupational accidents (Electrical risks in maintenance due to direct exposure to high-voltage electricity and inductive electricity; Overhead construction during maintenance)***

a.1. Measures to organize and manage

- Operators must be trained in professional and technical skills in accordance with the management, inspection and maintenance of the line.
- Operators must be trained and issued electrical safety cards.
- There are internal rules and regulations on line operation safety.
- Periodically improve the qualifications of employees in line operation.

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- Equipping labor protection equipment for inspection and maintenance staff.
- Operators must fully and strictly comply with safety regulations when doing management and operation. Implement the regime of Work permit, Switching Permit and procedures for working permits as prescribed.
- Annual health check-ups for officials and employees.

a.2. Organization of training and training

- Transmission line operators will be trained in electrical safety, issued electrical safety cards, and trained in environmental protection.
- The training on electrical safety and environmental protection is carried out annually by the National Electricity Transmission Corporation, with inspection and testing for electrical safety qualification level.
- The electrical safety training program has the following main contents:
  + The process of operation and troubleshooting of transmission lines.
  + Regulations on safety when inspecting, maintaining, repairing and testing transmission lines and electrical equipment in case of power cuts and no power cuts.
  + How to identify and take measures to eliminate the risk of causing incidents and accidents at the workplace and methods of emergency treatment for people suffering from electrical accidents.
  + Set up a safe work zone.
  + Features, effects, use, storage, regulations on inspection of safety equipment, working means and tools.
  + Practice content related to ensuring safety for work.
  + Test.
  + Save the results and notify each affiliated facility.
- The training program on environmental protection has the following main contents:
  + Environmental impacts and incidents that may occur during the inspection and operation of the line.
  + Measures to minimize adverse impacts on the environment need to be taken during the inspection and operation of the line.
  + Environmental incident response process.

a.3. Regulations on occupational safety

- All work must be carried out "Work permit".
- Each working group must have a work sheet. The working group must fully write the work items and safety measures on the work sheet.
- The working group must appoint a supervisor with the right title as prescribed. The safety supervisor must be present at the scene at all times during the working process.
- Must learn the procedures and technical regulations of electrical safety, emergency treatment for people who are electrocuted, etc. and pass a satisfactory examination.
- It is necessary to seriously implement the normative process and work orders.

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- Must comply with working hours, discipline and labor regulations.
- Must be fully equipped with personal safety: long-sleeved workwear with buttons, wear a safety helmet with straps, wear shoes, wear a seat belt, use an electrical test pen...
- Tools and tools must be stored in special-use bags, without pockets of personal shirts and pants. Do not toss or throw tools, but must be pulled and passed with small ropes.
- Must be in good health: no heart failure, nerve pain, epilepsy, etc., psychologically stable.
- It is strictly forbidden to drink alcohol and beer and other stimulants before and during working hours.
- It is strictly forbidden to go on business trips alone, the working group must have at least 02 people or more. They are only allowed to enter the working position when they are supervised by the worker leader or the electricity safety supervisor.
- It is forbidden to work at height when there is a level 6 wind, heavy rain, thunderstorms.
- When working, you must concentrate your thoughts, do not joke, work carefully according to the process, the right technique, do it cautiously and accurately.
- It is strictly forbidden to do things that are not in accordance with regulations, improper techniques, work not in accordance with functions and tasks, do work without work cards or work orders, and operate without switching permit.
- All safety technical tools, safety belts, construction and repair equipment must be inspected and tested periodically according to regulations, absolutely do not use tools that do not ensure quality.
- All regulations must be strictly complied with when receiving and handing over the work site. The working unit is only allowed to work on the power grid after the power grid operation management department cuts off the electricity, tests the absence of voltage, discharges electric charges, grounds, hangs safety signs, puts up adequate barriers and signs the working permit. The power grid operation management department is only allowed to return the power to the work site normally after the working groups have signed to return the work site and re-inspect the site where there are no more people and working tools, remove all grounding, clean up signs, barriers and equipment eligible for operation electrification.
- Any additional work on the power grid that is cutting off power to the working group must be registered, must have a work permit, work order, must test no more voltage, discharge electric charge, fully ground the working position, hang safety signs, and place barriers in accordance with the technique.
- When performing work, if encountering problems, difficulties or abnormalities, they must immediately stop the work and report to the leaders for appropriate handling.
- Before going on a business trip, they must fully prepare supplies, tools, safety technical equipment, personal protective equipment, etc. must listen to the reminders to disseminate the work contents and safety measures of the worker leader or the safety supervisor, carefully read, understand and memorize the work contents and safety measures stated on the Work permit and orders.
- Before working, you must carefully observe the scene, understand the places where there is electricity, and always keep a safe distance.
- Work permit, work orders, manipulations, whether there is sufficient working lighting, etc. If any abnormalities are detected, they must immediately report them to the worker leader (for Work permit) and the person giving the order (for the operation slip) for settlement.

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- Before working on the line, it is necessary to cut off the electricity, test that there is no electricity, discharge the charge, ground 02 ends, around the workplace in accordance with the technique, hang a sign prohibiting electricity at the cutter operator, cutter knife, put barriers and signs in accordance with regulations.
- Suspension of current work when employees violate electrical safety techniques, threaten life and equipment, employees are not fully equipped with labor protection, employees do not obey orders, do not do techniques correctly, are drunk and report to superiors.

a.4. Measures to respond to accidents during operation:

- Rescue forces:
  + Transmission team leader: assess the scene, issue an order to stop work; directly direct the plan to approach the victim; contact the Dispatching Center to request an emergency power cut, report to the unit's leader and coordinate with local authorities/health.
  + Rescue specialists of the transport team: approach the victim by means of safe movement, using the rope/pulley technique to lower the victim to the ground.
  + Local health: emergency first aid, preparation of first-aid documents and handover to the medical unit.
  + Local authorities and commune/ward police: zone the scene, prevent people who are not on duty from entering the danger zone/electricity leakage.
- Firefighting equipment, vehicles and tools: load-bearing rescue ropes, rescue pulleys, fall locks, additional full-body safety belt sets, emergency hangers, specialized walkie-talkies,...
- Mobilization time:
  + Detection and alarm: 1-3 minutes.
  + Emergency power cut: 3-5 minutes.
  + Approaching and lowering the victim: 5-15 minutes.
  + First aid and handover: 15-30 minutes.
- Mechanism for coordination with local authorities:
  + Local authorities and commune/ward police directed local forces to block the scene, ensuring security and order.
  + The commune/ward police coordinated with the scene protection transmission team to determine the cause of the incident.
  + Troubleshooting transmission team (if necessary).
  + The transmission team and the local government made a record of confirming the safety of the area before allowing the power to be restored.

b. ***Risk of fire, explosion, electrical shorts***

- Cut off power/isolate the fault element as soon as possible and set up safety perimeters, barriers, warning signs to prevent off-duty people and livestock from accessing the dangerous area.
- When a fire occurs, organize initial fire fighting on the spot after ensuring electrical safety; zoning to limit the spread of fire and mobilizing professional fire fighting forces.
- For forest fires, immediately coordinate with forest rangers, forest owners and local authorities to organize firefighting forces, zone and establish contact at the scene.

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- When the crane/crane collides with the line, instruct the people in the cabin not to step on the ground without confirming electrical safety; block the scene and organize rescue after the power source is isolated.
- Perform first aid/emergency treatment of victims and transfer them to appropriate medical facilities; and at the same time protect the scene to determine the cause of the incident.

c. Risks*, collisions of cranes, cranes entering the line, breakage of transmission lines*

In order to prevent the collision of cranes and cranes into the line and minimize the damage to people and the transmission power system, the project applies the following measures:

- Construction and installation of transmission lines in accordance with electrical safety techniques and regulations.
- Install signage at tower foundation locations and along the transmission line.
- Regularly inspect and maintain safety corridors.
- Install automatic relays on the line system so that when a problem occurs, the automatic relay in the system will automatically cut off the power and the alarm system works. At that time, the operator will notify and coordinate with relevant units (if any) to fix and handle the problem.
- Coordinate with local authorities in propagating regulations on power grid corridor safety, incident prevention and response plans.
- Closely coordinate with the People's Committees of communes and relevant agencies in information and timely handling when incidents occur or affect people's lives and production.

Response measures in case of incidents:

- Rescue forces:
  + Driver/worker at the scene: be psychologically instructed (sit still in the cabin if the car is not on fire, do not step on the ground to avoid step voltage).
  + Technical staff operating the transmission line: quick access, isolation of electricity, checking the extent of damage to conductors/accessories, carrying out safe grounding procedures, repairing and replacing damaged equipment.
  + Fire and rescue police: rescue the driver/person trapped on the crane; extinguish the fire if the crane/tire catches fire due to electrical discharge.
  + Police and commune/ward police: blockade the scene, regulate traffic, remotely channel (especially when the incident occurs at the road intersection).
  + Medical Emergency (115): first aid and transport an injured/electrocuted person to the nearest medical facility.
- Mobilization equipment and means: high-voltage electrical test pens, voltage measuring equipment, high-voltage insulated boots/gloves, pole presses, wire rope winches, pickup trucks/specialized cranes in the electrical industry, ...
- Mobilization time:
  + Emergency power detection and cut-off: 0-3 minutes.
  + Alarm and call for help: 3-10 minutes.
  + Scene blockade and rescue: 10-30 minutes.
  + Survey Approach: 20-40 minutes.

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+ Site clearance and repairs: 1-4 hours or longer depending on the incident.

- Mechanism for coordination with local authorities:
  + The commune/ward police and the traffic police are mainly responsible for evacuating curious crowds standing nearby (avoiding the risk of step voltage if not fully grounded) and dividing traffic if the line section crosses the road.
  + The commune/ward police coordinated with the Power Transmission team to make a record of the incident, examine the scene, and temporarily seize the violating vehicle to investigate the act.
  + After completing the examination and pulling the violating vehicle out of the corridor, the Transmission Team conducted a technical acceptance test and announced the restoration of electrification and operation of the line.

6.1.4.9. Measures to mitigate and respond to power grid safety risks to the community

a. For power cuts, maintenance/repair and working at height near residential areas

- Establish and implement safety procedures for each maintenance and repair activity, including pre-job risk assessment, isolation/power shutoff, and pre-deployment safety confirmation.
- Establish appropriate exclusion zones below and around elevated working positions; arrange barriers, warning signs and vigilantes, not allow unauthorized persons to access areas where there is a risk of falling objects or specialized equipment in operation.
- Notify the affected authorities and communities in advance of the time, location, scope of work, and access restrictions; for emergency repairs, make notice as soon as possible.
- When maintaining near or intersecting roads, arrange a plan for channeling and controlling traffic, signage and regulators; limit road occupancy during peak hours when possible.
- Tools and materials for working at height must be fixed/anti-falling; do not lift or lower materials through areas where people or vehicles are circulating.
- Coordinate with the power system dispatching unit when implementing power cuts, choose appropriate time and operation plans to reduce the interruption time and affect the reliability of power supply.
- Once the work is completed, the barrier is removed, materials are cleared, and the site is inspected for safety before allowing community access again.

b. For the risk of public electric shock caused by contact with conductive objects near the line

- Maintain and periodically inspect line safety protection corridors, safe distances between conductors and trees, works and activities below; promptly detect and handle trees or objects at risk of violating safety distances.
- Maintain high-voltage hazard warning signs and anti-tower climbing devices at necessary locations; inspect and replace as soon as signs or equipment are damaged/lost.
- Coordinate with local authorities to periodically communicate to households and land users in/adjacent to the ROW about safe distances and dangerous behaviors, especially climbing towers, flying kites/flying objects, using ladders, metal pipes, fishing rods, agricultural machinery or high-height irrigation equipment near conductors.

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- Establish and publicize a point of contact for the community to report fallen trees, objects violating the corridor, sagging/broken wires or abnormal conditions.
- When detecting a broken conductor or falling to the ground, the area must be urgently isolated, the community must be warned not to approach or touch the relevant wires/objects, and mobilize the operating unit to handle it according to the incident response procedure.
- Record and investigate incidents/near-incidents related to public safety; identify the causes and apply remedial measures to prevent recurrence.

6.1.5. Mitigation Measures for Cumulative Impacts

a. Minimizing Cumulative Impacts (3D Flight Barriers, Bird Collisions, Noise & Magnetic Resonance, Line Maintenance Machinery):

Avoid

- The line is expanded to 6.0 km in order to eliminate all direct resonant impacts on the animal ecosystem in the conservation core area.
- The 4-phase conductor (bundle conductor) design completely eliminated corona noise from both parallel routes — eliminating the entire risk of corona noise accumulation on birds and bats.

Minimize

- Uniform clear cutting and maintenance schedule
- Agree on the clear cutting and maintenance schedule of two parallel routes to reduce the frequency of disturbances accumulated on the fauna along the corridor
- The two operation management units of Power Transmission Company 3 and Power Transmission Company 4 coordinate with each other in managing and operating the two existing 500kV Krong Buk – Tay Ninh 1 and 500kV Pleiku – My Phuoc – Cau Bong transmission lines to monitor, share operation data and respond to incidents when necessary.

Restore

- Carry out periodic review and inspection of the technical status of the line during the operation process.

b. Measures to minimize impacts on road and waterway traffic activities at intersections

In order to minimize the impact on road traffic at intersections and ensure traffic safety as well as the safety of the line, the project applies the following measures:

- At intersections with roads, the design process complies with current regulations and regulations and Decree 165/2024/ND-CP dated December 26, 2024, amended and supplemented by the Government's Decree 241/2026/ND-CP dated June 26, 2026 detailing and guiding the implementation of a number of articles of the Road Law and Article 77 of the Law on Road Traffic Order and Safety.

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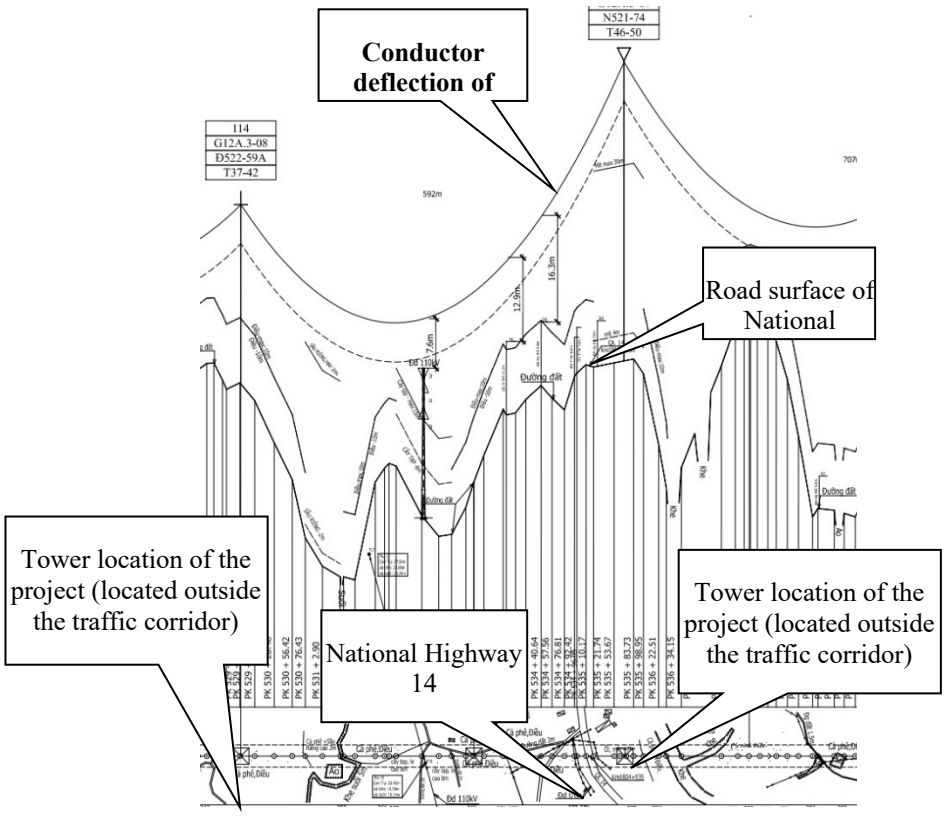


Figure 17: Longitudinal cross-section at the intersection with National Highway 14 (G12A.3-G12A.4)

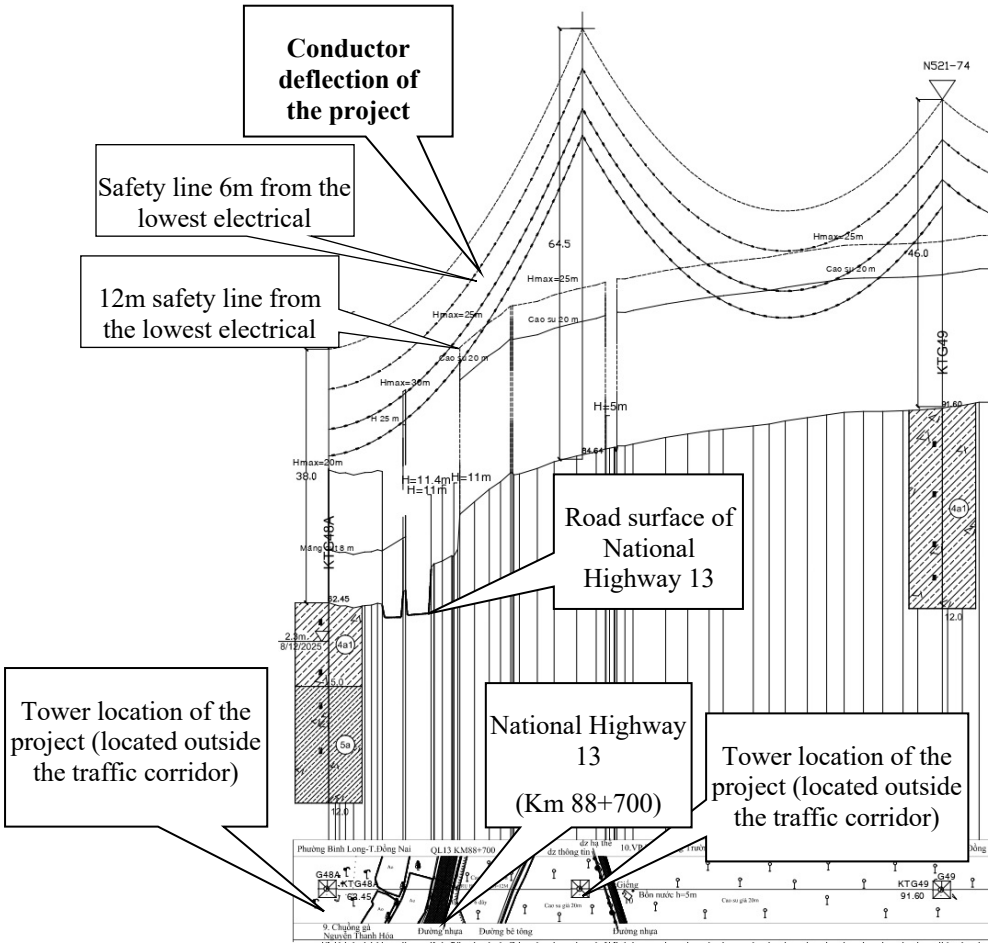


Figure 18: Vertical cross-section at the intersection with National Highway 13 (G48A-G49)

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- At the intersections with waterways, especially the crossing of Be River, Saigon River, and Serepok River, the design process ensures static and non-navigation for ships, barges, ... (taking into account the height of the flood crossing).

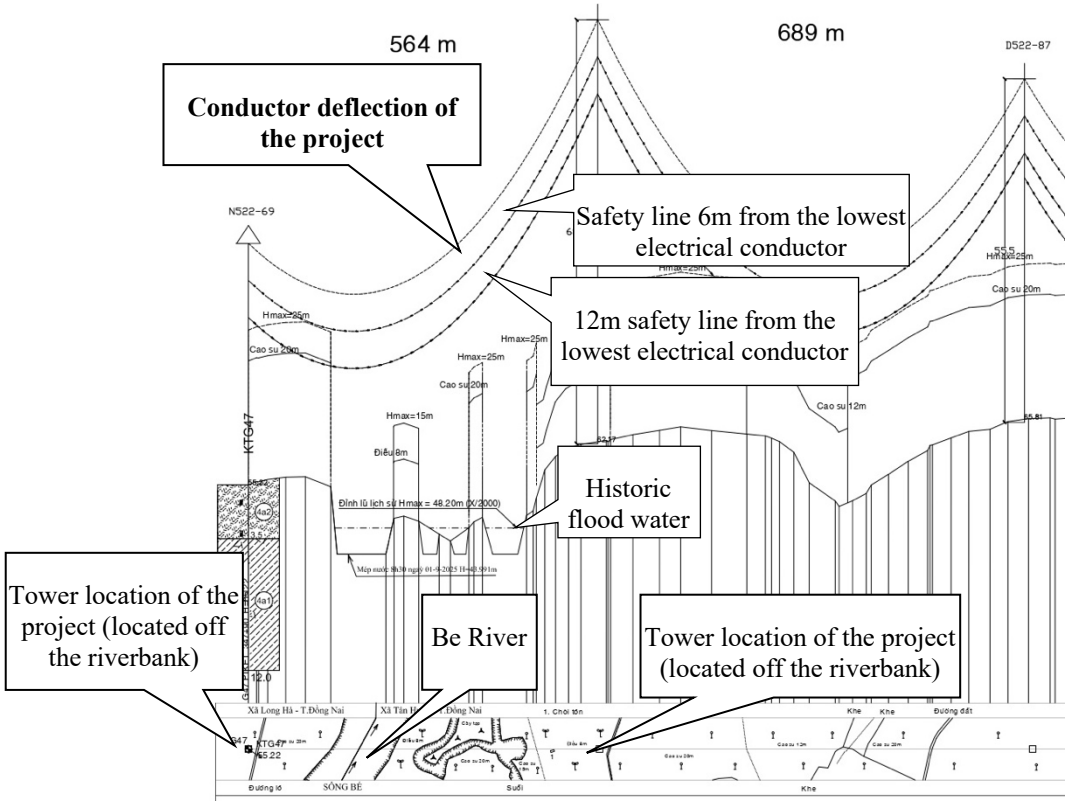


Figure 19: Vertical cross-section at the project location at the intersection with Be River (G47-G47A)

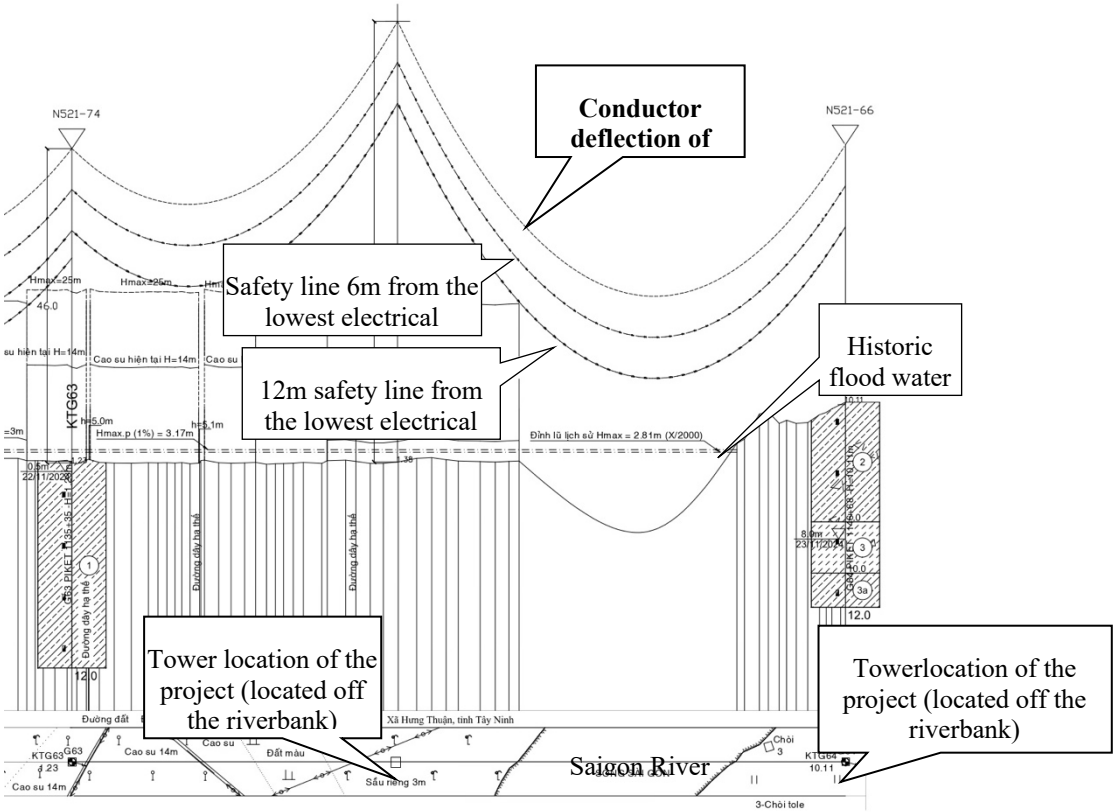


Figure 20: Vertical cross-section at the project location at the intersection with the Saigon River (G63-G64)

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- Technical elements of the line such as tower position, column foundation, tower height, non-line static, etc. are considered, designed and built in accordance with current regulations on the line to ensure circulation for vehicles and boats.
- Install signboards and warning lights at intersections, specifications and sizes in compliance with current regulations, specifically:

Safety signs for crossing roads: All signs are painted to prevent rust with 3 liners; The signs are designed according to Circular 54/2019/TT-BGTVT QCVN 41:2019/BGTVT. Each crossing of national highways and provincial sea roads is installed on the right for both directions of the road and 20-30m away from the intersection.

