EXPRESSION OF INTEREST
(EOI)

Title of Consulting Service: Consulting Services for Walkover, Geological Study, Detail Survey, Tower Spotting/Tower Scheduling, BoQ Preparation and Cost Estimation of Humla - Phukot 400 kV Transmission Line Project.

Method of Consulting Service: National

Project Name : Consulting Services for Walkover, Geological Study, Detail Survey, Tower Spotting/Tower Scheduling, BoQ Preparation and Cost Estimation of Humla - Phukot 400 kV Transmission Line Project.

EOI : RPGCL/EOI/NCB/082-83/01

Office Name: Rastriya Prasaran Grid Company Limited

Office Address: Buddhanagar Kathmandu Kathmandu

Funding agency : Internal Resources

Abbreviations

AP - Angle Point

AGL - Above Ground Level

ASTM - American Society for Testing and Materials

ALOS - Advanced Land Observing Satellite

BoQ - Bill of Quantities

BM - Benchmark

BS - British Standards

CAAN - Civil Aviation Authority of Nepal

CAD - Computer-Aided Design

CBI&P - Central Board of Irrigation and Power

DBM - Design Basis Memorandum

DEM - Digital Elevation Model

DGPS - Differential Global Positioning System

DoED - Department of Electricity Development

DPR - Detailed Project Report

DSM - Digital Surface Model

DTM - Digital Terrain Model

ESRI - Environmental Systems Research Institute

GIS - Geographic Information System

GNSS - Global Navigation Satellite System

GoN - Government of Nepal

GCP - Ground Control Point

GSD - Ground Sample Distance

HFL - High Flood Level

HT - High Tension

IEC - International Electrotechnical Commission

IEEE - Institute of Electrical and Electronics Engineers

ISO - International Organization for Standardization

ISRM - International Society for Rock Mechanics

KML - Keyhole Markup Language

KMZ - Keyhole Markup Zipped

LAS - LiDAR Data Exchange File

LAZ - Compressed LAS File

LiDAR - Light Detection and Ranging

LT - Low Tension

MP - Megapixel

MUTM - Modified Universal Transverse Mercator

OPGW - Optical Ground Wire

PGA - Peak Ground Acceleration

PLS-CADD - Power Line Systems – Computer Aided Design and Drafting

QA - Quality Assurance

QA/QC - Quality Assurance / Quality Control

RGB - Red Green Blue

RINEX - Receiver Independent Exchange Format

RMSE - Root Mean Square Error

RoW - Right of Way

RPGCL - Rastriya Prasaran Grid Company Limited

RTK - Real Time Kinematic

S/S - Substation

SRTM - Shuttle Radar Topography Mission

T/L - Transmission Line

ToR - Terms of Reference

UAV - Unmanned Aerial Vehicle

USCS - Unified Soil Classification System

UTM - Universal Transverse Mercator

VDC - Village Development Committee

WGS - World Geodetic System

Table of Contents

A. Request for Expression of Interest

Request for Expression of Interest

Government of Nepal (GoN)

Name of Employer: Rastriya Prasaran Grid Company Limited

Date: 11-06-2026 00:00

Name of Project: Consulting Services for Walkover, Geological Study, Detail Survey, Tower Spotting/Tower Scheduling, BoQ Preparation and Cost Estimation of Humla - Phukot 400 kV Transmission Line Project.

1. Government of Nepal (GoN) has allocated fund toward the cost of Consulting Services for Walkover, Geological Study, Detail Survey, Tower Spotting/Tower Scheduling, BoQ Preparation and Cost Estimation of Humla - Phukot 400 kV Transmission Line Project. and intend to apply portion of this fund to eligible payments under the Contract for which this Expression of Interest is invited for National consulting service
2. The Rastriya Prasaran Grid Company Limited now invites Expression of Interest (EOI) from eligible consulting firms ("consultant") to provide the following consulting services: Feasibility study for the approximately 85 km Humla–Phukot 400 kV double-circuit transmission line, connecting the proposed Humla 400 kV Substation to the Phukot 400 kV Substation.
3. Interested eligible consultants may obtain further information and EOI document free of cost at the address Rastriya Prasaran Grid Company Limited,Rastriya Prasaran Grid Company Limited
   Buddhanagar
   Kathmandu, Kathmandu
   Bagmati Province
   Nepal during office hours on or before 08-07-2026 12:00 or visit e-GP system www.bolpatra.gov.np/egp or visit the client's website www.rpgcl.com
4. Consultants may associate with other consultants to enhance their qualifications.
5. Expressions of interest shall be delivered online through e-GP system www.bolpatra.gov.np/egp No on or before 08-07-2026 12:00
6. In case the last date of obtaining and submission of the EOI documents happens to be a holiday, the next working day will be deemed as the due date but the time will be the same as stipulated.
7. EOI will be assessed based on Qualification 48.0 %, Experience 40.0 %, and Capacity 12.0 % of consulting firm and key personnel. Based on evaluation of EOI, only shortlisted firms will be invited to submit technical and financial proposal through a request for proposal.
8. Minimum score to pass the EOI is 65

B. Instructions for Submission of Expression of Interest

Instructions for Submission of Expression of Interest

1. Expression of Interest may be submitted by a sole firm or a joint venture of consulting firms and the maximum number of partners in JV shall be limited to three.
2. Interested consultants must provide information indicating that they are qualified to perform the services (descriptions, organization and employee and of the firm or company, description of assignments of similar nature completed in the last 7 years and their location, experience in similar conditions, general qualifications and the key personnel to be involved in the proposed assignment).
3. This expression of interest is open to all eligible consulting firm/ company/ organization.
4. In case, the applicant is individual consultant, details of similar assignment experience, their location in the previous 4 years and audited balance sheet and bio data shall be considered for evaluation.
5. The assignment has been scheduled for a period of 14 months. Expected date of commencement of the assignment is 07-08-2026.
6. A Consultant will be selected in accordance with the QCBS method.
7. Expression of Interest should contain following information:

   (i) A covering letter addressed to the representative of the client on the official letter head of company duly signed by authorized signatory.

   (ii) Applicants shall provide the following information in the respective formats given in the EOI document:

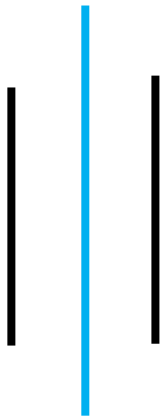
   - EOI Form: Letter of Application (Form 1)
   - EOI Form: Applicant’s Information (Form 2)
   - EOI Form: Work Experience Details (Form 3(A), 3(B) & 3(C))
   - EOI Form: Capacity Details (Form 4)
   - EOI Form: Key Experts List (form 5).

8. Applicants may submit additional information with their application but shortlisting will be based on the evaluation of information requested and included in the formats provided in the EOI document.
9. The Expression of Interest (EOI) document must be duly completed and submitted by electronically only using the forms and instructions provided by the system.
10. The completed EOI document must be submitted on or before the date and address mentioned in the “Request for Expression of Interest”. In case the submission falls on public holiday the submission can be made on the next working day. Any EOI Document received after the closing time for submission of proposals shall not be considered for evaluation.

C. Objective of Consultancy Services or Brief TOR

Client **Rastriya Prasaran Grid Company Limited, Buddhanagar, Kathmandu-10, Nepal**

Project **Humla - Phukot 400 kV Transmission Line Project**



Terms of Reference (ToR)

For

Consulting Services for Walkover, Geological Study, Detail Survey, Tower Spotting/Tower Scheduling, BoQ Preparation and Cost Estimation of Humla - Phukot 400 kV Transmission Line Project

June 2026

1. Background

Nepal possesses an incredible amount of hydropower potential that must be harnessed to drive the country's economic growth. Developing an efficient power evacuation scheme and network is essential to boost investment in the generation sector. Rastriya Prasaran Grid Company Limited (RPGCL) is the company committed to exclusively construct and operate transmission line and substations. RPGCL shall conduct several evacuation studies considering the candidate hydroelectric projects in the country.

The lack of adequate transmission facilities has been one of the bottlenecks in power sector development in Nepal. Considering potential of hydroelectric power in Nepal development of transmission line linking Nepal to neighboring country is very essential. Among the strategic projects in this regard, the Humla - Phukot 400 kV transmission line is a crucial project in Karnali (Humla & Kalikot) and Sudurpaschim Province (Bajura).

The list of the hydropower projects to be connected to Humla substation in various stage of development are listed in Table 1.

Table 1 List of Proposed Hydropower Projects

S.N.	Name of Hydro Power Projects	Capacity (MW)
1	Humla Karnali- 2 Hydropower Project	335
2	Upper Mugu Karnali Hydroelectric Project	306
3	Humla Karnali- 1 Hydropower Project	235
4	Loti Karnali hydropower project	47.7
5	Chuwa Khola Peaking Run of River Hydroelectric Project	98.17
6	Namlan Khola Hydroelectric Project	135
7	Upper Chuwa Lurupya Khola Hydroelectric Project	110.2
8	Super Chuwa Khola Hydropower Project	80
9	Bichchhya-Kuwadi Khola Hydropower Project	70
10	Karnali	62
11	Chuwa	70
12	Mugu Karnali	100
13	Mugu	57
14	Darma Khola	49.5
15	Kawadi Khola	30
16	Kawadi Khola	15
17	Hima Nadi	8
Total Capacity:		**1808.57**

Source: DoED Website

A 400-kV transmission line will be constructed between the proposed Humla 400 kV substation and the bay extension at Phukot 400 kV substation, spanning approximately 85 km. The proposed transmission line will pass through community forest areas, private land, and conservation areas. Currently, Rastriya Prasaran Grid Company Limited aims to conduct a feasibility study for the Humla to Phukot 400 kV double-circuit transmission line, including a substation at Sarkegad Rural Municipality, Humla and khadachakra municipality at Kalikot.

This project includes design of the Humla- Phukot 400 kV Double Circuit Transmission Line. RPGCL seeks consultancy services to engage a team of consultants through a firm in accordance with GoN Guidelines. This Terms of Reference (ToR) outlines the tasks related to conducting and preparation of DPR (desk study, walkover survey, geological study, detail survey, tower spotting/scheduling, BoQ preparation, cost estimation) for the successful planning and implementation of the transmission line and details survey of associated Humla 400/132 kV substation and Bay extension area at Phukot substation.

