CRITICAL HABITAT ASSESMENT

Electrification of the East-West Region and Rural Electrification

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Abstract

This Critical Habitat Assessment for the Electrification of the East-West Region, including the northern extension to Wanhatti and surrounding communities, presents an overview of biodiversity risks and protection measures based on assessments conducted in 2018, 2024, and 2025. The assessment aims to guide environmentally responsible project implementation by identifying ecologically sensitive areas, minimizing impacts on endangered species, and aligning with national and international biodiversity safeguards.

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1. Introduction

This report is part of a series of documents outlining the Critical Habitat within the "Energy Transition and Integration Program for Suriname."

The Peperpot-Albina Transmission Line Project is a crucial infrastructure initiative designed to expand Suriname's electricity grid, enhance energy access, and reduce reliance on costly diesel generation in the eastern region. The project covers the road corridor from Peperpot to Albina, including all rural villages along this route, as well as Wanhatti and its surrounding communities.

The primary objective is to transition from isolated energy systems to a centralized energy generation and distribution network.

Currently, energy distribution in the region varies:

- The communities of Perica, Adjoema Kondre, Moengoe Tapoe, and Alfons Dorp are connected to the EBS grid.
- Moengo and Albina rely on isolated fossil fuel generators.
- The villages around Wanhatti also depend on fossil fuel generators for electricity.

The planned interventions include:

Component 1. Infrastructure Investments:

1. Subcomponent 1: Transmission line EPAR–Moengo–Albina. This subcomponent will cover the construction of a new 110 kV / 50 MW, 127 km transmission line (TL) to interconnect the EPAR system with Albina, installed along the existing road corridor. It will also include complementary works and digitalization initiatives for network management, control, and supervision, incorporating cybersecurity measures. In addition, funding will be allocated to:
   a. upgrade of the existing Peperpot substation,
   b. construction of two new substations in Moengo and Albina, and
   c. development of a new 33 kV, 34 km distribution line connecting Moengo and Perica.

2. Subcomponent 2: Last-mile rural electrification in Wanhatti. This subcomponent will cover the required distribution infrastructure to connect new users in Wanhatti, meeting the increasing electricity demand of the village and surrounding communities, while ensuring a highly reliable supply.

3. Subcomponent 3: Solar PV plant in Moengo. This subcomponent will cover the installation of a 1.6 MW grid-tied solar photovoltaic (PV) power plant in Moengo. It will be connected to the new Moengo substation and thus to the EPAR system through the existing 12 kV distribution line. By integrating this solar PV plant into the main grid, the project will expand the supply of renewable energy, improving the quality, security, and reliability of electricity in Albina, Moengo, Wanhatti, and surrounding villages. The PV plant will also feature a modern SCADA monitoring and control system to enable real-time performance tracking and fault detection.

2. Scope and Objectives

2.1 Project Scope

Electrification of the East-West Region (Albina to Peperpot) with Critical Habitat Considerations. The Electrification of the East-West Region aims to expand energy infrastructure from Peperpot to Albina**,** increasing access to reliable electricity for rural communities. Given the ecological sensitivity of at least one stretch of the region, a Critical Habitat Assessment will be integrated to mitigate environmental impacts.

This document includes an evaluation of the criteria for identifying potential Critical Habitat in accordance with the Inter-American Development Bank's Environmental and Social Performance Standard 6 (ESPS 6): "Biodiversity Conservation and Sustainable Management of Living Natural Resources."
In line with ESPS 6, the assessment systematically considers the six qualifying criteria for Critical Habitat, namely:

1. Habitats of significant importance to critically endangered, endangered, vulnerable, or near-threatened species.
2. Habitats of significant importance to endemic and/or restricted-range species.
3. Habitats supporting globally significant concentrations of migratory and/or congregatory species.
4. Highly threatened and/or unique ecosystems.
5. Areas associated with key evolutionary processes.
6. Legally protected and internationally recognized areas of high biodiversity value.