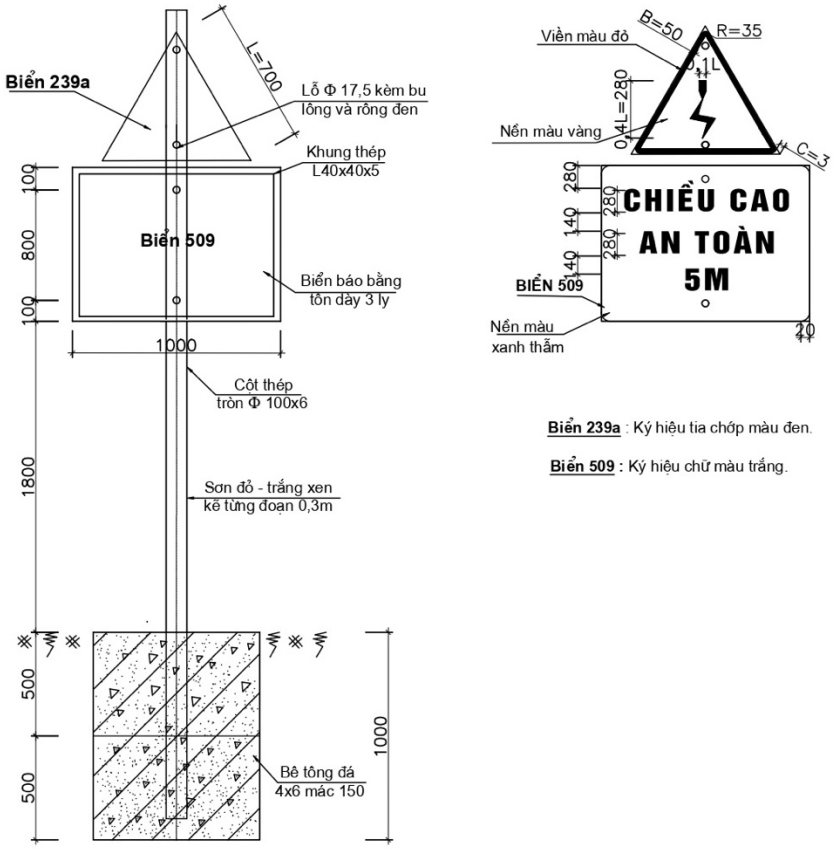


Figure 21: Safety signs for crossing roads

River warning lights: These are specialized induction lights used to warn rivers at night and have technical characteristics in accordance with the requirements of QCVN 39:2020/BGTVT dated April 17, 2020 of the Viet Nam Inland Waterways Administration; Lights are installed on the bottom electrical conductor at the lowest point in the river crossing with passing boats. Number of lights installed on the river crossing: 02 lights/tower interval.

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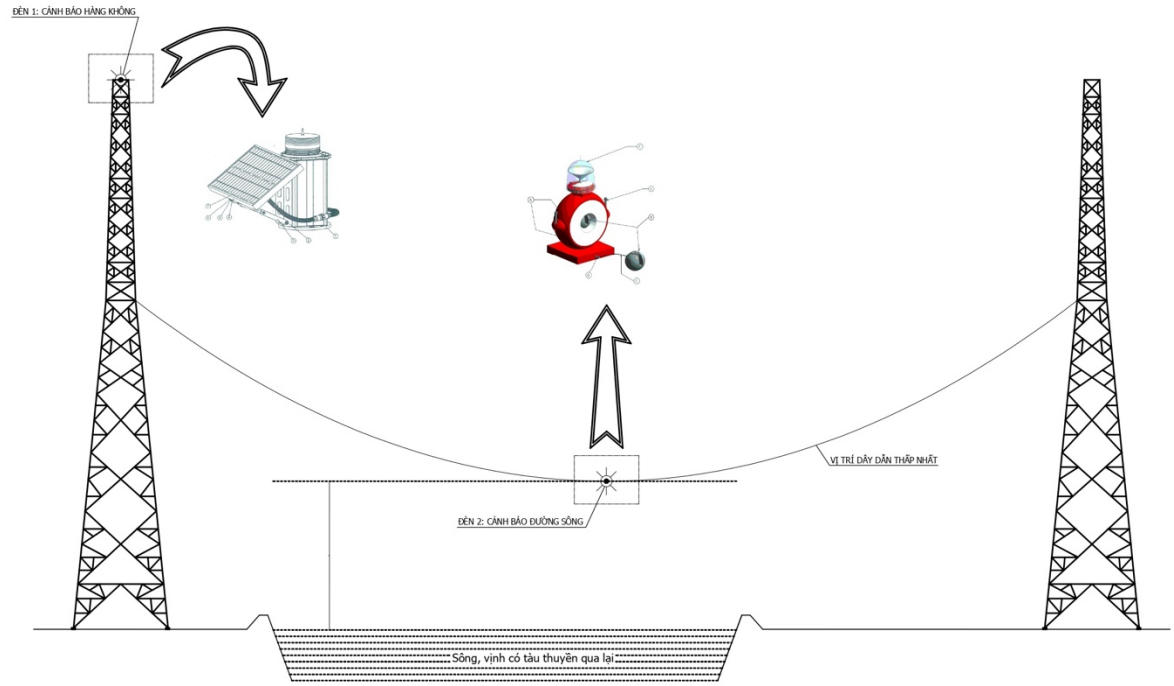


Figure 22: river warning lights, river crossing positions, and aviation warning lights

- In the process of periodic inspection of the line route, if unsafe phenomena of the line are detected (abnormal sagging of wires, damage to signs, etc.), the operator shall promptly repair and replace the equipment, so as not to cause the situation of wire breakage or loss of warning affecting the safety of vehicles and vessels at the intersection area.

c. Impacts on households in the inter-corridor zone between the two safety corridors

EVNNPT/SPMB shall:

(i) conduct a census and detailed measurement survey (DMS/IOL) to identify all households with residential structures and ancillary works located in the inter-corridor zone between the two parallel 500kV transmission lines;

(ii) notify all identified households of their entitlements in accordance with domestic applicable regulations;

(iii) conduct individual consultations with each affected household in a language and manner accessible to them, including ethnic minority households, to ensure informed decision-making;

(iv) document each household's chosen option and incorporate the results into the Resettlement Plan (RP), ensuring that entitlements are provided prior to commencement of construction in the relevant section; and

(v) ensure that grievance redress mechanisms are accessible to all households in the inter-corridor zone throughout the construction and operation phases.

6.1.6. Mitigation measures for the impacts of climate change

6.1.6.1. During the construction phase

Avoid:

- Prioritize avoiding immediate impacts from the organization of construction and site selection. Make the most of existing access roads, limit the opening of new roads and occupy temporary land; plant markers and strictly control the construction scope to avoid clearing outside the foundation area, wire pulling yards and access roads.

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- In sensitive forest/habitat sections, priority is given to overcoming trees and avoiding site expansion, thereby limiting the loss of biomass and carbon sinks. Do not burn vegetation or waste.
- Avoid the placement of excavated soil, fuel and materials in water convergences, rivers/streams, areas at risk of flooding, erosion or landslides.
- Before the work of digging foundations, cranes erecting columns, working at height and pulling ropes, it is necessary to monitor the weather forecast; do not deploy or have to stop work when there are thunderstorms, strong winds, heavy rains, the risk of flash floods, landslides or forest fires at an unsafe level.

Minimize:

- Organize reasonable routes and transportation schedules; limit vehicles from idling, start engines and transport unnecessarily; maintain machinery and vehicles to maintain fuel efficiency and monitor fuel consumption for GHG inventory.
- In sloping terrain, water collection ravines and areas near water sources, arrange temporary drainage ditches, barriers, cover excavated soil, control foundation pit water and reinforce the slope to reduce erosion, sedimentation and foundation instability.
- During the dry season, especially in sections through/near forests, strictly control fire sources, welding, fuel and arrangement of initial firefighting equipment; coordinate with forest owners, forest rangers and local authorities.
- The topsoil layer and vegetation that can be reused are collected and stored separately for post-construction restoration.

Restore:

- After completing each location of foundations, temporary roads, rope pulling yards and auxiliary grounds, materials must be cleared, terrain returned, topsoil reuse and carpet cover restored early to re-establish the function of soil retention, water permeation and carbon absorption.
- Sites of erosion, landslides, erosion trenches or drainage systems damaged by construction must be reinforced and restored.
- After a rainstorm, flood, forest fire, or extreme weather event, the contractor must inspect the construction site, treat the damage, and only resume construction when safe conditions have been restored.

6.1.6.2. During the operation phase

Avoid:

- Maintain integrated climate-resilient design solutions for columns, foundations, embankments, drainage, lightning protection, grounding and overpasses; do not change the current state of drainage or carpet covering in a way that increases the risk of erosion and landslides.
- Manage ROW according to the principle of selective clear cutting, do not cut down trees or remove vegetation while ensuring a safe distance and absolutely do not burn vegetation.
- For switchgear with SF_6, preferably sealed equipment with a low leakage rate; do not discharge SF_6 directly into the atmosphere during maintenance or dismantling.

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- Establish a list of climate-risk hotspots including foundations on steep terrain, near rivers/streams, erosion/subsidence areas, high wind exposure columns, and sections through/near forests with high fire risk to prioritize prevention.

Minimize:

- Periodic inspections and additional inspections after extreme rains, floods, thunderstorms, tornadoes, or wildfires; maintenance of foundation embankments, drainage systems, erosion prevention, slope stabilization, lightning protection, grounding, protection relays, and line fittings. Findings from post-extreme-weather inspections, including identified damage, corrective actions taken and timelines for remediation, shall be documented and included in semi-annual environmental monitoring reports submitted to the Bank.
- When detecting cracks, erosion of foundation feet, subsidence, tilting of columns, dangerous trees or abnormal rope deflection, they must be dealt with early.
- For SF_6, monitor intake, replenishment, recovery and loss; check for tightness and correct leaks before refilling; recovered gas must be reused/recycled appropriately and the loss amount converted to CO_2. Monitor transmission losses and the efficiency of releasing renewable energy sources; quantify avoided/enabled GHGs only when appropriate power figures and calculation methods are available.

Restore:

- When natural disasters or extreme weather cause erosion, subsidence, damage to embankments/foundations, broken wires, falling towers or forest fires, the operator must isolate the dangerous area, coordinate with the authorities and rescue forces, repair the works and restore the terrain, drainage, carpet cover and affected areas.
- Erosion or instability points must be sustainably reinforced rather than only temporarily repaired.
- For SF_6 incidents, the unit must be isolated, the remaining gas recovered by specialized equipment, the leak must be repaired, the amount of loss is recorded, and the unit must be returned to operation only after confirming the tightness and safety conditions. SF_6 initial charge volumes per equipment unit shall be recorded and updated in the SF_6 inventory log once final equipment specifications are confirmed, and incorporated into annual GHG monitoring reports.

6.2. ROLES AND RESPONSIBILITIES FOR ESMP IMPLEMENTATION

6.2.1. Organization of implementation

The tables and figures below summarize the roles and responsibilities of key stakeholders and their relationships in the implementation of the environmental protection plan.

- The contractor is responsible for implementing mitigation measures. Measures will be included in the bidding documents and costs will be included in the construction bidding packages.
- CSC is responsible for day-to-day monitoring of the implementation of mitigation measures, and the costs that will be included in the service contract with CSC.
- The Independent Social Environment Monitoring Consultant (IESMC) is responsible for periodic monitoring of the social environment, including assisting PMU (SPMB) in environmental monitoring and monitoring, training on environmental and social safety implementation, and reporting on the implementation of environmental protection plans through monitoring reports.

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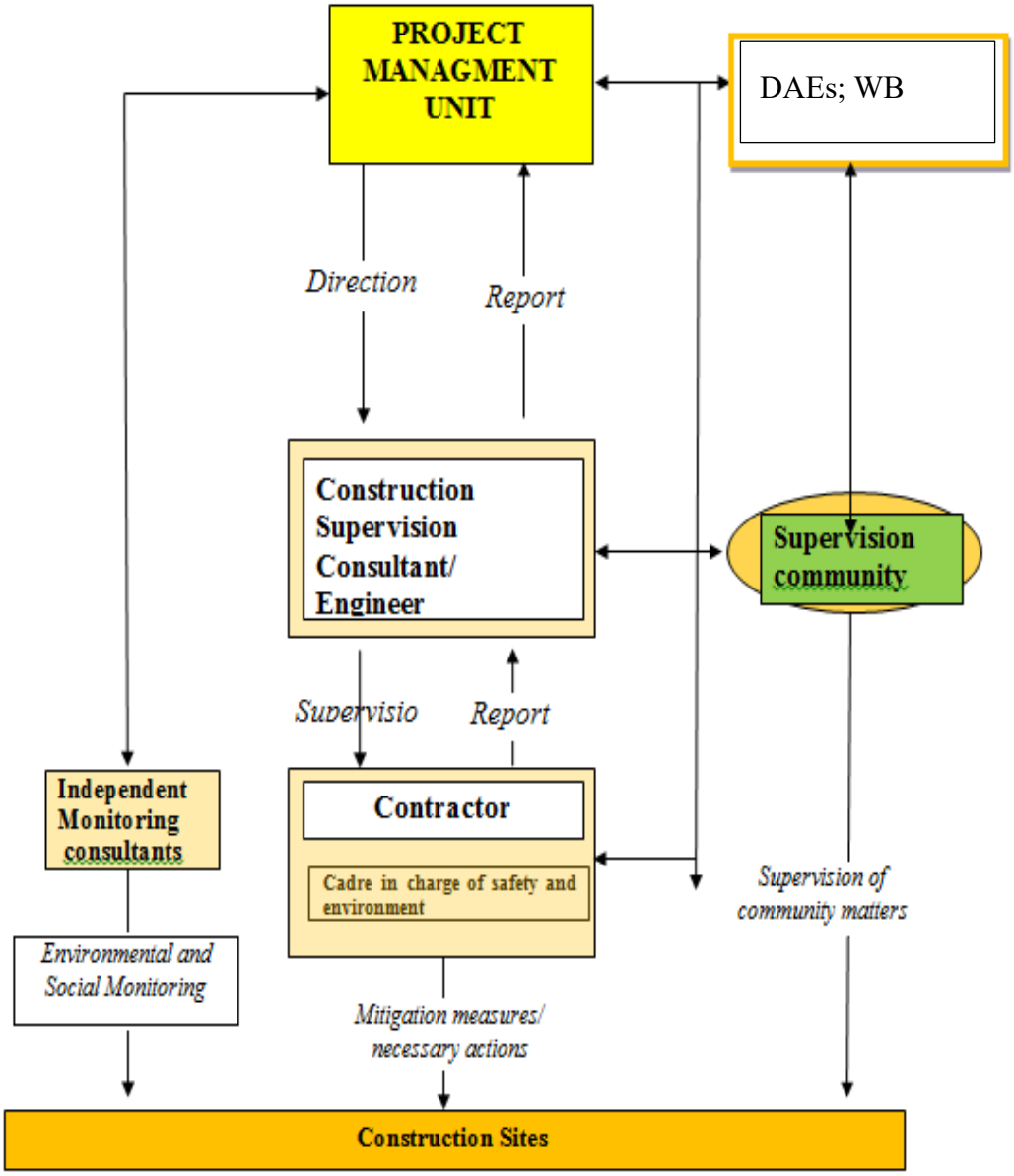


Figure 23: ESMP Implementation Organizational Chart

The roles and responsibilities of key stakeholders are outlined in the Table below.

Table 31: Roles and responsibilities of key stakeholders

Unit	Environmental and social responsibility
Investor/ Project Management Board: *Southern Power Works Project Management Board (SPMB) / National Power Transmission*	Responsible for overall supervision of the implementation of the Project, including compliance with regulations on social media. (i) Closely coordinate with local authorities in community participation in the implementation of the project; (ii) Ensure that the detailed design of the project adequately incorporates the environmental impact mitigation measures proposed in the ESMP; (iii) Supervise and inspect the full integration of ESMP contents included in bidding documents and contract documents (iv) Establish and effectively operate a social environment management system to support the implementation of ESMP

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Unit	Environmental and social responsibility
Corporation (EVNNPT)	(v) Acting as the focal point for coordinating and representing the implementation of the ESMP with the Department of Agriculture and Environment, the Ministry of Agriculture and Environment, and the World Bank. (vi) Implement and monitor measures and actions in the ESCP, and compile ESCP progress reports as part of project monitoring
Investor's Social and Environmental Officer (ESO)	Responsible for overseeing the implementation of the project's ESMP. Specifically, ESO will be responsible for: (i) Monitor the integration of ESMP requirements into detailed technical designs, construction and installation bidding documents, and contractual documents; (ii) Monitoring the integration of ESMP and RP requirements into terms of reference, bidding documents for Construction Supervision Consultants (CSCs) and Independent Environmental-Social Monitoring Consultants (IESMC); (iii) Provide input and participate in the CSCs and ISEMC consultant selection process (iv) Review of professional reports submitted by IESMC and CSC (v) Monitoring, and recommending corrective action for violations, with the professional support of IESMC (vi) Field inspections, to confirm compliance or recommend corrective actions as necessary (vii) Coordinate with the Social Environment and Environment staff at each subproject to handle issues related to social mobility and resettlement of each subproject. (viii) Consolidate the content of the implementation of socio-environmental safety in the report to the relevant agencies (DAE) and the World Bank.
Contractors	The contractor is responsible for implementing environmental, social, health, and safety (ESHS) requirements in accordance with the ESMP and related documents. Specifically: - Appoint ESHS staff and designate a focal point for receiving and addressing grievances. - Prepare the Contractor's ESMP (C-ESMP) for each construction package and submit it to the SPMB and CSC for review and approval prior to the commencement of construction. - Ensure all necessary construction permits are obtained in compliance with current regulations (e.g., traffic control permits, fire safety permits, etc.) before starting construction. - Implement mitigation measures identified in the ESMP, C-ESMP, bidding documents, etc. - Conduct training to ensure that all staff and workers understand the procedures and their responsibilities under the environmental management program. - Maintain effective communication with the community and local authorities to address issues related to construction and ESHS. - Report to the SPMB, the Technical/Environmental-Social teams at each subproject, and the CSC on progress, challenges, incidents, and corrective actions. - Coordinate with competent authorities and stakeholders to handle E&S incidents if they occur.

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Unit	Environmental and social responsibility
Independent Environmental and Social Monitoring Consultant (IESMC)	IESMC is the independent monitoring unit, responsible for supporting the SPMB in ensuring compliance with the project's environmental and social (E&S) requirements. Specifically: - Support the SPMB in establishing and operating the E&S management system. - Organize training for the SPMB, CSC, Contractors, and relevant stakeholders on the project's E&S management requirements, in order to raise awareness and strengthen implementation capacity. - Conduct regular field visits to assess compliance with the ESMP, RP, and LMP; and propose corrective and improvement measures when necessary. - Monitor the implementation of recommended corrective measures to ensure that E&S issues are fully addressed and resolved on schedule. - Arrange and organize training sessions to raise awareness on Gender/Labor influx for all Contractors, CSC teams, and SPMB staff. The cost of this training is included in the consulting service contract. - Carry out periodic environmental quality monitoring (as if) in accordance with the approved monitoring plan. - Prepare periodic consolidated monitoring reports on the implementation of the project's E&S requirements.
Construction Supervision Consultant (CSC)/ Environmental Supervisor (ES)	The CSC is responsible for regularly supervising the contractor's compliance with environmental and social (E&S) requirements during the construction phase. Specifically: - Assign qualified E&S officers to oversee the contractor's implementation of E&S mitigation measures and ensure compliance. - Support the SPMB in reporting and maintaining close coordination with the local community. - Carry out daily on-site E&S monitoring, record emerging issues, and propose timely corrective actions. - Follow up and verify the implementation of recommended corrective measures to ensure that E&S issues are fully addressed in a timely and effective manner. - Prepare monthly E&S monitoring reports and submit them to the SPMB.
Local Communities	- Participate in environmental and social monitoring activities on a voluntary basis.
Provincial Departments of Agriculture and Environment in 5 provinces/cities (DAEs)	- Monitor compliance with government environmental requirements.

6.2.2. Environmental and Social Compliance Framework

6.2.2.1. SPMB Environmental and Social Responsibility/Detailed Design Consultancy

During the preparation of the Terms of Reference for consultancy services and construction bidding documents, SPMB will also work closely with consultants to ensure: i) the division of contract packages and cost estimates including ESMP implementation, independent safety

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monitoring services, environmental sampling/compliance monitoring and monitoring, reporting, etc.; ii) ESCOP and relevant common and specific mitigation measures are included in the tender documents; iii) environmental monitoring and training are included within the scope of work assigned to the construction supervision consultant. At the feasibility study/detailed engineering design phase, SPMB will work closely with feasibility study consultants and detailed design engineers to ensure that the green/landscape, environmentally friendly solutions and relevant mitigation measures proposed in the ESIA/ESMP are reviewed and incorporated into the engineering design as appropriate. During the construction phase, SPMB will work closely with the monitoring consultant to monitor the contractor's compliance and report to the relevant authorities. SPMB will also direct the monitoring consultant and the contractor on the actions to be taken in the event of a problem, incident or accident.

SPMB is required to establish a dedicated Environmental and Social Safety Unit or Department, consisting of at least 02 full-time experts throughout the life cycle of the project, including: an Environment Specialist responsible for environmental/ecological affairs; a Social and Resettlement Specialist in charge of livelihoods, land acquisition, Complaint Resolution Mechanism (GRM) and community work. These experts must have a university degree or higher, preferably a master's degree in related fields such as Environmental Science, Water Resources Management, Sociology, Anthropology, and Occupational Safety, and must demonstrate a mastery of all 10 Environmental and Social Standards (ESS) of the World Bank. In addition, applicants should have 3 to 5 years of practical experience in ODA projects, especially those funded by the World Bank (WB) or the Asian Development Bank (ADB), to review international EIA/ESIA and ESMP reports, as well as to coordinate directly with World Bank supervisory teams.

The EO will monitor environmental issues and monitor the safety compliance of the Project. The EO will be supported by an Independent Environmental Monitoring Consultant, a dedicated ES Officer of the construction supervision team as well as contractors. The SO will supervise and coordinate the social/resettlement aspects of the Project. The SO will be supported by an Independent Relocation Supervision Consultant, the Social Officer of the construction supervision team as well as contractors.

6.2.2.2. Environmental and social responsibilities of contractors

It is the Contractor's responsibility to take measures to control and mitigate the negative impacts arising from the construction activities. The mitigation measures specified in the ESMP should be fully applied to prevent impacts on the local community and the environment during the entire construction phase. When remedial measures cannot be implemented effectively during the construction process, the Contractor should be implemented during the completion phase of the work (and prior to the issuance of the acceptance test for completion of the work). The Contractor's responsibilities include, without limitation, the following tasks:

- Comply with relevant legislative requirements governing the environment, public health and safety;
- Perform work within the scope of contractual requirements and other bidding conditions;
- Appoint representatives of the construction team to participate in the site supervision organized by the environmental supervisor (ES) of CSC;
- Implement corrective activities under the direction of the Environmental Officer (EO), Social Officer (SO) of the SPMB and the Environmental Supervisor (ES) of CSC;
- In the event of non-compliance or non-conformity, the Contractor shall conduct an investigation and propose mitigation measures, and take corrective measures to minimize the environmental/social impact;

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- Stop construction activities when these activities generate adverse impacts beyond the instructions received from EO and ES. Propose and implement repair activities, apply alternative construction plans if necessary to minimize environmental impacts; The Contractor's failure to comply with the requirements may cause the construction to be suspended or receive some other penalties until this issue is resolved to the satisfaction of the requirements of EO and ES;
- In the event that the contractor proposes to use raw material sources not covered by ESIA, the contractor will report to the CSC and SPMB and coordinate with them to carry out an environmental assessment of these raw material sources to assess their compliance with national environmental requirements. Only compliance sources may be used under this project;
- The contractor shall: (i) survey the potentially affected works and record the current status before construction; (ii) conduct piling experiments to determine the scope of impact; (iii) control the strength of piling; (iv) organize the relocation and support the cost of renting houses for temporary residence, or arrange long-term resettlement if the area is at risk of unsafety; and (v) make compensation for cases that are not subject to relocation but are still affected without support;
- The Contractor shall be responsible for implementing the remedies at its own expense. The Contractor shall also be responsible for the payment of the costs of damages resulting from non-compliance with the ESMP and/or applicable environmental regulations.

6.2.2.3. Contractor's Environmental and Social Management Plan (C-ESMP)

After signing the contract, the contractor will be required to prepare and submit a Specific Social and Environmental Management Plan (CESMP) Contractor for each contract package and submit it to the CSC and SPMB for review and approval. The deadline for making and submitting the C-ESMP is within 28 to 30 days from the date of signing the contract or from the date of receipt of the Letter of Acceptance, as specified in the Specific Conditions of Contract (PCC) and the Bidding Documents.

The objective of the Contractor's Social and Environmental Management Plan (CESMP) is to provide information for environmental management in the proposed jobs/activities on the project site. This is to ensure that the Contractor (and any subcontractors) with minimal environmental impacts must have an environmental management plan on the sites. The CESMP will detail how the contractor will mitigate the impact of construction activities and record the contractor's feedback for inspection, monitoring, verification, internal inspection, and repair or improvement of environmental conditions that must be adhered to. The CESMP must be site-specific and must include details of the controls that will be implemented on-site to mitigate any potential environmental impacts from the proposed jobs/activities. If the works/activities proposed in the CESMP are changed in the Contract, the CESMP will be requested by the Contractor to revise them to reflect these changes or modifications. The content of the CESMP must include the following contents:

(i) Applicable policies/regulations, providing a definition of the Contractor's environmental policy and an indication of the Contractor's commitment to implement the Environmental Management Plan on site.

(ii) Brief document description; Date of issue; Revision status; Distribution list; and preparation of personnel and access details.

(iii) Applicable laws and regulations regarding the requirements in the project's ESMP. Identify contractor licenses, permits, and approvals related to CESMP.

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(iv) Details of how the environmental and social impacts identified in the ESIA will be managed on-site, including: 1) specific measures in place to mitigate impacts during construction; 2) ESCOP; 3) ESMP contractor that will be developed after the contractor is selected and before construction begins; and 4) The contractor dredging management plan that the contractor is required to prepare.

(v) Detailed environmental and social training that all contractor's employees (including subcontractors) must undertake. At a minimum, all contractor employees working at project locations must: i) be familiar with and understand the CESMP for the work; ii) be aware of their environmental responsibilities and legal obligations on the construction site; and iii) undertake health and safety and emergency response training.

(vi) The specific capabilities, support mechanisms, and resources required to implement the CESMP satisfactorily. The detailed environmental responsibilities of all contractor staff including subcontractors working on-site with the appropriate knowledge, skills, and training for specific tasks will be determined.

