



ZANZIBAR ENERGY SECTOR TRANSFORMATION AND ACCESS (ZESTA)

TERMS OF REFERENCE (ToR) FOR A CONSULTANT ASSIGNMENT TO CONDUCT DETAILED BIRDS AND BATS STUDY FOR THE 132 kV TRANSMISSION LINE

1. Background

The Revolutionary Government of Zanzibar (RGoZ) through Zanzibar Electricity Corporation intends to extend power supply in both urban and rural areas of Unguja Island. It will cover five (5) Districts within three (3) regions. The five (5) districts are West A, North A, North B, Central and South. The districts were chosen based on their impact on increasing access of electricity to people while helping Zanzibar Electricity Corporation (ZECO) to increase its revenues.

The proposed Zanzibar Energy Sector Transformation and Access (ZESTA) project will support the implementation of the ZECO Electrification Master Plan (EMP) by financing the strategic grid extension, strengthening, and modernization investments, including last mile electricity connections. The grid investments will improve efficiency of power supply to end customers, increase the ability of the grid to reliably integrate a high proportion of variable renewable Energy (VRE), evacuate greater amount of energy from any given location, and expand access to electricity to unserved households. The investments will modernize the Zanzibar electricity network to better harness domestic renewable energy resource and expand reliable access to electricity to its citizens.

The project will cover the construction of transmission line (132 kV) of approximately 100 km from Welezo to Ubago, Ubago to Makunduchi, Ubago to Matemwe and from Matemwe to Makunduchi. It will also include the construction of 132kV switching station at Welezo, the area between Fumba submarine cable landing station and Mtoni 132kV substation to connect the proposed 132kV backbone transmission infrastructure to the existing grid, construction of two 132/33kV substations at Matemwe and Makunduchi with two 60 MVA transformers respectively.

The proposed transmission line is therefore expected to provide cheaper, reliable and quality power to boost socio-economic development in the country and support agro-processing industries, among others.

The Environmental and Social Impact Assessment (ESIA) Study for the proposed construction of 132 kV Welezo - Ubago, Ubago - Makunduchi and Ubago – Matemwe overhead transmission lines identified a possibility of impacting avifauna and bat resulting from the operational phase of the project. The ESIA Study proposed a number of environmental mitigation measures, management and monitoring plans to minimize those impacts of the project on avifauna and bats (please refer to the ESIA study for the proposed Welezo - Ubago, Ubago - Makunduchi and Ubago – Matemwe overhead TL).

For each of the proposed potential environmental impacts, detailed knowledge of distribution and flight activity is necessary in order to predict the potential effects of the transmission line infrastructure on bird and bats. The ESIA study to be provided further recommends that the surveys of birds and bats be carried out subsequent to the ESIA Study to monitor the phenomena.

The ESIA study has been conducted and it is already reviewed by the World Bank. The study recommended carrying out the detailed study on birds and bats in identified sensitive areas to be impacted in the construction and operational phase of the project. Some of identified birds and bats sensitive areas are Jozani Forest Conservation Area, Zanzibar (Muyuni Forest Reserve), Menai Bay Conservation Area. The study should assess the entire project influence areas which may have impacts and risks on birds and bats.

2. Purpose and Goal of the detailed birds and bats study

The objective of this assignment is to provide assistance to ZECO to prepare the birds and bats study for the 132 kV TL as part of updated ESMP on the project's safeguards arrangements in full compliance with the World Bank Environmental and Social Framework (including Environmental and Social Standards 6). The overall goal of the detailed birds and bats study described in this Terms of reference are as follows:

- ✓ To establish baseline data on birds and bats along the proposed Transmission Lines.
- ✓ To identify the migratory route along side or crossing the proposed 132 kV Lines in relation to the above mentioned sensitive areas.
- ✓ Determine the potential for the proposed Transmission Line project to cause adverse impact on birds and bats by characterizing the use of the Transmission Line sites and surrounding areas by birds and bats under various environmental conditions throughout the year. Data collected prior to construction can be compared to information collected in a similar manner after the construction to determine which impact, if any, the project has on migrating and resident breeding and wintering birds and bats.
- ✓ Inform the routing of the proposed overhead transmission lines;
- ✓ Develop species protection plans (particularly for specially protected species); and
- ✓ Propose proper mitigation measures which will be included in the design of towers and conductors of the proposed Transmission Lines project.