The identification of Critical Habitat is informed by site-specific data, expert consultation, and spatial analysis within the project's area of influence. The consultant has reviewed and applied the relevant methodological guidance as presented in the IDB's *Guidelines for Implementing ESPS 6*, available on the Bank's official website.
This evaluation not only fulfills the Bank's safeguard requirements but also ensures that the project integrates a precautionary and adaptive approach to biodiversity protection during planning,

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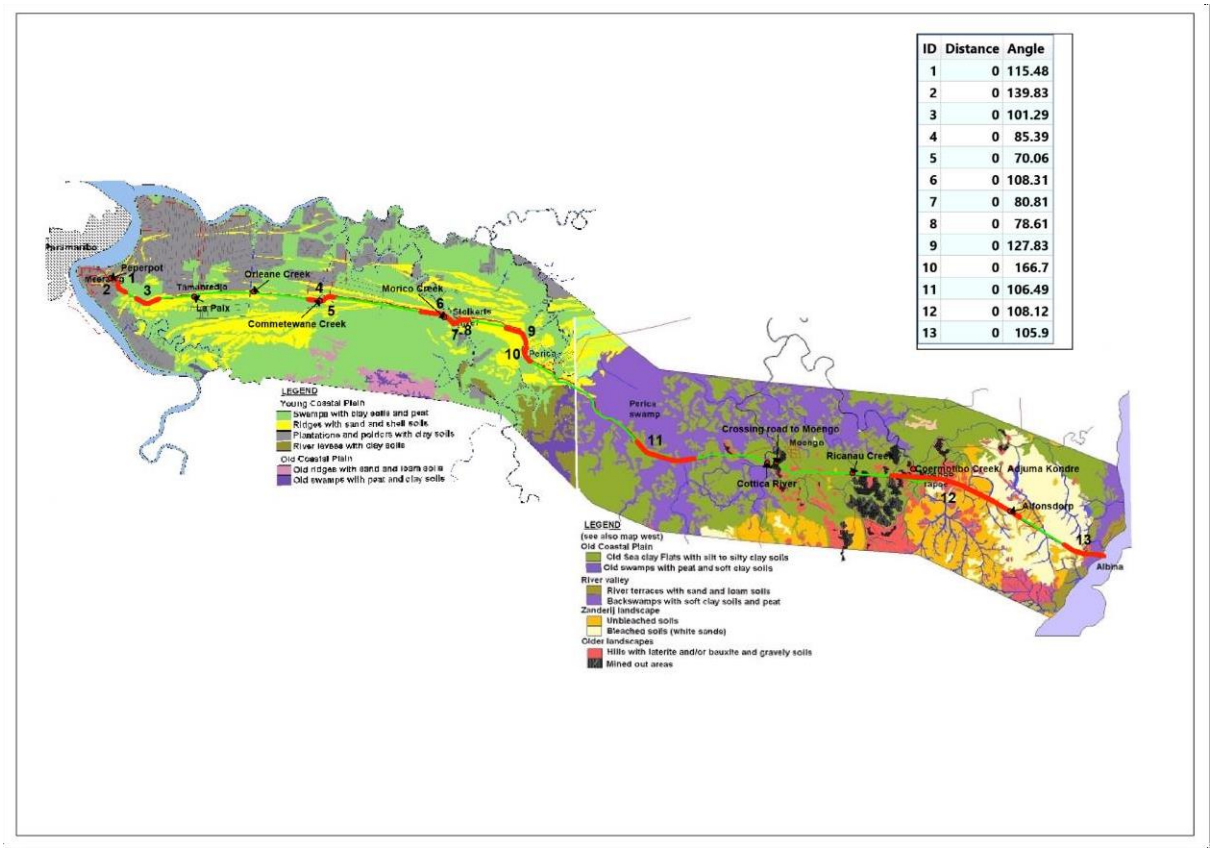

Figure 1: The Study Area and the project location

Project Design

As analysis of the Critical Habitat and potential risks will regularly be updated over the course of the Project. The current version of the analysis is based on the assessment that were carried out in 2018/2024 and also in 2025. An update will be performed once the project is under execution. This can also facilitate possible changes in designs or locations based on field adaptations.