(vii) The contractor is responsible for preparing monthly environmental reports, as part of the Progress report required in the tender document, including an ad-hoc report if any, for submission to the project owner. The content of these reports may include the following details:

- The Contractor's CESMP implementation plan complies with the agreed program;
- Point out any difficulties encountered in implementing CESMP and recommendations to overcome them for the future;
- Indicate the number and non-compliant activities and recommend corrective action;
- Reports from Subcontractors related to the implementation of the CESMP, including minutes of meetings and discussions held by the Contractor.

6.2.2.4. Contractor's Safety, Social Environment Officer (C-ES)

Construction Contractor's Safety and Environment Officer: The Contractor is required to appoint a qualified individual to serve as a Safety and Environment Officer (C-ES) on site. (C-ES) must be trained in environmental management and have the necessary skills including imparting environmental management knowledge to all employees involved in the contract. (C-ES) will be responsible for monitoring the contractor's compliance with the requirements of the Environmental Management Plan and environmental technical instructions. The responsibilities of the (C-ES) include:

- Perform on-site environmental monitoring to evaluate the Contractor's implementation of the ESHS field, tooling and construction methods related to pollution control and the adequacy of the implementation of environmental impact mitigation measures.
- Monitoring compliance with environmental protection solutions, pollution prevention, control methods and contractual requirements.
- Monitoring the implementation of solutions to reduce environmental impact.
- Prepare audit reports for environmental monitoring data and environmental conditions in the field.
- Investigate complaints and propose remedial options.
- Advising the Contractor on environmental improvement, awareness and pioneering implementation of pollution prevention solutions.

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- Propose appropriate mitigation solutions for the Contractor in case of violation. Conduct additional supervision of violations, according to the instructions guided by /ES of the SPMB and CSC.
- Notify the Contractor, ES (SPMB and CSC) of environmental issues, submit the ESMP Implementation Plan report of the Contractor to the ES of SPMB and CSC, and relevant agencies, if necessary.
- Keep detailed records of field activities that are related to the environment.
- Use or designate qualified personnel to take the actions and measures necessary to ensure labor-related issues, such as the occupational health and safety specialist(s) to manage OHS issues.
- Preparation of labor management process (contractor LMP) and C-ESMP (CONTRACTOR ESMP including OHS regulations) will apply to contract workers working on projects.
- Submitting the Contractor's LMP and C-ESMP to the SPMB/CSC for review and approval before commencing the dispatch of staff to the project site for the assigned tasks.
- Supervising the subcontractor's construction work, including the Contractor's implementation of LMP and C-ESMP.
- Keeping records of employment and employment for contract workers (including subcontractors), including documentation verifying the minimum working age as specified in this LMP.
- Regular training for contract workers on issues, but not limited to, such as occupational safety and health and other social risks such as GBV, SEA/SH, codes of conduct to maintain good relations with the local community, etc.
- Require the supplier to identify and address the risks of child labor, forced labor, GBV, SEA/SH, and occupational health and safety for key workers.
- Develop and implement the GRM-based complaints mechanism set out in this LMP for contract workers, including ensuring that complaints received from contract workers are resolved in a timely manner, and reporting the status of complaints and settlement to the CSC and SPMB. This complaints mechanism will be part of the Contractor's LMP.
- Ensure that all contractor and subcontractor workers understand and sign the Code of Conduct before starting work.
- Take all necessary measures to address the risks of sexual exploitation and abuse (SEA)/sexual harassment (SH) as specified in the contractor's LMP/C-ESMP and ensure full implementation of these measures.
- Promptly report to the SPMB incidents occurring at its construction site and the implementation of labor work, occupational safety and health.

Incident Reporting

Contractors must notify the Construction Supervisor and the Employer of any of the incidents listed below within the agreed time frame:

- Any violation of national laws, regulations, or international agreements.
- Any serious accidents or fatalities.
- Significant impacts resulting in personal property damage, such as traffic accidents, damage to houses/roads, or other incidents.
- Severe surface water/groundwater pollution.
- Failures of dikes/embankments at temporary disposal sites causing serious environmental

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pollution.

- Forest fires linked to worker behavior or labor influx.
- Any complaints related to sexual harassment, child abuse, or other child-related incidents.
- Complaints received regarding pollution or damages.

6.2.2.5. Independent Social Environment Monitoring Consultant (ISEMC)

The Independent Environmental and Social Monitoring Consultant (ISEMC) will be contracted with SPMB to provide a number of environmental protection training courses for SPMB officials and to carry out environmental inspections. ISEMC will carry out monitoring, including:

- Providing support to SPMB to establish and operate environmental and social management systems, coordinating with the CSC team to train the Contractors on the environmental management requirements of the project.
- Organizing training courses and implementing capacity building activities for SPMB, CSCs, contractors and stakeholders on ESHS during the implementation of the Project. In particular, training content is implemented to raise awareness of Gender/Labor Flow for employees of the Contractor, CSC and officials of SPMB.
- Conduct random field inspections to certify compliance or recommend corrective/improvement actions in a timely manner.
- Assessment of environmental quality in areas affected by construction activities (including site observation, review of environmental quality data provided by CSC, review of other available documentation, and additional sampling if necessary).
- Review the contractor's environmental compliance, including the implementation of mitigation measures and related documentation.
- Review the ESMP compliance of SPMB and CSCs.
- Review the Project Management Board's compliance with the Resettlement Plan (RP) and the Ethnic Minority Development Plan (EMDP).
- IESMC will also provide guidance and technical assistance to SPMB and EOs related to environmental and social issues.

Conduct unscheduled field inspections when:

Environmental incidents or serious accidents: When there are reports of incidents such as oil spills, hazardous chemical leaks, serious riverbank/canal landslides, or dike breaks that cause sudden changes in water quality and ecosystems; when serious occupational accidents (death or serious injury) occur at construction sites; or when incidents directly threaten the lives and property of local people (e.g., cranes hit power lines or construction materials fall on people's houses).

Urgent complaints from the community: Through the Complaint Settlement Mechanism (GRM), when there is an urgent report or strong complaint from the public about construction activities that seriously affect their lives: cracking or collapsing the structure of the house due to vibration of piling stones, construction noise at night causing insomnia, obstructing travel without arranging alternatives, or causing loss of domestic water/irrigation.

There are signs of serious violations of the Environmental and Social Management Plan (ESMP): When the Construction Supervision Consultant (CSC), the local government or the press discovers and reports that the contractor repeatedly and knowingly fails to implement environmental protection measures: illegally dumping dredged sludge or construction waste

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outside the designated area, discharging untreated wastewater directly into canals, or failing to provide personal protective equipment (PPE) to workers in hazardous jobs.

Risks after natural disasters or extreme weather: Immediately after major storms, floods, or abnormal high tides, the Independent Consultant may conduct an unscheduled site inspection to assess the integrity of temporary environmental protection works (such as dikes, fenders, material gathering areas) and consider secondary erosion risks.

At the direct request of the Investor or the World Bank (WB): When SPMB or the World Bank's supervisory delegations determine that there are potential risks that have not been fully assessed or need to independently verify sensitive environmental and social information before making a decision on disbursement or suspension of construction.

6.2.2.6. Responsibilities of the Construction Supervision Consultant (CSC)

During the construction phase, the Construction Supervision Consultant (CSC) who is qualified as required by SPMB will carry out environmental monitoring. The CSC will assign the Environmental and Social Officer(s), who will be responsible for inspecting and monitoring all construction activities to ensure the mitigation measures applied in the ESMP are properly implemented and the negative environmental and social impacts of the Project are minimized. The CSC will recruit a sufficient number of Environmental Supervision Engineers with sufficient knowledge of environmental protection and construction project management to perform the necessary tasks and monitor the Contractor's execution. Specifically, the ES of the CSC will:

- Review and evaluate on behalf of SPMB whether the construction design meets the requirements of the measures to mitigate and manage impacts in the ESMP.
- Review and approve the Contractor's Environmental Management Plan (CESMP).
- Coordinate with the SPMB's Environmental Officer (EO) in reviewing environmental compliance at the proposed new material mines and quarries and advise SPMB on whether these mining projects are eligible for use by the Project.
- Verify and confirm with the environmental monitoring procedures of SPMB. parameters, monitoring positions, equipment and monitoring results.
- Monitoring the contractor's implementation of the CESMP includes enforcement, recommending additional measures in a timely manner to finalize the impact mitigation measures, and providing corrective instructions. If the contractor commits a serious violation (e.g., a fatal occupational accident, chemical leak or large-scale oil spill, or repeatedly fails to comply with the Non-Compliance Notices), the CSC reserves the right to suspend the relevant construction item until the risk is fully remedied. In addition, the CSC reserves the right to propose that the Employer withhold a portion of the contractor's payment until the violation is resolved.
- Arrange and implement HIV/AIDS awareness training for all workers, employees of the CSC team and officials of the SPMB.
- Conduct sampling of environmental quality monitoring and prepare periodic environmental monitoring reports, including reports on the implementation of ESMP to SPMB and prepare environmental monitoring reports during the construction phase.
- Review payment requirements related to environmental mitigation costs, if any.

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6.2.2.7. Compliance with laws and contractual requirements

The construction activities will comply not only with the requirements of pollution control and environmental protection in the contract but also with the laws on pollution control and environmental protection of the Socialist Republic of Viet Nam.

All reports on construction measures submitted by the Contractor to the CSC for approval will also be sent to ES to review whether the pollution control and environmental protection solutions have been fully covered.

The ES will also review the progress of the implementation of the items to check whether there is a violation of the relevant environmental laws, so that the risks of violating the law can be prevented.

The Contractor will periodically make copies of the relevant documents sent to the Environment and Social Protection Officer of SPMB and CSC. These documents shall at least include the Construction Progress Report, the Updated Construction Measures, the application for a permit/registration under the environmental protection law, and all valid permits/registrations. The CSC's CSC Site Social Welfare Officer (C-ES) and CSC will also be entitled to use the Site Log, upon request.

Upon receipt of these documents, the SEO and ES will advise the environmental officer of SPMB (EO) and the Contractor on cases of non-compliance with the law and the requirements of the environmental protection and pollution control contract, in order to direct further activities. If the SEO and ES conclude that the application for licensing/registration or any preparatory work for pollution control and environmental protection may not comply with the construction measures, or may lead to a possible violation of the requirements of pollution control, environmental protection, advise the Contractor and SPMB.

6.2.2.8. Environmental Complaints and Sanctions System

The Bidding Documents will require the Contractor to arrange an Environmental, Social, Health and Safety (ESHS) Enforcement Assurance in the amount of 1 to 3% of the contract value. In the event that serious non-compliance, environmental pollution or social issues are detected and the Contractor fails to repair them within the allowable time frame, the budget from the ESHS Performance Assurance source will be used to make payments to the third party mobilized by SPMB to resolve these issues.

In addition, if the CSC/ES/ISEMC/SPMB finds that the contractor is not complying with the contractor's ESMP or environmental and social regulations during the field monitoring, the contractor's monthly temporary payments may be withheld according to the severity of the violation through the sanctioning system which is classified into four levels:

(I) Level 1 includes minor non-compliances with localized, small-scale impacts that are easily rectifiable immediately without leaving long-term consequences on the environment or the community, such as workers not fully wearing personal protective equipment (PPE) in low-risk areas, indiscriminate disposal of domestic waste in temporary camps/yards, or trucks transporting tower foundation materials spilling a small amount of soil/gravel without immediate cleanup;

(II) Level 2 includes moderate non-compliances where impacts extend beyond a narrow scope, causing recoverable environmental harm or nuisance to the community, or recurring Level 1 non-compliances despite warnings, such as oil/grease leakage from excavation machinery/generators at tower sites, uncontained dust emissions during material transport, minor opening of access tracks beyond approved boundaries, or failure to set up basic safety barriers/warning signs at foundation construction sites;

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(III) Level 3 includes severe non-compliances causing clear and widespread environmental damage, directly threatening community or worker health and safety, leading to serious grievances, or recurring Level 2 non-compliances, such as serious occupational accidents resulting in fractures or disability, vegetation clearing/tree felling outside approved boundaries, construction activities causing slope instability/erosion that impacts adjacent agricultural land without timely rectification/compensation, or unauthorized burning of cleared biomass/waste posing forest fire risks; and

(IV) Level 4 includes catastrophic non-compliances involving disaster incidents, irreversible environmental damage, severe violations of national laws, or complete non-compliance with work suspension orders, such as fatal occupational accidents, structural failure/collapse of 500kV towers during erection/stringing, triggering major forest fires within the Right-of-Way (RoW), trespassing into special-use forest boundaries / strictly protected zones, or using child labor or forced labor.

For level 1 and 2 violations, administrative penalties and direct deductions may be applied to that month's payment, while for level 3 and 4 violations, immediate suspension of construction activities in the items or areas where the violations occurred.

The Contractor will be granted an extension of time (at the discretion of the CSC/SPMB) to remedy the non-compliance. If the Contractor satisfactorily performs the repairs during the grace period (confirmed by the CSC/SPMB), no penalty will be incurred and the repair money will be paid to the Contractor. However, if the Contractor fails to successfully carry out the necessary repairs during the grace period, the Contractor will pay the cost to the third party to repair the damages (deducted from their payment).

In case IESMC/CSC/SPMB does not detect the contractor's non-compliance with environmental regulations, these units must be responsible for paying the cost to repair the violations.

Based on this Environmental and Social Compliance Framework including the penalty system, CSC will develop a detailed penalty system for environmental and social non-compliance and submit it to the SPMB for approval for implementation.

6.3. REPORTING MECHANIZM

SPMB is responsible for conducting internal monitoring of the implementation of the reporting regime. In addition, SPMB will hire an independent monitoring agency to carry out independent monitoring of the implementation of the resettlement plan (RP) and to assess the living standards of the affected persons during and after the completion of the resettlement.

Both internal and independent monitoring will be carried out regularly during the construction phase (on a monthly basis for internal monitoring and six months for independent monitoring). A post-project assessment of the implementation of the relocation plan is mandatory and a report will be prepared to confirm whether the objectives of the project have been achieved.

Tools for monitoring and reporting on ESMP implementation are summarized in the Table below.

Table 32: Reporting mechanism

No.	Report prepared by	Submit to	Reporting frequency
1	Contractor		Immediately if a project-related incident or accident has occurred that has or is likely to have a significant adverse effect on the environment, the affected community, the

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No.	Report prepared by	Submit to	Reporting frequency
		CSC	public, or workers. Monthly report on C-ESMP compliance.
2	Construction Supervision Consultant (CSC)	SPMB	Immediately if a project-related incident or accident has occurred that has or is likely to have a significant adverse effect on the environment, affected community, the public, or workers. Monthly reports on contractors' compliance with C-ESMP.
3	Local Communities	SPMB	When receiving complaints related to the implementation of the project's safety tools.
4	Independent Environmental and Social Monitoring Consultant (IESMC)	SPMB	Once every 6 months (quarterly) according to TOR.
5	Project Management Board (SPMB)	WB	**Monitoring and reporting** The Contractor and CSC must submit monthly environmental and social performance monitoring reports throughout the project implementation. IESMC must submit the Quarterly Environmental Monitoring Report and the Social Monitoring Report every six months to the Bank no later than seven (07) days after the end of each reporting period; the monthly reports of the contractor and CSC must be attached as an appendix to the respective quarterly report and made available to the Bank upon request. All reporting activities must comply with the Loan Agreement and ESCP. **Incidents and accidents** Any incident or accident that causes or is likely to cause a significant adverse effect on the environment, community, the public or workers, including death or injury, violence, discrimination, protests, impacts on cultural heritage or biodiversity, pollution, dam breakdowns, forced or child labour, forced relocation, allegations of SEA/SH or disease outbreaks, must be notified to the Bank within 48 hours together with the available information as required. A root cause review must be carried out and a Corrective Action Plan must be agreed with and submitted to the Bank within 10 days of the initial notification, unless otherwise agreed in writing.

6.4. ENVIRONMENTAL MONITORING AND MONITORING PROGRAM

6.4.1. Supervision during the construction phase

The environmental management and monitoring will be presided over by SPMB with the support of consultants or service units.

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Table 33: Environmental monitoring during the construction phase

No.	Monitoring content	Monitoring Parameters/Contents	Frequency/Timing	Locations and regulations/reference requirements
1	Monitoring of domestic solid waste, general industrial solid waste and hazardous waste	Generated volume; classification, storage and handover of treatment of domestic waste, ordinary industrial waste and hazardous wastes.	03 months/time during the construction process.	06 positions of tower foundations are under construction at the time of supervision. Comply with: Decree 08/2022/ND-CP; Decree 05/2025/ND-CP; Decree 48/2026/ND-CP.
2	Supervising site cleanup and site return	The site clearance and return of the site after construction.	After the completion of construction activities.	The construction locations of the tower foundation of the line.
3	Supervision of the area of the line passing through natural forests and protection forests	Compliance with the boundary markers of the construction scope; the felling of forest trees; management of post-luminescence vegetation.	When there are construction activities at the section of the route passing through natural forests and protection forests.	The construction locations of tower foundations at the section of the route passing through natural forests and protection forests.
4	Supervision of the construction area of pulling the rope across the river	Signs of oil leakage, oil spill from construction equipment; boat and boat accidents; drowning accidents.	When there is an activity of pulling the rope across the river.	The rope pulling positions cross the Saigon River, the Be River and the Serepok River.

6.4.2. Monitoring during the operation phase

After completing the construction of the project's work items, the project owner will hand over to relevant units for management, operation and maintenance of the port in accordance with regulations. The operation management unit complies with annual environmental mitigation measures and supervises in accordance with environmental protection requirements.

Table 34: Environmental monitoring during the operation phase

No.	Monitoring content	Monitoring Parameters/Contents	Frequency/Timing	Locations and regulations/reference requirements
1	General Industrial Solid Waste Monitoring	Generated volume; classification, storage and handover of	When there are corridor maintenance	Along the line route. Comply with: Decree 08/2022/ND-CP; Decree 05/2025/ND-CP; Decree 48/2026/ND-CP.

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		normal industrial waste treatment.	activities (01 year/time).	
2	Electric Field Monitoring	Electric field.	01 year.	06 locations intersecting with traffic roads, where houses live along the road and near the safety corridor: DT1: National Highway 14, G12A.3–G12A.4, Cu Jut commune, Lam Dong; DT2: DT760, G36–G37, Bom Bo commune, Dong Nai city; DT3: DT757, G45–G45A, Long Ha commune, Dong Nai city; DT4: National Highway 13, G48A–G49, Binh Long ward, Dong Nai city; DT5: DT744, G55B – G56B, Dau Tieng commune, Ho Chi Minh City. HCMC; DT6: DT789, G62–G63, Hung Thuan commune, Tay Ninh.So Province: QCVN 25:2016/BYT.
3	Monitoring the risk of subsidence, subsidence, erosion, and flooding	Signs of landslides, subsidence, erosion and flooding at the tower bases.	Annually and during thunderstorms, tornadoes, or unusual weather phenomena.	Locations at the foot of the tower of the line, concentrated where there is a risk. Requirements: timely detection of phenomena/risks for appropriate and timely remedial measures.

6.5. TRAINING AND CAPACITY BUILDING PROGRAM ON ENVIRONMENTAL AND SOCIAL MANAGEMENT

The table below provides a sample training program on safeguard policies. The training programs will be developed and conducted by a Technical Assistance Group to implement safeguard policies for SPMB. SPMB/IESMC, with support from the Technical Assistance Group, will provide training for environmental and social staff of contractors, CSCs, and other groups.

- Trainee groups: SPMB management staff and environmental-social officers, Construction Supervision Consultants (CSCs), construction contractors, SPMB procurement officers, representatives of stakeholders, and local communities in the project area.
- Training schedule: Training will be organized at least one month before the implementation of the first construction contract. Subsequent training sessions may be adjusted to align with the construction schedule of project components.
- Training frequency: The basic training programs outlined in the table below will be delivered every 6 months, with content updated and tailored to the components under implementation. Training for SPMB staff is expected to continue during the initial years of the Project. Three-day training sessions for CSCs and contractors are also expected to be held twice a year for at least 2 years.

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Table 35: Training and capacity building programs in environmental and social management

Module 1: Training for Environment and Social Affairs (E&S) Officers of SPMB	
Training Course	- The project will provide training for SPMB's E&S staff as part of the SPMB's capacity building activities on ESF requirements and related tools. - E&S (Environment and Society) training for SPMB staff plays an important role in project risk management, focusing on the World Bank's Environmental and Social Standards (ESS), complaint resolution mechanisms, stakeholder involvement, labor/working conditions and standards, as well as contractor supervision. Training includes implementation of E&S tools, management of ESHS implementation results, codes of conduct (such as SEA/SH), and reporting; training plans will be developed after the project takes effect.
Students	- Appointed E&S Officer and other relevant officials of SPMB
Implementation Time	- Initial training will be held within 03 months from the effective date of the project. - Periodic training will be held at least once a year and as necessary during the implementation of the project.
Duration	02 days
Contents	- E&S Risk Management: Understand and apply the World Bank's Environmental and Social Framework (ESF) and Environmental and Social Standards (ESSs). - Project specific tools: Implementation of the Environmental and Social Management Plan (ESMP), Stakeholder Engagement Plan (SEP), Labour Management Process (LMP) and Resettlement Plan (RP). - Complaint resolution mechanism: Efficient handling of complaints and feedback. - Stakeholder Engagement: Identify stakeholders and conduct meaningful consultations. - Contractor Management: Ensure contractors fulfill E&S requirements. - Code of Conduct: Training on rules related to Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH). - Reporting and monitoring: Preparing reports on the results of E&S implementation and notifying incidents.
Lecturer	- IESMC with the support of World Bank E&S experts
Module 2: Training for CSC ESHS Officers and Contractors/Subcontractors	
Training Course	- Implement and monitor compliance with ESF tools, including ESMP, CESMP, LMP, SEP, and RP.
Students	- Site Manager and ESHS Officer of the Contractor; ESHS Officer and Field Engineer of CSC.
Training Frequency	- Immediately after awarding the contract to the contractors. - Additional training depends on training needs.
Duration	▪ 02 days
Contents	- The Project's environmental and social management process. - Site management and pollution control. - Occupational Health and Safety, and Public Health and Safety. - Management of working and working conditions.

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	- GBV/SEA/SH risks, preparedness and response. - Complaint settlement mechanism.
Lecturer	▪ SPMB and IESMC
Module 3: ESHS Training for Contractor/Subcontractor Workers	
Training Course	- ESHS (Environmental, Social, Health and Safety) training includes mandatory site-specific instruction, periodic on-site safety briefings and specialized training on hazards such as fall protection, risk communication and the use of PPE, to ensure compliance with national policies, regulations and WB ESS through programs including site regulations, risk assessments and emergency response procedures to promote a safe working environment for all workers.
Students	- Representatives of employees (team leaders) and all workers at the construction site.
Training Frequency	- Before the start of construction activities and periodically every six months during the construction period. - Daily team meetings to remind OHS compliance before starting work.
Duration	▪ One day of presentations and one day of on-site instruction
Contents	- Initial Training: All workers must complete a general on-site instruction course before starting work, including basic regulations, emergency contact information, and site diagrams. - Daily briefings: Short, frequent pre-shift briefings to discuss specific job hazards, safety practices, and reinforce ESHS policies. - Job-specific training: Focus on site-specific risks such as confined spaces, heat-generating work, LOTO, and heavy equipment operation. - Hazard Communication (HazCom): Training in chemical safety, understanding Safety Data Sheets (SDS), and proper labeling. - Personal Protective Equipment (PPE): Proper selection, use, and maintenance of required PPEs (helmets, gloves, respirators, etc.). - Emergency Response: Procedures for fires, medical emergencies, spills, and evacuation plans. - The Code of Conduct, which includes regulations on stakeholder engagement, security management, and general E&S regulations applies to all personnel, including contractors and subcontractors. - Training to raise awareness about SEA and GBV.
Lecturer	- ESHS Officer of the Contractor/Subcontractor. - Designated E&S Officer of the SPMB with the support of IESMC if needed

6.6. COST ESTIMATE FOR IMPLEMENTATION OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

6.6.1. Cost estimates for environmental monitoring programs

According to the unit price of local environmental monitoring, the estimated cost of monitoring the environmental quality of the project is shown in the table below.

Table 36: Estimate of sampling and analysis costs during the construction phase (1 year)

No.	Monitoring content/cost	Location/Range	Times/Quantity	Unit Price(VND)	Money	
					VND	USD(1 USD =

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						27,000 VND)
1	Environmental monitoring activities during the construction phase	By Locations/Scope of Supervision	04 times/year	5,000,000/time	20.000.000	740,74
2	Writing and submitting environmental monitoring reports	Report to the competent authority/specialized agency on environmental protection	02 times/year	50,000,000/time	100.000.000	3.703,70
TOTAL		—	—	—	**120.000.000**	**4.444,44**

Note: The above cost does not include the cost of conventional industrial solid wastes monitoring and monitoring of the risk of subsidence, subsidence, erosion, and flooding.

Table 37: Estimate of sampling and analysis costs during the operation phase (1 year)

STT	**Monitoring content/cost**	**Location/Range**	**Times/Quantity**	**Unit Price(VND)**	**Money**	
					VND	**USD(1 USD = 27,000 VND)**
1	Electric Field Measurement	06 locations along the route	06 positions/time × 01 time/year	1,000,000/position	6.000.000	222,22
2	Writing and submitting environmental monitoring reports	Report to Competent Authority/Sponsor	01 time/year	50,000,000/time	50.000.000	1.851,85
TOTAL		—	—	—	**56.000.000**	**2.074,07**

6.6.2. Cost estimate for IESMC

According to the project implementation schedule from 2027 to 2028 and the requirement to mobilize an Independent Environmental and Social Monitoring Consultant (ISEMC) periodically during the construction process, the cost of ISEMC is expected **to be about VND 2.0–2.5 billion** (equivalent to the entire phase. This cost includes:

(i) the salary of experts is about 1.1-1.3 billion VND;

(ii) management costs are about VND 0.20-0.25 billion;

(iii) the cost of field and supervision during the construction process is about VND 0.50–0.65 billion; and

(iv) Other expenses such as training, training, electricity and water, communications, stationery, printing reports and other necessary administrative expenses are about VND 0.20-0.30 billion.