3. Description of the study areas for birds and bats

The proposed transmission line passes through landscape and terrain characterized by varied habitats that support avifauna. These areas include Jozani and Chwaka Bay National Park with mangroves, salt marsh and wetlands, Jambiani-Muyuni Forest Reserve (coral rag forest) and Menai Bay Conservation Area. Wetlands of international importance and other man-made water pans occur in relative proximity to the proposed transmission line as mentioned below:

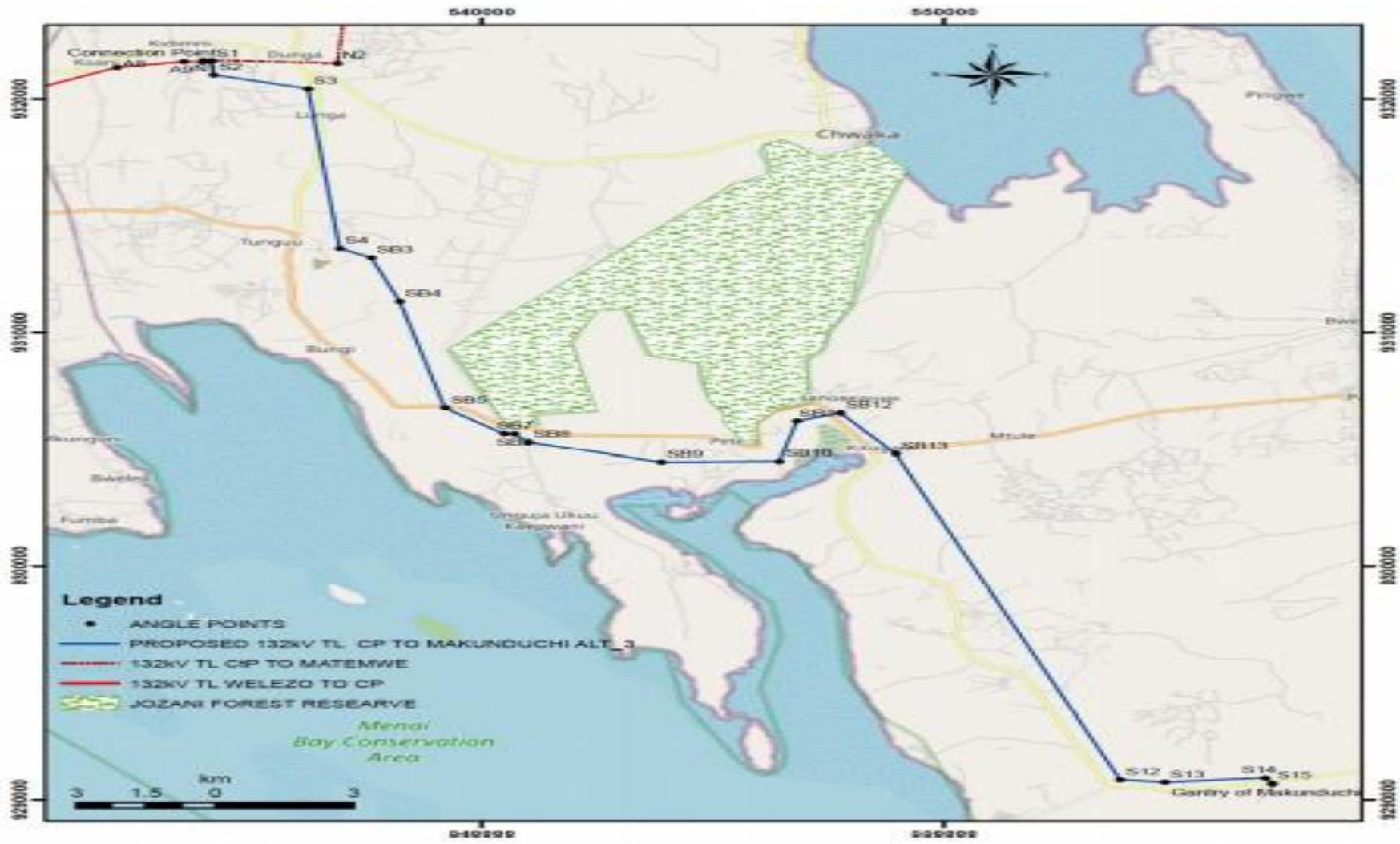


Figure 1: Map of the Transmission Line and the Jozani Forest Reserve (sensitive area for birds and bats)