2.2 Objective of the Critical Habitat Considerations

The Critical Habitat Strategy for the Electrification of the East-West Region (Peperpot to Albina), with extension to the north to Wanhatti and surrounding communities, aims to ensure that the expansion of energy infrastructure is carried out in full compliance with the Inter-American Development Bank's Environmental and Social Performance Standard 6 (ESPS 6): *Biodiversity Conservation and Sustainable Management of Living Natural Resources*. This includes adherence to the specific requirements for projects located in natural or critical habitats.

The strategy prioritizes the conservation of biodiversity and ecosystem services by applying a precautionary and scientifically informed approach to identifying, avoiding, and mitigating potential impacts. Where avoidance is not possible, the project will implement measures to minimize impacts and, where necessary, restore or offset losses to achieve at least no net loss and preferably a net gain in biodiversity.

The specific objectives of the Critical Habitat assessment are to:

- **Identify and verify the presence of natural and critical habitats** within the project's area of influence, using the criteria established under ESPS 6.
- **Avoid adverse impacts on critical habitats**, unless all the conditions under ESPS 6 are satisfied, including the absence of measurable impacts on the ecological integrity of the habitat, the implementation of a robust mitigation hierarchy, and clear demonstration of project benefits.
- **Avoid significant conversion or degradation of natural habitats**, unless no viable alternatives exist and appropriate mitigation measures are put in place, as required under ESPS 6.
- **Implement the mitigation hierarchy** (avoid, minimize, restore, offset) to manage biodiversity risks and impacts effectively throughout the project lifecycle.
- **Ensure sustainable management of living natural resources**, including through engagement with local and Indigenous communities where relevant.
- **Promote Free, Prior, and Informed Consent (FPIC)** and meaningful stakeholder engagement, especially in areas with cultural and ecological significance to Indigenous and Tribal Peoples.
- **Develop and apply biodiversity monitoring frameworks**, ensuring adaptive management, transparency, and regular reporting on the effectiveness of implemented measures.

By following these objectives, the project will integrate biodiversity conservation into its core planning and operational activities, in alignment with the Bank's safeguards and best international practices.

3. Biodiversity and critical habitat

This section provides an overview of biodiversity within the project's area of influence and evaluates the potential presence of critical habitats based on the criteria outlined in the Inter-American Development Bank's Environmental and Social Performance Standard 6 (ESPS 6). It begins with definitions relevant to the assessment, followed by a discussion of the six qualifying criteria for critical habitat.

3.1 Definitions

Following the Convention on Biological Diversity, to which Suriname is a signatory, biodiversity is defined as:
"The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species, and of ecosystems."

For the purpose of this assessment, **critical habitats**, as defined by the IDB's ESPS 6, are:
"Areas with high biodiversity value, including (i) habitat of significant importance for critically endangered, endangered, vulnerable, or near-threatened species; (ii) habitat of significant importance to endemic and/or restricted-range species; (iii) habitat supporting globally significant concentrations of migratory and/or congregatory species; (iv) highly threatened and/or unique ecosystems; (v) areas associated with key evolutionary processes; and/or (vi) legally protected areas or internationally recognized areas of high biodiversity value."

This Critical Habitat Assessment evaluates each of the six ESPS 6 criteria or qualifying biodiversity values to determine whether any areas within the project's area of influence may be classified as critical habitat. The identification process considers baseline environmental data, ecological significance, and potential risks posed by project activities. Each criterion is examined in detail in the following subsections.

3.2 Landscape and Environmental Characteristics

Physical Environment

The study area is located within the flat and low-lying Young and Old Coastal Plains and the Coesewijne Landscape. The western part is primarily characterized by sandy terrain with shell ridges, while the eastern section comprises swamps on narrow and discontinuous low-lying clay flats. The area is intersected by remnants of Moengo-type bauxite hills along the East-West Corridor, where extensive excavation has resulted in abandoned bauxite mines.