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Note:

- The above funding level is a preliminary estimate for the preparation of ESIA/ESMP and needs to be updated at the time of construction of TOR, estimate and selection of ISEMC consultant based on the actual construction progress, number of supervision rounds, structure and time of mobilization of experts, geographical scope of bidding packages and unit price at the time of implementation.
- Independent environmental and social monitoring mobilization experts need to be inclusive of environmental, social, gender, and biodiversity domains to align with the environmental and social issues of the project.

6.6.3. Estimate the cost of the training program

According to the project implementation schedule (from 2027 to 2032) and the requirement to mobilize IESMC and CSC periodically as well as the expected number of bidding packages. The estimated cost for the training program on environmental/social supervision management capacity is presented in the following table.

Table 38: Estimate the cost of training

(Exchange rate: 1 USD = 27,000 VND)

Training content	Trained Subjects	Unit of calculation	Quantity	Unit Price(VND)	Money	
					VND	USD
I. Training on environmental and social monitoring						
ESF/ESMP, implementation mechanism, reporting, etc.	SPMB/EVNNPT, E&S officers, contract managers	Lock	2	30.000.000	60.000.000	2.222
Monitoring the implementation of ESMP/C-ESMP, waste, water, dust/noise management, site return	CSC; contractor's E&S/HSE officer; field commander/engineer	Lock	14	20.000.000	280.000.000	10.370
II. Implementation of measures to reduce social security; Safety and environmental sanitation; management of labor flows.						
Occupational Safety, Work at Height, Electrical Safety, Crane Mounting/Pulling, Crossing, Fire Protection and Incident Response	Safety officers, team leaders, key workers of contractors and CSCs	Lock	14	20.000.000	280.000.000	10.370
Community safety, traffic management, GRM, Code of Conduct, SEA/SH	Contractor/CSC officers, relevant community officials	Lock	7	20.000.000	140.000.000	5.185

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and GBV prevention						
Forest/Biodiversity Protection, ROW Luminescence Control, Hunting/Logging Ban, Chance Finds	Contractors, CSCs and field staff at sensitive sections	Lock	7	20.000.000	140.000.000	5.185
TOTAL					**900.000.000**	**33.333**

6.6.4. Total Projected Costs for ESMP Implementation

The following table provides an estimated cost for the implementation of the Environmental and Social Management Plan (ESMP). The cost of implementing the ESMP[4] will include: (i) the cost of implementing mitigation measures by the contractor, (ii) the cost of monitoring by the CSC, (iii) the cost of the Independent Environmental Monitoring Consultant (IESMC) (iv) the cost of environmental quality monitoring (v) the cost of safety management training for SPMB, including technical assistance in the implementation of safety policies and training programs. The costs of implementing mitigation measures during construction will be part of the cost of the construction contract, while the costs for monitoring the Contractor's Environmental and Social Management Plan (C-ESMP) by the Construction Supervision Consultant (CSC) will be provided in the construction supervision contracts. The cost of SPMB's activities related to ESMP is derived from the SPMB's project management budget, including basic safety training and allowances for participants in the monitoring program. After the project is completed, the cost of environmental monitoring of the works that have been constructed will be taken from the provincial operating and maintenance budgets.

It should be noted that the participation of the community in the implementation of the ESMP is a purely voluntary activity, for the benefit of the community itself and its families. Therefore, the participation of the community in the monitoring of the ESMP will not be paid.

The table below provides the estimated costs for monitoring the socio-environmental quality and ISEMC (in line with national practice) for reference purposes. However, the final cost will be updated during the detailed design phase.

Table 39: Summary of ESMP implementation costs

Contents	ESMP implementation cost of the project	
	VND	USD
Implementation of RP (land acquisition, livelihood support)	View RP	
Mine/Explosive Ordnance Clearance	View cost estimates for mine clearance	
Minimization during construction	As part of the contract but to ensure that all E&S and OHS measures are fully funded	
Monitoring compliance with safety policies during construction	As part of the costs of hiring a Construction Supervision Consultant (CSC)	
Specialized department in charge of	As part of the costs for the SPMB	

[4]Exclusion of costs for the implementation of the RP and independent monitoring of the implementation of the RP.

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Contents	ESMP implementation cost of the project	
	VND	USD
Implementation of RP (land acquisition, livelihood support)	View RP	
Mine/Explosive Ordnance Clearance	View cost estimates for mine clearance	
environmental safety policies of the SPMB		
Environmental quality monitoring/monitoring (conducted by IESMC)	120.000.000	4.444
Independent Environmental and Social Monitoring Consultant (IESMC)	2.500.000.000	74.074
Environmental and social training (implemented by SMC)	As part of the costs for ISEMC	
Training on HIV/IDS and GBV (CSC implemented)	900.000.000	33.333
SEP Implementation	View the SEP report	

6.7. GRIEVANCE AND GRIEVANCE MECHANISM (GRM)

6.7.1. Project-level GRM

Within the legal framework of Viet Nam, complaining citizens have the right to protection. As part of the overall implementation of the project, a complaint settlement mechanism (GRM) will be developed by the EO, SO of the SPMB, according to the procedure, responsible persons and contact information will be prepared. It will be easily accessible to ensure that complaints will be handled and resolved at the lowest possible level as quickly as possible. This mechanism will provide a framework in which complaints about environmental and safety issues can be handled, complaints can be resolved and disputes can be resolved in a timely manner. The GRM will be put in place before the start of construction.

During construction, the grievance resolution mechanism (GRM) will also be managed by the contractors under the supervision of the CSC. The contractors will inform the affected communities and communes of the availability of a complaint resolution mechanism to resolve complaints and problems related to the project. This will be done through a community consultation and information disclosure process whereby the contractors will communicate regularly with the affected communities and relevant agencies. Meetings will be held at least quarterly and monthly, project information sheets will be published, announcements will be made in local media, and announcements of upcoming activities will be published,... Contractors should provide contact information for any complaints as contractors communicate construction progress to the local community.

All complaints and corresponding actions taken by contractors will be recorded in the Project's monitoring report.

Households affected by the project will be able to submit complaints directly to the contractor or through the local authorities using the following channels:

- Verbally: directly to the CSC, the contractor's security staff or a representative at the site office or the People's Committee of the commune/ward.
- In writing: file in person or send complaints to designated addresses.

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- By phone, fax or email: sent to CSC, security personnel, contractor representatives or commune/ward People's Committees.

After receiving the complaint, the CSC, the officer/representative in charge of safety of the Contractor or the People's Committee of the commune/ward will register the complaint in the complaint monitoring book and record all relevant developments until the complaint is resolved. Immediately after receiving the complaint, the dossier will be copied into four sets. The original will be kept on record; one copy will be kept by the receiving officer; one copy will be sent to the CSC; and the final copy will be sent to the SPMB within 24 hours of receipt of the complaint.

The information recorded in the complaint will include:

- Date and time of complaint.
- Name, address, and contact details of the complainant.
- A short description of the complaint.
- Actions taken to resolve complaints, including contacts and findings at each stage of the complaint resolution process.
- The date and time when the complainant was contacted during the settlement process.
- Final decision of the complaint.
- The date, time and manner in which the complainant was notified.
- The signature of the complainant when the decision is issued.

Small complaints will be resolved within one week. Within two weeks (and weeks thereafter), a written response will be sent to the complainant (by hand, post, fax, e-mail) outlining the procedures carried out and the process by date.

The main objective is to resolve the problem as quickly as possible by the simplest means, involving as few people as possible and at the lowest possible level. Only if the problem cannot be solved at the simplest level and/or within 15 days, other authorities will be involved. Such a circumstance may arise, for example when a claim for damages, the amount payable cannot be resolved, or the causes of the damage are identified.

The complaint procedure and complaint settlement will be carried out as shown in the table below.

Table 40: Complaint settlement mechanism

The first level CSC/Contractor or the People's Committee of the commune/ward	Affected households shall send complaints directly to the contractor's representative or CSC, or to one of the officials of the commune/ward People's Committee, through the village/hamlet head or directly to the commune/ward People's Committee, in written or verbal form. The commune/ward official or village/ward head will notify the commune/ward People's Committee of the complaint; or in case of involving the contractor, it will ensure that the complaint is handled and coordinated by the contractor's E&S officer. The commune/ward People's Committee or the contractor will work directly with the affected household and provide a solution within 05 working days from the receipt of the complaint. The office department of the commune/ward People's Committee is responsible for recording and keeping all complaint records being resolved; the equivalent responsibility belongs to the contractor's E&S officer. After the commune/ward People's Committee or the contractor issues a settlement decision, the household can continue to complain within 30 working days. If there has been a second settlement decision but the household

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	still does not agree, the household can transfer the complaint to the Provincial People's Committee or directly to SPMB.
Second Level Provincial People's Committee or SPMB	Upon receipt of complaints from households, the Provincial People's Committee or SPMB will have 30 working days to resolve the case. The Provincial People's Committee or SPMB is responsible for documenting and keeping records of all complaints submitted. After the Provincial People's Committee or SPMB issues a decision, the household can file a complaint within 45 working days. In case a second decision has been made and the household is still not satisfied with that decision, it has the right to complain to the People's Court within 45 working days. The Provincial People's Committee will, if appropriate, transfer the compensation amount to an account.
Third Level Courts	In case the complainant initiates a lawsuit to the People's Court of the commune or province and the Court shall settle it in favor of the complainant. The complaint settlement decision must be sent to the complainant and related parties and publicly posted at the head office of the People's Committee of the relevant level. The complainant will receive such decision after 3 days from the date of the complaint settlement result at the ward or commune level and 7 working days for the commune or provincial level.

SPMB's Environmental Officer (EO) and Social Officer (SO) will be responsible for regular monitoring of complaints, regardless of whether such complaints are submitted through the contractor or local authorities.

6.7.2. Grievance Mechanism for Workers

GRM for Workers: Project workers (all three categories, direct workers, contract workers, and primary supply workers) can directly register their complaints with the GRM for workers. Members of this GRM will be trained to be able to resolve workers' complaints, including workplace complaints, in an efficient and reasonable manner to meet national labor regulations and the World Bank (ESS2). Reference the project's Labor Management Process (LMP).

Table 41: Complaint settlement mechanism

Complainant	GRM Functions	Timeframe
Workers or labor unions will submit their complaints to the GRM to Workers through one of the information channels.	- Refer worker-related complaints to the worker's GRM. - Registration, triage and analysis of complaints. - Convene the GRM for workers' meetings to analyze and resolve complaints. - Provide a written response to the complainant/contractor. - Provide guidance with recommendations to contractors to improve working conditions/labor management issues.	10 days

6.7.3. World Bank Grievance Mechanism (GRS)

Individuals and communities who believe that a subproject supported by the World Bank adversely affects their lives can submit their grievances to the existing subproject-level grievance mechanism or directly to the World Bank's Grievance Redress Service (GRS). This

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mechanism ensures that submitted grievances are reviewed promptly to address issues related to the subproject. Individuals or organizations affected by a subproject may also submit complaints to the World Bank Inspection Panel to determine whether any harm has occurred or could occur due to non-compliance with World Bank policies and procedures. Complaints can be submitted at any time when the issue is of concern to the World Bank, and the Bank's management is responsible for responding. For more information on how to submit a complaint to the World Bank Grievance Redress Service (GRS), please visit www.worldbank.org/grs. For more information on submitting a complaint to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

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CHAPTER 7. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

7.1. OVERVIEW OF THE STAKEHOLDER ENGAGEMENT PROCESS

The World Bank's Environmental and Social Framework (ESF), specifically Environmental and Social Standard 1 (ESS1: Assessment and Management of Environmental and Social Risks and Impacts) and Environmental and Social Standard 10 (ESS10: Stakeholder Engagement and Information Disclosure), requires conducting consultations and disclosing information to project-affected parties and local authorities regarding environmental and social issues during project preparation. Public consultation activities for the ESIA report must also comply with the requirements under Point a, Clause 3, Article 26 of the Government's Decree No. 08/2022/ND-CP detailing a number of articles of the Law on Environmental Protection, as amended by Decree No. 05/2025/ND-CP dated January 6, 2025.

The objectives of the consultation activities include: engaging local authorities and local communities in the project area during the preparation and implementation of the ESMP and ESIA to provide necessary information for a comprehensive understanding of the project, its potential impacts, and applicable mitigation measures; clarifying issues discussed during the early stages of the project; informing stakeholders of the benefits of project implementation; encouraging community participation in identifying the project's environmental impacts; and gathering feedback and identifying the needs of local residents and authorities to formulate recommendations for mitigating environmental impacts or to consider adjustments during the detailed design phase.

Information disclosure and public consultation on environmental issues aim to secure the consensus of local authorities, local non-governmental organizations (NGOs), and affected people within the project area. Community participation is a fundamental prerequisite to securing the support of local authorities and communities for the project while taking their perspectives into consideration. Through public consultation, previously unidentified adverse environmental impacts and potential mitigation measures can be recorded and integrated into the ESIA report. In practice, early community involvement in project preparation fosters a collaborative relationship between the community and project staff. Consequently, the community can continue to provide feedback and raise concerns during project implementation.

7.1.1. Stakeholder Identification and Analysis

The project stakeholders are identified as individuals, groups, or other organizations who: (i) are affected or likely to be affected, directly or indirectly, beneficially or adversely, by the Project; or (ii) may have an interest in the project. These categories encompass individuals or interest groups who could be affected by the project, as well as those with the potential to influence the Project's outcomes in any manner. Based on this definition, the project stakeholders include:

- Households whose land is permanently acquired for the construction of tower foundations;
- Households whose houses and structures are physically displaced and require relocation;
- Households whose crops and standing trees are cleared or cut down;
- Households with land located within the Right-of-Way (RoW) of the transmission line;
- Local residents living in the vicinity of the project construction sites;
- Local residents living along the transportation routes utilized for construction materials and equipment;

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- Women (specifically female members of the project-affected households);
- Vulnerable groups (including persons with disabilities, poor/near-poor households, landless households, and ethnic minority groups);
- Other organizations or individuals with an interest in the project's outcomes and/or impacts, including: (i) Provincial People's Committees (PPCs); and (ii) Commune/Ward People's Committees (CPCs/WPCs);
- Environmental, Forestry, and Biodiversity Authorities / Resource Management Units.

7.1.2. Consultation Process and Methodology

The consultation process was conducted utilizing face-to-face interviews (including key informant interviews) and in-person community consultations. The face-to-face interview method was applied to specialized officers from the provincial Departments of Agriculture [and Rural Development] and [Natural Resources and] Environment across the project-affected provinces and cities, while community consultations were conducted with local residents within the project area.

Face-to-face Interviews:

- During the first half of August 2026, face-to-face interviews were conducted with commune/ward-level departments and mass organizations, households in the project area, and key stakeholders (including the Protection Forest Management Boards of Loc Ninh, Bu Dang, and Dak Mai, and the Nam Nung Nature Reserve Management Board). The objective of this consultation phase was to introduce the proposed investment components, which included: presenting a project overview; preliminarily identifying the potential beneficial and adverse environmental and social impacts of each proposed option; identifying sensitive receptors and affected areas; conducting an initial assessment of impact levels, including land acquisition and impacts on structures and trees associated with the implementation of project components; and discussing and gathering feedback from representatives of local departments, agencies, and participating households.
- In-person interviews were also conducted with specialized officers at the headquarters of the Commune/Ward People's Committees during the first half of August 2026. The objective was to inform relevant departments and agencies about the project development policy, present the potential beneficial and adverse impacts of the project during the construction phase, and collect other relevant baseline data and information. The detailed consultation results are presented in the Table below.

Public Consultation Meetings:

In-person public consultation meetings were held at the headquarters of the Commune People’s Committees (CPCs) from 04 to 07 August and from 25 to 27 August, 2026. The objective was to disseminate basic project information, present potential beneficial and adverse impacts during project implementation, and seek broad consensus from both local authorities and residents. The primary agenda of these public consultation meetings included:

- Project overview, investment components, and the identification of target villages/hamlets within the project area;
- Introduction to the core requirements of the World Bank’s Environmental and Social Framework (ESF);
- Baseline environmental and social conditions related to the investment components within the communes and outstanding/pending issues;

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- Potential environmental and social impacts of the project on local communities, including the scope of impacts resulting from land acquisition;
- Identify risks and concerns regarding the depletion of forest resources and biodiversity. The purpose is to verify baseline forestry and biodiversity information, confirm forest management boundaries and statutory forest repurposing requirements, review biodiversity and fire risks, agree on clearance and site restoration protocols, and establish coordination and monitoring mechanisms during construction and operation phases.
- Community-proposed measures to limit and mitigate environmental and social impacts during project implementation;
- Community-proposed measures for avoidance and mitigation at forest and habitat hotspots; forest fire control and worker access restrictions; revegetation and site restoration; and avian collision/nesting risk management and monitoring;
- Electromagnetic field (EMF) and transmission-line safety issues: EMF assessment, applicable exposure criteria, and communication with Right-of-Way (RoW) users and sensitive receptors;
- Feedback and comments regarding the construction of specific project components.

The participants of the public consultation meetings comprised:

- Representatives of the Southern Power Projects Management Board (SPMB);
- Representatives of the Project Consultants (Consulting Firms);
- Leaders of the Commune/Ward People's Committees (CPCs/WPCs);
- Representatives of local departments, line agencies, and mass organizations (e.g., Fatherland Front, Women's Union, Youth Union, Farmers' Union);
- Heads or deputy heads of villages, residential groups, and ethnic minority hamlets;
- Representatives of the project-affected households (AHs).

7.2. CONSULTATION RESULTS

7.2.1. Results of Community Consultation

The consolidated results of community consultation meetings held in 25 wards/communes within the project area spanning the project's provinces and cities are summarized as follows:

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Table 42: Summary of results of public consultation on the project's environmental and social documents

No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
1	**Ea Kiet Commune, Dak Lak province**	○ Time: 09:30, August 04, 2026 ○ Venue: Ea Kiet Commune People's Committee (CPC)	○ CPC: Vice Chairman of CPC, Head of Economic Division, Construction Investment Project Management Unit (EVNNPT/SPMB), Vice Chairman of the Fatherland Front, Deputy Chief of Office. ○ Project Proponent / Consultants: Deputy Head of Compensation Department (EVNNPT/SPMB), EVNNPT/SPMB Environmental Officer, WB representatives, and WB consultants. ○ Total participants: 13 persons (06 females, including 01 ethnic minority female).	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Agree with the project investment policy. ○ Recommend adjusting the alignment to avoid impacting on the commune's centralized resettlement site project. ○ Regarding resettlement: The commune already has the Buon Hmong Resettlement Site. ○ The CPC will coordinate with EVNNPT/SPMB to update the land-use planning and related legal procedures for submission to competent authorities for approval. ○ Upon project commencement, the implementing unit for land clearance and compensation will be determined later. ○ The CPC will convene meetings with local households for project information disclosure once comprehensive and detailed data are available.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
2	**Ea Wer Commune, Dak Lak province**	○ Time: August 05, 2026 ○ Venue: Ea Wer CPC	○ CPC: Chairman of CPC, Deputy Head of Economic Division, Economic Officer, Socio-Cultural Officer.	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA	○ The CPC endorses the project policy and agrees with the reporting contents presented by EVNNPT/SPMB & WB.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			○ Project Proponent / Consultants: Deputy Head of Compensation Department (EVNNPT/SPMB), EVNNPT/SPMB Environmental Officer, and WB consultants. ○ Total participants: 14 persons (06 females, including 01 ethnic minority female).	(WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ The transmission line does not traverse protection forests. Recommend EVNNPT/SPMB to contact Sai Gon Cao Nguyen Company (the cassava land lessee) for information exchange. ○ Request EVNNPT/SPMB to coordinate with local cadastral/land management officers to update land-use plans and organize community meetings for disclosure. ○ Upon project commencement, the land acquisition and compensation unit will be identified at a later stage. ○ The commune will organize community meetings for information dissemination upon receiving complete project dossiers.	the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
3	**Truong Xuan Commune, Lam Dong province**	○ Time: August 05, 2026 ○ Venue: Truong Xuan CPC, Lam Dong Province	○ CPC & Mass Organizations: Vice Chairman, Chairman of Fatherland Front, Deputy Head of Socio-Cultural Division, Chief of Office, Deputy Head of Economic Division, Chairwoman of Women's Union,	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support,	○ CPC fully supports the investment policy and agrees with the contents of the project. ○ Recommend EVNNPT/SPMB to coordinate closely with the Land Fund Development Center regarding compensation, support, and resettlement (GPMB). ○ The line passes through significant forest areas:	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation;

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			Chairman of Farmers' Association. ○ Community: Village Head of Dak Lep, Village Head of Village 03. ○ Project Proponent / Consultants: EVNNPT/SPMB, WB, and consultants. ○ Total participants: 18 persons (05 females, including 01 M'nong ethnic minority female).	resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	Request consideration of line corridor demarcation to preserve existing forests (especially landscape forests along National Highway 14); propose designing elevated transmission towers to span over pine forests. ○ Formulate adequate support policies for affected households to build community consensus. ○ Upon project commencement, the land clearance implementing unit will be determined later, but it is recommended to assign it to an entity under the Provincial Land Fund Development Center.	○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
4	**Dak Song Commune, Lam Dong province**	○ Time: August 06, 2026 ○ Venue: Dak Song CPC	○ CPC: Vice Chairman of CPC, Economic Officer, Deputy Head of Economic Division, Chairman of People's Council. ○ Community: Village Head (Ha Nam Ninh Village). ○ Project Proponent / Consultants: EVNNPT/SPMB and WB officers/consultants.	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety);	○ The CPC agrees with the project policy and anticipates early implementation to safeguard national energy security. ○ Recommend contacting the Economic Division to coordinate land-use planning updates. ○ Construction contractors must strictly minimize spoil/rock spillage that could impact agricultural cultivation.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			○ Total participants: 14 persons (03 females).	○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ The alignment does not traverse forest conservation areas. Contact and coordinate directly with Duc Hoa Forestry Company regarding land under its management.	affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
5	**Nam Dong Commune, Lam Dong Province**	○ Time: August 06, 2026 ○ Venue: Nam Dong CPC	○ CPC: Vice Chairman of CPC, Head of Economic Division, Deputy Head of Socio-Cultural Division, Economic Officer. ○ Community: Representatives of households subject to permanent land acquisition (04 persons). ○ Project Proponent / Consultants: EVNNPT/SPMB and WB consultants. ○ Total participants: 09 persons (01 female).	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM),	○ The CPC, mass organizations, and community representatives endorse the project policy. ○ Household representatives expressed desire for expedited project implementation due to current power supply shortages for production, while also raising concerns over electromagnetic field (EMF) impacts beneath the transmission lines. ○ Request EVNNPT/SPMB and WB to coordinate closely with competent local divisions to ensure compliance with regulations, openness, transparency, and protection of citizens' legitimate rights.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
				focal points, and future consultation plans; o Gathering feedback, concerns, and recommendations from local authorities and communities.	o Assigned the Economic Division to provide the master land-use map. o The commune will continue organizing community meetings to disclose information and consult with affected persons. o Upon project commencement, the land clearance implementing unit will be determined later, but it is recommended to assign it to a provincial-level entity.	
6	**Quang Tan Commune, Lam Dong province**	o Time: August 07, 2026 o Venue: Quang Tan CPC	o CPC: Deputy Head of Economic Division, Economic Officer. o Community: Party Secretary - Head of Tan Binh Village, Head of Fatherland Front Board of Tan Binh Village. o Project Proponent / Consultants: EVNNPT/SPMB and WB consultants. o Total participants: 07 persons (01 female).	o Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; o Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); o Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS);	o The CPC reaches consensus in supporting the project policy. o Request EVNNPT/SPMB to continue coordinating with the commune Economic Division to update survey data and pinpoint land acquisition boundaries. o Demographic baseline recorded: Tan Binh Village comprises 436 households across 12 ethnic groups (indigenous group is the M'nong). o The commune has not previously executed any large-scale land clearance project of transmission line magnitude.	o Continue providing updated, tailored, and accessible project information; o Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; o Maintain the Grievance Redress Mechanism throughout project implementation; o Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
				○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Currently, there are no major social welfare/security issues. ○ Upon project commencement, the land acquisition and compensation unit will be determined at a later stage.	
7	**Tan Quan Commune, Dong Nai City**	○ Time: August 05, 2026 ○ Venue: Tan Quan CPC, Dong Nai CityVenue: Tan Quan CPC, Dong Nai Province	○ CPC & Mass Organizations: Vice Chairman of CPC, Head of Economic Division, Chairman of Veterans' Association, Chairwoman of Women's Union, Secretary of Youth Union, Deputy Chief of Office, Economic Officer. ○ Community: Hamlet Heads (Van Hien, Xa Trach, Truong An) and local resident representatives. ○ Project Proponent / Consultants: EVNNPT/SPMB and WB Consultants. ○ Total participants: 12 persons (05 females, including 01 ethnic minority female).	○ Introduction of the Krong Buk – Tây Ninh 1 500kV Transmission Line Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from	○ Local authorities and communities agree with and endorse the project policy. ○ Recommend timely provision of complete technical design data, expected impact levels, and compensation, support, and resettlement (CSR) policies. ○ Study route adjustments and optimal technical options to minimize acquisition of productive agricultural and forestry land. ○ Apply appropriate support policies (combining local regulations and the World Bank's ESS5). ○ Pay close attention to ethnic minority livelihoods (the Stieng ethnic group accounts for over 26%).	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
				local authorities and communities.		
8	**Dau Tieng Commune, Ho Chi Minh City**	○ Time: 14:30, August 06, 2026 ○ Venue: Dau Tieng CPC, Ho Chi Minh City	○ CPC & Mass Organizations: Deputy Head of Economic Division, Economic Officer, Fatherland Front Committee, Farmers' Association, Veterans' Association, Women's Union, Youth Union. ○ Community: Nui Cau Hamlet Head (households not yet invited as the exact corridor scope is pending finalization). ○ Project Proponent / Consultants: EVNNPT/SPMB, WB Consultants. ○ Total participants: 08 persons (03 females).	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Local authorities and community agree with and support the project policy. ○ Request EVNNPT/SPMB to maintain close coordination and provide legal documents and CSR policies. ○ Carry out administrative procedures for registering the land acquisition inventory and annual land-use plans. ○ Consider reporting to competent authorities for approval of supplementary support policies in alignment with ODA/WB standards. ○ Propose reviewing additional ODA-funded assistance policies and giving priority to employing local labor.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ • Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
9	**Minh Thanh Commune. Ho Chi Minh City**	○ Time: 08:00, August 06, 2026	○ CPC & Mass Organizations: Chairman of CPC, Vice	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project	○ Local authorities reach consensus and support the project implementation policy.	○ Continue providing updated, tailored, and accessible project information;