2. Location Details and Terminal Points

The route passes through the proposed Humla substation at Sarkegad Rural Municipality, Ward No. 1 of Humla District (Longitude 81°56'49.28"E, Latitude 29°40'41.25"N) to Khandachakra Municipality, Ward No. 11 of Kalikot District (Longitude 81°36'45.96"E, Latitude 29°10'20.14"N) covering approximately 85 km. The route traverses through Sudurpashchim and Karnali Provinces, passing through the districts of Humla, Kalikot, and Bajura. It includes the municipalities/rural municipalities of Sarkegad, Adanchuli, Soru, Khatyad, Sumikartik Khapar, Pandav Gufa, Pachaljharna, Sanni Triveni, Budhinanda, Raskot, and Khandachakra. The route crosses cultivated lands, forest areas, paddy fields, bushes, barren land, and maize fields.

3. Definition

- Unless otherwise specified the following terms used in this TOR have the following meanings
- The term **"RPGCL"**, "**the Company"** and "**the Client**" have the same meaning and may be used interchangeably in this document depending on the context.
- **"The Project"** means Humla - Phukot 400 kV Double Circuit Transmission Line Project and associated substations.
- **"Transmission Lines"** means Humla - Phukot 400 kV Double Circuit Transmission Line
- **"T/L"** means Transmission Line
- **"S/S"** means Substation
- **"TOR"** means "Terms of Reference".
- **"GoN"** means "Government of Nepal".

4. Objectives and Scope of the Assessment

The primary objective of the ToR is to procure a consulting service for walkover, geological study, detail survey of line and associated substation, tower spotting/tower scheduling, BoQ preparation and cost estimation of Humla – Phukot 400 kV Transmission Line.

The consulting firm shall prepare a line design covering the walkover survey, geological studies, selection of the optimum route (T1), and detailed alignment survey of the T1 route, and associated substation, including Right-of-Way (RoW) planning, profiling, tower spotting, and tower scheduling. The scope shall also include preparation of the Bill of Quantities (BoQ) and cost estimates for the transmission line.

4.1 Objectives

The objectives of this Terms of References (ToR) is to procure a consulting service to

- Assess three alternative 400 kV transmission line routes through desk study, surface geological survey and walkover survey, and recommend the most feasible shortest alignment considering technical, environmental, and social factors.
- Perform surface geological and geotechnical investigations, slope stability analysis, and geo-hazard mapping at tower/angle point locations and along the alignment.
- Establish permanent benchmarks, reference points, and angle points with monumentation; prepare D-Cards; and carry out precise DGPS survey in UTM and MUTM co-ordinates systems.

- Conduct detailed LiDAR-based drone survey of the final alignment and prepare plan/profile drawings for the Transmission Line and detail plan survey drawing of associated substation.
- Prepare design of the 400 kV transmission line route details (profiling, tower spotting, scheduling, sag-tension, check survey after tower spotting) and preparation of BoQ and cost estimate.

4.2 Scope of the Services:

The following scope of work is proposed to achieve the objective of the project, which shall include but not limited to the tasks and assignments, activities outlined below:

4.2.1 Desk Study

I. *Review of Existing Information*

The consultant shall review all available primary and secondary data relevant to the transmission line route selection. This includes:

- Existing desk study Report
- Collect existing topographic maps (1:25,000 or 1:50,000 scale from Survey Department of Nepal)
- Review satellite imagery, DEMs (SRTM/ASTER/ALOS), and land cover datasets.
- Gather hydrological, geological, and seismic data relevant to the region.
- Geological and geotechnical reports, maps, literature reviews, geomorphological and hydrogeological inventories,
- Study existing transmission lines, substations, and access roads.
- Infrastructure databases.

II. Route Identification and GIS Mapping

The Consultant shall identify three potential transmission line routes using topographical maps and DEM analysis. Consultant shall consider the MUGU Karnali 1902 MW Hydroelectric Project and Phukot Karnali 480 MW project crest level / HFL if any updates to till date during allocation of the angle points. Each route shall be mapped with angle point details, including UTM and MUTM coordinates, elevations, spans, deviation angles, land cover, natural and manmade features, protected zones, rivers and water bodies, settlements and residential areas, forests, existing roadways, and major infrastructure. A comparative chart shall be prepared to evaluate the alternatives, and the most suitable alignment shall be recommended.

III. Geological Investigation

The Consultant is required to review the geology of the transmission line, angle point and associated substation on a local and regional scale during the desk study. The review must include literature, research papers, satellite images, geological maps, hydrogeological maps, landslide hazard mappings, and seismological activities around the location. Furthermore, preparation of data sheets, log sheets, will assist during data acquisition and documentation. It is equally important to prepare an approximate inventory of geo-hazards, hydrogeological and geomorphological conditions through reports published research papers, walkover survey, detail survey data, google earth, satellite images or similar tools.

4.2.2 Field Verification and Route Finalization

I. *Walkover Survey*

The purpose of the walkover survey is to:

- Verify the findings of the desk study.

- Observe ground based geological and topographical challenges not visible in topographical maps or satellite data.
- Assess land access, right-of-way, social, and environmental issues.
- Fix angle points based on topography and constructability.

The Consultant shall carry out physical walkover surveys for the three proposed routes in the presence of the Client's representative.

During the walkover survey, the Consultant shall avoid:

- Settlements, Historical Monuments/Temples, schools, and health posts.
- Dense forests, conservation areas, and protected zones (e.g., National Parks, Protected areas and Buffer Zones).
- Geo-hazard prone areas such as landslides, rockfall zones, floodplains, and unstable slopes.
- Swampy or marshy areas.
- Interference/Crossings with existing high-voltage transmission lines.

The alignment shall be optimized for minimum angle points and least resettlement impacts.

II. Terrain and Topography Assessment

The Consultant shall record and assess:

- Terrain types such as plains, hill slopes, river crossings, and gorges.
- Slope gradients, soil conditions, and rock exposures.
- Ridge crossings, valleys, and potential tower spotting constraints.

III. River and Infrastructure Crossings

The Consultant shall identify and document:

- River and stream crossings, including width, bank conditions, flood marks, and watershed characteristics.
- Crossings with existing infrastructure such as:
    - Transmission and distribution lines.
    - Roads and highways.
    - Telecommunication lines, irrigation canals, and pipelines.

IV. Environmental and Social Features

The Consultant shall document:

- Types of forests along the alignment.
- Settlement density near the proposed alignment.
- Cultural and religious sites.
- Agricultural lands and potential right-of-way impacts.

V. Accessibility and Logistics

The Consultant shall record the following during the survey:

- Existing roads and trails that can be utilized by survey teams and for construction activities;
- Areas where temporary access roads will be required;
- Availability of water sources and potential sites for construction camps; and
- Sources of quarry materials and water required for transmission line construction.

VI. Geological and Geotechnical Investigation and Engineering Geological Mapping

The geological and geotechnical investigation during the walkover shall include:

- Regional and local geology of the project area.
- Geological information along the route, including lithological composition at each angle point, rock and soil types as per standard guidelines, geological structures (faults, folds, thrusts, etc.), rock and joint orientations (where exposed), and depositional characteristics with approximate thickness. Rock and soil descriptions shall follow ISRM and USCS classifications.
- Classification soil/rock type and design of appropriate foundation type required for tower foundation and erection depend upon the soil parameters and properties, sub-soil water level and the presence of surface water which have been classified as per standard.
- The type of soil as per standard guidelines, sub-soil water level, and the presence of surface water. Nine foundation types for TL towers are classified based on geology, the nature of the soil, and groundwater conditions (Classification soil type and design of appropriate foundation type required for tower erection depend upon the soil parameters and properties, sub-soil water level and the presence of surface water Geomorphological setting of each angle point and transmission line alignment.
- Identification of potential geo-hazards such as landslides, rock fall, land subsidence, slope instability, and steep gradients. The study shall also cover major crossings such as rivers, streams, valleys, roads, residential areas, and existing electric lines.
- Seismicity of the project area, including maximum Peak Ground Acceleration (PGA) and records of past earthquake activities near the project location.
- Hydrogeological observations along the alignment, including rivers, streams, tributaries, and sediment deposition characteristics, as well as potential hazards.
- Weathering and erosion conditions near angle points.
- Classification of foundation types for each angle point, in accordance with RPGCL guidelines and the CBIP.
- Photographic documentation of each angle point location with proper captions.
- Detail engineering geological mapping cross-sections and hazard mapping incorporating geological elements, structures, soil & rocks type's landslides, slope instabilities in AutoCAD or relevant software format.

4.2.3 Final Route Selection and Reporting

Based on survey findings, the Consultant shall recommend the most suitable alignment (T1) among the three alternatives, considering technical, geological, environmental, and social factors. The final alignment shall include appropriate angle point details. Based on walkover survey findings, geological, environmental, and social assessments, the Consultant shall finalize the alignment. Angle point and route data shall be collected using a handheld GPS with an accuracy of ±1 m in the UTM/MUTM coordinate system. The data shall include:

- Angle point identification, coordinates, elevations, spans, and deviation angles.
- Crossing details, road access, and soil types.
- Locational details, including current and former local administrative boundaries.
- Land use, forest types, and infrastructure details.

The mapping of angle points, transmission line routes, and attribute details shall be prepared using AutoCAD and GIS, software. The Consultant shall submit:

- Walkover survey data and angle point details for all three routes in KML format with complete attribute information.
- GIS and Auto-CAD based mapping overlaid on a topographical base map, including elevation details.
- Plan and profile drawings of each route alignment with Right-of-Way (ROW) details of 125m on either side of selected T1 route.
- A comprehensive report in both soft and hard copy, including all survey data and analyses.

Based on a comparative evaluation of technical, geological, environmental, and social factors, the Consultant shall recommend the most suitable route among the three alternatives for approval with comparative chart.

4.2.4 Monumentation of Angle Points

I. Control Survey

The national grid (MUTM) and WGS UTM coordinate systems will be maintained by establishing new survey control points, connected to existing trig points at intervals of 3–5 km and nearby benchmarks (BMs), if available, through joint DGPS observations. The coordinates obtained will then be transferred to the National Grid Coordinate System.

The trig points shall either be purchased from the Survey Department, Government of Nepal (with verified purchase documents) or subsequently verified as required.

The survey team shall carry out a DGPS survey of the transmission line using modern surveying techniques and instruments, ensuring positional accuracy within standard acceptable limits. For the DGPS survey, dual-frequency GNSS instruments with an accuracy of better than 5 mm ± 1 ppm shall be used.

