LIDAR MAPPING AND AERIAL PHOTOGRAPHY FOR THE PROPOSED LIMBANG 2 TO LAWAS TOWN TRANSMISSION LINE PROJECT

RFP DOCUMENTS: SARAWAK ENERGY REF. NO. [PLS140131/LAWASTL/LIDAR/2016]

PART I – RFP PROCEDURES

SECTION 1 – INTRODUCTION

This Introduction should be read in conjunction with Proposal Appendix A [Scope of Services / Specifications] set out in Part II, Section 2 of the RFP Documents.
SCOPE OF SERVICES / SPECIFICATIONS

Background
A feasibility study for the Proposed Limbang 2 to Lawas Town Transmission Line Project is being conducted. Details are illustrated in the attached map.

These proposed routes have been identified through the determination of the potential angle towers from 1:50,000 topographical maps and further verified using IFSAR data.

A LiDAR consultant is required to undertake a LiDAR survey along the proposed transmission route. The Consultant is invited to submit a proposal with quotation for undertaking LiDAR contour mapping and aerial photography of the proposed transmission line route.

SPECIFICATION FOR LiDAR SURVEY

1. Scope
The scope of Services under this Contract shall include:
   a. Undertake LiDAR survey of the proposed transmission line route with 500 metres width with proposed line route being the centre line as defined in the tender documents.
   b. Acquisition of simultaneous digital aerial imagery covering the total extent of each Project Route.
   c. All required data and imagery processing, handling, mapping and printing to prepare and deliver the Deliverables.

The proposed transmission line route is shown in the attached drawing (Part 1 – RFP Procedures, Section 1A – Proposed Line Route).

As part of this Contract, the Consultant shall be responsible for:
   a. Providing all necessary materials and equipment, supervisory, professional and technical services personnel required to manage, survey, document and process all data inclusive of mapping, scanning, printing and digital imaging.
   b. Organising and providing the required flight services.
   c. Planning for all flight schedules to suit the weather condition and to ensure clear imagery.
   d. Obtaining all necessary flight planning and permit approvals.
   e. Standby due to bad weather, adherence to local custom, helicopter and LiDAR system maintenance or replacement, re-acquisition of missing data and additional flights to close out contours.
f. The Consultant is responsible to acquire helicopter/fixed wing landing ground at their base station(s).

g. Preparing, updating and/or revising project baseline schedule, in MS project 2003 and excel 2003 format, describing relevant detail such as key project milestone dates, allocation of resources and duration to complete each task or sub-task.

h. Preparing a weekly (due Friday every week 4pm) and monthly progress report (due 26th of every month 4pm), which shall include but not limited to the following:
   i. Outline planned works for the following week / month
   ii. Weather record and flight log for the current month / week

2. Methodology

The Consultant shall provide in his proposal a detailed methodology covering all essential aspects of LiDAR data and aerial imagery acquisition, processing, handling and mapping to meet all SEB’s requirement in this tender documents, including a QA/QC plan. The Consultant should note that this requirement is one of the main criteria against which the Consultant’s proposal will be assessed.

The Consultant shall provide the deliverables with the following survey accuracies:

- The vertical accuracy shall be 0.15 metres or less in clear areas and 0.25 metres or less in dense vegetated area.
- The horizontal accuracy shall be 0.5 metres or less in clear areas and 1.0 metres or less in dense vegetated area.
- The average ground data point spacing (point density) shall not be more than 3 metres.

All data points shall be read and recorded to the nearest centimetre. The unit of measure for the service shall be metres.

The Consultant shall also specify the methodology for undertaking ground check survey to:

- Allow for the measurement and removal of any small systematic error between the LiDAR terrain model and the true ground heights.
- Provide independent checks on how well the aircraft trajectory computed to one base station agrees with adjoining base stations.
- Enable an assessment of the achieved accuracy of the acquired LiDAR terrain model.

3. Projection System and Datum

The projection system and datum of relevant deliverables for this project shall comply with Sarawak Land and Survey Department practice and requirement.
4. **Ground Check Survey**

Ground check survey shall be undertaken to the relevant ASPRS standard or equivalent. As a minimum, a ground check survey shall be undertaken every 20 to 30 kilometres. Ground reference data (if available) may be supplied by SEB upon award of the Contract. In addition to the on-site ground check survey, this additional ground data shall also be used to verify the LiDAR terrain model.

The LiDAR data should be tied to must be tied to the local ground reference points from Sarawak Land and Survey Department.