Biological Environment

Wetland ecosystems in the region are dominated by freshwater herbaceous swamps, swamp scrub, and swamp forest. Dryland areas, once covered by natural forests, have been subject to deforestation and are now partly used for cultivation or remain excavated. Savannah vegetation thrives on bleached sand soils in the eastern part, while higher, non-bleached zones retain forest cover. These ecosystems may meet ESPS 6 criteria for unique or threatened ecosystems (criterion iv). Faunal diversity is expected to align with typical coastal species distributions, including species that may be of conservation concern.

Proximity to Peperpot Nature Park and its corridor further increases the potential significance of biodiversity in the area. The park and corridor connect primary and secondary forest ecosystems and serve as a movement pathway for wildlife, potentially supporting globally significant populations or threatened species (criteria i, iii, and vi).

Human Environment

Historically, bauxite mining (conducted by Suralco) dominated the eastern region. Currently, the energy provider EBS NV is active in populated zones. The corridor's communities, especially those near the East-West connecting road, Moengo, Albina, and adjacent villages—are demographically diverse, with Hindustani and Javanese populations in the west and predominantly Maroon populations in the east. Ribbon development is visible along the road, supporting horticulture, subsistence farming, and roadside cash crop trade. The corridor is a major transportation route connecting Paramaribo with eastern Suriname and French Guiana and is part of the South American highway network.

3.3 Vulnerable ecosystems and current land-use systems

Ecosystems

Swamps, identified in Sinabo, Siparipabo, near Stolkertsijver, and Perica, are ecologically sensitive and may qualify under ESPS 6 as unique or highly threatened ecosystems (criterion iv). Savannah forests on bleached soils in Alfonsdorp, Moiwana, and Albina, as well as pine plantations in Alalekondre, Moengo, and Ricanau, contribute to ecosystem diversity. Savannahs also serve a crucial hydrological function as shallow aquifers providing potable water.

Vegetation

The Peperpot to Albina corridor features a mosaic of secondary forests (often starting 300–400 meters from the road), shrubbery, pastures, swamps, savanna forest, and pine plantations. Notable vegetation includes Kankantries, Awara palms, Mauritius palms, Pina palms, Manja trees, and extensive bamboo stands, especially in Belasoir, Sinabo, Siparipabo, and Stolkertsijver. Cecropia spp. (bospapaja) is common in abandoned farming plots. These species-rich landscapes support diverse flora and fauna and could meet ESPS 6 criteria depending on their contribution to ecological integrity and the presence of restricted-range or endangered species (criteria i and ii).

Horticultural Activities

Cultivation up to 500 meters from the road is widespread. Crops include cassava, bananas, citrus, beans, cabbage, pineapple, pepper, and bitter melon. Fruit trees are also common. These practices impact land cover and, when unmanaged, may contribute to habitat fragmentation or degradation.

Deforested and Burned Forest

Deforestation and burning are prevalent along settlement areas for farming, charcoal production, and settlement development. These activities, if encroaching upon sensitive ecosystems, may exacerbate biodiversity loss. Additionally, some areas have been cleared up for the construction of camps and houses.

Protected Areas and Natural Forests

a. ***Peperpot Nature Park and Peperpot Nature Corridor*** – Spanning 706 hectares, the park links primary and secondary forests and is home to common, protected, and threatened species.
The corridor plays a crucial role in facilitating species movement and maintaining water flow. It is home to a diverse range of species, including common, protected, and threatened wildlife.
The park is actively involved in research and monitoring programs through collaborations with both local and international institutions. While the transmission line is planned to be outside the corridor, construction activities must implement protective measures to minimize any impact on its outer boundaries.
It is an actively monitored biodiversity hotspot, potentially qualifying as a critical habitat under ESPS 6 criteria i, iii, and vi.

b. ***Perica Forest Reserve*** – A swamp ecosystem providing essential ecological services and potentially qualifying under criteria iv or vi.