A pair of control points shall be established at intervals of every 3 km. The observation time shall be a minimum of 24 hours for the base point and at least 3 hours for other points. The coordinates of the angle points shall be fixed through DGPS traverses. For the UTM and MUTM coordinate systems of Nepal, three-dimensional coordinates (latitude, longitude, and elevation or Northing, Easting, and Elevation) of all identified tower locations shall be determined. The specifications of the DGPS instruments and procedures shall be approved by the Client prior to the monumentation survey by the Consultant.

II. Monumentation:

Each angle point and control point shall be documented for the T1 route with a D-card. The D-card shall include:

- A clear photograph of the location for sufficient foundation area including Angle Points (AP) details in photographs.
- Location details (Sabhik VDC and Local Level Details).
- XYZ coordinates (in both MUTM and UTM systems).
- Name of the landowner (if available).
- References to permanent structures or identifiable landmarks in the vicinity.

Permanent markers (monuments) shall be installed at each angle point along the final transmission line route, in accordance with the design specifications—a concrete pillar or Casting measuring 10 cm × 10 cm × 45 cm. These monuments will serve as permanent reference points for the transmission line alignment and will comply with the standard of Monumentation M15.

The placement of monuments at angle points shall avoid areas with the following characteristics:

- Dense forest areas.
- Buildings or other permanent structures.
- Swampy or wetland areas.
- Major roads or highways.
- Agricultural lands or areas that may affect construction feasibility

4.2.5 Detailed Survey (UAV–LiDAR-Based)

The verification of transmission line angle points for tower locations identified during the walkover survey falls within the scope of the Consultant. The survey team shall carry out a detailed survey of the approved route alignment, as well as the associated Humla and Phukot 400 kV substations, using the closed traverse survey method.

The Consultant shall prepare a strip plan map at a scale of 1:1000 to 1:2000 and profile sections at a scale of 1:200 or 1:400 for the entire transmission line, using Auto-CAD or relevant software. The contour interval shall be 0.5 m –2.5m (0.5 for minor contour and 2.5m for major contour).

A detailed survey of the transmission line and associated substations with Bay Expansion shall be conducted using modern survey techniques, including LiDAR and DGPS instruments, ensuring accuracy within standard acceptable limits. The survey shall cover a corridor width of 125 meters on either sides of the proposed alignment.

As part of the consulting scope, the Consultant shall also prepare:

- A high-resolution aerial orthophoto and Ortho-mosaic.
- An accurate 3D terrain surface model.
- Sufficient (4 points/m^2) point cloud data.

These deliverables are required for the Transmission Line, covering the approx. 85 km length of Humla-Phukot 400 kV using LiDAR technology deployed via an aerial platform.

I. Procedures

To undertake the LiDAR survey, the following procedures shall be carried out:

1. Obtain permissions from concerned authorities for the LiDAR survey in consultant scope.
2. Establish Ground Control Points (GCPs) through DGPS surveying.
3. Acquires LiDAR data from aerial platforms.
4. Conduct aerial photography.
5. Process orthophotos of aerial photographs to produce high-accuracy aerial orthophotos with GSD of 15 cm or higher.
6. Process and classify LiDAR data, differentiating ground and non-ground features using appropriate classification codes.
7. Produce classified point cloud data, along with DSM/DTM of 0.5 m ground resolution or higher.
8. Prepare large-scale topographic base maps (scale 1:1000 – 1:2000) in Auto-CAD and prepare GIS database for the project area for mapping.

II. Aerial Photography and LiDAR Data Acquisition

1. Pre-survey planning
    a. Review existing reports, maps, and project details.
    b. Develop a flight mission and data acquisition plan in consultation with the Client and relevant authorities.
2. Permissions and clearances
    a. Obtain permits for installing Drone, cameras/LiDAR sensors on aerial platforms.
    b. Secure flight mission approvals from the Civil Aviation Authority of Nepal, Department of Survey, Ministry of Defense/Nepal Army, Ministry of Forest and Environment, and Ministry of Home Affairs.
3. Calibration and testing
    a. Test and calibrate aerial cameras and LiDAR sensors prior to data acquisition.

b. Submit calibration reports to the Client.

4. GNSS Base Stations
    a. Establish GNSS base stations at intervals of 3–5 km along the flight path.
    b. Connect GNSS base stations to WGS-UTM Coordinates and National Control Network maintained by the Department of Survey MUTM system.
    c. Ensure continuous GNSS data recording during the LiDAR survey mission.
5. Flight missions
    a. Conduct aerial photography and LiDAR point data acquisition according to the flight plan.
    b. Maintain safety, weather, and security protocols.
6. Ground validation
    a. Establish LiDAR validation checks points along flight lines.
    b. Use DGPS RTK points on bare ground to calibrate LiDAR first pulse data.
    c. Locate check points near GNSS base stations.

III. Post-Processing and Deliverables

1. LiDAR Data Processing

- Process raw LiDAR data into georeferenced dense point clouds, applying QA/QC checks.
- Classify clouds into ground and non-ground categories.
- Generate DSM and DTM at 0.5 m or higher ground resolution.
- Validate DSM/DTM with ground check points.
- Submit an accuracy assessment report with technical details.

2. Aerial Photography Processing

- Orthorectify aerial photographs using GCPs and LiDAR-derived DTM and DSM.
- Apply aerial triangulation for high accuracy.
- Generate seamless orthophoto mosaics with color balancing, radiometric corrections, and image enhancements.
- Submit an accurate assessment report.

3. Topographic Base Map Preparation

- Vectorize extract ground features (roads, buildings, hydrography, land cover, embankments, land use, and features code data, etc.).
- Verify and update maps through ground surveys.
- Generate 0.5 m contour intervals from LiDAR-derived DTM.
- Develop GIS database and maps in UTM and MUTM systems.
- Prepare orthophotos and topographic base maps at 1:1000 – 1:2000 scale.
- Prepare profile maps at 1:200 / 1:400 for tower spotting using PLS CAD or relevant software.
- Submit a final accuracy assessment report with technical parameters.

IV. Technical Details and Specifications of Image and LiDAR

Specification of camera and LiDAR must be approved by the consultant from client 15 days ahead of detail field survey.

Table 2 Technical Details and Specifications of Image and LiDAR

S.N.	Description	Specification
1	**Coverage**	Coverage area of the transmission line will be 250 m Right of Way (125 m left and 125 m right) of the proposed transmission line alignment.

		Coverage area for the both substation area shall be 150 m buffer from the outer boundary of the substation area.
2	**LiDAR Point Density**	At least 4 points/m2 or more but needs to increase due to terrain conditions and other conditions to maintain desired accuracy with RGB colored point cloud data.
3	**Ground sample distance (GSD) and focal length of lens**	Medium frame cameras should be used to capture digital images, and GSD at nadir should be 15 cm. Consultants must provide Camera model, Megapixel pixel (not less than 50 MP) pitch (um), focal length (mm), sensor image width (pixels) computed required AGL for 0.15m GSD and flight plan showing strips with altitude, speed, frontlap/sidelap and tigger interval before approval of flight plan.
4	**Photographic Coverage**	The forward overlap (forward lap) between successive exposures in each run should be minimum 60 percent but can increase to maintain desired accuracy. The lateral overlap (side lap) between adjacent strips should be minimum 40 percent but can increase to maintain desired accuracy. The forward overlap and lateral overlap should be sufficient in order to produce Ortho-mosaic images of the dense forest area. In extreme terrain relief where the lateral overlap specified above is impossible to maintain in straight and parallel flight lines, the 'gaps' created by excessive relief shall be filled by short runs flown between the main runs and parallel to them.
5	**Fundamental Spatial Accuracy**	Fundamental vertical accuracy: Root Mean Square Error <= +/- 15 cm. or better on clear or vegetated ground. Fundamental horizontal accuracy of ortho photo should be <= +/- 10 cm.
6	**Coordinate Datum's**	WGS 84 and MUTM with Everest Spheroid Vertical: above mean sea level
7	**Vertical Datum**	Consultants should adjust elevation data to Global (WGS) and local (MUTM Everest 1830) height data.
8	**Ground Control System**	The maximum distance between the Reference DGPS station on the ground and airborne GPS units must not exceed 5 kilometers during the flight. All survey control data used or derived from this contract must be supplied to ensure independent Quality Assurance (QA) of the survey operations. It is therefore essential that all primary ground stations should be visible in photographs in accordance with the appropriate system. The primary ground control and check point surveys must be referenced to survey control marks with geodetic control points (in terms of coordinates and height) demarcated by the survey department. Elevation data must be validated and corrected for systematic errors to ensure accuracy specifications are met. Documentation must describe how this has been achieved.
9	**LiDAR Data acquisition details**	Flight line overlap must be 40% or greater, as required to ensure there are no data gaps between the usable portions of the swaths. Collections in high relief terrain are expected to require greater overlap. Any data with gaps between the geometrically usable portions of the swaths will be rejected. LiDAR data over the Study Area must not be collected during any period where the extent of

		LiDAR ground returns in any part of the study Area is likely to be significantly compromised e.g. Flood, adverse weather, etc. The spatial distribution of geometrically usable points is expected to be uniform and free from clustering. To ensure consistent data densities throughout the project area: • Environmental conditions for data capture • Cloud and fog free between the aerial platform and the ground
10	**Intensity Image**	0.15 m grid intensity image or better to preserve required accuracy. Mosaic generated using average laser intensity values from "first return" LiDAR points. Tiled delivery covering 85 km of the transmission line.
11	**Digital Surface Model (DSM) (Orthometric)**	0.5 m or better grid Digital Surface Model (DSM) to preserve required accuracy. The DSM should be generated from the "first return" LiDAR mass point data. This will include ground and non-ground points such as vegetation and buildings. The DSM generation should employ a Point to TIN and TIN to Raster process with Natural Nearest Neighbour interpolation
12	**Digital Terrain Model (DTM) (Orthometric)**	0.5 m or better grid bare earth Digital Elevation Model (DEM) to preserve required accuracy. The DEM should be generated from the LiDAR mass point data classified as "Ground" only, so that it defines the "bare earth" ground surface. The DEM generation should employ a Point to TIN and TIN to Raster process with Natural Nearest Neighbour interpolation.
13	**DGPS Data collection**	DGPS data for all base station occupations for more than 24 hours or more is to be provided in RINEX format (Receiver Independent Exchange Format). GPS observation log sheets which include the following details: a. Survey mark id (APs) b. Occupation time & date c. Antenna height measurements d. Instrument /antenna types & serial numbers. The DGPS observation log sheets should be provided in pdf format and Excel spreadsheet if data is captured digitally. Where appropriate, some jurisdictions may find it useful to also request DGPS data for any static primary control surveys. Description Card of the DGPS locations must be submitted by the consultant.
14	**Metadata**	For each supplied data product, a complete metadata statement is consistent with the ISO Standard. Metadata must be provided with every delivery including interim, partial, and final deliveries. The job will not be signed by the Contract Authority until the metadata is supplied.
15	**Spatial Accuracy Validation**	The fundamental vertical accuracy of the point cloud dataset must be determined with check points located only in open, relatively flat terrain, where there is a very high probability that the sensor will have detected the ground surface. The vertical accuracy of the point cloud dataset is to be tested using a TIN surface constructed from bare-earth LiDAR points compared against ground survey check points. Check points are to be surveyed independently of any LiDAR GPS operations.