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
		○ Venue: Minh Thanh CPC, Ho Chi Minh City	Chairman of CPC, Head of Economic Division, Chairman of Fatherland Front, Director of Commune Project Management Board, Chairman of Veterans' Association, Vice Chairwoman of Women's Union, Chairman of Farmers' Association, Chief & Deputy Chief of Office of CPC. ○ Project Proponent / Consultants: EVNNPT/SPMB, WB Consultants. ○ Total participants: 11 persons (04 females).	(under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Recommend studying and refining technical options to minimize land acquisition; provide legal information to the locality at an early date. ○ Apply adequate support policies in compliance with World Bank ESS5 and secure budget availability for prompt compensation disbursement upon approval of the compensation plan. ○ Pay close attention to monitoring impacts on the Cham ethnic minority community (over 100 households in Hoa Loc Hamlet).	○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
10	**Hung Thuan Commune, Tay Ninh Province**	○ Time: 08:30, August 07, 2026 ○ Venue: Hung Thuan CPC, Tay Ninh Province	○ CPC & Mass Organizations: Deputy Head of Economic Division, Economic Officer, Public Administration Center Officer, Office of People's Committee, Fatherland Front, Commune Police.	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition,	○ Local authorities and mass organizations agree with and support the project policy. ○ Publicize project information at the earliest; ensure swift and orderly construction strictly on schedule to minimize environmental impacts and mitigate disturbances to local production and daily life.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments;

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			○ Community: Hamlet Officials / Hamlet Heads and local residents from hamlets (Don Thuan, Thuan Loi, Cau Xe, Ba Nha). ○ Project Proponent / Consultants: EVNNPT/SPMB, WB Consultants. ○ Total participants: 17 persons (05 females).	compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Implement satisfactory CSR policies (in accordance with state laws and WB ESS5); make financial provisions ready for immediate compensation payment once the compensation plan is approved. ○ Establish a flexible grievance intake and redress channel stationed at the Commune People's Committee.	○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
11	**Phu Nghia Commune, Dong Nai City**	○ Time: August 04, 2026 ○ Venue: Phu Nghia CPC	○ CPC & Mass Organizations: Chairman of Fatherland Front, Vice Chairman of Fatherland Front, Fatherland Front Officer, Vice Chairman of CPC, Deputy Chief of Office, Deputy Head of Economic Division. • Project Proponent / Consultants: EVNNPT/SPMB, WB Consultants. • Total participants: 07 persons (02 females).	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the	○ Local authorities support the project implementation policy to ensure national energy security; ○ Recommend further technical studies and reassessment of the route alignment to minimize adverse impacts on land acquisition, livelihoods, and agricultural production; ○ Acquired land mainly comprises forestry land and agricultural land; recommend reporting to higher authorities to supplement tailored support policies (in line with ESS5 and local regulations);	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
				World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Land-use restrictions within the Right-of-Way (ROW) do not exert substantial adverse impacts on agricultural production; ○ Pay due attention to ethnic minority groups (accounting for approximately 30%, including Stieng, Tay, Nung); local authorities currently maintain support policies allocating residential and agricultural land to affected ethnic minority households; ○ Grievance Redress Mechanism is currently channeled and processed through voter meetings and direct petition submissions to the Commune People's Committee.	
12	**Cư Jút Commune, Lâm Đồng Province**	○ Time 9:00: August 25, 2026 ○ Venue: Cư Jút CPC	○ Commune People's Committee & Mass Organizations: Vice Chairman of the Fatherland Front, Vice Chairman of CPC, Deputy Chief of Office, Deputy Head of the Economic Division, Officer of the Economic Division, Village	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic	○ Local authorities and residents agree with the project implementation policy; ○ Requested early provision of project profiles, legal documents, and compensation and support policies; ○ A resettlement area has already been planned within the commune; ○ - Multiple projects cross the commune (e.g., Village 11), hence requested early	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			Heads of Villages 11 and 12 ○ Project Owner / Consultant: SPMB, WB Consultants ○ Total participants: 13 persons (02 females)	minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	formulation of satisfactory support policies; ○ Village 12 is predominantly Tay ethnic people; Village 11 has 162 ethnic minority households from 07 coexisting ethnic groups.	groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
13	**Đắk Sắk, Commune, Lâm Đồng Province**	○ Time 9:00: August 26, 2026 ○ Venue: Đắk Sắk CPC	○ Commune People's Committee & Mass Organizations: Vice Chairman of the Fatherland Front, Vice Chairman of CPC, Head of Economic Division, Deputy Head of Economic Division, Culture & Social Affairs Officer, Village Head of Nam Xuan, and Village Head of Dak Thanh ○ Project Owner / Consultant: SPMB, WB Consultants	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS);	○ Local authorities and residents support the project policy; ○ Requested early provision of legal dossiers and compensation, support, and resettlement policies; expedite construction progress; ○ Land use restrictions under the Right-of-Way do not significantly affect agricultural production; ○ The whole commune has 17 ethnic groups; Dak Thanh village is predominantly Thai, with Tay and Nung people (9 ethnic groups in total); Nam Xuan village comprises 540 households, predominantly Thai, mainly engaged in	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			○ Total participants: 12 persons (02 females)	○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	agriculture and mostly fluent in Vietnamese (Kinh).	
14	**Đức An, Commune, Lâm Đồng Province**	○ Time 14:00: August 26, 2026 ○ Venue: Đắk Sắk CPC	○ Commune People's Committee & Mass Organizations: Vice Chairman of the Fatherland Front, Vice Chairman of CPC, Deputy Head of Economic Division, Village Head of Village 9, and Deputy Village Head ○ Project Owner / Consultant: SPMB, WB Consultants ○ Total participants: 10 persons (01 female)	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from	○ Agree with and support the project policy; ○ Requested the project owner to contact Duc Hoa Forestry One Member Co., Ltd. for further information, as most of the alignment passes through company-managed land; ○ Land use restrictions under the Right-of-Way do not significantly affect agricultural production; ○ Village 9 has no affected ethnic minority households; Village 11 has many ethnic minority households currently residing.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
				local authorities and communities.		
15	**Phước Bình Commune, Đồng Nai City**	○ Time 9:00: August 25, 2026 ○ Venue: Phước Bình CPC	○ Commune People's Committee & Mass Organizations: Vice Chairman of the Fatherland Front, Deputy Head of the Economic Division ○ Project Owner / Consultant: SPMB ○ Total: 06 persons	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ The Ward People's Committee of Phuoc Binh supports the project policy and agrees with the presentations of SPMB and the WB; ○ The project route does not cross protection forest areas; ○ SPMB is requested to provide official written requests referencing legal regulations, along with specific acquired land areas to serve as a basis for submission to the People's Council for approval of the land acquisition list; ○ Continue coordinating with the Economic Division to provide data on tower positions in the ward.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
16	**Đa Kia, Commune, Đồng Nai City**	○ Time 14:30: August 25, 2026	○ Commune People's Committee & Mass Organizations: Vice Chairman of CPC,	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project),	○ The Commune People's Committee agrees with and supports the project implementation policy;	○ Continue providing updated, tailored, and accessible project information;

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
		○ Venue: Đa Kia CPC	Village Head of Binh Ha ○ Project Owner / Consultant: SPMB ○ Total participants: 15 persons (04 females, including 01 ethnic minority)	including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ The transmission line route does not pass through protection forest areas; ○ SPMB is requested to coordinate closely with the commune's functional divisions to ensure compliance during project implementation; ○ The CPC will continue advocacy and project information dissemination to households to build consensus; ○ Requested transparent, clear, and open information disclosure, particularly in Binh Ha village (where ethnic minorities account for 90%).	○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
17	**Tân Hưng, Commune, Đồng Nai City**	○ Time 7:30: August 27, 2026 ○ Venue: Tân Hưng CPC	○ Commune People's Committee & Mass Organizations: Chairman of the Fatherland Front, Vice Chairman of CPC, Deputy Head of Economic Division, Office staff, Economic Division staff, Women's	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support,	○ Local authorities, Loc Ninh Rubber Company, and residents agree with the policy; ○ Provide full legal dossiers/investment policy approval; give 3 days prior notice before measurement and inventory; publish coordinates of tower foundation boundaries;	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation;

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			Union, Youth Union, Hamlet Heads ○ Project Owner / Consultant: SPMB, Consultants ○ Total participants: 16 persons (04 females)	resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Land is mainly rubber plantation, partially crossing planned industrial zone; ○ Clarify whether houses within the Right-of-Way can remain to develop adequate resettlement and compensation packages; compensate for actual damages during construction; prioritize hiring local labor.	○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
18	**Bình Long, Commune, Đồng Nai City**	○ Time 10:00: August 27, 2026 ○ Venue: Bình Long CPC	○ Local Authorities & Mass Organizations: Vice Chairman of Ward People's Committee, representatives from the Economic, Infrastructure & Urban Planning Division, HND & WPC Office, Fatherland Front, Farmers' Association, Women's Union, and Youth Union. ○ Affected Community & Organizations: Representatives from Loc Ninh Rubber One Member Co., Ltd.	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS);	○ Local authorities, Loc Ninh Rubber Company, and residents strongly support the project policy for national energy security and regional socioeconomic growth. ○ SPMB must provide complete legal documents and investment policy approval. The project owner must announce exact boundary coordinates for tower foundations to allow organizations and residents to adapt production and business plans. ○ Land measurement and detailed inventory must be notified to	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			Leaders of Thanh Binh Quarter, and local affected households. ○ Project Owner / Consultant: SPMB, Consultants ○ Total participants: 21 persons (09 female)	○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	land users at least 3 days in advance to avoid disputes. ○ Clarification is requested regarding whether houses within the Right-of-Way (RoW) can remain; if not, adequate compensation, support, and relocation arrangements must be provided. ○ Compensation must cover actual damage incurred during construction. ○ Request to prioritize hiring unskilled local labor during civil works, and formulate tailored social support policies for any affected ethnic minority individuals. ○ Complaints will be addressed via citizen reception desks at the Ward People's Committee and regular voter meetings, with a dedicated channel established for project-related issues.	
19	**Bình Tân, Commune, Đồng Nai City**	○ Time 9:00: August 26, 2026 ○ Venue: Bình Tân CPC	○ Commune People's Committee & Mass Organizations: Head of Economic Division, Deputy Head of Economic Division	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule;	○ The local authority agrees with and supports the project implementation policy; ○ SPMB is requested to coordinate closely with the commune's functional	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			○ Project Owner / Consultant: SPMB ○ Total participants: 05 persons	○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	divisions to ensure compliant project implementation; ○ The project owner needs to provide comprehensive information early so the locality can timely notify the residents.	and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
20	**Long Hà, Commune, Đồng Nai City**	○ Time 14:00: August 26, 2026 ○ Venue: Long Hà CPC	○ Commune People's Committee & Mass Organizations: Vice Chairman of CPC ○ Project Owner / Consultant: SPMB ○ Total participants: 06 persons	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety);	○ The Commune People's Committee agrees with and supports the project implementation policy; ○ The project does not cross protection forest areas; ○ SPMB is requested to coordinate closely with the commune's functional divisions to ensure compliant project implementation; ○ The project owner needs to provide comprehensive information early so the	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
				○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	locality can timely notify the residents; ○ - The CPC will continue public advocacy and information dissemination to foster consensus.	affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
21	**Minh Đức, Commune, Đồng Nai City**	○ Time: 9:00 August 26, 2026 ○ Venue: Minh Đức CPC	○ Commune People's Committee & Mass Organizations: Vice Chairman of CPC, Economic Division Officer, Youth Union Secretary, Women's Union President, Farmers' Association President ○ Project Owner / Consultant: SPMB, Consultants ○ Total participants: 8 persons (02 females)	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM),	○ Consensual with the project policy; the alignment passes through perennial crop land (rubber, cashew), without crossing protection forests; ○ Section crossing the Industrial Park (Binh Long Rubber Company) is about 5km long: requested local alignment adjustments or placing towers along planned road corridors to minimize impacts; ○ Provide satisfactory compensation, reinstate temporary construction lands, and accelerate construction; ○ Presence of Tay people in Dong Dau hamlet and indigenous Stieng people.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
				focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.		
22	**Tân Khai, Commune, Đồng Nai City**	○ Time 14:00: August 26, 2026 ○ Venue: Tân Khai CPC	○ Ward People's Committee & Mass Organizations: Chairman of the Fatherland Front, Deputy Head of Economic Division, Office staff, Urban Infrastructure and Economic Division staff, Head of Tan Hiep neighborhood, Head of Dong No neighborhood ○ Project Owner / Consultant: SPMB, Consultants ○ Total participants: 10 persons	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Unanimous agreement with the project policy; contact relevant provincial departments to update the alignment into sectoral/ward master plans; ○ Land crossed is mainly perennial cropland and production plantation forest (rubber); coordinate with forest rangers to convert production forest land use purpose; consider raising tower heights to limit tree clearing; ○ Design components to limit land parcel fragmentation; restore temporary construction sites; ○ Alignment may cross indigenous Ta Mun ethnic people in former Soc 5 (now Tan Hiep neighborhood).	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
23	**Phu Rieng, Commune, Dong Nai City**	○ Time 9:00: August 27, 2026 ○ Venue: Phu Rieng CPC	○ Commune People's Committee & Mass Organizations: Chairman of the Fatherland Front, Deputy Head of Economic Division, Office staff, Economic Division staff, Women's Union, Youth Union, Village Head of Phu Hiep ○ Project Owner / Consultant: SPMB, Consultants ○ Total participants: 8 persons (03 females)	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	○ Basically, agreed with the project policy; requested early provision of legal dossiers and compensation/support policies; ○ The project has not yet been integrated into the Master Plan of Bu Nho Urban Area (Decision No. 1501/QD-UBND dated Oct 3, 2024 by Binh Phuoc PPC); exact tower coordinates are not yet available; ○ Requested organizing meetings to collect opinions from households, especially those affected by tower footings; ○ - Phu Hiep village currently has no ethnic minorities residing.	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
24	**Thọ Sơn, Commune, Dong Nai City**	○ Time 8:30: August 27, 2026 ○ Venue: Thọ Sơn CPC	○ •Commune People's Committee & Mass Organizations: Economic Division Officer	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule;	○ Local authorities and residents support the policy; requested rapid construction meeting the planned schedule; ○ Requested additional support policies under ESS5; allocate funds ready for payout	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
			○ Project Owner / Consultant: SPMB, WB Consultants	○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety); ○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	immediately after compensation plan approval; ○ Regarding land pricing: apply a land price adjustment coefficient (K-coefficient) multiplied by the provincial land price table, or apply specific land valuation; ○ Presence of Stieng ethnic group in Phu Son and Son Loc villages.	and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
25	**Dak Mil Commune, Lam Dong Province**	○ Time 14:00: August 25, 2026 ○ Venue: Dak Mil CPC	○ Commune People's Committee & Mass Organizations: Vice Chairman of Commune People's Committee, Head of Economic Division, Village Head of Bac Son ○ Project Owner / Consultant: SPMB, WB Consultants ○ Total participants: 09 persons (02 females)	○ Introduction of the 500kV Krong Buk – Tay Ninh 1 Transmission Lines Project (under the REACH project), including project scale, ODA (WB) financing, and implementation schedule; ○ Presentation of anticipated environmental and social risks and impacts (land acquisition, compensation, support, resettlement, livelihoods, ethnic minorities, community health and safety);	○ Local authorities and residents support the project implementation policy to ensure energy security; ○ Early provision of complete dossiers, legal documents, and compensation and support policies; expedite construction progress; ○ A resettlement area has already been planned within the commune; ○ Land-use restrictions within the Right-of-Way (RoW) do not	○ Continue providing updated, tailored, and accessible project information; ○ Review, respond to, and incorporate relevant feedback into the technical engineering design and environmental and social (E&S) instruments; ○ Maintain the Grievance Redress Mechanism throughout project implementation; ○ Continue conducting public consultations with stakeholder groups, particularly project-

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No.	Communes	Time & Venue	Participants	Consultation Contents	Summary of feedback	Project Owner's Response
				○ Overview of Vietnamese policies and laws as well as the World Bank's Environmental and Social Standards (ESS); ○ Introduction to the Grievance Redress Mechanism (GRM), focal points, and future consultation plans; ○ Gathering feedback, concerns, and recommendations from local authorities and communities.	significantly affect agricultural production; ○ Bac Son village is currently inhabited predominantly by the Thai and M'Nong ethnic groups. ○	affected persons (PAPs), women, vulnerable groups, and ethnic minorities.
	25 communes		**268 participants, of which 191 male, 77 female (5 ethnic people)**			

7.2.2. Stakeholder Consultation Results

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Table 43: Summary of the Project's Stakeholder Consultations

No.	Comments / Recommendations	Response / Incorporation / Explanation	Consulted Agency / Organization / Community / Stakeholder
I	**Written consultation during the preparation of the EIA**[56]		
1	Comments of the Dak Lak DAE in Letter No. 6595/SNNMT-BVMT dated 30 December 2025: 1. Project location: As the EIA Report is prepared concurrently with the application for investment policy approval, the Project Owner and consultant should review and ensure that the Project location is consistent with the approved investment policy. 2. Environmental impacts: The EIA generally follows the prescribed structure. Environmental impacts should cover waste-related impacts (wastewater, emissions, solid waste and hazardous waste) and non-waste impacts (noise, vibration and other impacts) during construction and operation. 3. Mitigation measures: The EIA presents measures for wastewater, dust/emissions, solid and hazardous waste, noise/vibration and environmental incident prevention and response. The Project Owner is requested to implement the proposed environmental protection works and measures and manage waste, noise and vibration in compliance with the 2020 Law on Environmental Protection and current guidance. 4. Environmental management and monitoring; incident prevention and response: Implement the monitoring program at the locations and frequencies proposed in the EIA.	The Project Owner accepts the comments and provides the following clarification/additions: 1. The Project will be implemented in accordance with Decision No. 3319/QD-UBND dated 06 July 2026 of the Lam Dong Provincial People's Committee approving the investment policy and investor. 2. The EIA has been updated in accordance with the structure and contents prescribed in Form No. 04 attached to Circular No. 09/2026/TT-BNNMT dated 29 January 2026. 3. The Project Owner commits to provide and implement environmental protection works and waste-management measures as described in the approved EIA. 4. The environmental monitoring program will be implemented in accordance with the contents, locations and frequencies specified in the approved EIA.	Dak Lak DAE

[5] Dak Lak received Official Letter No. 11253/SPMB-PDB dated December 9, 2025, and the Department of Agriculture and Rural Development provided its response on December 30, 2025. Lam Dong and Dong Nai provinces also received the documentation on the same date, December 9, 2025. Ho Chi Minh City and Tay Ninh also fall under the same December 9, 2025 timeline.

[6] Three protection forest management boards were also consulted concurrently on December 9, 2025, and provided very prompt responses between December 17 and 18, 2025: Loc Ninh on December 17, and Bu Dang and Dak Mai on December 18.

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No.	Comments / Recommendations	Response / Incorporation / Explanation	Consulted Agency / Organization / Community / Stakeholder
	5. Other matters: Clarify whether acquired paddy land is single-crop or double-crop land to determine environmental sensitivity; review the alignment coordinates in Dak Lak to ensure consistency with the approved land-use planning and Letter No. 2716/UBND-CN dated 01 April 2025 agreeing on the 500kV Krong Buk - Tay Ninh 1 alignment.	5. The paddy-land acquisition area has been reviewed. Under the applicable regulations, the Project's environmental sensitivity relates to conversion of 20.86 ha of forest-use land: 5.12 ha protection forest, 4.53 ha production forest and 11.21 ha outside the planning boundaries of the three forest categories. The Project will follow the locations and alignment approved by the provincial authorities and the approved land-use planning.	
2	Comments of the Lam Dong DOIT in Letter No. 430/SCT-QLNL dated 26 January 2026: 1. Location and alignment: The 500kV Krong Buk - Tay Ninh 1 alignment (section formerly within Dak Nong Province) was agreed by the Provincial People's Committee in Letter No. 95/UBND-KTN dated 07 January 2022. The Project Owner should coordinate with local authorities and relevant organizations to accurately determine tower locations and the high-voltage overhead transmission-line safety corridor; avoid impacts on urban development space, production, residential areas and other planning; comply with requirements for tower locations within road corridors, conversion of natural forest land, affected facilities, minerals, land and environmental matters. Local comments indicate that the alignment mainly crosses household agricultural land, forestry-planning land and mineral-planning land. 2. Environmental matters: The EIA generally identifies Project impacts, but should further assess impacts from equipment transport, stringing, crossings over roads, buildings and crops, access-road opening and tower-foundation excavation. Mitigation should address electromagnetic fields, timely information to affected households, repair of damaged roads/infrastructure, dust and noise control, compliant waste management, reinstatement of temporarily used land and productive land, electrical and occupational safety, and protection of air, soil and water. The environmental management/monitoring and incident prevention/response arrangements are generally acceptable, but	The Project Owner accepts the consolidated comments and provides the following responses: 1. The Project will follow the locations and alignment approved by the relevant provincial People's Committees and complete all required legal procedures and agreements. 2. The EIA has reviewed waste-related and non-waste impacts, including land acquisition/site clearance, forest impacts and conductor stringing. For electromagnetic fields, Article 68 of Electricity Law No. 61/2024/QH15 does not permit residential buildings or buildings where people live/work within the safety corridor of overhead lines of 500kV or higher, except specialized grid-operation facilities; therefore, the Project does not propose measures to maintain such residential buildings within the 500kV corridor.	Lam Dong DOIT; DAE; DOST; DOC; DOCST; Provincial Police; and relevant commune-level People's Committees

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No.	Comments / Recommendations	Response / Incorporation / Explanation	Consulted Agency / Organization / Community / Stakeholder
	coordination with local authorities on transmission-line corridor safety and emergency response should be strengthened. Other matters include reviewing overlaps with forest-land, national defense/security and mineral planning; transparent compensation and site clearance; advance notification of construction schedules; road restoration and site clean-up; maintenance of local security and order; environmental monitoring coordination; chance-find procedures for cultural heritage; and compliance with provincial directions concerning land planned for national-defense purposes.	The Project Owner will coordinate closely with local authorities, inform affected households of the implementation schedule, require contractors to repair damaged transport and other infrastructure, control dust/noise and manage waste, reinstate temporarily occupied land and productive land, comply with electrical/occupational/environmental safety requirements, and implement all measures in the approved EIA. The Project Owner will implement the environmental management and monitoring program and coordinate with local authorities on corridor-safety communication and environmental incident response. The Project Owner has worked with relevant agencies regarding forest, defense-security and mineral planning. Compensation, assistance and site clearance will be lawful, public and transparent. Contractors will maintain security/order, clean sites and repair damaged roads. Chance finds of relics, antiquities or national treasures will trigger suspension of work and notification to the Department of Culture, Sports and Tourism and competent authorities. Matters concerning national-defense planning have been handled in accordance with Letter No. 1089/UBND-XDCT dated 23 January 2026.	
3	Comments of the Dong Nai People's Committee in Letter No. 1335/UBND-KTN dated 26 January 2026: 1. Legal basis: Add investment-policy approval and review relevant legislation, including amendments in the agriculture/environment sector, planning legislation and regulations implementing the Law on Biodiversity. 2. Consultation matters under Clause 3, Article 33 of the Law on Environmental Protection:	The Project Owner accepts the comments and has supplemented the EIA as follows: 1. Legal basis: Decision No. 3319/QD-UBND dated 06 July 2026 approving the investment policy and investor has been added, together with updated legislation including Law No. 146/2025/QH15, Decree No. 48/2026/ND-CP, the Law on Biodiversity, Law No. 35/2018/QH14, the Law on Geology and Minerals and its amendments, Decree No. 65/2010/ND-CP and Decree No. 193/2025/ND-CP. 2.a) The G45-G45A section through Phu Gieng Commune has been updated. Forest impacts are summarized by forest function,	Dong Nai People's Committee

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No.	Comments / Recommendations	Response / Incorporation / Explanation	Consulted Agency / Organization / Community / Stakeholder
	2.a) Project location: update the G45-G45A section through Phu Gieng Commune; provide more specific forest location/area/boundary information and demonstrate consistency with national forestry planning and the National Environmental Protection Strategy. 2.b) Environmental impacts: fully define the Project's area of influence, including residential areas, agricultural land, tower foundations and the right-of-way; describe canals, streams and receiving waters; identify access routes for oversized/heavy equipment and assess impacts of road improvement/clearance; calculate/measure electric-field intensity at crossings with existing 110/220/500kV lines and at maximum load; prepare transport and material-staging plans and road-restoration arrangements; and clarify temporary-road reinstatement. 2. c) Mitigation: do not bury domestic solid waste at sites without a collection service; contract authorized collection/treatment; strictly control dust/noise, traffic and occupational safety, local security and worker temporary residence; provide timely compensation/assistance and reinstate land; during operation, strictly manage the high-voltage safety corridor, fire prevention and line inspection; and coordinate with local forest rangers. 2.d) Environmental management/monitoring and emergency response: specify monitoring locations, parameters, frequency and applicable standards and implement environmental management and emergency measures. 2. e) Other matters: clarify construction water sources; provide compensation/site-clearance progress and affected-household information; complete clearance-height agreements; complete forest-conversion procedures before forest-related construction; and coordinate closely with local authorities.	locality and forest manager, while lot/compartment/sub-compartment details are provided in the forest-status survey reports prepared for forest-purpose conversion procedures. The Project will complete all forestry legal procedures, and the EIA has added an assessment of consistency with the National Environmental Protection Strategy. 2.b) The EIA has reviewed the Project's area of influence, hydrology, temporary/access roads, temporary land use and electric-field impacts. EMTP is used to calculate electric-field intensity beneath the 500kV line and at crossings. Transport/material-staging and road-restoration measures are included, as are site clean-up and reinstatement measures. 2.c) The proposed burial of domestic solid waste at locations without collection services has been removed. Contractors will strictly control dust/noise, traffic and occupational safety, local security and worker registration. Adequate funding and coordination will be ensured for compensation and assistance, followed by land reinstatement. During operation, the safety corridor will be strictly managed, lines inspected and coordination maintained with local forest rangers. 2.d) An environmental monitoring program has been proposed in accordance with the applicable EIA template; environmental management, monitoring and emergency prevention/response will be implemented as required. 2.e) Construction water sources have been clarified. The EIA provides the expected compensation/site-clearance schedule; due to the approximately 330-km alignment across 34 communes/wards in five provinces and the feasibility-study stage, a final household list is not yet provided. Clearance-height agreements are being processed. Forest-conversion procedures	