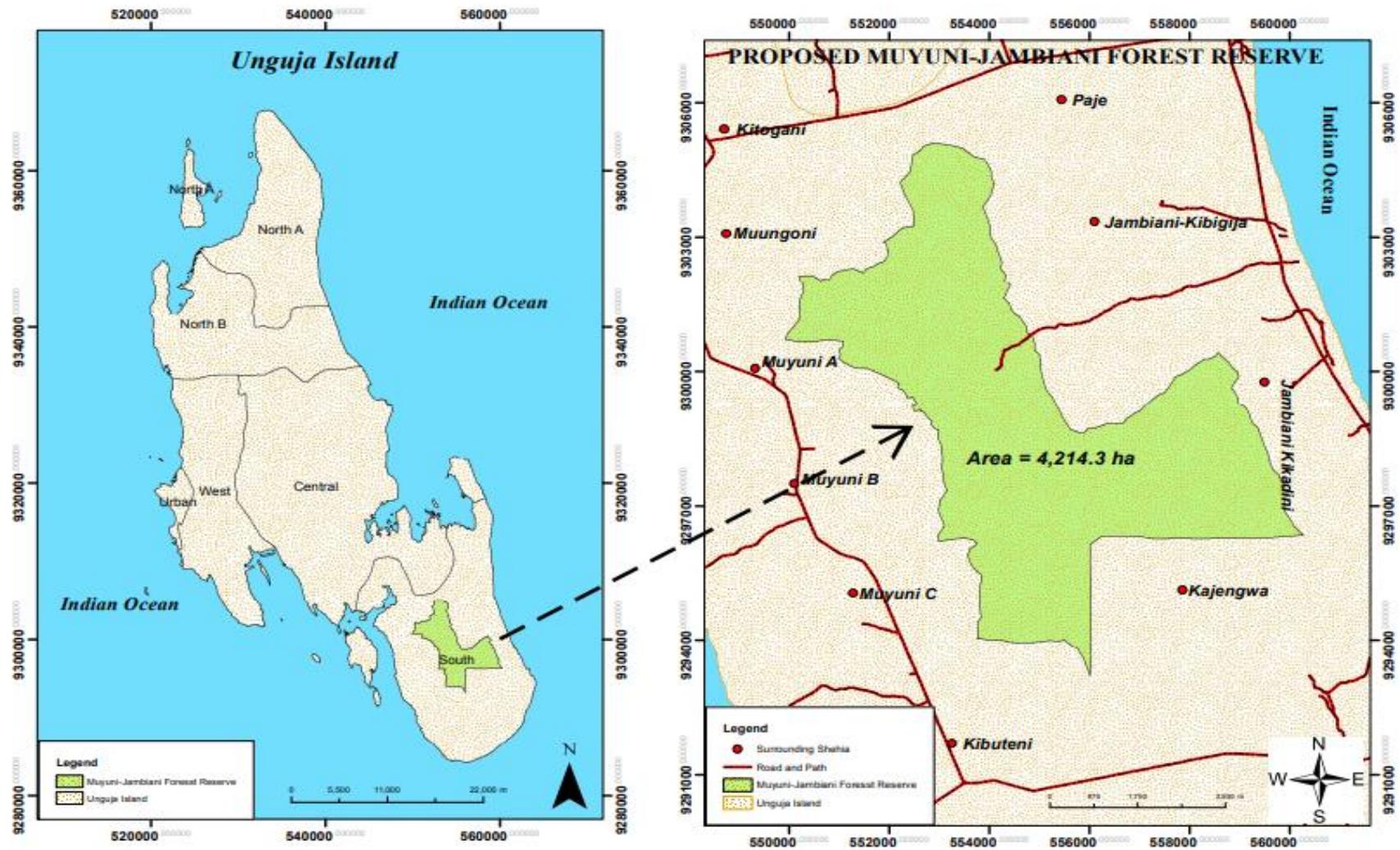


Figure2: Jambiani-Muyuni Forest Reserve

4. Scope of work for detailed birds and bats study

The purpose of the detailed birds and bats study is to establish baseline data by identifying the migratory routes and gather detailed information and knowledge of birds and bats distribution and flight activities in order to predict the potential effects of the proposed overhead transmission line infrastructure on the birds and bats.

The work must be executed in accordance with the Zanzibar Environmental Management Act 2005 and the World Bank Group's Environmental and Social Frameworks on ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources.

The Scope of Work for birds and bats surveys during pre-construction and during detailed studies for the Welezo - Ubago, Ubago - Makunduchi and Ubago – Matemwe overhead Transmission Line is given below.

4.1. Pre-survey scope of work

Prior to field work, the Consultant will collate and review existing literature on the project area under consideration, including local and international research, maps and aerial photographs; available data on habitats which may be used by birds and bats; data on birds and bats distributions and sightings, nests and roosts, flyways and migration routes, and likely foraging and commuting areas on, along or close to the proposed transmission line.