		The number of check points (locations) is dependent on the extent of the survey. The following strategy should be used as a guide: • Check points must be established to adequately cover the full extent of the transmission line survey area and be representative of the project area landscape. In the above circumstances, a "compiled to meet" statement of horizontal accuracy at 95 percent confidence should be reported.
16	**Data Processing**	Consultants should process all the acquired data (LiDAR and Ortho photo) in Data Processing LAB (Software and Hardware) inside Nepal with close coordinaion and presence of Client representative.
17	**Facilitation**	Client will only facilitate in administrative procedure

The excel sheet of features present in site must be in the below format if any suggestion please consult with client representatives and make a proper feature code data excel sheet of detail survey.

Table 3 feature code data excel sheet

S. No.	Feature Name	Feature Code	Reference Value / Notes	Feature Code Value
1	Ground / Bare Earth	GRD	Elevation points for DTM generation	10
2	Road / Highway	RD	Road centerline, attribute	20
3	Tracks / Trails	TRK	Local access paths	30
4	River / Stream / Canal	WTR	River / canal (bank-to-bank line)	40
5	Riverbank / Embankment	BNK	Left / right bank coding	50
6	Slope / Landslide Area	SLP	Mark slope, unstable areas	60
7	Rock Outcrop / Cliff	RCK	Hazardous rocky areas	70
8	Tall Trees / Forest	VTL	> 3 m vegetation (clearance check)	80
9	Medium Vegetation / Shrubs	VSM	1 – 3 m shrubs	90
10	Low Vegetation / Grassland	VGP	< 1 m grassland	100
11	Vegetation within RoW	VCL	Vegetation clearance within RoW	110
12	Transmission Tower Location	TWR	Tower center point (Unique ID required)	120
13	Tower Foundation Point	TWF	4 foundation corner points	130
14	Transmission Line Conductor / Wire	TLN	LiDAR classified wire points	140
15	Optical Ground Wire (OPGW)	OPG	If visible in LiDAR point cloud	150
16	Substation / Gantry Structure	SUB	Substation structures & gantries	160
17	Utility Poles (LT/HT, Telephone)	UTL	LT/HT poles, telephone poles	170
18	Buildings / Houses	BLD	Building footprints	180
19	Fence / Compound Wall	FNC	Fence / compound demarcation	190
20	Bridge / Culvert	BRG	Bridge / culvert structure	200

21	Retaining Wall / Boundary Wall	WAL	Boundary / retaining wall	210
22	Right of Way (RoW) Boundary	ROW	132 kV – 18 m, 220 kV – 30 m, 400 kV – 46 m RoW	220, 224, 228
23	Obstructions within RoW	OBS	Any obstruction inside RoW	230
24	Road Crossing	CRS_RD	Location of TL road crossing	240
25	River Crossing	CRS_WT	Location of TL river crossing	250
26	Clearance Hazard Point	HGR	Obstruction near conductor clearance	260
27	Ground Control Point (GCP)	GCP	GNSS surveyed GCP point	270
28	Check Point	CHK	Independent check points	280
29	Reference Base Station	REF	Reference GNSS base station	290
30	Angle Point (AP)	AP	Transmission line angle / deviation points (AP1, AP2, …)	300
31	Spot Height	SP		310
32	As per client suggestion if any			

The consultant shall carry out a high-resolution topographic and alignment survey using Unmanned Aerial Vehicle (UAV/Drone) mounted LiDAR, supported by Differential GPS (DGPS/RTK) and Total Station where required. The purpose of the survey is to produce accurate terrain, obstacles, and corridor data suitable for transmission line design, tower spotting,tower scheduling and clearance analysis and preparation of BoQ and cost estimate of Transmission Line.

V. Reporting and Deliverables

Mapping and GIS Deliverables (UAV-LiDAR Based):

All deliverables must be developed in GIS and AutoCAD or PLS CAD -compatible formats (ESRI Shapefile, KMZ, GeoTIFF, LAS or LAZ and CAD dwg) and meet RPGCL's mapping standards on hard copy and softcopy 4 TB hard drive.

Table 4 Mapping and GIS Deliverables (UAV- LiDAR Based)

Output Type	**Description**
Strip Maps	High-resolution 250m corridor maps at 1:1000 to 1:2000 scale with towers, terrain, land use, and contours
Longitudinal Profile	Side-view elevation profile showing ground undulation, spans, angle point and clearance at a scale of 1:200 or 1:400.
Plan and Profile Drawings	Auto-CAD and PLS-CAD or relevant software based plan/profile sheets including angle point, elevation data, and crossing details
GIS Maps	Final route alignment in .shp, .kmz, and .kml formats overlay with topographical base map as well as Topographical survey map.
Coordinate Tables	Excel sheet with tower coordinates UTM/MUTM elevation, span length, angles, and tower type
LiDAR Point Cloud	Raw and classified LAS or LAZ files showing all scanned features (ground, vegetation, buildings, etc.)
DTM and DSM Files	GeoTIFF/DEM outputs used for design, clearance, and terrain analysis

Crossing/Obstruction Inventory	GIS database and table of all rivers, road, TL, building, and forest crossings and other features.
3D Visualization (Optional)	3D fly-through or corridor model using RGB LiDAR point cloud and orthophotos and documents for stakeholder and submit it with presentation.

Reporting and deliverables for this assignment are as under:

Table 5 reporting and deliverables

SN	Report & Deliverables	Timeline
1	Delivery 1: Inception report ➢ Detailed work plan and timetable. Three alternative route plan map and comparison table with complete report (Soft and Hard copies)	Within 15 days of commencement
2	Delivery 2: Walkover Survey and Geological survey report ➢ Walkover survey report with best route among the three alternatives with complete comparison overlay on topographic map and report and geological and geotechnical study report. (Soft and Hard copies ➢ Final Angle Point, DGPS survey, monumentation, DGPS survey report overlay on Topomap, D-card, DGPS processing report accuracy assessment RMSE calculation report.	Within 15 days after completion of filed work of the assignment
3	Delivery 3: LiDAR survey RAW data and Processing Report ➢ Flight plan, LiDAR and orthophoto acquisition report with raw data and images including flight mission report and GNSS check control point field report. ➢ LiDAR and orthophoto acquisition report with processed and corrected LiDAR and orthophoto data and maps. ➢ LiDAR and aerial orthophoto processing report composition @ 15 cm ground resolution in GeoTIFF format in appropriate data tiles sizes	Within 20 days after completion of filed work of the assignment
4	Delivery 4: Draft Reports and Base Map and Data in ArcGIS and AutoCAD. • Draft topographical base map and GIS data (Base maps at 1:1000 – 1:2000 scale printed in 3 copies) • Accuracy assessment report • Draft Engineering Geological mapping (Including Hazard mapping and cross-sections report in hard and softcopy.)	Within 20 days after completion the assignment
5	Delivery 5: Final reports and base map and data • Final topographical base map and GIS data (Base maps at 1:1000 to 1:2000 scale printed in 3	Within 20 days after completion the assignment

	copies) and 1:200/1:400 Profile of transmission line showing angle point and 250 m row data with D- Card Information. • Project report with methodology, outputs, data handling and usages recommendations and process. • Excel sheet data of prominent (natural and manmade features) and topographical features and angle point details as mentioned below feature code data. • Final Consolidate Engineering Geological and Geotechnical mapping (Including Hazard mapping and cross-sections report in hard and softcopy.)	

4.2.6 Design of Transmission Line

I. Scope

1. Design of Transmission Line including profiling, tower spotting using PLS-CADD or any similar relevant software and tower scheduling, verification and demarcation of the intermediate tower spotting if required in the site for actual construction purpose.
2. Preparation of foundation type Bill of Quantity (BoQ), Cost estimates, and Technical Specification of civil works, steels, insulator, shield wires, OPGW, damper and transmission line in detail.

II. Design of Transmission line

1. Prepare design base memorandum (DBM) for the standardization transmission line and shall be approved by client before starting the detail of transmission line.
2. Collect the weather/climate data including isokeraunic data and determine various loading zones and employ the data to develop the optimal design of transmission lines and tower, passing through terrain with varying elevation and climate conditions.
3. Select design parameters/criteria for the transmission line as per IEEE standard: Guide for the preparation of a Transmission Line Design Criteria Document. However, other standards such as IEC, ASTM, BS, SHALL be used for design of specific components and for any aspect not covered by IEEE.
4. Employ the design parameters as per relevant IS codes to prepare the specifications for steel towers, conductor, shield wires, Optical Ground Wire (OPGW), dampers, insulators, line hardware and all other line accessories, etc.
5. During Check survey Tower Spotting, Wind and Weight span at each location must be checked at field in presence of client representative before final report submission.
6. For the profiling and plotting of line, the following data should be considered;
   - Specification of profiling and plotting including scales to be adopted,
   - Normal wind and weight span,
   - Minimum weight span for tangent tower,
   - Maximum single spans for all types of towers.
   - Specifications for statutory clearances.
   - The height of the towers, insulator strings, hangers and other attachments. Use of reinforced cross arm to take extra weight span will increase additional load on the tower leg and other tower members. The towers in all locations may not be adequate to take care of this additional load due to an extra weight span.
   - Details of conductor, earth wire, insulators including wind loads, maximum and minimum temperatures and corresponding working tension.

7. The Consultant Shall Employ PLS-CADD or any similar relevant state-of-the-art tools/software for the transmission line routing, profiling and tower spotting. Furthermore, the Consultant shall consider for the development of design criteria, calculations, drawings, Conductor, Shield wires, OPGW, dampers, insulators, line hardware and all other line accessories etc. while preparing the Report; including Tower Spotting, Tower Scheduling including check survey.
8. The Consultant shall prepare tower spotting/ tower schedule, technical specification, typical foundation design as per soil type in quantity based and BoQ, Cost estimate related drawings after completion of check survey, and submitted final tower spotting/scheduling in any commercial/applicable software, BoQ preparation and cost estimate.