5. **Deliverables**

Upon completion of the survey, the Consultant shall submit to the Client the following:

a. Digital terrain model (DTM) of each Project Site consisting of the LiDAR ground strikes in LAS 1.2 format.

b. Digital surface model (DSM) of each Project Site consisting of all LiDAR non-ground strikes in LAS 1.2 format.

c. All ground check survey data supplied in an appropriate AutoCad format.

d. A digital copy of index plan, appropriately labelled, for each tile or reference point on separate AutoCAD layers for each DTM, DSM, orthophoto, contour and aerial imagery in appropriate AutoCAD format; hardcopy to be printed in A1 size to a scale to be agreed upon.

e. A digital copy of orthophoto mosaic (each tile 1kmx1km) in ECW format complete with geospatial reference covering the total extent of the Project Area.

f. A digital copy of seamless orthophoto in JPEG format covering the total extent of the Project Area.

g. One set of 30cmx30cm hardcopy digital 60% forward overlapping orthophotos in JPEG format at 1:25,000 scale covering the total extent of the Project Area. The orthophotos shall be suitable for stereoscopic viewing.

h. Clear, cloud-free aerial imagery data shall be collected and processed to produce seamless digital JPEG files at a resolution of better than 15cm pixel size, covering the total extent of the planimetric and topographic mapping with the integration of cadastral plan.

i. Digital planimetric and topographic mapping of each project site in two-dimensional (2D) vector files to include the following features on separate AutoCad layers:
i. Data collection limits.

ii. Buildings and structures.

iii. Roads, tracks and footpaths.

iv. Edges of vegetation.

v. Type of vegetation.

vi. Edges of water.

vii. All 5m contours (on individual layer).

viii. All 10m contours (on individual layer).

ix. All 20m contours (on individual layer).

x. All 100m contours (on individual layer).

xi. All 1m contours and other than those covered from (vii.) to (x.) (on individual layer).

Digital model shall be delivered in both individual tiles and combined tile, and each individual tile shall be limited to a file size of 200MB.

Hardcopy to be submitted in A1 size at 1:25,000 scale adopting contour interval agreed by the Client and shall include a drawing list and index map.

j. Contours of the transmission line route in a single file showing all 10m contours only in an appropriate AutoCad format and shall include only item h(i.) to h(vi.) on separate AutoCad layers and the contour lines shall be continuous.

k. A survey report detailing the findings and survey outcome.

l. All relevant data that shall be prepared in a format suitable for use in the PLS-CADD software.

Where relevant submissions of individual item as listed above to be delivered complete with a QA/QC checklist.

The Consultant shall submit all maps prepared and procured under the Services in hard and soft copies. All hardcopy deliverables to be submitted in three sets. All data obtained or produced during the Contract including calculations and intermediate productions shall be handed over to the Client upon completion of the Services.

Upon completion of LiDAR survey, the Consultant shall maintain all digital survey data for a period of 5 years for the purpose of any further processing, which may be required by SEB in the future. Such further processing is not included in the Services under this Contract.

6. Fees
The Consultant shall provide a quotation for undertaking the required Services covered under this Contract. **The proposed fee shall be broken down in accordance with the Price and Payment in Tender Appendix B – Price and Payment.**

7. **Timing**

It is required that the proposed LiDAR survey and associated data processing be completed within **eight (8) weeks** upon award of Contract. The deliverables for each part of the Services shall be delivered based on the priority specified by SEB.

8. **Quality Assurance and OHS Systems**

The Consultant shall demonstrate to SEB’s satisfaction that quality assurance and safety management systems are in place for the Services under the Contract within one week of receipt of the Letter of Award.

9. **Health and Safety**

The survey technologies and the methodologies implemented under the Contract shall not pose any unusual risks to either the Consultant or the Client. The Consultant shall be fully committed to ensuring the health and safety of all staff and stakeholders working on the project.

The Consultant shall be solely responsible for any injury or damage to life and property arising out of or caused by the execution of the Services and shall take out all necessary insurance covers to indemnify SEB against claims, losses or proceedings whatsoever arising out of such injury or damage.