The desk-based search and review will also collect primary information pertaining to the proposed route of the transmission line, including proposed access/haul roads and temporary construction or material storage areas or other associated development, as these can also have an impact and possible loss of roosts and/or foraging habitat in the project areas. The search will seek information on the topography, geology and soil within the study area, identify known surface water and groundwater features in the study area, identify known aquatic habitat, terrestrial vegetation including wetlands, wildlife and wildlife habitat, and connectivity and ecological linkages to the study areas.

The desk study should provide a broad overview of bird and bat populations in the proposed transmission line corridor, their sensitivity to the transmission line and information on the relevant designated sites.

4.2. Field survey at the proposed project areas

Following literature review the Consultant will prepare a detailed field study work plan for discussion and approval by ZECO, identify field logistics and support required to carry out the survey and where necessary seek any specialized regulatory clearance necessary to carry out the field surveys in the protected areas. The plan should include important information and data gaps which require filling, the physical extent of the survey, survey timeline and type of information and data which will be collected. The Consultant should liaise with the ESIA and other documents from the forestry department, Management agencies for the Jozani National Park, Muyuni Forest Reserve, Menai Bay Conservation Area to ensure that the duplication in data collection is minimized where possible, that the information and data collected is shared freely and in timely manner and that there is minimal disturbance to the bird and bat roosts and nesting areas during various field work.

Based on the above and other considerations, the Consultant will conduct detailed field work on birds and bats in the sensitive areas mentioned above and identify potential impacts on birds and bats resulting from the construction and operation of the proposed Transmission Line in the area.

In carrying out the detailed survey the Consultant may choose to use one or more of the following survey techniques, namely:

(i) Abundance surveys for birds

These are surveys to record numbers and distribution of breeding, wintering and migrant birds using the site. They will allow the evaluation of a site's importance and provide information to help quantify predicted impacts from disturbance and displacement.

(ii) Vantage Point (VP) surveys for birds

These surveys comprise a series of watches from a fixed location to quantify the flight activity of birds at proposed development site, which provides data to estimate collision risk.

(iii) Automatic bat detectors for bats

Consultant may use Anabat SD2 or similar bat ultrasonic sound recorder to investigate diversity and monitor bat activities in selected static positions along proposed transmission line. Hand-held Bat box detectors may also be used to monitor bat activities along selected habitats along the Transmission line.

(iv) Field surveys for bats

During the field survey, the Consultant may wish to visit locations where bats are likely to live - caves, trees, crevices, abandoned mines, etc. Special tools, such as infrared cameras or telephoto lenses, can be helpful for finding and counting bat numbers and in identifying species which may inhabit various locations at different times of the year.

(v) Mist nets for Bats

Capture of bats using mist-netting may be considered where other standard techniques such as activity surveys, acoustic surveys, roost surveys, etc. cannot deliver robust data and should only be conducted by appropriately trained people. The trapped bats should be freed carefully and information such as bat species, bat weight, samples for genetic studies or for disease surveillance collected. The bat may be tagged with a band or other device for tracking and then released to continue its nightly activities.

(vi) Acoustic surveys for Bats

Consultant will record the echolocations or calls that bats make when they are flying through the air using specialized microphones and recording devices. This will allow the Consultant to identify the species of bats that fly by. The recording device may be used to record bat calls over a number of nights or to survey an area in one night by walking or driving along a specific route.

4.3. Target species

The Consultant will limit the abundance and vantage point surveys to the "target species" which are afforded a higher level of regulatory protection. The Consultant may also select some species as a result of their behaviour, which make them more susceptible to impact from the proposed transmission line. Target species should be restricted to those likely to be affected by the proposed project.

4.4. Area of survey

The Consultant will ensure that the survey area and the field survey design adequately cover all identified sensitive areas mentioned above. The survey area should extend at least 500m either side of the proposed limits of variation of the transmission line route.

4.5. Timing of survey visits

Given that all birds and bats have variable diurnal and seasonal activity patterns, the Consultant will ensure that the field survey timing is based around the times when birds and bats are likely to be most active in the project areas.

4.6. Duration of survey period

The fieldwork will span all seasons and periods when the target bird and bat species are present for at least **three months (90 days)**.

4.7. Distribution and abundance surveys

The Consultant will undertake distribution and abundance surveys along the proposed transmission line corridor. Survey techniques will vary according to species of interest, habitat and time within the two-month period.

4.8. Flight activity surveys

4.8.1. Survey method

The Consultant will undertake Vantage Point (VP) watches in specific areas along the proposed transmission line corridor to assess the presence of major birds and bats flight lines, concentrations of birds and bats or the presence of particular sensitive species during seasonal periods (breeding, migration and roosting).