Table 6 General Description of Towers for Transmission Lines

Type of Tower	**Deviation Limit**	**Typical Use**
DA / A	0°–2°	Used as a tangent tower
DB / B	0°–15°	Angular tower with tension insulator string
DC / C	15°–30°	Medium-angle tower with tension insulator string
DD / D	30°–60°	a) Large-angle tower with tension insulator string b) Anchor tower for river crossing • 0° deviation on crossing side • 0°–30° deviation on line side

After performing the Design of Transmission line, the consultant shall prepare the report incorporating the following:

a) Project Description with location map.
b) Salient Features of Transmission line.
c) Tower spotting/scheduling, tower spotting data using PLS-CADD or any similar relevant software.
d) Select typical foundation design of each tower location as per standard.
e) Incorporation of design criteria in the relevant software.
f) Sag tension chart
g) Plan and profile of transmission line with tower Schedule of obligatory crossing locations.
h) Transmission line technical specifications and drawings including BoQ.
i) Final Cost estimate

Reporting and deliverables for this assignment are as under:

Table 7 reporting and deliverables

SN	**Report & Deliverables**	**Timeline**
1	Delivery 1: • Design base Memorandum report of Transmission Line • (Soft and Hard copies)	Within 30 days of commencement
2	Delivery 2:	Within 15 days after completion the assignment

	• Draft transmission line tower spotting/scheduling including design criteria and sag tension report and associated drawings using PLS-CADD or any similar relevant software.	
3	Delivery 3: • Draft BoQ and cost estimate of transmission line	Within 15 days after completion the assignment
4	Delivery 4: • Final consolidated report transmission line design report, BoQ, cost estimate and relevant drawings including technical specification.	Within 15 days after completion the assignment

4.2.7 Costing of Individual Items

The Consultant shall depict the major assumptions forming the rate analysis and cost estimates in text including the major item wise details of cost estimates. The Consultant shall prepare BoQ and cost estimate on following topics including required descriptions as per standard on Cost Estimate of Transmission line. (Template of Bill of Material of 400 kV towers will be provided by the Client if required.)

- Necessary tools and equipment should be analyzed by consultants for BoQ preparation and cost estimation.

Refer following information

  - Refer existing reference for relevant task, in Nepal.
  - Reference price level of estimates
  - Currency and Exchange rates and their referenced period
  - Level of Contingencies
  - Level of inventories of materials, spares, etc.
  - Status of engineering and design based on which the estimates have been framed - Rates and quantity of the items on the basis of value analysis.
  - Insurance, Transportation, Custom Duty and Taxes, etc.
- Prepare a workable and cost-effective procurement, construction & execution plan including schedule and a detailed description of the process and submit report with incorporation of suggestions from the Client.
- The Consultant shall provide recent years' rate of equipment and material.
- The consultant shall provide all the references for the rate of each component.

5. Implementation Arrangement

The Consultant will work closely with the office of RPGCL, local administration, and relevant ministries & agencies. The Consultant's team leader will be the principal contact and will be expected to be readily available at the project office within a notice of seven days from the project during the assignment period. The Consultant will be responsible for all aspects of performance of services set forth in the ToR. The Client will be responsible for providing the existing data and information and supporting arrangement for the necessary field investigations.

a. **Method Statements**. Prior to commencing any section of the work, the Consultant shall submit method statement to the project in accordance with the requirement of the Consulting Services with the allocated input of days from both technical key expert and technical experts and expected input from RPGCL's project focal person. When requested by the Client, the

Consultant shall provide additional method statements related to specific item of work, inception report and DBM.

b. **Design Progress Meetings**. The Consultant shall hold periodic progress meetings with the Client at least once a month. Additional meetings shall be scheduled as required by the Consultant's design. The intent of these meetings will be for the Client to provide input and to discuss options for addressing the Client's comments. The Consultant shall fully cooperate with the Client in scheduling and attending such meetings as requested by the Client. These meetings shall be held at RPGCL office in Kathmandu. The Client will be responsible to prepare meeting minutes during each of these meetings. Minutes will be distributed to participants for review and comment.

c. **Monthly Progress Reports**. The Consultant shall furnish the Client with a written Monthly Progress Report that summarizes all aspects of the completed monthly and cumulative work progress. The objectives of the Monthly Progress Report are to:

    i. Provide a reliable and readily accessible summary record of the project activities with daily activities performed by each individual when they are at the site.

    ii. Provide a detailed description of all work actually completed up to the date and revision to the project schedule required, which shall reflect changes in the critical path since the date of the last revision.

    iii. Identify issues and problems requiring action by the Client or the Consultant, including issues of conflicting priorities.

    iv. Provide a forecast of the work to be accomplished in the next month.

    v. Provide information to help substantiate the Consultant's pay request

d. **Submittal Protocol**. No later than thirty (30) days after the Contract Date, the Consultant shall submit a submittal protocol for the Consulting Services. The submittal protocol shall identify the submittal packages to be prepared by the Consultant including but not limited as specified in Schedule, including a detailed listing of the content, the expected dates of the submittals, number of copies, and distribution of the submittals by the Consultant based on distribution information provided by the Client. The submittal protocol shall include the time allowed for the Client's review, which at a minimum shall be twenty (20) days. For large or complex submittals, the Client may require a submittal review period longer and the Consultant shall coordinate with the Client inclusion of these review periods in the submittal protocol. The submittal protocol shall avoid the simultaneous submittal of a large number of submittals for the concurrent Client review.

e. **Consultant's Obligations**. The Consultant shall provide submittals for review consistent with the submittal dates. The Consultant acknowledges that the Client's review will often involve input from, or consultation with, a number of individuals. Therefore, should submittal dates to the Client be delayed, the Consultant shall provide prompt notice to the Client of the delay. In no case shall this notice be given less than ten (10) calendar days prior to the scheduled submittal date for that submittal. The submittals shall identify any proposed change to the requirements, or the design concept, project delivery approach, or the project schedule provided in the Consultant's proposal, accompanied by the rationale behind the proposed change. No changes shall be implemented without the Client's acceptance. Such acceptance shall not, however, relieve the Consultant of any of its obligations under the contract.

Form of Submittals. Each submittal shall be transmitted electronically and in hard copy with official stamp and signature, unless otherwise required by other sections of the ToR, with a cover letter to the Client at the office of RPGCL. Unless otherwise specified in the contract, the Consultant shall prepare one (01) hard copy of each submittal for distribution except three (03)

6. The Consultant is expected to complete consulting task with in Fourteen (14) months.

6.1 Expertise and Person Month Requirements

It is estimated that in total 47 person-months of Services are required from technical key experts. Details on key expertise, non-key and person month requirements are in Table 9 and 10. The key expertise should be provided by a consulting firm specializing in designing and preparing (desk study, walkover survey, geological study, detail survey, tower spotting/scheduling, typical foundation for bid purpose, BoQ preparation and cost estimation) for the successful planning and implementation of the transmission line and details survey of associated Humla 400/132 kV substation and Bay extension area at Phukot substation.

Table 8 Indicative Consultant Expertise and Key Person Months Requirements

S.N.	Position	Person-Month		
		Office	Field	Total
1	**Civil/Electrical/Geomatics Engineer (CumTeam Leader)**	9	3	12
2	**Electrical Engineer (Transmission)**	4	2	6
3	**Transmission Line Engineer**	5	4	9
4	**Survey Engineer /Geomatics engineer**	4	5	9
5	**Geotechnical Engineer /Geologist**	1	2	3
6	**Engineer**	4	4	8
Total Person-Month		**27**	**20**	**47**

Table 9 Non-Key Person Months Requirements

S.N.	Position	Person-Month		
		Office	Field	Total
1	**Diploma in Geomatics Engineering**	4	4	
2	**Diploma in Civil Engineering**	4	4	
3	**Support Staff (4 Person)**		8	
Total Person-Month				

6.1.1 Responsibilities and Qualification of the Technical Key Experts

All technical experts indicated in Table 9, Table 10 and Table11 are considered as technical inputs of key experts. The main responsibilities and qualifications of each expert are highlighted, but not limited to, as follows:

Table 10 Responsibilities and qualification of the technical key experts and non-key experts.

Key Experts	
A. Civil/Electrical/Geomatics Engineer (Cum Team Leader)	
Qualification/ Experience	▪ Bachelor in Civil/Electrical / Geomatics Engineering. ▪ Above 10 years of experience in infrastructure projects. ▪ At least 5 years of experience in detail design report, associated drawing document finalization, bill of quantities, and cost estimate finalization or construction of 132 kV or above voltage level transmission line projects.
Responsibilities	As the Team Leader, the expert is responsible for but not limited to: ▪ Act as the team's point of contact with RPGCL; ▪ Must be available for progress or other meetings as and when requested by the Client; ▪ Lead and manage the entire team involve in the detail design of the project including experts for the fulfillment of the outlined scope of work; ▪ Make necessary inputs and advice to the project team on transmission line technical matters; ▪ Develop a full understanding of project requirements through discussion with RPGCL; ▪ Coordinate field surveys, necessary additional studies to ensure that the line ToR's overall requirements of the projects. ▪ Coordinate to review all reports, drawings and plans prepared for RPGCL until finalization; ▪ Prepare or lead the team to prepare all the reports as listed in the reporting requirements; ▪ Prepare or lead the team to prepare tower spotting tower scheduling project designs, documentation, bill of quantities and cost estimates; including but not limited to the technical specifications, performance specifications, and drawings; and submit report with incorporation of the comments by RPGCL on draft report and finalize the draft documents until approved by RPGCL. ▪ Monitoring project progress against proposed work plan, report on progress, and propose remedial measures as necessary; ▪ Conduct other duties as reasonably requested by RPGCL. ▪ The team leader is responsible to; with support from other key and non-key experts'; complete assignment as demanded by this consulting works;
B. *Electrical Engineer (Transmission)*	
Qualification/ Experience	▪ Bachelor's Degree in Electrical engineering ▪ At least 7 years of experience in infrastructure projects. ▪ At least 3 years of experience in transmission line of 132 kV or above voltage level transmission line projects.
Responsibility	▪ Provide inputs and advice to the project team on transmission line related technical matters, preparation of bill of quantities and cost estimates. ▪ Design of transmission line technical parameters, conductor configuration, insulators, tower footing resistance, and tower types, taking account of RPGCL's requirements as prevailing code of conduct and Nepal specific conditions including wind velocity, terrain type and altitude. ▪ Assist in transmission line design technical contribution ▪ Provide support to the Team Leader in completing transmission line related assignments as demanded by this consulting works.