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No.	Comments / Recommendations	Response / Incorporation / Explanation	Consulted Agency / Organization / Community / Stakeholder
		will be completed before any forest-related works. Close coordination with local authorities will be maintained.	
4	Comments of the Ho Chi Minh City DAE in Letter No. 17879/SNNMT-CCBVMT dated 31 December 2025: The Department requested review of the Project location and legal consistency; full identification of construction and operation impacts, including land acquisition, vegetation/forest clearance, waste, noise/vibration, traffic, conductor stringing, worker influx, electromagnetic fields and risks; appropriate mitigation and environmental management; compliance with compensation/site-clearance and land-use requirements; protection and restoration of roads, irrigation and other infrastructure; strict management of the transmission-line safety corridor; fire prevention and emergency response; and close coordination with local authorities and relevant agencies. The EIA should also address forest and biodiversity impacts, temporary land use and restoration, road and watercourse crossings, hazardous waste, and community feedback mechanisms.	The Project Owner accepts the comments and has reviewed/supplemented the EIA accordingly. The Project will be implemented within the approved location and alignment and in compliance with land-use and other applicable legal procedures. Construction and operation impacts have been reviewed comprehensively, including waste and non-waste impacts, land acquisition/site clearance, forests/ecology, stringing, worker concentration and electromagnetic fields. Mitigation includes vegetation-clearance controls, forest-fire prevention, erosion/slope measures, covered material transport and road cleaning, traffic control at stringing crossings, hazardous-waste management, reinstatement of temporary land, irrigation systems, field roads and embankments, and comprehensive operation-phase incident prevention. The Project Owner commits to the environmental management and monitoring program and will receive community feedback through the Project Owner's and branch units' telephone numbers, email addresses and websites.	Ho Chi Minh City DAE
5	Comments of the Tay Ninh DAE in Letter No. 371/SNNMT-MTBDKH dated 09 January 2026: The Department requested confirmation of the approved Project location/alignment and consistency with land-use planning; comprehensive assessment of construction and operation impacts, including waste, noise, stringing, worker influx, land acquisition/site clearance, electromagnetic fields, forests, ecology and sensitive receptors; adequate mitigation for vegetation clearance, forest-fire risks, steep/weak-ground construction, watercourse crossings, forest/biodiversity impacts, material transport, road crossings, hazardous waste and post-construction land/infrastructure restoration; and complete operation-phase emergency measures for	The Project Owner accepts the comments. The approved Project location and alignment and land-use procedures have been reviewed. The EIA assesses waste and non-waste impacts during construction and operation, electromagnetic fields, land acquisition/site clearance, forest/ecological impacts and sensitive receptors. The Project mainly crosses agricultural land, partly runs parallel to the existing 500kV Pleiku - My Phuoc - Cau Bong line and partly crosses production/protection forests; except for certain road crossings with nearby houses, it does not cross concentrated residential areas and does not affect cultural/religious buildings, schools or health facilities.	Tay Ninh DAE

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No.	Comments / Recommendations	Response / Incorporation / Explanation	Consulted Agency / Organization / Community / Stakeholder
	settlement/landslide, tower collapse, conductor breakage, lightning, forest fire and crane contact with the line. The Project should implement environmental management/monitoring and establish channels for receiving and addressing community feedback.	The EIA includes vegetation-clearance measures, forest-fire prevention and response, measures for steep/weak ground, confirmation that no tower foundations are located within river/stream beds or banks, forest-status survey results, biodiversity offset/replacement planting, covered material transport and road cleaning, traffic signs/control at stringing crossings, hazardous-waste management, reinstatement of soil/irrigation/field roads/embankments, and operation-phase measures for foundation settlement/landslide, tower collapse, conductor breakage, lightning, forest fire and crane contact. The Project Owner commits to implementing the environmental management and monitoring program and will receive community comments through telephone, email and website channels.	
6	Comments of the Loc Ninh Protection Forest Management Board in Letter No. 135/BQLR-KT dated 17 December 2025: 1. Implement the Project at the locations approved by the provincial authorities. 2. No comment on environmental impacts. 3. Fully implement the mitigation measures in the approved EIA. 4. Implement the environmental management/monitoring and emergency prevention/response program in the approved EIA. 5. Complete all legal procedures, particularly forest and forest-land conversion, before implementation; affected households must comply with procedures for harvesting planted trees; notify the forest management unit before construction and tree felling in forest sections; ensure forest-fire prevention during construction; and clear vegetation only within forest/forestry land approved for conversion, without encroaching outside the approved area.	The Project Owner accepts the comments. The Project will follow the approved location/alignment and implement the mitigation, environmental management and monitoring measures in the approved EIA. All applicable legal procedures, including forest and forest-land conversion and procedures for harvesting planted trees, will be completed. The forest management unit will be notified before construction/tree felling. Forest-fire prevention measures will be applied, and clearance will be confined strictly to areas approved for conversion.	Loc Ninh Protection Forest Management Board

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No.	Comments / Recommendations	Response / Incorporation / Explanation	Consulted Agency / Organization / Community / Stakeholder
7	Comments of the Bu Dang Protection Forest Management Board in Letter No. 977/BQLR-KTBVR dated 18 December 2025: 1. Implement the Project at the locations approved by the provincial authorities. 2. Generally agrees with the environmental impact assessment. 3. Fully implement mitigation measures as required. 4. Fully implement environmental management/monitoring and emergency prevention/response requirements. 5. Ensure fire and explosion safety when constructing through forest areas and coordinate closely with the Bu Dang Protection Forest Management Board on inventory of acquired areas, compensation for planted trees and forest-purpose conversion procedures.	The Project Owner accepts the comments. The Project will follow the approved location/alignment and implement the mitigation, environmental management and monitoring measures in the approved EIA. Fire and explosion prevention measures will be applied during construction through forest areas, and close coordination will be maintained with the forest management unit for land inventory, tree compensation and forest-purpose conversion procedures.	Bu Dang Protection Forest Management Board
8	Comments of the Dak Mai Protection Forest Management Board in Letter No. 121/BQL-HCTH dated 18 December 2025: 1. Agrees with the Project locations approved by the provincial authorities. 2. No comment on environmental impacts. 3. Fully implement required mitigation measures. 4. Fully implement the environmental management and monitoring program. 5. Complete all legal procedures for forest-purpose conversion; during construction, clear only forest/forest land approved for conversion and do not encroach on other forest areas; notify the forest management unit before construction and tree felling in forest sections.	The Project Owner accepts the comments. The Project will follow the approved location/alignment and implement the mitigation, environmental management and monitoring measures in the approved EIA. Forest and forest-land conversion procedures will be completed in accordance with current regulations. The forest management unit will be notified before construction/tree felling, and vegetation clearance will be limited strictly to the approved conversion area.	Dak Mai Protection Forest Management Board
II	**Supplementary consultation via discussion meetings and in-depth interviews during the ESIA preparation phase[1].**		

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No.	Comments / Recommendations	Response / Incorporation / Explanation	Consulted Agency / Organization / Community / Stakeholder
1	- Confirmed that the 500kV transmission line corridor boundary is not under the direct management of Nam Nung Nature Reserve. - Assessed construction-phase impacts as 'None' for noise, vibration, dust, forest-tree cutting, access-road opening, forest fire and forest intrusion, and 'Low' for forest habitat fragmentation. - Assessed operation-phase impacts as 'Low' for bird-collision risk, birds nesting on towers and habitat loss. - Recommended that, although the alignment is outside the forest area under its management, SPMB should strictly comply with legal requirements on forest protection and biodiversity and minimize adverse impacts on the surrounding environment.	- SPMB and the Consultant sincerely thank the Nam Nung Nature Reserve Management Board for its objective professional assessment. - SPMB accepts the recommendation and commits to directing construction contractors to strictly comply with the Law on Forestry, the Law on Environmental Protection of Viet Nam and WB standards. - SPMB commits to strict implementation of dust and noise mitigation measures and worker-behavior management so as not to affect the buffer zone of the Nature Reserve.	Nam Nung Nature Reserve Management Board (Expert: Pham Trong Thuy – Deputy Director)
2	- Confirmed that the transmission line does not pass through the strictly protected zone or any forest area managed by the Nature Reserve. - Assessed all construction-phase activities (noise, dust, vibration, forest-tree cutting, access-road opening, forest fire and worker intrusion) as 'No impact'. - During operation, bird-collision risk was assessed as 'No impact'. - Recommended that the Project apply good construction management measures to minimize overall impacts on the ecological environment.	- SPMB accepts the confirmation that the alignment does not affect forest areas managed by the Nature Reserve. - SPMB commits to strict implementation of the Environmental and Social Management Plan (ESMP) to ensure that construction does not cause secondary pollution, emission sources are tightly controlled, and natural vegetation is maintained along the transmission-line corridor.	Nam Nung Nature Reserve Management Board (Phạm Thế Mẫn – Acting Head of the Department of Science & International Cooperation)

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7.3. INFORMATION DISCLOSURE

The initial draft Vietnamese versions of the ESIA, SEP, LMP, and ESCP are scheduled to be disclosed at the commune offices within the project area and at the Project Management Unit (SPMB) on September 15, 2026, for public consultation. Based on the contents of the ESIA, local communities will have access to Project-related information and can provide feedback and comments regarding environmental and social concerns.

The final draft English versions of the ESIA, RP, SEP, LMP, and ESCP are expected to be disclosed on the World Bank's external website on September 15, 2026, for public comments. The final ESIA report, in both Vietnamese and English, will also be officially disclosed at the project sites and on the World Bank's website.

Following the public consultations conducted across 25 communes/wards in 05 provinces/cities within the project area, the priority concerns raised by stakeholders focused on: (i) land acquisition, compensation, and livelihood restoration; (ii) mitigating impacts on agricultural production; (iii) controlling environmental impacts and ensuring community safety; and (iv) protecting forests and biodiversity, and restoring affected areas. Stakeholders also requested continuous information disclosure, consultation, and close coordination with local authorities, communities, and resource management agencies throughout the design, construction, and operational phases of the Project.

The Project Owner has recorded all feedback and comments from local authorities and residents within the project area. These inputs will be forwarded to the Technical Design Consultant for review and supplementary field surveys to ensure appropriate design adjustments, thereby minimizing losses to affected households, organizations, and entities to the lowest extent possible.

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CONCLUSIONS, RECOMMENDATIONS AND IMPLEMENTATION COMMITMENTS

1. Conclusions

The 500kV Krong Buk – Tây Ninh 1 Transmission Lines Project (REACH) is an energy infrastructure project of significant importance for enhancing regional power transmission capacity, strengthening national power grid reliability, improving inter-regional connectivity between the Central Highlands and the Southern Key Economic Zone, and supporting the integration of renewable energy sources. In the long term, ensuring a stable and efficient power supply is expected to generate positive benefits in terms of regional socio-economic development, industrial growth, energy security, and greenhouse gas emission reduction.

The ESIA has identified and assessed the potential environmental and social impacts and risks associated with Project implementation. Key issues during the pre-construction and construction phases include permanent land acquisition for tower foundations; UXO related risk, temporary land occupation and restrictions within the Right-of-Way (RoW); impacts on livelihoods and agricultural activities; biomass clearing, tree felling, and potential impacts on forest land and biodiversity; soil erosion and slope instability along mountainous alignment sections; dust, noise, vibration, and construction wastewater; occupational health and safety (OHS), community health and safety, labor influx, and traffic disruption along material transport routes. The impacts are mainly localized, concentrated along the transmission line alignment, tower sites, access tracks, and construction yards; most are temporary and can be controlled through engineering design solutions, construction management measures, and the ESMP. During the operation phase, issues requiring continued management mainly include electromagnetic field (EMF) exposure and safety, noise, RoW vegetation maintenance, forest fire prevention and fighting (FFPF), avian collision and nesting risks, emergency response, as well as ensuring the line infrastructure's resilience to extreme weather events and climate risks.

With full implementation of the ESMP, contractors' environmental and social management plans (C-ESMP), specialized safeguard plans (RAP, EMDP, SEP, FFPF), the environmental monitoring program, independent environmental and social monitoring, and the grievance redress mechanism (GRM), most adverse Project impacts can be reduced to low or low-to-moderate levels after mitigation. Therefore, considering the overall balance between manageable adverse impacts and the long-term energy, socio-economic, and environmental benefits, the Project is assessed as being capable of controlling its environmental and social impacts and risks.

2. Recommendations

EVNNPT/SPMB recommend that the competent authorities, provincial/local authorities across the five project provinces/cities, and the World Bank (WB) continue to coordinate with, provide guidance to, and support the Project Owner during the completion of detailed design, land acquisition/forest repurposing procedures, and implementation of the Project. Environmental and social requirements should be treated as a mandatory component of Project management, with adequate resources and budget allocated, and should be updated whenever the detailed alignment design, tower spotting, access routes, construction methods, or site conditions change.

3. Commitments of the Project Owner

EVNNPT/SPMB commit to fully implementing its environmental and social protection obligations in accordance with Vietnamese law, the applicable requirements of the World Bank's Environmental and Social Framework (WB ESF), the Project approval conditions, and the provisions established in the ESIA/ESMP. SPMB will ensure that mitigation measures are incorporated into appropriate bidding and contract documents, adequate resources are allocated for environmental and social management, independent monitoring is established, and meaningful engagement with affected communities and stakeholders is maintained throughout the Project's implementation.

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APPENDIXES

APPENDIX 1: APPENDIX TO CHAPTER 3 - BASELINE ENVIRONMENTAL AND SOCIO-ECONOMIC CONDITIONS

Table A3.1: Average number of thunderstorm days in months and years

Unit: day

Features	Months and years												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Year**
Buon Ma Thuot Station	0.1	0.7	3.0	8.0	14.6	10.6	10.1	8.8	11.3	5.9	0.6	0.1	74.0
Dak Nong Station	0.5	1.5	5.1	9.3	10.0	5.8	6.2	5.4	6.1	6.5	1.0	0.3	57.8
Phuoc Long Station	0.8	1.5	5.1	13.3	17.1	12.6	13.0	11.5	14.3	11.5	5.1	1.4	107.2
Dong Xoai Station	0.7	1.0	3.4	10.6	14.7	13.7	13.8	11.0	14.9	12.8	5.2	1.5	103.3
Tay Ninh Station	0.9	0.7	2.7	9.0	15.3	13.2	12.9	11.6	15.6	14.1	7.2	1.1	104.2

Source: National Technical Regulation on data on natural conditions in construction QCVN 02:2022/BXD issued under Circular No. 02/2022/TT-BXD dated September 26, 2022.

Table A3.2: Lightning strike density

No.	Province/commune	Pre-merged province/district	Lightning Strike Density (Number of times/km^2/year)
1	**Dak Lak Province**	**Dak Lak**	
1.1	Ea Kiet Commune	Cu M'gar district	13.7
1.2	Ea M'Droh Commune		
1.3	Ea Wer Commune	Buon Don District	13.7
2	**Lam Dong Province**	Old Dak Nong	
2.1	Dak Wil Commune	Cu Jut district	13.7
2.2	Nam Dong Commune		
2.3	Cu Jut Commune		
2.4	Dak Mil Commune	Dak Mil District	13.7
2.5	Dak Sak Commune		
2.6	Nam Da Commune	Krong No District	10.9
2.7	Krong No Commune		
2.8	Dak Song Commune	Dak Song District	13.7

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No.	Province/commune	Pre-merged province/district	Lightning Strike Density (Number of times/km^2/year)
2.9	Duc An Commune		
2.10	Truong Xuan Commune		
2.11	Quang Tan Commune	Tuy Duc District	13.7
2.12	Quang Tin Commune	Dak R'Lap district	13.7
3	**Dong Nai City**	Old Binh Phuoc	
3.1	Tho Son Commune	Bu Dang District	13.7
3.2	Dak Gan Commune		
3.3	Bom Bo Commune		
3.4	Phu Nghia Commune	Bu Gia Map district	13.7
3.5	Dak O Commune		
3.6	Da Kia Commune		
3.7	Phuoc Binh Ward	Phu Gieng District	13.7
3.8	Binh Tan Commune		
3.9	Phu Rieng Commune		
3.10	Long Ha Commune		
3.11	Tan Hung Commune	Dong Phu District	14.9
3.12	Tan Quan Commune	Hon Quan District	14.9
3.13	Binh Long Ward		
3.14	Minh Duc Commune		
3.15	Tan Khai Commune		
4	**Ho Chi Minh City**	Old Binh Duong	
4.1	Minh Thanh Commune	Dau Tieng District	14.9
4.2	Dau Tieng Commune		
5	**Tay Ninh Province**	**Tay Ninh**	
5.1	Loc Ninh Commune	Duong Minh Chau	14.9
5.2	Hung Thuan Commune	Trang Bang town	14.9

Source: National Technical Regulation on data on natural conditions in construction QCVN 02:2022/BXD issued under Circular No. 02/2022/TT-BXD dated September 26, 2022.

Table A3.3: Typhoons making landfall along the coasts of Binh Dinh to Ninh Thuan (from 1961 to present)

Coastline	Appearance time	Name of the storm	Storm level
Binh Dinh-Ninh Thuan	07/11/2020	ETAU	Level 9 (75-90km/h)
Ninh Thuan-Binh Thuan	14/11/2018	TORAJI	Level 8 (60 - 75km/h)

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Coastline	Appearance time	Name of the storm	Storm level
Khanh Hoa-Ba Ria Vung Tau	19/11/2017	KIROGI	Level 8 (60 - 75km/h)
Khanh Hoa-Ninh Thuan	12/12/2014	HAGUPIT	Level 6 (39 - 49 km/h)
Khanh Hoa-Binh Thuan	06/11/2013	THIRTY	Level 6 (39 - 49 km/h)
Phu Yen-Ninh Thuan	14/11/2013	PODUL	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	04/10/2012	NUMBER 7	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	12/11/2010	ATND	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	18/07/2010	TRY OUT	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	25/10/2009	MARINAE	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	03/09/2009	Occupational Safety	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	15/11/2008	NOUL	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	11/11/2008	ATND	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	22/11/2007	HAGIBIS	Level 12 (118-133 km/h)
Binh Dinh - Ninh Thuan	29/10/2007	Occupational Safety	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	02/08/2007	Occupational Safety	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	26/10/2006	Anonymous	Level 13 (> 133 km/h)
Binh Dinh - Ninh Thuan	11/09/2005	Occupational Safety	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	09/06/2004	CHANTHU (No. 2)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	07/11/2001	LINGLING (No. 8)	Level 11 (103-117 km/h)
Binh Dinh - Ninh Thuan	14/12/1999	NONAME (No. 10)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	04/11/1999	Occupational Safety	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	09/12/1998	FAITH (No. 8)	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	23/11/1998	ELVIS (No. 6)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	17/11/1998	DAWN (No. 5)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	01/11/1996	Occupational Safety	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	24/10/1995	YVETTE (No. 10)	Level 10 (89-102 km/h)
Binh Dinh - Ninh Thuan	17/10/1994	TERRESA (No. 9)	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	02/12/1993	LOLA (No. 11)	Level 10 (89-102 km/h)
Binh Dinh - Ninh Thuan	19/11/1993	KYLE (No. 10)	Level 13 (> 133 km/h)
Binh Dinh - Ninh Thuan	18/10/1992	COLLEEN (No. 7)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	15/10/1992	ANGELA (No. 6)	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	10/11/1990	NELL (No. 3)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	16/10/1990	LOLA (No. 8)	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	01/10/1990	IRA (No. 7)	Level 6 (39 - 49 km/h)

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Coastline	Appearance time	Name of the storm	Storm level
Binh Dinh - Ninh Thuan	07/10/1988	NONAME (No. 7)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	14/11/1987	MAURY (No. 6)	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	06/11/1986	HERBERT (No. 9)	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	20/11/1985	GORDON (No. 11)	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	23/10/1984	WARREN (No. 9)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	11/10/1984	SUSAN (No. 8)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	15/10/1983	KIM (No. 10)	Level 9 (75 - 88 km/h)
Binh Dinh - Ninh Thuan	06/10/1983	HERBERT (No. 8)	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	17/03/1982	MAMIE (No. 1)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	12/10/1981	FABIAN (No. 7)	Level 9 (75 - 88 km/h)
Binh Dinh - Ninh Thuan	29/10/1980	CARY (No. 7)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	04/10/1979	SARAH (No. 8)	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	31/10/1978	NONAME (No. 10)	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	28/06/1978	SHIRLEY (No. 2)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	02/11/1975	HELLEN (No. 7)	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	13/11/1974	HESTER (No. 14)	Level 6 (39 - 49 km/h)
Binh Dinh - Ninh Thuan	09/11/1973	SARAH (No. 13)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	04/10/1973	OPAL (No. 10)	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	04/12/1972	THERESE (No. 10)	Level 10 (89-102 km/h)
Binh Dinh - Ninh Thuan	23/04/1971	WANDA (No. 1)	Level 9 (75 - 88 km/h)
Binh Dinh - Ninh Thuan	26/10/1970	LOUISE (No. 6)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	18/10/1970	KATE (No. 5)	Level 9 (75 - 88 km/h)
Binh Dinh - Ninh Thuan	15/11/1968	MAMIE (No. 9)	Level 10 (89-102 km/h)
Binh Dinh - Ninh Thuan	07/11/1967	FREDA (No. 10)	Level 9 (75 - 88 km/h)
Binh Dinh - Ninh Thuan	12/11/1964	KATE (No. 15)	Level 7 (50 - 61 km/h)
Binh Dinh - Ninh Thuan	06/11/1964	JOAN (No. 14)	Level 8 (62 - 74 km/h)
Binh Dinh - Ninh Thuan	01/11/1964	IRIS (No. 13)	Level 8 (62 - 74 km/h)

Source: National Center for Hydrometeorology

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Table A3.4: Storms making landfall along the coasts of Binh Thuan to Ca Mau (from 1961 to present)

Coastline	Appearance time	Name of the storm	Storm level
Coastal from South Binh Thuan – Ben Tre	24/11/2018	USAGI (No. 19)	Level 8 (62-74km/h)
Binh Thuan – Ca Mau	19/11/2017	KIROGI	Level 8 (62-74km/h)
Binh Thuan – Ca Mau	12/12/2014	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	29/3/2012	Anonymous	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	18/01/2010	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	23/11/2009	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	22/01/2008	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	13/01/2008	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	04/11/2007	Anonymous	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	02/11/2007	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	24/11/2006	Durian	Level 13 (>133 km/h)
Binh Thuan – Ca Mau	22/10/1999	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	11/11/1998	CHIP (No. 4)	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	31/10/1997	LINDA (No. 5)	Level 8 (62-74 km/h)
Binh Thuan – Ca Mau	07/11/1996	ERNIE (No. 8)	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	26/6/1994	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	03/11/1988	TESS (No. 10)	Level 11 (103-117 km/h)
Binh Thuan – Ca Mau	10/10/1985	Occupational Safety	Level 6 (39-49 km/h)
Binh Thuan – Ca Mau	14/11/1973	THELMA (No. 4)	Level 10 (89-102 km/h)
Binh Thuan – Ca Mau	18/10/1968	HESTER (No. 8)	Level 8 (62-74 km/h)
Binh Thuan – Ca Mau	28/11/1962	LUCY (No. 9)	Level 9 (75-88 km/h)

Source: National Center for Hydrometeorology

Table A3.5: Historical Flood Mark Survey

Surveyed location	Rivers (streams)	Hmax (m)	Time of occurence	Notes
G5 Location	Water storage pond area	359,29	11/1999	Mr. Nguyen Van Luc (survey guide)
G6 - G7	Ea M' Droh	356,28	11/1999	Mr. Chu Huy Thao cited
G6 - G7	Ea M' Droh	326,52	11/1999	Near Mr. Trieu Choi Chang's house

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Surveyed location	Rivers (streams)	Hmax (m)	Time of occurence	Notes
G7 - G8	Stream	300,48	11/1999	Mr. Hoang Van Phat (survey guide)
G7 - G8	Suoi Duc (Ea Tul)	264,45	11/1999	Mr. Nguyen Van Boil (survey guide)
G7 - G8	Suoi Duc (Ea Tul)	287,88	11/1999	Mr. Hoang Van Nam (survey guide)
G12 - G12A	Srepôk 3 channel	272,03	March 9, 10 annually	Tran Anh Khoa, NV. Srepok 3
G12A - G12A1	Srepok River	225,08	11/1999	Mr. Y Kim (survey guide)
G12A4 - G13	Dak Sôr stream (Lon stream)	382,05	8/2019	Mr. Tran Thanh Tam (survey guide)
G13 - G14	Lo O Stream	429,06	8/2019	Mr. Dang Van Dinh (survey guide)
G16 - G17	Dak Mam Stream (Bong Stream)	565,72	8/2016	Mr. Nong Van Huan (survey guide)
G17 - G18	Dak Mam stream (Doc Dai stream)	624,25	8/2023	Mr. Hoang Van Tuan (survey guide)
G20-G21	Dak Mam Stream	708,87	2018	Historic floods in 2018
G26-G27	Dak Drung Stream	791,62	2018	Historic floods in 2018
G27-G28	Dak Gouat Stream	744,62	2018	Historic floods in 2018
G30-G31	Dak Tih Stream	669,38	2018	Historic floods in 2018
G32-G33	Dak Rlap River	309,46	2018	Historic floods in 2018
G33-G34	R Lap River	281,01	2018	Historic floods in 2018
G34-G35	R Lap River	262,78	2018	Historic floods in 2018
G38-G39	Thac Mo Lake	221,30	-	Enhanced water level rise (flood inspection, frequency 0.1%)
		218,20	-	Annual floods
G42A-G43	Be River	113,51	2013	Historic floods in 2013