c. ***Wane Nature Reserve*** – Covering 110,000 hectares and consisting of swamps, savannas, and marsh forests, the reserve is a key breeding habitat for the orange-winged amazon and other species. Its ecological functions align with multiple ESPS 6 criteria including i, iii, iv, and vi. Although not directly affected by the transmission line, project design must ensure hydrological connectivity and ecological integrity are maintained.
The Wane Creek, from which the reserve takes its name, connects the Marowijne and Cottica Rivers and was historically part of an inland waterway linking Marowijne to Paramaribo. However, the area has remained uninhabited since the 1950s due to ongoing land disputes with Indigenous communities from Marijkedorp and Alfonsdorp, who claim it as part of their traditional hunting and fishing grounds. Although the road will not pass through the protected area, construction plans must ensure the Wane Hill water system remains unaffected.

These areas demonstrate the presence of ecosystems and habitats that may meet one or more of the ESPS 6 qualifying criteria and must be treated with the necessary level of precaution and conservation effort during project implementation.

3.4 Identification and Protection of Critical Habitats & Precautionary Principle

Apart from the freshwater swamps, no critical habitats were observed. It was pointed out that construction in swamps should be executed cautiously.
To minimize the impact, the detailed design should encompass the area necessary for construction and material storage, as well as requirements for daily operation. This design should be developed in accordance with the precautionary principle, aiming to minimize impact and implement prevention and mitigation measures promptly.
Along the projected transmission line route, there are several notable environmental features, including Peperpot Nature Park, Sinabo and Perica forest reserves, swamps, rivers, creeks, secondary forests, and a pine plantation. These areas harbor abundant biodiversity, particularly in Peperpot Nature Park, secondary forests, and the pine plantation

Threats, Challenges and Opportunities

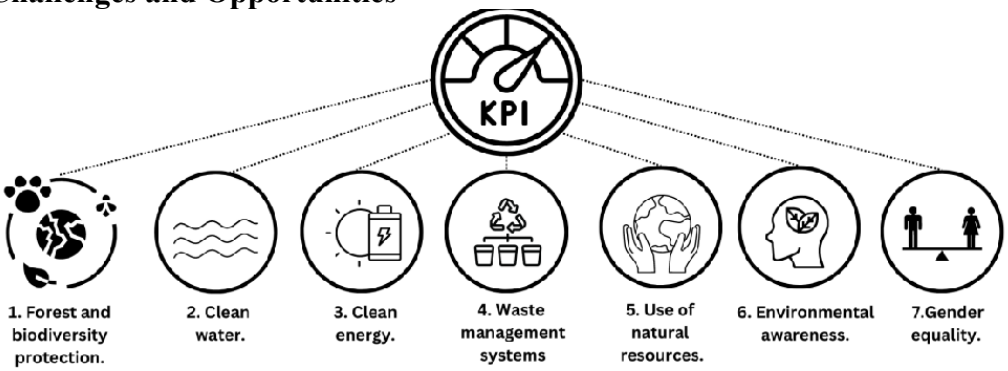

Figure 2: Environmental, including biodiversity KPIs

Table 1: Indicators for Environmental, incl. biodiversity Impact

Key indicator	*Potential Negative Impact*	*Likelihood of impact*	*Potential Risk Rating*	*Comments*
1. Climate: heavy rainfall/drought	Moderate	Possibly	Moderate	In the more challenging accessible parts (swamps and creek forests), project may be delayed due to transportation and construction work. Floods or extreme droughts may impact on execution.
2. Deforestation & biodiversity loss	Moderate	Possibly	Moderate	The storage of material and construction requires clearing of parcels/forest and could result in a local loss of genetic material (doesn't need to be permanent)
3. Noise disturbance	Moderate	Possibly	Moderate	In the residential (urban) parts noise pollution may hamper the living comfort. For biodiversity, this may lead to at least temporary migration of species.