	▪ Other responsibilities assigned by the client.
C. Transmission Line engineer (Civil/Electrical)	
Qualification/ Experience	▪ Bachelor Degree in Civil / Electrical Engineering. ▪ At least 7 years of experience in infrastructure project. ▪ At least 5 years in design and construction of 132 kV or above voltage level transmission line projects including route alignment identification, detail survey and tower spotting using preferably PLS-CADD or relevant transmission line design software & calculation of sag template chart.
Responsibilities	▪ Support inputs and advice to the project team for transmission line related technical matters. ▪ To assist walkover survey, and alignment finalization. ▪ Employ state-of-art tools/software, such as PLS-CADD or other relevant transmission line design software, for the transmission line routing, profiling and tower spotting, with demarcation of tower spot in the site of actual construction. ▪ Prepare sag templates and curves in the scale of plan & profile drawings. The sag curves shall be for both Hot and Cold conditions with all other necessary details prescribed by international standards. ▪ Preparation of typical foundation design for bid purposed as per different soil type for different type of tower. ▪ Conduct Check survey after tower spotting in field and assure the sufficient location for foundation drawing for each location. ▪ Perform transmission line detail design, associated drawing, prepare bill of quantity and cost estimation. ▪ Provide support to the Team Leader in completing transmission line related assignments as demanded by this consulting works. ▪ Other responsibilities assigned by the client.
D. Survey Engineer /Geomatics engineer	
Qualification/ Experience	▪ Bachelor in Survey Engineering /Geomatics Engineering ▪ At least 7 years of professional experience in surveying in infrastructure project. ▪ At least 5 years in survey, design and construction of 132 kV or above voltage level transmission line projects in mountainous/hilly (Elevation greater than 1000 m) region using Airborne LiDAR technology and photogrammetry with detail design associated drawing, transmission line route selection, detail survey and tower spotting with associated substation in hill and mountains region/area.
Responsibilities	▪ Provide inputs and advice to the Team leader on transmission line survey and tower spotting related technical matters. ▪ Employ state-of-art tools/software, such as AutoCAD, PLS-CADD, GIS, Google Earth, Google Earth Engine and DGPS and LiDAR survey data processing for the transmission line routing, profiling and tower spotting, with demarcation of tower spot in the site of actual construction. ▪ Shall be responsible for the processing and finalization of DGPS, Photogrammetry, and LiDAR data, Ortho-mosaic, DSM and DTM/DEM. ▪ Verify the accuracy of survey data, including measurements and calculations conducted at survey sites and related reports. ▪ Processing and extraction of LiDAR survey output and feature code data extraction, digitization of data required for transmission line design, autocad drawing and other relevant task. ▪ Review and record the results of surveys, including the shape, contour, location, elevation, and dimensions of land or land features.

	▪ Extract the data from DEM/DSM as required from appropriate software. ▪ Conduct Check survey after tower spotting in field. ▪ Provide support to the Team Leader in completing structural engineering related assignments as demanded by this consulting works. ▪ Other responsibilities assigned by the client.
E. Geotechnical Engineer/Geologist	
Qualification/ Experience	▪ Master's Degree in Geotechnical Engineering or engineering geology. ▪ At least 7 years of experience in infrastructure project. ▪ At least 5 years of experience in surface geological investigation and soil investigation for the design of tower foundations of 132 kV or above voltage level transmission line project.
Responsibility	• Make necessary inputs and advice to RPGCL on transmission line on geotechnical matters. • Perform walkover field survey and identified soil and rock standard in tabular format of each angle point and substation major structure as per standard. • Contribute to the preparation of project designs, documentation. • Perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment. • Submit Surface geological map (Soil and Rock identification) and report with incorporation of suggestions from approving agencies. • Provide support to the Team Leader in completing geological/geotechnical related assignments as demanded by this consulting works. • Other responsibilities assigned by the client.
F. Engineer	
Qualification/ Experience	▪ Bachelor degree in Civil Engineering / Geomatics Engineering ▪ At least 5 years of experience in infrastructure project. ▪ At least 3-year experience in walkover survey, monumentation and detail survey and tower spotting and scheduling of 132 kV or above voltage level transmission line projects in mountainous/hilly (Elevation greater than 1000 m) region using Airborne LiDAR drone-based technology and photogrammetry with detail survey drawing, plan and profile preparation.
Responsibilities	▪ Provide inputs and advice to the Team leader and to RPGCL on transmission line walkover, monumentation, Detail survey, tower spotting and scheduling related technical matters. ▪ Should have experience of LiDAR survey in transmission line project. ▪ Should operate LiDAR based drone in hilly and mountainous terrain with achievement of accuracy in horizontal and vertical positioning survey. ▪ Processing and extraction of LiDAR survey output and feature code data extraction, digitization of data required for transmission line design, autocad drawing and other relevant task. ▪ Employ state-of-art tools/software, such as AutoCAD, PLSCAD, GIS, Google Earth, Google Earth Engine and DGPS processing for the transmission line routing, profiling and tower spotting, with demarcation of tower spot in the site of actual construction. ▪ Verify the accuracy of survey data, including measurements and calculations conducted at survey sites and related reports to Team Leader and RPGCL. ▪ Review and record the results of surveys, including the shape, contour, location, elevation, and dimensions of land or land features.

	▪ Extract the data from DEM/DSM and Ortho-mosaic as required from appropriate software. ▪ Conduct and perform LiDAR data accuracy, error adjustment, and removal of data noise, check overlap and remove gaps and voids during data acquisition as well as final deliverables submission with associated report. ▪ Provide support to the Team Leader in completing geotechnical related assignments as demanded by this consulting works. ▪ Other responsibilities assigned by the client.
Non- Key Experts	
G. Diploma in Geomatics Engineering /Surveyor	
Qualification/ Experience	▪ Diploma in Geomatics Engineering ▪ At least 3 years of experience in infrastructure projects. ▪ At least 1 project in design and project preparation of 132 kV or above voltage level transmission line projects. Experience shall include route definition; walk over survey, selection of best route, detail survey and tower spotting.
Responsibility	▪ The knowledge on Auto CAD or similar software is highly preferred. ▪ Provide inputs and advice to the project team and to RPGCL on transmission line related technical matters. ▪ Perform monumentation, GPS and DGPS survey in transmission line survey and D-card preparation. ▪ Perform coordinate transformation WGS and MUTM as per project requirement. ▪ Preparation of plan and profile of the transmission line route using relevant software. ▪ Employ state-of-art tools for the transmission line routing, profiling and tower spotting, with demarcation of tower spot in the site of actual construction. ▪ Assist team on final deliverables associated drawing and report preparation ▪ Provide support to the Team Leader in completing transmission line related assignments as demanded by this consulting works. ▪ Other responsibilities assigned by the client.
H. Diploma in Civil Engineer	
Qualification/ Experience	▪ Diploma in Civil Engineering ▪ At least 3 years of experience in infrastructure projects. ▪ At least 1 project in design and project preparation of 132 kV or above voltage level transmission line projects. Experience shall include route definition, detail survey and tower spotting.
Responsibility	▪ Provide inputs and advice to the project team and to RPGCL on transmission line related technical matters. ▪ Drafting the civil drawing related to TL on Auto CAD, PLS-CADD or similar software. ▪ Perform draft man in the preparation of associated drawings and report as a draft person and assist in the team. ▪ Assist in the preparation of BoQ with associated with tower spotting and scheduling drawings related to the project. ▪ Provide support to the Team Leader in completing transmission line related assignments as demanded by this consulting works. ▪ Other responsibilities assigned by the client.

7. Reporting Requirements

The Consultant shall prepare the various reports and maintain records documenting decisions made at meetings, progress on project preparation, financial records and changes to the contract plans. The reporting shall, in general, comprise of the following:

i. Design basis memorandum
ii. For walkover survey, surface geotechnical and detail survey of the transmission line alignment, RPGCL representatives must be present for the study in joint team.
iii. Route alignment survey report with all the alternatives alignments (at least three) for approval from RPGCL to carry out the detailed survey.
iv. Report on detail survey of the transmission lines with incorporation of suggestions from approving agencies.
v. Report on Soil / Rock type as surface geology as per standard and guidelines.
vi. Report on line routing, tower spotting plans, and survey information using PLS- CADD or any applicable software with demarcation of tower spot in the field of actual construction.
vii. Report on definition of transmission line design technical parameters, conductor configurations, insulator and special tower types, taking account of RPGCL's requirements and Nepal-specific conditions including wind velocity, terrain type and altitude.
viii. Report on technical specifications, performance specifications, schedules and drawings for bidding of the project
ix. Report on design of transmission lines.
x. Prepared Estimate and bill of quantities of the transmission line in close coordination with RPGCL.
xi. Report on detail cost estimate.
xii. Other reports in accordance with the detailed task of the Consultant.

All documents and reports would be made available on hard copy as well as electronic format. (4 TB Hard drive) Electronic submission/reports shall be in the original file format. Consultant must submit Design Drawings/Construction Drawings in editable format. All reports will be in English language.

8. Milestones

Consulting Firm will be paid upon completion of the Milestones. Details of the Milestones and Mode of payment are described below.

Milestone 1: Approval of Desk Study Report - 10% (T+ 15 days) T = Contract Effective Date

The Consultant shall submit inception report no later than 15 days of the Contract effective date.