The surveys will include an assessment of the following areas considered to be potentially sensitive for birds and bats within and immediately adjacent to the 132kV transmission line study corridor:

- All known flyways or migration routes;
- All major valleys;
- All wetlands within 1km of route;
- All major watercourse crossings; and
- All known and important birds/bats feeding/roosting areas.

Each Vantage Point survey coverage will be approximately 2km long and 0.5km wide corridor being watched. The Consultant will choose VPs along the proposed power line route and at other strategic locations to ensure complete observation coverage of all potentially sensitive areas.

4.8.2. Analysis of data

On completion of the flight activity surveys, the Consultant will analyze the field observations, maps and recording forms to identify potentially sensitive areas within the study corridor. The Consultant will analyze the data collected during the VP watches for the wider countryside assessment using professional judgment on the sensitivity of areas. This will provide an assessment of areas according to: high, medium and low sensitivity to collision risk, based on the species present and intensity of flights.

4.8.3. Additional data

ZECO will share with the Consultant all relevant documents related to the projects to simplify, coordinate and synergize the assignment. Those documents include, but are not limited to Project Feasibility Study, recent ESIA report and Environmental and Social Management Framework

4.9. Planning and reporting

4.9.1. Work plans

As soon as the Field Study is awarded, the Consultant will review its work plan and make suggestions / recommendations to enhance the study output and outcome without altering the objectives of the Study. The Consultant will submit a draft work plan incorporating the necessary elements of the study and field survey of the site. The work plan will include the site description and maps of the most up to date project layout, as well as shapefiles indicating the locations of all project components, points, and transects to be used for bird and bat surveys.

4.10. Reporting

The output of this study will include a rapid assessment report, and a detailed assessment report. The rapid assessment will entail (i) literature review of birds and bats in Zanzibar, (ii) field survey of the 100km transmission line to characterize the types of birds and bats; (ii) characterize potential impacts on birds and bats; (iii) identify the types of mitigation measures for the potential adverse impacts. The rapid assessment report will form the basis of the detailed assessment of birds and bats.

After completion of the agreed-upon surveys and the Study, the Consultant will prepare a draft detailed assessment report presenting the results, the Study findings and recommendations. Broadly, the detailed assessment report should include:

- Baseline information,
- Impact assessment of building the transmission line on birds and bats,
- Impact mitigation and monitoring plan
- Avian and Bats Protection Plans.
- Stakeholder consultation

The Study should include detailed description of the proposed site development, and provide the basis for assessment of the impacts.

The Report should include detailed maps and photos of the proposed transmission line corridor, sub-stations and associated ancillary facilities (e.g. solar plant). It should feature topography, wetlands, nearby linked forest reserves and wildlife areas showing birds and bats migratory routes and flyways and other relevant information and environmental features on or along the transmission line corridor. Composite maps containing all project and study information (transmission line, raptors and bats observation points, breeding and migratory bird transects with observation points, wintering bird/bat survey points/routes, acoustic detector locations, and habitat types) should also be provided.

The report should inform the routing of the proposed overhead transmission line; develop species protection plans (particularly with specific protected species) and propose mitigation measures which will be included in the design of towers and conductors of the proposed Transmission line project. The outcome should also include recommendations covering the operation and monitoring of the Transmission Line.

The birds and bats study should provide location specific recommendations/measures for technical designer, contractor and ZECO. Suggest that mitigation measures and monitoring be summarized in a table below (as an Annex to the Study Report).

Chainage (*Specifying KM point of Transmission Line)	Phase (Design/ Construction/ Operation)	Impacts and Risks	Mitigation Measures	Monitoring	Responsible Entity	Cost (if substantial)

The Study should refer to the IUCN Red List, CITES, Important Bird Areas (IBA), and other relevant documents.

5. Study Team

The Consultant shall deploy experts with the demonstrable practical experience in conducting birds and bats studies with specific experience on linear projects such as transmission line.

The Team will be headed by an Ornithologist with at least a Bachelor Degree and 10+ years of progressive experience at senior level, in carrying out birds and bats studies and assessments. Knowledge of the WB Environmental and Social Framework will be an added advantage. The Ornithologist will be assisted by a Bats Specialist with a Bachelor Degree in Zoology or relevant field and experience of 5+ years

In addition to the Ornithologist and Bats Specialist, the Team should include:

- Environmental scientists
- Ecologists
- GIS/Survey expert
- Data Analysts and Technicians

The supporting experts should have minimum of Bachelor Degree on relevant field and an experience of 5 years.