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Surveyed location	Rivers (streams)	Hmax (m)	Time of occurence	Notes
G45-G45A	Stream	117,98	-	Water levels at high times
G45-G45A	Stream	118,25	-	Water levels at high times
G45-G45A	Stream	104,41	-	Water levels at high times
G46 - G47	Stream	55,68	-	Water levels at high times
G46 - G47	Be River	104,41	2000	Historic flood water level in 2000
G46 - G47	Be River	55,68	2000	Historic flood water level in 2000
G46 - G47	Be River	48,20	2000	Historic flood water level in 2000
G46 - G47	Be River	48,05	2000	Historic flood water level in 2000
G50 – G50A	Stream	44,25	-	Water levels at high times
G50 – G50A	Stream	51,79	-	Water levels at high times
G50A-G51	Stream	50,01	-	Water levels at high times
G50A-G51	Stream	53,05	-	Water levels at high times
G52B - G53B	Stream	27,70	2025	Historic flood water level 2025
G52B - G53B	Stream	32,08	-	High water level
G52B - G53B	Stream	51,06	-	High water level
G59 - G60	Saigon River	4,88	2000	Historic flood water level in 2000
G59 - G60	Saigon River	4,62	-	High water level
G59 - G60	Saigon River	4,58	-	High water level
G59 - G60	Saigon River	4,69	-	High water level
G59 - G60	Saigon River	4,75	-	High water level
G61 - G64	Saigon River	2,81	2000	Historic flood water level in 2000
		2,75	-	High water level

Source: Topographic survey report of the 500kV Krong Buk - Tay Ninh 1 transmission line project, PECC2-PECC3-PECC4, 12/2025

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Table A3.6: Results of ambient air quality analysis in the project area

Location	Dust (mg/m3)	SO2(mg/m3)	NO2(mg/m3)	CO (mg/m3)	Noise level (dBA)
K1	0.19	0.066	0.066	5.11	57.7
K2	0.16	0.074	0.054	5.28	59.6
K3	0.15	0.068	0.051	5.16	55.8
K4	0.12	0.072	0.071	5.09	56.9
K5	0.15	0.088	0.068	5.18	54.7
K6	0.18	0.067	0.081	5.22	60.1
K7	0.13	0.065	0.052	5.11	56.8
K8	0.11	0.077	0.091	5.32	54.5
K9	0.15	0.084	0.101	5.21	55.1
K10	0.10	0.080	0.064	5.12	55.7
K11	0.16	0.067	0.067	5.81	57.3
K12	0.11	0.072	0.112	5.06	58.4
K13	0.12	0.066	0.088	5.27	55.9
K14	0.14	0.078	0.065	5.21	57.2
K15	0.18	0.081	0.077	5.13	56.1
QCVN 05:2023/BTNMT	**0.3**	**0.35**	**0.2**	**30**	**-**
QCVN 26:2025/BTNMT	**-**	**-**	**-**	**-**	**70**

Notes: Sampling location diagram shown above Figure 7: Diagram of air, surface water, soil sampling location *above; QCVN 05:2023/BTNMT- National technical regulation on air quality; QCVN 26:2025/BTNMT- National technical regulation on noise.*

Table A3.7: Results of surface water quality analysis in the project area

No	Parameters	Unit	N1	N2	N3	N4	N5	QCVN 08:2023/ BTNMT, Level B
1	pH	-	6.58	6.68	6.61	6.63	6.68	**6.0-8.5**
2	COD	mg/l	10.6	13.4	12.6	12.7	14.1	**≤15**
3	BOD5	mg/l	**6.31**	**7.79**	**8.65**	**7.45**	**8.13**	**≤6**
4	TSS	mg/l	23.0	29.0	27.0	28.0	26.0	**≤100**
5	Total Phosphor (HCMC)	mg/l	0.18	0.23	0.19	0.21	0.24	**≤ 0.3**
6	Total Nitrogen (TN)	mg/l	0.47	0.46	0.58	0.55	0.61	**≤1.5**
7	Coliform	MPN/ml	1.100	900	1.200	1.000	1.300	**≤5,000**

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Notes: Sampling location diagram shown above Figure 7: Diagram of air, surface water, soil sampling location *above; QCVN 08:2023/BTNMT- National technical regulation on surface water quality.*

Table A3.8: Results of soil quality analysis in the project area

Location	Arsenic (As)	Cadmium (Cd)	Lead (Pb)	Zinc (Zn)
	mg/kg	mg/kg	mg/kg	mg/kg
A1	KPH	KPH	5.23	4.15
A2	KPH	KPH	6.15	5.11
A3	KPH	KPH	8.01	5.06
D4	KPH	KPH	6.68	5.42
A5	KPH	KPH	7.23	4.98
A6	KPH	KPH	6.45	5.56
A7	KPH	KPH	6.78	6.01
A8	KPH	KPH	5.51	6.89
D9	KPH	KPH	8.12	5.67
A10	KPH	KPH	6.67	4.78
A11	KPH	KPH	8.41	5.14
A12	KPH	KPH	6.87	6.08
QCVN 03:2023/ BTNMT (type I)	**25**	**4**	**200**	**300**

Notes: Sampling location diagram shown above Figure 7: Diagram of air, surface water, soil sampling location *above; QCVN 03:2023/BTNMT- National technical regulation on soil quality; KPH: not detected.*

Table A3.9: List of endangered, precious and rare plant species in Nam Nung National Park

No.	Scientific Name	Vietnamese name	IUCN status	Viet Nam Red Book	Decree 06/2019/ND-CP (amended by Decree 84/2021)
1	*Aquilaria crassna*	Trầm hương	**CR**	**EN**	IIA
2	*Quercus blaoensis*	Sồi blao	**CR**	-	-
3	*Afzelia xylocarpa*	Gõ đỏ	**EN**	**EN**	IIA
4	*Hopea pierrei*	Kiền kiền	**VU**	**EN**	IA
5	*Dalbergia oliveri*	Cẩm lai bông	**EN**	-	IIA
6	*Pterocarpus macrocarpus*	Giáng hương trái to	**EN**	**EN**	IIA

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7	*Magnolia braianensis*	Giổi braian	-	**EN**	-
8	*Cinnamomum balansae*	Gù hương	**EN**	**VU**	IIA
9	*Cephalotaxus mannii*	Đỉnh tùng	**VU**	**VU**	IIA
10	*Cycas micholitzii*	Tuế lá xẻ	**VU**	**VU**	IIA

Notes: CR (Critically Endangered); EN (Endangered); VU (Vulnerable); IIA (CITES Appendix II, Annotation A): CITES Appendix II – note A; IA (CITES Appendix I, Annotation A); CITES Appendix I – note A

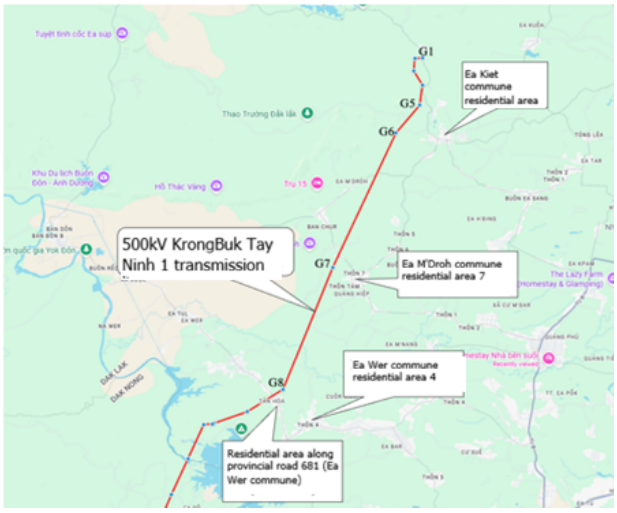
(Source: Project Report "Investigation and Assessment of Forest Plant Diversity in Nam Nung Nature Reserve, 2022")

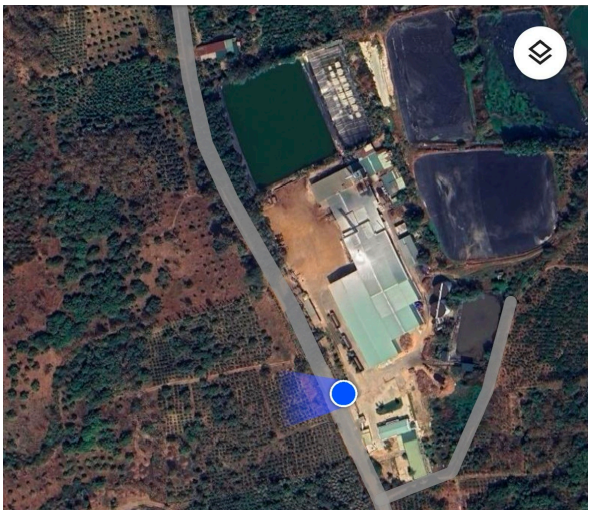
Table A3.10: Distance from the project to residential areas

No.	Existing residential area	Distance to the project	Latest project items	Impact
1	Residential area of Ea Kiet commune	1.9km	G5	Minor impact due to material transportation activities
2	Residential area of village 7, Ea M'Droh commune	1.1km	G7	
3	Residential area of village 4, Ea Wer commune	1.9km	G8	
4	Residential area along provincial road 681 road (Ea Wer commune)	450m	G8	Some homestays are located in the safety corridor
5	Residential area of Dak Wil commune	1.4km	G12A.2	Minor impact due to material transportation activities
6	Residential area of village 10, Nam Dong commune	3.76km	G12A.2A	
7	Residential area of village 7, Nam Dong commune	1.7km	G12A.2B	
8	Residential area of Krong No commune	3.1km	G13	
9	Residential area of Dak Sak commune	3.3km	G18	
10	Residential area of Kien Duc commune	2.8 km	G30A	
11	Residential area of Phuoc Binh ward	2.7km	G45	
12	Residential area of Phu Gieng commune	3.1km	G45A	
13	Residential area of Long Ha commune	1.5km	G45A	
14	Residential area of Binh Long commune	5.2km	G48A	
15	Residential area of Tan Khai commune	2.9km	G48A	
16	Residential area of Dau Tieng commune	1.75km	G60	

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No.	Existing residential area	Distance to the project	Latest project items	Impact
17	Residential area of hamlet 1, Loc Ninh commune	600m	G60	
18	Residential area of Hung Thuan commune	750m	G65	













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Figure A3.1: Location of residential areas along the transmission line

Table A3.11: Summary of crossings of the line

No.	Description	Unit	Total	Notes
A	**Crossing with transmission line**			
1	Cu M'Gar 110kV Transmission Line – JPO	times	1	G7-G8
2	220kV Srepok 4 transmission line – Krong Buk	times	1	G9-G10
3	500kV Pleiku - My Phuoc - Cau Bong transmission line	times	1	G10-G11
4	220kV Buon Kop - Serepok 3 transmission line	times	1	G12-G12A
5	220kV Dak Hoa - Dak Nong transmission line	times	1	G21-G22
6	220kV Dak Nrung Power Plant Transmission Line - Dak Nong 500kV Substation	times	1	G28-G29
7	Dak Glun 110kV Hydropower Line	times	1	G37-G38
8	110kV Thac Mo - Loc Ninh transmission line	times	1	G43-G45
9	220kV Dak Nong – Phuoc Long – Binh Long transmission line	times	1	G45A-G45B
10	220kV My Phuoc – Binh Long transmission line	times	1	G48-G48A
11	110kV Binh Long 2 – Minh Hung transmission line	times	1	G48-G48A
12	110kV Binh Long 2 – Binh Long transmission line	times	1	G48-G48A
13	110kV Binh Long – Tay Ninh Cement Transmission Line	times	1	G49A-G50
14	110kV Binh Long – Tay Ninh 2 transmission line	times	3	G52-G52B, G55B-G56B, G58C-G59

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No.	Description	Unit	Total	Notes
15	110 kV Dau Tieng - Minh Hung transmission line	times	2	G53C-G54, G55B-G56B
16	110kV Dau Tieng - Tay Ninh 2 transmission line	times	1	G58C-G59
17	Medium voltage and low voltage lines	times	707	
B	**Crossing with roads**			
1	Provincial road 967	times	1	G8-G9
2	Serepok 3 Dam Route	times	4	G12-G12A-G12A.1
3	National Highway 14	times	4	G12A.3-G12A.4, G24-G25, G25-G26
4	Provincial road 683	times	1	G13-G14
5	Binh Phuoc – Dak Nong – Dak Lak expressway is expected	times	2	G13-G14, G17-G18
6	Provincial road 681	times	1	G30A-G31
7	Provincial road 760	times	2	G36-G37, G38-G39
8	National Highway 14C	times	1	G40-G41
9	Provincial road 759	times	1	G43-G45
10	Hoang Ngoc Thuc Street	times	1	G45-G45A
11	Provincial road 757	times	1	G45-G45A
12	Provincial road 758	times	1	G47-G47A
13	Provincial road 756	times	1	G47A-G47B
14	National Highway 13	times	1	G48A-G49
15	Provincial road 749B	times	1	G53C-G54
16	Provincial road 744	times	1	G55B-G56B
17	Provincial road 710	times	1	G58C-G59
18	Tran Van Lac Street	times	1	G59-G60
19	District road 603	times	1	G59-G60
20	Provincial road 789	times	3	G60-G61, G62-G63, G64-G65
21	Provincial road 782	times	1	G60-G61

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No.	Description	Unit	Total	Notes
22	Soc Lao Road	times	1	G64-G65
23	Canal shoreline	times	6	G65A-G66-G67
24	Tan Thuan Street	times	1	G66-G67
25	Crossing asphalt roads, dirt roads, stone roads and rural roads (≤ 10m wide)	times	1581	
C	**Crossing with rivers and streams**			
1	Duc stream (38.5m wide)	times	1	G7-G8
2	Serepok 3 Hydropower Canal (94.8m wide)	times	1	G12-G12A
3	Serepok River (217m wide)	times	1	G12A-G12A.1
4	Dak N'Đrung stream (36m wide)	times	1	G26-G27
5	Dak R'Tih stream (18m wide)	times	1	G30-G30A
6	Dak River (31-126m wide)	times	6	G32-G33-G34-G35
7	Small branch of Thac Mo hydropower reservoir (244m wide)	times	1	G38-G39
8	Be River (88-110m wide)	times	2	G42A-G43, G47-G47A
9	Saigon River (64m-200m wide)	times	2	G59-G60, G63-G64
10	East Canal (35m wide)	times	1	G66-G67
11	Streams, creeks, ditches, ponds <30m wide	times	879	

Source: Topographic survey report, PECC2-PECC3-PECC4, 12/2025

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APPENDIX 2: APPENDIX TO CHAPTER 7 - PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A7.1. Consultation Minutes

Validated supporting consultation records are maintained by EVNNPT/SPMB. Records referenced in this ESIA and SEP will be made available for Project review, with personal data redacted as appropriate. Records for scheduled consultations will be incorporated or referenced in the next SEP update following completion and validation.

- **Ea Kiet Commune – Dak Lak Province**

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

DỰ ÁN: DỰ ÁN THÚC ĐẨY CHUYỂN DỊCH NĂNG LƯỢNG TÁI TẠO (REACH)
BIÊN BẢN THAM VẤN CỘNG ĐỒNG

1. Thông tin cuộc họp

Tên dự án: **ĐƯỜNG DÂY 500KV KRÔNG BUK – TÂY NINH 1**
Thời gian họp: ngày ..04.. tháng ...8..... năm 2026
Địa điểm: Ủy ban Nhân dân xã .....Ea Kiết.....

2. Thành phần tham dự

Đại diện Ủy ban nhân dân xã

STT	Họ và tên	Chức vụ	Đơn vị
1	Nguyễn Văn Minh	P. Chủ tịch UBND	0977128559
2	Vương Hoàng Tiến	Trưởng phòng Kinh tế	
3	Hnaini Mlô	CV Ban QLDA-ĐTXD	
4	Bùi Thế Khải	Phó CT MTTQ	
5	Nguyễn Thị Thảo	Phó Chánh VP UBND	

Đại diện cộng đồng/người dân/nhóm bị ảnh hưởng

STT	Họ và tên	Chức vụ	Địa chỉ
1			
2			
3			
4			
5			

Đại diện chủ đầu tư/đơn vị tư vấn

STT	Họ và tên	Chức vụ	Địa chỉ
1	Nguyễn Văn Lanh	PTP Đầu tư SPMB	
2	Lưu Nguyễn Hương Lan	CV. Môi trường SPMB	
3	Lê Tùng Thông	Chuyên gia Xã hội WB	
4	Nguyễn Phương Mai	Chuyên gia Tài chính WB	
5	Nguyễn Thị Thu	Tư vấn xã hội	
6	Nguyễn Thị Thúy	Tư vấn Môi trường	

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Tổng số người tham dự: 13.. người; trong đó nữ: ...6... người; người thuộc nhóm dễ bị tổn thương: ..... người; đại diện DTTS (nếu có): ..... người.

3. Mục tiêu tham vấn

- Cung cấp thông tin về mục tiêu, phạm vi, hạng mục đầu tư, tiến độ và khu vực dự kiến bị ảnh hưởng của dự án.
- Trình bày các rủi ro và tác động môi trường, xã hội dự kiến, bao gồm thu hồi đất, bồi thường, hỗ trợ, tái định cư, sinh kế, DTTS, an toàn cộng đồng và các vấn đề liên quan khác nếu có.
- Tham vấn và thảo luận lấy ý kiến đại diện UBND xã, các đoàn thể, hộ gia đình về các tác động môi trường và xã hội, tài nguyên sinh vật trong các giai đoạn thực hiện dự án và biện pháp giảm thiểu tương ứng.
- Thu thập ý kiến, quan ngại, kiến nghị và đề xuất của các bên liên quan để hoàn thiện thiết kế dự án và các công cụ quản lý rủi ro môi trường và xã hội.
- Giới thiệu cơ chế tiếp nhận và giải quyết khiếu nại, đầu mối liên hệ, phương thức phản hồi và kế hoạch tham vấn tiếp theo.

4. Nội dung thảo luận trong buổi tham vấn

..... Ban QLDA các công trình điện miền Nam (SPMB) đã trình bày các thông tin về mục tiêu, phạm vi, hạn mục đầu tư, tiến độ và khu vực dự kiến bị ảnh hưởng của DA trên địa bàn xã.
..... NH Thế giới (WB) đã trình bày các rủi ro và tác động môi trường, xã hội dự kiến, bao gồm thu hồi đất, bồi thường, hỗ trợ tái định cư khi thực hiện dự án. Đồng thời WB cũng kiến nghị UBND giúp họ thu thập cung cấp các thông tin về dân cư, đa dạng sinh học để báo cáo an toàn xã hội của dự án.
..... UBND đã có báo cáo sơ bộ về thông tin địa lý, dân cư trên địa bàn, đồng thời UBND xã có ý kiến như sau:
..... + DA Đường dây 500kV Krông Buk – Tây Ninh 1 có hướng tuyến liên đi qua địa bàn của xã, đề nghị điều chỉnh hướng tuyến để không ảnh hưởng đến dự án của xã.
..... + Về vấn đề tái định cư (TDC) khi thực hiện DA: Xã đã có kế hoạch TDC Buôn Hmâng.
..... + Sau khi có thông tin, UBND xã sẽ tiến hành

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mời hộ dân phổ biến thông tin DA

+ UBND xã đề nghị SPMB phối hợp với P. Kinh tế để cung cấp hồ sơ cập nhật quy hoạch và các thủ tục pháp lý liên quan để trình cấp thẩm quyền phê duyệt.

5. Tổng hợp các nội dung chính

Sau khi nghe các bên báo cáo, UBND xã Ea Kiết ủng hộ chủ trương và thống nhất với các nội dung của SPMB và WB. Phía UBND sẽ tiếp tục hỗ trợ cung cấp số liệu tháo gỡ vướng mắc, khó khăn của dự án

6. Kết luận và cam kết

Ban Quản lý Dự án/đơn vị thực hiện cam kết:

- Tiếp tục cung cấp thông tin cập nhật cho các bên liên quan theo hình thức phù hợp và dễ tiếp cận.

3

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- Xem xét, phản hồi và tích hợp các ý kiến phù hợp vào thiết kế dự án và các tài liệu môi trường xã hội hoặc các tài liệu khác nếu áp dụng.
- Duy trì cơ chế tiếp nhận và giải quyết khiếu nại trong suốt quá trình chuẩn bị và thực hiện dự án.
- Tổ chức các đợt tham vấn tiếp theo với các nhóm bên liên quan phù hợp, đặc biệt là hộ bị ảnh hưởng, phụ nữ, nhóm dễ bị tổn thương và DTTS nếu có.

7. Xác nhận

Biên bản được lập thành ..... bản có giá trị như nhau, đã được đọc lại/thông qua tại cuộc họp và được các đại diện ký xác nhận dưới đây.

ĐẠI DIỆN DỰ ÁN	ĐẠI DIỆN CHÍNH QUYỀN ĐỊA PHƯƠNG	ĐẠI DIỆN CỘNG ĐỒNG/NGƯỜI THAM DỰ
	PHÓ CHỦ TỊCH	
Nguyễn Văn [illegible]	Nguyễn Văn Minh	

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A7.2. Pictures of Consultation Minutes

Validated consultation photographs are maintained by EVNNPT/SPMB and may be incorporated or referenced in the ESIA, updated SEP, subject to consent, privacy protection and appropriate redaction of personal data.



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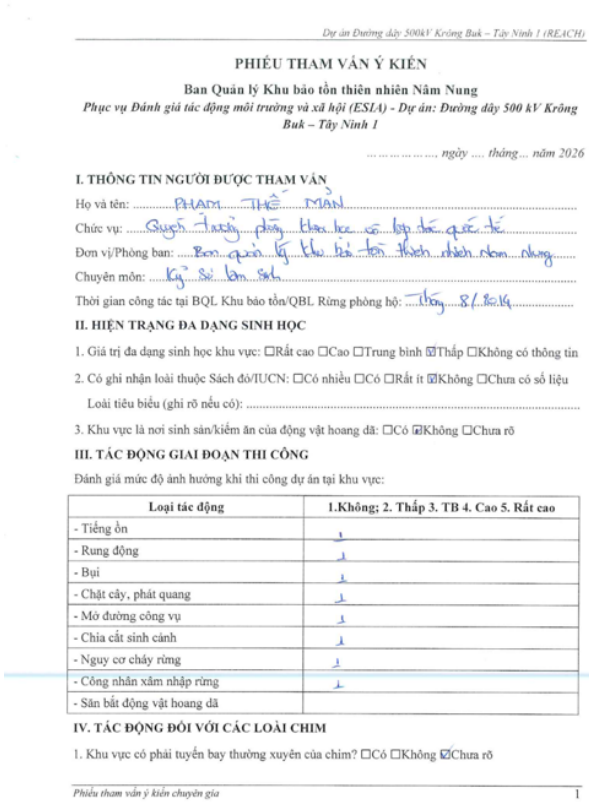
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Dự án Đường dây 500kV Krông Buk – Tây Ninh 1 (REACH)

PHIẾU THAM VẤN Ý KIẾN

Ban Quản lý Khu bảo tồn thiên nhiên Năm Nung

Phục vụ Đánh giá tác động môi trường và xã hội (ESIA) - Dự án: Đường dây 500 kV Krông Buk – Tây Ninh 1

……, ngày …. tháng… năm 2026

I. THÔNG TIN NGƯỜI ĐƯỢC THAM VẤN

Họ và tên: PHẠM THỊ MAI

Chức vụ: Quyền Trưởng phòng Khoa học và hợp tác quốc tế

Đơn vị/Phòng ban: Ban quản lý khu bảo tồn thiên nhiên Năm Nung

Chuyên môn: Kỹ Sư lâm sinh

Thời gian công tác tại BQL Khu bảo tồn/QBL Rừng phòng hộ: Tháng 8/2016

II. HIỆN TRẠNG ĐA DẠNG SINH HỌC

1. Giá trị đa dạng sinh học khu vực: ☐Rất cao ☐Cao ☐Trung bình ☑Thấp ☐Không có thông tin

2. Có ghi nhận loài thuộc Sách đỏ/IUCN: ☐Có nhiều ☐Có ☐Rất ít ☑Không ☐Chưa có số liệu

Loài tiêu biểu (ghi rõ nếu có): .....

3. Khu vực là nơi sinh sản/kiếm ăn của động vật hoang dã: ☐Có ☑Không ☐Chưa rõ

III. TÁC ĐỘNG GIAI ĐOẠN THI CÔNG

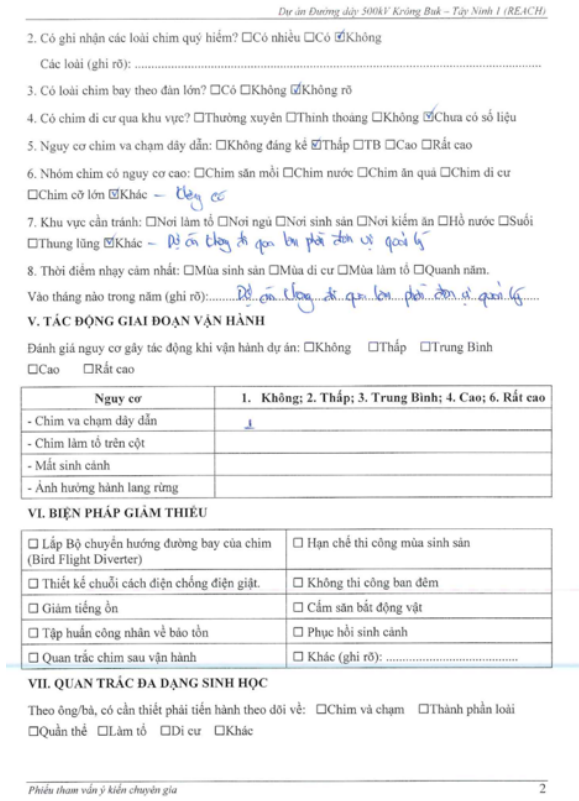
Đánh giá mức độ ảnh hưởng khi thi công dự án tại khu vực:

Loại tác động	1.Không; 2. Thấp 3. TB 4. Cao 5. Rất cao
- Tiếng ồn	1
- Rung động	1
- Bụi	1
- Chặt cây, phát quang	1
- Mở đường công vụ	1
- Chia cắt sinh cảnh	1
- Nguy cơ cháy rừng	1
- Công nhân xâm nhập rừng	1
- Săn bắt động vật hoang dã	

IV. TÁC ĐỘNG ĐỐI VỚI CÁC LOÀI CHIM

1. Khu vực có phải tuyến bay thường xuyên của chim? ☐Có ☐Không ☑Chưa rõ

Phiếu tham vấn ý kiến chuyên gia 1



Dự án Đường dây 500kV Krông Buk – Tây Ninh 1 (REACH)

2. Có ghi nhận các loài chim quý hiếm? ☐Có nhiều ☐Có ☑Không

Các loài (ghi rõ): .....