Inception report — detailed work plan, resource deployment timetable, team mobilisation schedule (3 hard copies + soft)

Desk study report — review of existing topographic maps (1:25,000 / 1:50,000), satellite imagery, DEM data (SRTM/ASTER/ALOS), geological/seismic/hydrogeological data, existing T/L and substation data, infrastructure databases; consideration of Mugu Karnali 1902 MW and Phukot Karnali 480 MW HFL/crest levels

Three alternative route plan maps — GIS/KML format overlaid on topographic base map; each route mapped with angle point UTM/MUTM coordinates, elevations, spans, deviation angles, land cover, crossings, protected zones, rivers, settlements, roads; comparative chart with recommended route

Design Base Memorandum (DBM) — design criteria per IEEE 1724 / IEC 60826 / ASTM / BS; loading zone definitions; weather/climate data sources; conductor and tower type selection rationale; RoW (46m for 400 kV); coordinate systems (WGS 84 + MUTM Everest 1830) — must be approved by Client before design commences

Submittal protocol — all planned submittals listed with content, dates, copy numbers and review periods; submitted to Client; minimum 20-day review period built in for each submittal

Milestone 2: Walk Over, Surface Geological, Mon mentation, DGPS and Detail Survey of Transmission Lines- 30%

Walkover survey report all 3 routes

Physical walkover of three routes — terrain/topography assessment, river and infrastructure crossings (widths, bank conditions, flood marks), environmental/social features (forest types, settlement density, cultural sites, agricultural land), accessibility and logistics (existing roads, trails, camp sites, quarry materials, water sources)

Recommended best route (T1) with complete comparative chart — technical, geological, environmental, social factors; overlaid on topographic map (3 hard copies + soft); KML data for all three routes

RoW plan — 125 m each side of T1 alignment; plan and profile drawings of each route alignment

Geological and geotechnical study report

Regional and local geology — lithology at each angle point in tabular format (ISRM + USCS classification); geological structures (faults, folds, thrusts); rock/joint orientations; depositional characteristics

Foundation type classification for each angle point as per — Normal Dry, Sandy Dry, Wet, Wet Cultivated, Partially Submerged, Fully Submerged, Black Cotton Soil, Fissured Rock, Hard Rock; per RPGCL guidelines and CBIP manual in Table Format.

Geo-hazard inventory — landslides, rockfall, subsidence, slope instability; hydrogeological observations; seismicity (max PGA, past earthquake records); weathering and erosion near angle points; geomorphological setting of each angle point

Surface geological map (soil/rock identification); photographic documentation with captions for each angle point

DGPS survey, monumentation and D-Cards (T1 route)

Control survey — new control points connected to existing trig points at 3–5 km intervals; base point observation ≥24 hours; other points ≥3 hours; dual-frequency GNSS instruments (accuracy better than 5 mm ± 1 ppm); DGPS processing report with RMSE accuracy assessment

Final angle point data in UTM and MUTM — AP identification, coordinates, elevations, spans, deviation angles, crossing details, soil type, administrative boundaries, land use, forest type; KML format with complete attributes

D-Cards for each angle point — photograph, location details, XYZ coordinates (MUTM + UTM), landowner name where available, permanent landmark references; DGPS data in RINEX format; GPS observation log sheets (PDF + Excel)

Permanent monuments (10 cm × 10 cm × 45 cm concrete) at each angle point per Monumentation M15; GNSS spec sheet approved by Client before monumentation survey

LiDAR survey — raw data and processing report (within 20 of days data acquisition flight completion)

Camera and LiDAR specification approved by Client 15 days before field survey; flight plan approved; permissions from CAAN, Department of Survey, Ministry of Defence/Nepal Army, Ministry of Forest and Environment, Ministry of Home Affairs.

LiDAR acquisition — 250 m corridor (125 m each side of alignment); ≥4 pts/m² RGB coloured point cloud; 100 m buffer around each substation; GNSS base stations at 3–5 km intervals; calibration reports; flight mission report; GNSS check control point field report

Aerial photography — GSD ≤15 cm (≥50 MP camera); forward overlap ≥60%; side lap ≥40%

Processed data — georeferenced LAS/LAZ point cloud (ground and non-ground classified); DSM and DTM at ≤0.5 m resolution; 0.15 m intensity mosaic; orthophoto mosaic at 15 cm GSD in GeoTIFF tiles; data processed inside Nepal in presence of Client; accuracy report (vertical RMSE ≤±15 cm, horizontal ≤±10 cm); metadata per ISO standard

Base maps, GIS data and profile drawings

Strip plan maps at 1:1000–1:2000 (250 m corridor); longitudinal profile at 1:200 or 1:400 showing ground undulation, spans, angle points, clearances; plan and profile drawings in AutoCAD or relevant software PLS-CADD; contour interval 0.5 m minor / 2.5 m major; 3 printed copies

GIS maps — final route in .shp, .kmz, .kml overlaid on topographic base; crossing/obstruction inventory (rivers, roads, T/L, buildings, forest) in GIS database and Excel

Feature code data Excel sheet per Table 4 (30 feature codes: GRD, RD, TRK, WTR, BNK, SLP, RCK, VTL, VSM, VGP, VCL, TWR, TWF, TLN, OPG, SUB, UTL, BLD, FNC, BRG, WAL, ROW, OBS, CRS_RD, CRS_WT, HGR, GCP, CHK, REF, AP and SP)

Coordinate Excel sheet — tower coordinates (UTM/MUTM), elevation, span length, angles, tower type; all deliverables in ESRI Shapefile, KMZ, GeoTIFF, LAS/LAZ, DWG , DXF on 4 TB hard drive

Tower spotting and sag-tension (integral to MS-2 scope)

Route alignment plans and profiles in Auto CAD or similar software PLS-CAD is highly preferred.; optimised tower locations; sag-tension calculations; sag template at plan/profile scale; sag curves for hot and cold conditions per international standards; wind and weight span verified at each location in field with RPGCL representative

Tower demarcation at actual construction locations with DGPS coordinates; substation location surveys (Humla 400/132 kV and Phukot bay extension)

Consultant must submit Draft final consolidate report before 20 days of final submittal.

Report on line routing and tower spotting — submitted and approved (3 hard copies + soft)

The Consultant shall submit all final consolidate reports within 15 days of completion of assignment and the submittals shall be scheduled accordingly in the submittal protocol.

Milestone 3: Design of Transmission Lines-25 %

Design criteria and design manual

Design Base Memorandum (DBM) — already approved at MS-1; detailed design manual per IEEE 1724 as primary standard; IEC 60826, ASTM, BS, CSA, VDE, IS for specific components; climate/weather data collection and analysis including isokeraunic data; loading zone determination for terrain with varying elevation and climate

Design parameters and criteria — conductor configuration, insulator types, wind velocity zones, altitude corrections, Nepal-specific conditions; full documentation, studies, design simulations supporting each parameter selection.

Profiling and tower scheduling in PLS-CADD or relevant software — normal and weight spans, minimum weight span for tangent tower, maximum single spans per tower type, statutory clearances, insulator strings, sag curves (hot and cold conditions)

Check survey (field verification, with RPGCL representative present)

Check survey after tower spotting — wind and weight span verified at each tower location in the field; ground verification; sufficient foundation area confirmed; demarcation of intermediate tower spots at actual construction locations

Consultant must submit Draft final consolidate report before 20 days of final submittal.

Final consolidated design report (3 hard copies + soft)

Complete design report — project description, salient features, all design input parameters for 400 kV D/C T/L; tower spotting/scheduling data from PLS-CADD; typical foundation design for bid purpose design criteria incorporation; sag tension chart; plan and profile with tower schedule at obligatory crossings; technical specifications and drawings for all components

The Consultant shall submit final consolidate reports within 15 days of completion of assignment and the submittals shall be scheduled accordingly in the submittal protocol.

Milestone 4: Preparation of BoQ of Transmission Line - 20%

Submission and approval of Report on cost estimation of the subprojects.

Other reports (if any) in accordance with the detailed task but not covered above.

Draft BoQ and cost estimate — prepared in close coordination with RPGCL; Bill of Material template for 400 kV towers from Client used as base; itemized under:

a. Refer existing reference for relevant task, in Nepal.
b. Typical foundation design quantities.
c. Construction and Installation services

Final BoQ covering — civil works steel lattice towers (all types); conductors; shield wires and OPGW; insulators (disc, composite, string assemblies); line hardware and accessories; dampers.as per Schedules which are divided into separate schedules as follows:

Schedule No. 1: Provisional Sum

Schedule No. 2: General Items

Schedule No. 3: Design Services

Schedule No. 4: Construction Items

Schedule No. 5: Installation and Other Services

Schedule No. 6: Operation & Maintenance (if any)

Schedule No. ..: (specify if any other schedule)

Schedule No. ..: Grand Summary (Schedule Nos. 1 to 6 or relevant number)

Rate analysis — major assumptions and item-wise narrative; recent market rates for each component with source references; value analysis basis for quantities and rates; necessary tools and equipment analyzed.

Consultant must submit Draft final consolidate report before 20 days of final submittal.

Any other reports in accordance with detailed task not covered in previous milestones

The Consultant shall submit all reports related within 15 days of completion of task and the submittals shall be scheduled accordingly in the submittal protocol.

Milestone 5: Preparation Cost Estimates of Transmission line project-15%

- Refer existing reference for relevant task, in Nepal.
- Reference price level of estimates
- Currency and exchange rates with referenced period
- Level of contingencies
- Level of inventories of materials and spares
- Scaling factors used for major equipment/items
- Status of engineering and design at time of estimate
- Rates and quantities on basis of value analysis
- Insurance, transportation, customs duty and taxes

Consultant must submit Draft final consolidate report before 15 days of final submittal.

Final Consolidate and Milestone based project report — all editable electronic files and hard copy with official stamp (DWG, DXF, .PLSCADD XYZ, .PLSCADD.XYZ.bak, KMZ/KML, XLS, CSV, DOC, SHP, MPK, LAS, TIF, and JPEG); 4 TB hard drive with all data and reports; all reports in English. The Consultant shall submit all reports related to the submittals shall be scheduled accordingly in the submittal protocol.

9. Payment Tables and Report Submittal Protocol

Table 11 final submittal and payment protocol

S.N.	Approval of Reports	Milestone	Payment %
1	Desk study Report (T+15 Days) T= Contract Effective Date	Milestone 1	10%
2	Final Consolidate report on Walk Over, Surface Geological, Mon mentation, DGPS and Detail Survey of Transmission Line. (T+195 Days)	Milestone 2	30%
3	Final Consolidate Design Report of Transmission line. (T+270 Days)	Milestone 3	25%
4	Final Consolidate BoQ Report of Transmission Line. (T+330 Days)	Milestone 4	20%
5	Final Consolidate report of Cost Estimates of Transmission Line. (T+410 Days)	Milestone 5	15%
	Total		100 %

10. Counterpart Support and Inputs Provided by RPGCL

RPGCL: RPGCL shall work in close collaboration with the consultant's team and be fully involved in all aspects of the consulting services. Both RPGCL and Consultant's teams shall work together as one single team in all matters related to the Project.

Administrative support for Consultant Team: If required by local regulations, RPGCL will provide Consultant with necessary support letters for obtaining permits for its experts. The cost and timing of obtaining the above is entirely the responsibility of the Consultant.