Table 2: Analysis of Environmental, incl. biodiversity Impact

Theoretical Frame vs Project Site				
Guidance			Results	
Rating impact	**Description**	**Proceed with**	**East-West Connecting Road**	**RANKING: MEDIUM**
High potential positive impact	Certain to benefit the environment and/or solves big socio-environmental issues	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated	1. Forest & biodiversity protection 2. Clean water 3. Cleaner energy	*1. Monitoring by Rangers in Parks, Game wardens in Nature Reserves on environmental and biodiversity indicators* *2. Creeks and savannah are important for potable water and can be monitored by Institutes (BOG/WLA) and Rangers* *3. Not applicable: transmission will be most likely from fossil fuel- however impact is minimal on biodiversity.*
Medium positive impact	May benefit the environment and/or may minor environmental issues	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated	4. Waste Management 5. Use of natural resources	*4. Mindful shopping, guidelines for waste collection, storage, and disposal-recycling. Set up awareness program and execute together with external partners* *5. During the preparatory phase, an inventory of the resources will be conducted to ensure if rare/threatened/protected species may be impacted. If needed a rehabilitation schedule will be made and implemented. Also, awareness raising amongst the recruited contractors to refrain from poaching, and commercializing resources, whilst engaged in the Transmission project.*
Low positive impact	Could benefit the environment, but may not solve (socio)environmental issues	Guidelines to enhance or optimize this potential positive impact or opportunity should be formulated	6. Environmental awareness 7. Gender equality	*6. Awareness program can be tailored designed and executed, adapted for the specific stakeholders* *7. Engage as much as possible all genders in all project phases*

The Key Risk Indicators (KRI's) to determine risk were:

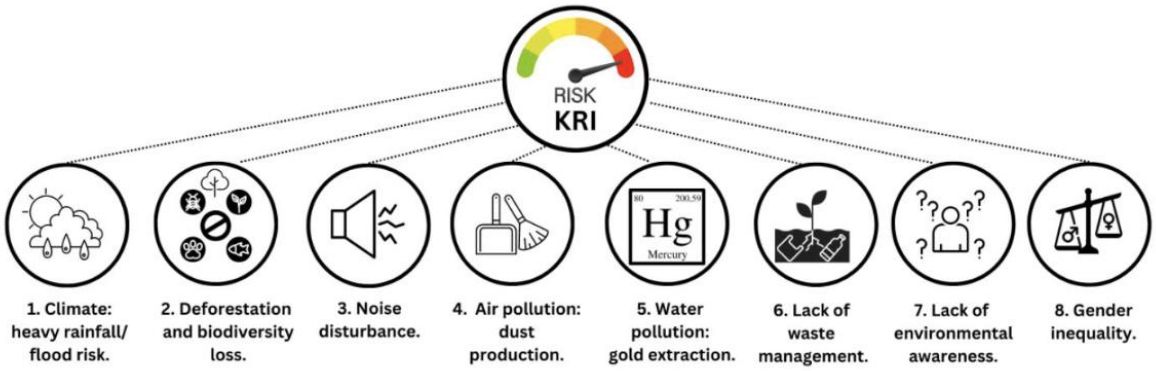

Figure 3: Environmental, including biodiversity KRI's

Table 3: Guidance for ranking, as well as the likelihood of these to occur

Impact Ranking	*Low potential negative impact* *[No or insignificant damage to the environment and/or socio-economic indicators]*	*Moderate potential negative impact* *[Consolidate damage to the environment and/or socio-environmental indicators]*	*High potential negative impact* *[Significant damage to the environment and/or socio-environmental indicators]*	*Very high potential negative impact* *[Irreparable damage to the environment and/or socio-environmental indicators]*
Likelihood Options	*Very Likely* *[certain to occur]*	*Likely* *[can occur]*	*Possibly* *[may occur]*	*Unlikely* *[almost never occurs]*