10. **Other requirement**

The consultant should note that information provided by SEB might not be accurate. The consultant shall be required to exercise its professional skill and judgement as to the accuracy of such information provided. The consultant may inspect and examine the Site and its surroundings and shall satisfy himself before submitting his quotation as to the nature of the Site, the scope and nature of the Survey, Plan and materials necessary for the completion of the Survey, and in general shall himself obtain all necessary information as to the risks, contingencies and any other circumstances which may affect his quotation.
PLS-CADD TRAINING REQUIREMENTS

SEB would require training for the transmission line engineers on the usage of PLS-CADD software utilising the LiDAR data for tower design. **This provision for PLS-CADD Training is optional.**

The consultant is required to submit the proposed training programme (including time frame, topics to be covered etc.). Proposed fee shall be **in accordance with the Price and Payment in Tender Appendix B – Price and Payment** and should include mobilization cost for trainer, training guides or documentations and etc. which is required for the training programme.

Training requirements are as shown in the table below.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Up to Five (5) days</th>
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<tbody>
<tr>
<td>Venue</td>
<td>Menara Sarawak Energy, Kuching, Sarawak, Malaysia</td>
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<tr>
<td>Personnel</td>
<td>Up to eight (8) transmission line engineers</td>
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<tr>
<td>Topics</td>
<td>Training should include but not limited to:</td>
</tr>
<tr>
<td></td>
<td>• Import of LiDAR Data to PLS-CADD</td>
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<td></td>
<td>• Transmission Line Design Concepts</td>
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<tr>
<td></td>
<td>• Overview of PLS-CAD software</td>
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<td></td>
<td>• Introduction to modelling in PLS-CADD</td>
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<td></td>
<td>• Digital Terrain Modelling</td>
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<td>• Alignment and Profiles</td>
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<td>• Structure Modelling</td>
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<td>• Conductor Modelling</td>
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<td>• Design Criteria</td>
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<td>• Sag and Tension Calculations</td>
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<td>• Clearance Checks</td>
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<td>• Reports</td>
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<td>• Files, Backup, Restore and Support</td>
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<td></td>
<td>• Generation of Construction Documents</td>
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<td></td>
<td>• Etc.</td>
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PART I – RFP PROCEDURES

SECTION 1A – PROPOSED LINE ROUTE
Part I, Section 1 – Introduction
LIDAR MAPPING AND AERIAL PHOTOGRAPHY FOR THE PROPOSED LIMBANG 2 TO LAWAS TOWN TRANSMISSION LINE PROJECT

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PART I – RFP PROCEDURES

SECTION 2 – RFP PARTICULARS

These RFP Particulars specify matters particular to this RFP process and should be read in conjunction with the Instructions to Proponents set out in Part I, Section 3 of the RFP Documents.
<table>
<thead>
<tr>
<th>No.</th>
<th>Clause Reference</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Clause 1.1(c)</td>
<td>Closing Date and Time</td>
<td>3:00 pm on <strong>25th May 2016</strong></td>
</tr>
<tr>
<td>2.</td>
<td>Clause 1.1(h)</td>
<td>Eligibility Requirements</td>
<td>Bone fide</td>
</tr>
</tbody>
</table>
| 3.  | Clause 1.1(ee) and 9 | Sarawak Energy’s Representative | Mervyn Song  
Manager, Project Development & Contracts  
T: 082 388 388 Ext: 8718  
F: 082 482 353  
E: MervynSong@sarawakenergy.com.my |
| 4.  | Clause 1.1(w)   | Proposal Validity Period | The period commencing from the Closing Date and Time and expiring on the date falling one hundred and eighty (180) days from the Closing Date and Time |
| 5.  | Clause 25.1     | Pricing Method | Rates reimbursable in accordance with the matters set out in the Pricing Appendix |
| 6.  | Clause 32.1     | Copies of Proposal | The Proponents shall prepare and submit:  
(a) one (1) original version;  
(b) one (1) soft copy versions (in separate CD-ROMS, or such other electronic format as may be acceptable to Sarawak Energy), of its Proposal |
<table>
<thead>
<tr>
<th>Clause 32.1(b) and Clause 33.1</th>
<th>Address for submission of Proposals</th>
<th>Delivery by hand or by courier to:</th>
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</thead>
<tbody>
<tr>
<td>Officer-In-Charge:</td>
<td></td>
<td>Request for Proposal: LiDAR Mapping and Aerial Photography for the Proposed Limbang 2 to Lawas Town Transmission Line Project (PLS140131/LAWASTL/LIDAR/2016)</td>
</tr>
<tr>
<td>Level 1 (Ground Floor), North Wing, Tender Box, Governance for Procurement and Policies Division, Ground Governance for Procurements and Contracts Department, Menara Sarawak Energy, No. 1, The Isthmus, 93050, Kuching Sarawak Malaysia</td>
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<td></td>
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