11. Other Terms and Conditions

i. The Consultant has to make all arrangements to provide necessary accommodation / shelter to all its employees at their own cost.
ii. The Consultant must possess required instruments/ devices for survey.
iii. The Consultant shall be responsible to take all precautions to ensure safety of the public and his own personnel. Further, you will also be required to take and maintain all relevant insurances at your own cost.
iv. The Consultant shall not employ any labour below 18 years.
v. If any dispute arises on the interpretation of the order or execution of work, RPGCL will be sole arbitrator and his decision will be final and binding on both the parties.

12. Acceptance of Proposal

RPGCL reserves all rights to approve or disapprove any proposal without giving any reasons whatsoever.

D. Evaluation of Consultant’s EOI Application

Evaluation of Consultant's EOI Application

Consultant's EOI application which meets the eligibility criteria will be ranked on the basis of the Ranking Criteria.

i) Eligibility & Completeness Test

Sl. No.	Criteria Title	Compliance
1	Corporate Registration	
2	Tax Clearance/Tax Return Submission FY 2081/82	
3	VAT/PAN Registration	
4	EOI Form 1: Letter of Application	
5	EOI Form 2: Application Information Form	
6	EOI Form 3: Experience (3(A) and 3(B))	
7	EOI Form 4: Capacity	
8	EOI Form 5: Qualification of Key Experts	
9	In case of a natural person or firm/institution/company which is already declared blacklisted and ineligible by the GoN, any other new or existing firm/institution/company owned partially or fully by such Natural person or Owner or Board of director of blacklisted firm/institution/company; shall not be eligible consultant.	
10	If the corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution /company or any partner of JV, such Natural Person or Board of Director of the firm/institution /company or any partner of JV shall not be eligible to participate in procurement process till the concerned Court has not issued the decision of clearance against the Corruption Charges.	

ii) EOI Evaluation Criteria

A. Qualification

Sl. No.	Criteria	Minimum Requirement
1	Team Leader - Qualification	Bachelor in Civil/Electrical / Geomatics Engineering.
2	Team Leader - Key Experience	General experience: Above10 years of experience in infrastructure projects and specific experience at least 5 years in detail design report, associated drawing document finalization, bill of quantities, and cost estimate finalization or construction of 132 kV or above voltage level transmission line projects.
3	Electrical Engineer (Transmission) - Qualification	Bachelor's Degree in Electrical engineering
4	Electrical Engineer (Transmission) -Key Experience	General experience: At least 7 years of experience in infrastructure projects and specific experience at least 3 years of 132 kV or above voltage level transmission line projects.
5	Transmission Line Engineer- Qualification	Bachelor Degree in Civil / Electrical Engineering.
6	Transmission Line Engineer - Key Experience	General experience: At least 7 years of experience in infrastructure projects and at least 5 years specific experience in route alignment identification, detail survey, tower spotting using preferably PLS-CADD or relevant transmission line design software & calculation of sag template chart in 132 kV or above voltage level transmission line projects.
7	Survey Engineer - Qualification	Bachelor in Survey Engineering /Geomatics Engineering
8	Survey Engineer - Key Experience	General experience: At least 7 years of experience in infrastructure projects and at least 5 years specific experience in survey, design and construction of 132 kV or above voltage

Sl. No.	Criteria	Minimum Requirement
		level transmission line projects in mountainous/hilly (Elevation greater than 1000 m) region using Airborne LiDAR technology and photogrammetry with detail design associated drawing, transmission line route selection, detail survey ,tower spotting in hill and mountains region/area.
9	Geotechnical Engineer - Qualification	Master in Geotechnical Engineering or engineering geology
10	Geotechnical Engineer - Key Experience	General experience: At least 7 years of experience in infrastructure projects and at least 5 years specific experience in 132 kV or above voltage level transmission line project.
11	Engineer - Qualification	Bachelor degree in Civil Engineering / Geomatics Engineering
12	Engineer - Key Experience	General experience: At least 5 years of experience in infrastructure projects and at least 3 years specific experience in walkover survey, monumentation, detail survey , tower spotting and scheduling of 132 kV or above voltage level transmission line projects in mountainous/hilly (Elevation greater than 1000 m) region using Airborne LiDAR drone-based technology and photogrammetry with detail survey drawing, plan and profile preparation.

Score: 48.0

B. Experience

Sl. No.	Criteria	Minimum Requirement
1	General Experience of consulting firm	At least 7 years of general experience in infrastructure project.
2	Specific experience of consulting firm within last 7 years for different numbers of projects completed.	At least 2 No. of projects consulting services had completed in detail design report, associated drawing document finalization, bill of quantities, and cost estimate finalization or construction of 132 kV or above voltage level transmission line projects.
3	Similar Geographical experience of consulting firm	At least 1 No. of projects consulting services of transmission line project detail design report, associated drawing document finalization, bill of quantities, and cost estimate finalization had completed for mountainous/hilly region (Elevation greater than 1000 m).

Score: 40.0

C. Capacity

Sl. No.	Criteria	Minimum Requirement
1	Financial Capacity	NRS 2,60,00,000 Average Annual Turnover of Best of 3 Fiscal Year Of Last 7 Fiscal Years
2	Equipment related to the proposed assignment.	Company has own Drone.

Score: 12.0

Minimum score to pass the EOI is: 65

Note : If the corruption case is being filed to Court against the Natural Person or Board of Director of the firm/institution /company or any partner of JV, such Natural Person or Board of Director of the firm/institution /company or any partner of JV such consultant's proposal shall be excluded during the evaluation.

E. EOI Forms & Formats

E. EOI Forms & Formats

Form 1. Letter of Application

Form 2. Applicant’s information

Form 3.Experience *(General, Specific and Geographical)*

Form 4. Capacity

Form 5. Qualification of Key Experts

1. Letter of Application

(Letterhead paper of the Applicant or partner responsible for a joint venture, including full postal address, telephone no., fax and email address)

Date: .....

To,

Full Name of Client: _____

Full Address of Client: _____

Telephone No.: _____

Fax No.: _____

Email Address: _____

Sir/Madam,

1. Being duly authorized to represent and act on behalf of (hereinafter "the Applicant"), and having reviewed and fully understood all the short-listing information provided, the undersigned hereby apply to be short-listed by ***[Insert name** of Client)* as Consultant for ***{Insert brief description** of Work/Services}.*

2. Attached to this letter are photocopies of original documents defining:

    a) the Applicant's legal status;

    b) the principal place of business;

3. ***[Insert name of Client]*** and its authorized representatives are hereby authorized to verify the statements, documents, and information submitted in connection with this application. This Letter of Application will also serve as authorization to any individual or authorized representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by yourselves to verify statements and information provided in this application, or with regard to the resources, experience, and competence of the Applicant.

4. ***[Insert name** of Client)* and its authorized representatives are authorized to contact any of the signatories to this letter for any further information.[1]

5. All further communication concerning this Application should be addressed to the following person,

    [Person]

    [Company]

    [Address]

    [Phone, Fax, Email]

6. We declare that, we have no conflict of interest in the proposed procurement proceedings and we have not been punished for an offense relating to the concerned profession or

[1] Applications by joint ventures should provide on a separate sheet, relevant information for each party to the Application.

business and our Company/firm has not been declared ineligible.

7. We further confirm that, if any of our experts is engaged to prepare the TOR for any ensuing assignment resulting from our work product under this assignment, our firm, JV member or sub-consultant, and the expert(s) will be disqualified from short-listing and participation in the assignment.

8. The undersigned declares that the statements made and the information provided in the duly completed application are complete, true and correct in every detail.

Signed **:**

Name **:**

For and on behalf of (name of Applicant or partner of a joint venture):

2. Applicant's Information Form

(In case of joint venture of two or more firms to be filled separately for each constituent member)

1. Name of Firm/Company:

2. Type of Constitution (*Partnership/ Pvt. Ltd/Public Ltd/ Public Sector/ NGO)*

3. Date of Registration / Commencement of Business *(Please specify):*

4. Country of Registration:

5. Registered Office/Place of Business:

6. Telephone No; Fax No; E-Mail Address

7. Name of Authorized Contact Person / Designation/ Address/Telephone:

8. Name of Authorized Local Agent /Address/Telephone:

9. Consultant's Organization:

10. Total number of staff:

11. Number of regular professional staff:

(Provide Company Profile with description of the background and organization of the Consultant and, if applicable, for each joint venture partner for this assignment.)

3. Experience

3(A). General Work Experience

(Details of assignments undertaken. Each consultant or member of a JV must fill in this form.)

S. N.	Name of assignment	Location	Value of Contract	Year Completed	Client	Description of work carried *out*
1.						
2.						
3.						
4.						
5.						
6.						
7.						

3(B). Specific Experience

Details of similar assignments undertaken in the previous seven years
(In case of joint venture of two or more firms to be filled separately for each constituent member)

Assignment name:	Approx. value of the contract (in current NRs; US$ or Euro)[2]:
Country: Location within country:	Duration of assignment (months):
Name of Client:	Total No. of person-months of the assignment:
Address:	Approx. value of the services provided by your firm under the contract (in current NRs; US$ or Euro):
Start date (month/year): Completion date (month/year):	No. of professional person-months provided by the joint venture partners or the Sub-Consultants:
Name of joint venture partner or sub-Consultants, if any:	Narrative description of Project:
Description of actual services provided in the assignment: **Note: Provide highlight on similar services provided by the consultant as required by the EOI assignment.**	

Firm's Name: _____

[2] Consultant should state value in the currency as mentioned in the contract

3(C). Geographic Experience

Experience of working in similar geographic region or country

(In case of joint venture of two or more firms to be filled separately for each constituent member)

No	***Name of the Project***	***Location (Country/ Region)***	***Execution Year and Duration***
1.			
2.			
3.			
4.			
5.			
6.			
7.			

4. Capacity

4(A). Financial Capacity

(In case of joint venture of two or more firms to be filled separately for each constituent member)

Annual Turnover	
Year	**Amount Currency**

- **Average Annual Turnover**

(Note: Supporting documents for Average Turnover should be submitted for the above.)

4(B). Infrastructure/equipment related to the proposed assignment[3]

No	Infrastructure/equipment Required	Requirements Description
1.		
2.		
3.		
4.		
5.		

[3] *Delete this table if infrastructure/equipment for the proposed assignment is not required.*

5. Key Experts *(Include details of Key Experts only)*

(In case of joint venture of two or more firms to be filled separately for each constituent member)

SN	Name	Position	Highest Qualification	Work Experience (in year)	Specific Work Experience (in year)	Nationality
1						
2						
3						
4						
5						

(Please insert more rows as necessary)