Table 4: Mitigation and action plan

GHG emissions, risks, and impacts associated with ecosystems, and climate change, to the project, air pollution and use or pollution/sedimentation of water systems;	Moderate	i. ii. iii. iv. v. vi.	**ESIA** conducted and; **ESMP** designed and implemented; Engage Nature Conservation Division (NCD) , AdeKUS (National Herbarium Suriname -BBS and National Zoological Collection-NZCS); Approval of Biological Action Plan (BAP) and Environmental Health and Safety **(EHS)** Guidelines by NCD and BOG (Public Health Authority) and NIMOS (National Environmental Agency); Implementation of the **monitoring plan** (biodiversity and People); Engage locals to become community monitors (rangers) to execute the monitoring plan together with research institutes, GoS and NGOs
Threat to the protection, conservation, maintenance, and restoration of natural habitats and biodiversity;	Moderate	i)	**Baseline studies** and **Monitoring plans** are guiding documents to minimize risks of degradation.
Adverse impacts on communities of Indigenous and Tribal Peoples;	Moderate	i)	Blue prints of the project edited with community input, such as mapping and respecting **Traditional Environmental Knowledge** (TEK) to minimize the impacts, mitigate.
Risks to cultural heritage;	Low	i)	Blue prints of project edited with community Mapping should minimize the impacts. If needed re-direct the projected transmission line.

4. Results

To minimize the impact, the detailed design should encompass the area necessary for construction and material storage, as well as requirements for daily operation. This design should be developed in accordance with the precautionary principle, aiming to minimize impact and implement prevention and mitigation measures promptly.

Along the projected transmission line route, there are several notable environmental features, including Peperpot Nature Park, Sinabo and Perica forest reserves, swamps, rivers, creeks, secondary forests, and a pine plantation. These areas harbor abundant biodiversity, particularly in Peperpot Nature Park, secondary forests, and the pine plantation.

According to NIMOS ‘for projects that follow under category B, it is necessary to further assess whether:

a. The adverse impacts are likely to be relevant, significant and complex and therefore an EA will be required;
b. The adverse impacts are not complex, easy to assess and therefore mitigation measures can be designed without the need for a full EA. Projects that fall under this sub-category will be required to present partial subjects of the recommended structure of a full EA or some other form of environmental statement.’

In this sense, special attention will be paid to possible impacts of climate and weather, water quality, hydrology, soil, land use, economic activities, social impact and employment opportunities. Also, the study will be conducted within the prevailing rainy season.

5. Conclusions and Recommendations

Through swift analysis of environmental factors like vegetation, biodiversity, and water resources, alongside social aspects such as community livelihoods and cultural heritage, various priority areas have emerged. Overall, the project can be categorized as presenting a low moderate level of risk.

It is evident that measures must be taken to mitigate potential adverse impacts on sensitive ecosystems, indigenous and tribal communities, and other stakeholders. This includes implementing robust environmental management plans, conducting thorough impact assessments, and engaging in meaningful consultation and collaboration with affected parties.

Moving forward, it is imperative that environmental and social considerations are integrated into all stages of the project lifecycle, from planning and design to implementation and monitoring. This will require close collaboration between project stakeholders, regulatory authorities, and local communities to ensure that the project is conducted in a manner that is environmentally sustainable, socially responsible, and respectful of human rights.

In light of the findings of this assessment, the following priority actions are recommended:
1. Develop and implement a comprehensive Environmental and Social Management Plan (ESMP) that addresses key risks and impacts identified in the assessment.
2. Establish mechanisms for ongoing stakeholder engagement and consultation to ensure that the concerns and interests of all parties are adequately addressed.
3. Monitor and evaluate the implementation of mitigation measures to track progress and make adjustments, as necessary.
4. Provide capacity-building and training opportunities for project staff and local communities to enhance understanding of environmental and social issues and play an active role in the project outcomes (recruited by the project).
5. Foster transparency and accountability in project decision-making processes through regular reporting and disclosure of information to stakeholders.
6. Ensure that the ITP communities are approached according to the special guidelines (FPIC, TEK, IPR) and are respectfully engaged. Respectfully engage in historic and cultural sacred sites that cannot be destroyed or degraded. Moiwana is a symbol of the physical and emotional battle fought in the 80’s.

By prioritizing environmental and social considerations and implementing proactive measures to address identified risks and impacts, the project can achieve its objectives in a manner that is both environmentally sustainable and socially responsible.