3. Có loài chim bay theo đàn lớn? ☐Có ☐Không ☑Không rõ

4. Có chim di cư qua khu vực? ☐Thường xuyên ☐Thỉnh thoảng ☐Không ☑Chưa có số liệu

5. Nguy cơ chim va chạm dây dẫn: ☐Không đáng kể ☑Thấp ☐TB ☐Cao ☐Rất cao

6. Nhóm chim có nguy cơ cao: ☐Chim săn mồi ☐Chim nước ☐Chim ăn quả ☐Chim di cư ☐Chim cỡ lớn ☑Khác – Đang cc

7. Khu vực cần tránh: ☐Nơi làm tổ ☐Nơi ngủ ☐Nơi sinh sản ☐Nơi kiếm ăn ☐Hồ nước ☐Suối ☐Thung lũng ☑Khác – Bị ồn thay đi qua bởi phải đến vị quản lý

8. Thời điểm nhạy cảm nhất: ☐Mùa sinh sản ☐Mùa di cư ☐Mùa làm tổ ☐Quanh năm.

Vào tháng nào trong năm (ghi rõ): Bị ồn thay đi qua bởi phải đến vị quản lý

V. TÁC ĐỘNG GIAI ĐOẠN VẬN HÀNH

Đánh giá nguy cơ gây tác động khi vận hành dự án: ☐Không ☐Thấp ☐Trung Bình ☐Cao ☐Rất cao

Nguy cơ	1. Không; 2. Thấp; 3. Trung Bình; 4. Cao; 6. Rất cao
- Chim va chạm dây dẫn	1
- Chim làm tổ trên cột	
- Mất sinh cảnh	
- Ảnh hưởng hành lang rừng	

VI. BIỆN PHÁP GIẢM THIỂU

☐ Lắp Bộ chuyển hướng đường bay của chim (Bird Flight Diverter)	☐ Hạn chế thi công mùa sinh sản
☐ Thiết kế chuỗi cách điện chống điện giật.	☐ Không thi công ban đêm
☐ Giảm tiếng ồn	☐ Cấm săn bắt động vật
☐ Tập huấn công nhân về bảo tồn	☐ Phục hồi sinh cảnh
☐ Quan trắc chim sau vận hành	☐ Khác (ghi rõ): .....

VII. QUAN TRẮC ĐA DẠNG SINH HỌC

Theo ông/bà, có cần thiết phải tiến hành theo dõi về: ☐Chim va chạm ☐Thành phần loài ☐Quần thể ☐Làm tổ ☐Di cư ☐Khác

Phiếu tham vấn ý kiến chuyên gia 2

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VIII. Ý KIẾN CHUYÊN MÔN

1. Đoạn tuyến nào có giá trị đa dạng sinh học cao nhất cần ưu tiên tránh?

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2. Có loài chim hoặc động vật nào đặc biệt nhạy cảm với hoạt động thi công?

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3. Có dữ liệu về khu vực làm tổ, kiếm ăn hoặc đường bay có thể chia sẻ?

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4. Có dữ liệu về chim va chạm đường dây 500kV Pleiku – Mỹ Phước – Cầu Bông hiện hữu trên đoạn tuyến có thể chia sẻ?

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5. Biện pháp giảm thiểu nào được khuyến nghị?

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XÁC NHẬN

(Ký và ghi rõ họ tên)

Phạm Thế Nhã

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APPENDIX 3: APPENDIX TO BIODIVERSITY IMPACT ASSESSMENT (BIA) REPORT

Click the link: https://docs.google.com/document/d/1Gp494sgGzy5J-P-xKQyq3maA8o5c-MYH/edit?usp=sharing&ouid=113967735206635301137&rtpof=true&sd=true

APPENDIX 4: CALCULATION OF ELECTRIC AND MAGNETIC FIELD EFFECTS ON HUMANS

1. CALCULATION METHOD

The electric field acting on a person standing under a power line is determined by the formula:

$$E_P = \frac{\varphi_P}{h_P}(kV/m)$$

h_P: height of the human body (m).

φ_P: potential of the electric field acting on the person (kV).

The formula for the potential of the electric field acting on a person, for a double-circuit line***, is determined as follows:***

$$\varphi_P = \varphi_{A1} + \varphi_{B1} + \varphi_{C1} + \varphi_{A2} + \varphi_{B2} + \varphi_{C2}$$

Where: φ_i is the potential contribution of phase i at the point under consideration (kV)

$\varepsilon_o = 8.85\times10^{-12}$: permittivity of free space (F/m).

$$\varphi_{Ai} = \frac{C_{Ai}U_A}{2\pi\varepsilon_0}\ln\frac{D'_{Ai}}{D_{Ai}}$$

$$\varphi_{Bi} = \frac{C_{Bi}U_B}{2\pi\varepsilon_0}\ln\frac{D'_{Bi}}{D_{Bi}}$$

$$\varphi_{Ci} = \frac{C_{Ci}U_C}{2\pi\varepsilon_0}\ln\frac{D'_{Ci}}{D_{Ci}}$$

D_{Ai}, D_{Bi}, D_{Ci}, D'_{Ai}, D'_{Bi}, D'_{Ci} : distance from the point under consideration to phase conductor A_i, B_i, C_i and to their images (mirror projections).

C_{Ai}, C_{Bi}, C_{Ci} : capacitance of the phases to ground.

U_A, U_B, U_C : voltage of phases A, B, C to ground (kV).

$U_A = U_{ph}$

$U_B = a^2.U_{ph}$

$U_C = a.U_{ph}$

Where: U_{ph} : is the phase voltage. $U_{pha} = \frac{U_{day}}{\sqrt{3}}(kV)$

a – is the phase operator, and $a = -\frac{1}{2} + j\frac{\sqrt{3}}{2} = -0{,}5 + j0{,}866$

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For double-circuit three-phase AC lines with conductors arranged symmetrically about the tower body and two shield wires, the working capacitances C_A, C_B, C_C or C_1, C_2, C_3 of the phases are determined by solving the following system of equations:

Where the potential coefficients α'_{ii}, α'_{kl} are determined as follows:

$$U = \sum_{k=1}^{k=3} \alpha'_{ik}\, q_k$$

$$\alpha'_{11} = \alpha''_{11} - \frac{\alpha_{T.T}\left[(\alpha''_{1T})^2 + (\alpha''_{1T'})^2\right] - 2.\alpha''_{1T}\,\alpha''_{1T'}\,\alpha''_{TT'}}{\alpha^2_{T.T} - \alpha^2_{T.T'}}$$

$$\alpha'_{22} = \alpha''_{22} - \frac{\alpha_{T.T}\left[(\alpha''_{2T})^2 + (\alpha''_{2T'})^2\right] - 2.\alpha''_{2T}\,\alpha''_{2T'}\,\alpha''_{TT'}}{\alpha^2_{T.T} - \alpha^2_{T.T'}}$$

$$\alpha'_{33} = \alpha''_{33} - \frac{\alpha_{T.T}\left[(\alpha''_{3T})^2 + (\alpha''_{3T'})^2\right] - 2.\alpha''_{3T}\,\alpha''_{3T'}\,\alpha''_{TT'}}{\alpha^2_{T.T} - \alpha^2_{T.T'}}$$

$$\alpha'_{12} = \alpha'_{21} = \alpha''_{12} - \frac{\alpha''_{1T}\left(\alpha_{T.T}\alpha''_{T2} - \alpha_{TT'}\alpha''_{T'2}\right) + \alpha''_{1T'}\left(\alpha_{T.T}\alpha''_{T'2} - \alpha_{TT'}\alpha''_{T2}\right)}{\alpha^2_{T.T} - \alpha^2_{T.T'}}$$

$$\alpha'_{13} = \alpha'_{31} = \alpha''_{13} - \frac{\alpha''_{1T}\left(\alpha_{T.T}\alpha''_{T3} - \alpha_{TT'}\alpha''_{T'3}\right) + \alpha''_{1T'}\left(\alpha_{T.T}\alpha''_{T'3} - \alpha_{TT'}\alpha''_{T3}\right)}{\alpha^2_{T.T} - \alpha^2_{T.T'}}$$

$$\alpha'_{23} = \alpha'_{32} = \alpha''_{23} - \frac{\alpha''_{2T}\left(\alpha_{T.T}\alpha''_{T3} - \alpha_{TT'}\alpha''_{T'3}\right) + \alpha''_{2T'}\left(\alpha_{T.T}\alpha''_{T'3} - \alpha_{TT'}\alpha''_{T3}\right)}{\alpha^2_{T.T} - \alpha^2_{T.T'}}$$

Where:

$\alpha''_{11} = \alpha_{11} + \alpha_{14}$; $\alpha''_{12} = \alpha_{12} + \alpha_{15}$; $\alpha''_{13} = \alpha_{13} + \alpha_{16}$

$\alpha''_{21} = \alpha_{21} + \alpha_{24}$; $\alpha''_{22} = \alpha_{22} + \alpha_{25}$; $\alpha''_{23} = \alpha_{23} + \alpha_{26}$

$\alpha''_{31} = \alpha_{31} + \alpha_{34}$; $\alpha''_{32} = \alpha_{32} + \alpha_{35}$; $\alpha''_{33} = \alpha_{33} + \alpha_{36}$

$\alpha''_{T1} = \alpha_{T1} + \alpha_{T4}$; $\alpha''_{T2} = \alpha_{T2} + \alpha_{T5}$; $\alpha''_{T3} = \alpha_{T3} + \alpha_{T6}$

$\alpha''_{T'1} = \alpha_{T'1} + \alpha_{T'4}$; $\alpha''_{T'2} = \alpha_{T'2} + \alpha_{T'5}$; $\alpha''_{T'3} = \alpha_{T'3} + \alpha_{T'6}$

With the coefficients α_{ii}, α_{kl} determined by the following expressions:

$$\left.\begin{aligned} \alpha_{ii} &= \frac{1}{2\pi\varepsilon_o} \ln\frac{2H_{tdi}}{r} \\ \alpha_{kl} &= \frac{1}{2\pi\varepsilon_o} \ln\frac{S'_{kl}}{S_{kl}} \end{aligned}\right\}$$

H_{td} is the average conductor height above ground, [m]

$$H_{td} = H_{min} + 1/3.f_{max} \text{ or } H_{td} = H_{dd} - 2/3.f_{max}$$

H_{min} is the lowest conductor height within the span, [m].

f_{max} is the maximum sag of the conductor within the span, [m].

r: is the radius of the conductor, [m]

In the case of a bundled-conductor line with n sub-conductors per phase, each with sub-conductor radius r_o, with average spacing between sub-conductors within a 333phase, a_{tb}, then r is replaced by R_{eq}

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$$R_{dt} = \sqrt[n]{r a_{tb}^{n-1}}$$

S_{kl} is the distance between phase k and phase l, [m].

S'_{kl} is the distance between phase k and the image of phase l in the ground, [m].

H_{dd} is the suspension height of the conductor on the tower, [m].

Given known voltage values U_1, U_2, U_3, solving the system of 3 equations, the charge quantity on the conductors can be determined as follows:

$$q_i = \sum_{k=1}^{k=3} \beta_{i.k} \dot{U}_k$$

Where:

$$\left.\begin{aligned}
&\beta_{11} = \frac{\alpha'_{22}.\alpha'_{33} - (\alpha'_{23})^2}{\Delta}; \beta_{22} = \frac{\alpha'_{11}.\alpha'_{33} - (\alpha'_{13})^2}{\Delta};\\
&\beta_{33} = \frac{\alpha'_{11}.\alpha'_{22} - (\alpha'_{12})^2}{\Delta}; \beta_{12} = \beta_{21} = \frac{\alpha'_{13}.\alpha'_{23} - (\alpha'_{12}.\alpha'_{33})^2}{\Delta};\\
&\beta_{13} = \beta_{31} = \frac{\alpha'_{12}.\alpha'_{23} - (\alpha'_{13}.\alpha'_{22})^2}{\Delta}; \beta_{23} = \beta_{32} = \frac{\alpha'_{12}.\alpha'_{13} - (\alpha'_{23}.\alpha'_{11})^2}{\Delta}
\end{aligned}\right\}$$

With: $\Delta = \alpha'_{11}(\alpha'_{22}\alpha'_{33} - \alpha'^2_{23}) - \alpha'_{12}(\alpha'_{12}\alpha'_{33} - \alpha'_{13}\alpha'_{23}) - \alpha'_{13}(\alpha'_{13}\alpha'_{22} - \alpha'_{12}\alpha'_{23})$

The working capacitance of each corresponding phase is then determined as follows:

$$\left.\begin{aligned}
C_1 &= \beta_{11} - \frac{1}{2}(\beta_{12} + \beta_{13})\\
C_2 &= \beta_{22} - \frac{1}{2}(\beta_{12} + \beta_{23})\\
C_3 &= \beta_{33} - \frac{1}{2}(\beta_{13} + \beta_{23})
\end{aligned}\right\}$$

2. CALCULATION DATA

- Voltage level : 500kV.
- Number of circuits : 02 circuits.
- Characteristic tower type : D522-67 (67m high).
- Spacing between phases within a circuit : 10.5m.
- Spacing between the 02 circuits : 7.5m, 7.7m and 8.0m.
- Conductor (4 sub-conductors per phase) : 4xACSR-400/51.
- Spacing between sub-conductors within a phase : 0.45m.
- Shield wire : PHLOX-116 and OPGW-90.
- Conductor radius : r_o = 0.0138m.
- PHLOX wire radius : r_{cs1} = 0.007m.
- OPGW wire radius : r_{cs2} = 0.00725m.
- Human body height : 1.65m.

3. CALCULATION RESULTS

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Based on the calculation method and input data, the Consultant calculated the electric field intensity distribution by height and by horizontal distance from the line centerline out to 90m, for the 500kV double-circuit transmission line with vertical phase arrangement.

Electric field intensity distribution (single 500kV transmission line, phase-transposed arrangement)

According to the calculation results of the electric field intensity distribution for the project at a point 1m above ground, with the lowest conductor heights of 12m and 16m, for the single 500kV transmission line section, as shown in Figure (12-1).

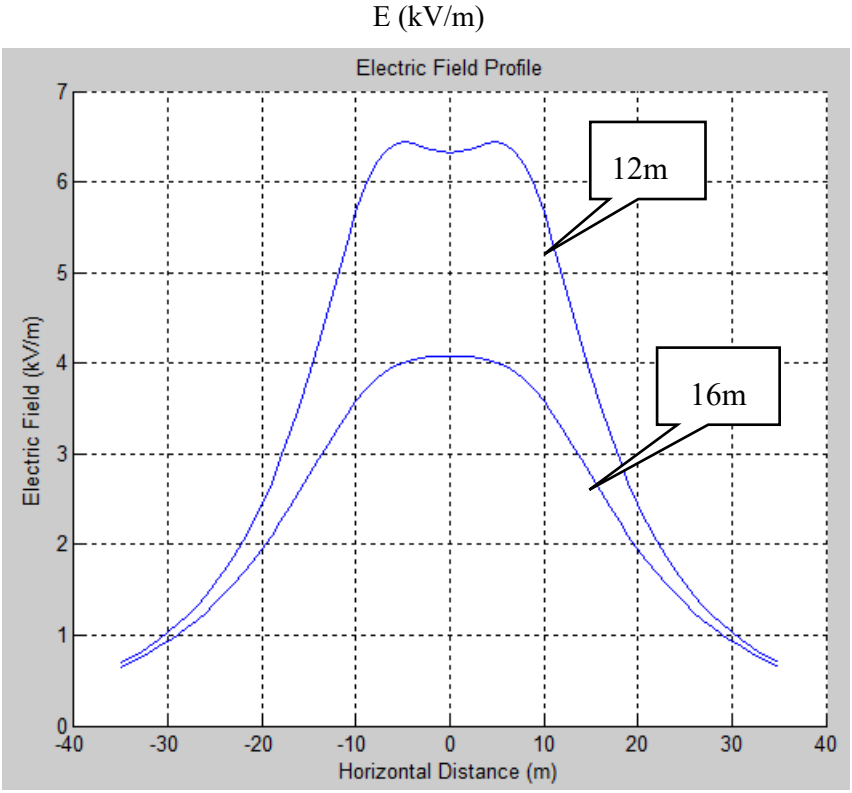


Figure 1: Electric field intensity distribution under the 500kV transmission line

The calculation results of the electric field intensity distribution for the project show that:

- The characteristic electric field intensity during project operation is mainly influenced by the conductors. The electric field intensity at 1m above ground, with the lowest conductor heights of 12m and 16m, is shown in Figure (12-1).
- For sections routed through areas without residents, considering a minimum conductor-to-ground clearance of 12m, the electric field intensity at 1m above ground within the safety corridor ranges from 2.95 to 6.45 kV/m. The electric field intensity at 1m above ground outside the safety corridor is 2.95 kV/m, meeting the requirement of less than 5 kV/m. It is therefore recommended that, for routes through areas without residents, the minimum conductor-to-ground clearance be 12m.
- For sections routed through areas requiring enhanced electrical and construction safety measures, and areas outside those requiring enhanced safety measures as specified (conductor-to-ground clearance of 16m): the electric field intensity at 1m above ground within the safety corridor ranges from 2.26 to 4.08 kV/m. The electric field intensity at 1m above ground outside the safety corridor is up to 2.2 kV/m.

Electric field intensity distribution (two parallel 500kV transmission lines, 50m apart)

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According to the calculation results of the electric field intensity distribution for the project at a point 1m above ground, with the lowest conductor heights of 12m and 16m, for the section of two parallel 500kV transmission lines 50m apart, as shown in Figure (12-2).

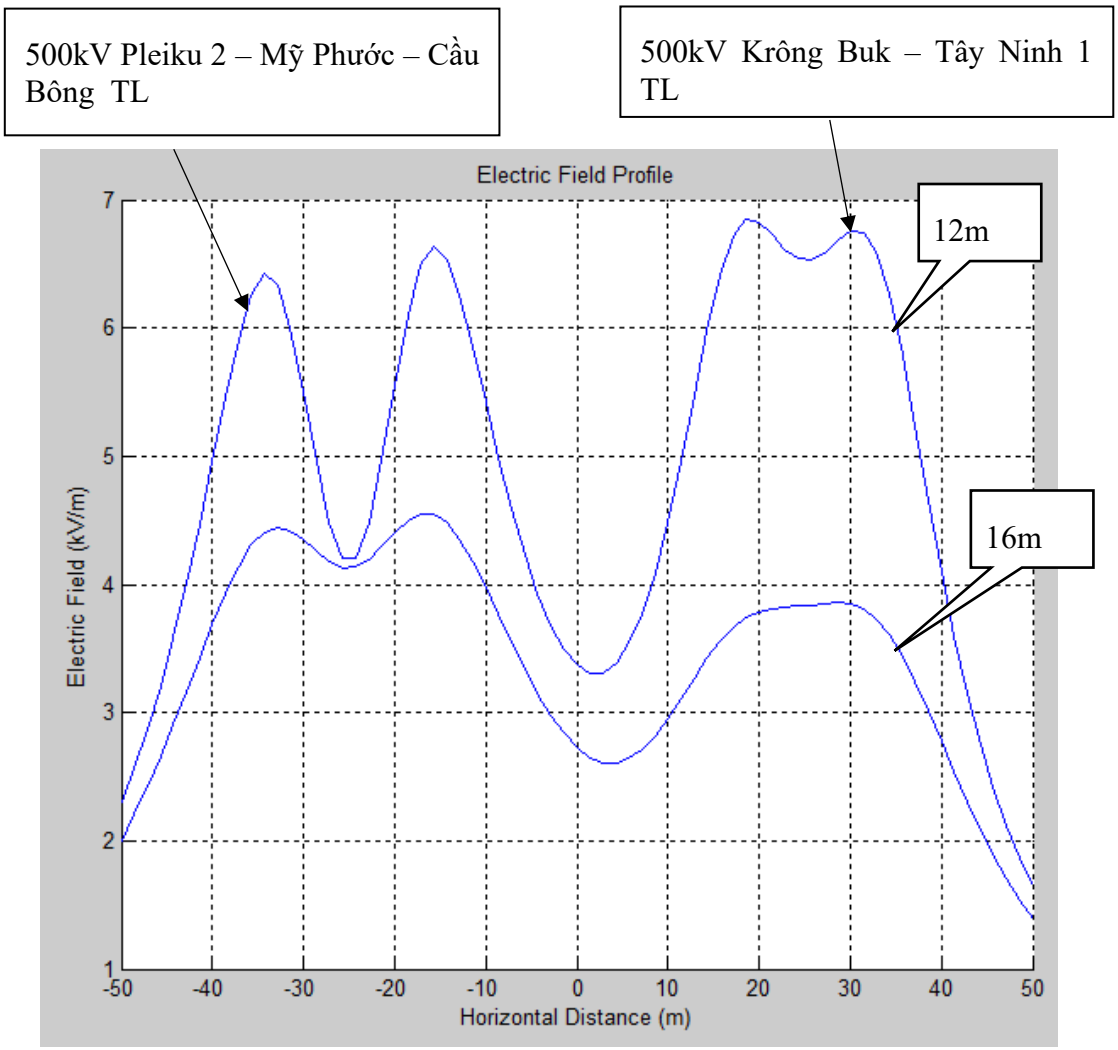


Figure 2: Electric field intensity distribution for the section of two parallel 500kV transmission lines

The calculation results of the electric field intensity distribution for the project show that:

- The characteristic electric field intensity during operation of the 500kV transmission lines is mainly influenced by the conductors. The electric field intensity at 1m above ground, with the lowest conductor heights of 12m and 16m, for the section of two parallel 500kV transmission lines 50m apart, is shown in Figure (12-2).

Electric field intensity inside and outside the safety corridor of the Krông Buk – Tây Ninh 1 500kV transmission line:

- For sections routed through areas without residents, considering a minimum conductor-to-ground clearance of 12m, the electric field intensity at 1m above ground within the safety corridor ranges from 2.95 to 6.81 kV/m. The electric field intensity at 1m above ground outside the safety corridor (on the side farther from the existing 500kV transmission line) is up to 2.95 kV/m, meeting the requirement of less than 5 kV/m. It is therefore recommended that, for routes through areas without residents, the minimum conductor-to-ground clearance be 12m.

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- For sections routed through areas requiring enhanced electrical and construction safety measures, and areas outside those requiring enhanced safety measures as specified (conductor-to-ground clearance of 16m): the electric field intensity at 1m above ground within the safety corridor ranges from 2.26 to 3.87 kV/m. The electric field intensity at 1m above ground outside the safety corridor (on the side farther from the existing 500kV transmission line) is up to 2.2 kV/m.

Electric field intensity in the strip between the two corridors of the two 500kV transmission lines:

- For sections routed through areas without residents, considering a minimum conductor-to-ground clearance of 12m, the electric field intensity at 1m above ground in the strip between the two corridors ranges from 3.31 to 4.55 kV/m, meeting the requirement of less than 5 kV/m.
- For sections routed through areas requiring enhanced electrical and construction safety measures, and areas outside those requiring enhanced safety measures as specified (conductor-to-ground clearance of 16m): the electric field intensity at 1m above ground in the strip between the two corridors ranges from 2.61 to 3.53 kV/m, meeting the requirement of less than 5 kV/m.

According to regulations on permitted daily working time for workers not using electric-field protective equipment, as shown in the table below:

Electric field intensity (kV/m)	<5	5	8	10	12	15	18	20	20<E <25	≥25
Permitted working time per day-night (minutes)	No limit	480	255	180	130	80	48	30	10	0

Remarks:

For the single 500kV transmission line section:

Thus, for the case of a route through an area without residents as specified (conductor-to-ground clearance of 12m), there is no restriction on working time outside the project safety corridor (since the electric field intensity at 1m above ground outside the safety corridor is <5 kV/m); however, working time must be restricted within the project safety corridor, especially directly beneath the conductors where the electric field intensity is >5 kV/m.

For the case of a route through areas requiring enhanced electrical and construction safety measures, and areas outside those requiring enhanced safety measures as specified (conductor-to-ground clearance of 16m), there is no restriction on working time either inside or outside the project safety corridor (since the electric field intensity at 1m above ground is <5 kV/m).

For the section of two parallel 500kV transmission lines:

Thus, for the case of a route in the strip between the two 500kV corridors, passing through an area without residents as specified (conductor-to-ground clearance of 12m), and through areas requiring enhanced electrical and construction safety measures, and areas outside those requiring enhanced safety measures as specified (conductor-to-ground clearance of 16m), there is no restriction on working time in the strip between the two 500kV corridors (since the electric field intensity at 1m above ground is <5 kV/m).

- **Effect of the magnetic field:**

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With a magnetic field intensity of 20-40 μT under the 500kV line and <10 μT at the edge of the 500kV line corridor, this value is much lower than: the ICNIRP public threshold (200 μT) — a safety margin of about 5-10 times the QCVN 25:2016/BYT occupational threshold (~500 μT)

4. MITIGATION MEASURES

4.1 Measures to reduce electric field intensity.

Conductor bundling → increases the equivalent bundle radius → reduces the surface electric field gradient E (per the Peek/Markt-Mengele formula) → reduces the potential for ionization of the air around the conductor (corona).

4.2 Measures to reduce noise.

Since corona audible noise (AN) and radio interference (RI) both arise directly from the corona discharge phenomenon, bundling the conductors reduces E, which in turn reduces both AN and RI.

Arcing horns (arc discharge horns) and corona rings combined with discharge function are installed on insulator strings to protect the insulators from flashover damage (for porcelain/glass insulators) and to protect the conductor-side fitting ends from damage (for composite/silicone insulators) due to overvoltage in cases such as: lightning strikes on the line, or surface flashover caused by contaminated insulators — by diverting the discharge through arc-protection devices installed on the line side and the tower side.

Corona rings for suspension insulator strings: installed on the phase-conductor side of the insulator string, or on both sides of the string depending on the voltage class, to improve the operating performance of the insulator string, reduce corona discharge, and reduce the level of noise and radio interference.

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