०७५-५२०१०९,५२०८९३,५२०९०९,५२०१२९
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# तानसेन नगरपालिका
## नगर कार्यपालिकाको कार्यालय
लुम्बिनी प्रदेश, नेपाल

तानसेन ,पाल्पा

प.स. ०८३।०८४

मिति : २०८३/०४/११

च.न. ६६२

श्री परामर्शदाता सबै ,

बिषयः आर्थिक प्रस्ताव पेश गर्ने सम्बन्धमा |

प्रस्तुत विषयमा यस तानसेन नगरपालिका योजना अन्तर्गत तानसेन -०६ टुडिखेल र तानसेन -०२ ,मेहलधारा जोड्ने झो.पू : **(Detailed Engineering Survey, Design, Drawing and Cost Estimate of Long Span Trail Bridge (LSTB) along with the Landscape Beautification )** तयार गर्नका लागि संलग्न कार्य क्षेत्रगत शर्त (Terms of Reference) र स्वीकृत Standard Norms अनुसार उल्लेखित परामर्श सेवा खरिदका लागि रु २९८८५७.४३ (रु. दुई लाख अन्ठानब्य हजार आठ सय सन्ताउन्न रुपैया त्रिचालिस पैसा VAT सहित ) लागत अनुमान(अधिकतम रकम) तयार भएको हनाले सार्वजनिक खरिद ऐन, २०६३(दोस्रो संसोधन, २०८३) को दफा ८ को उपदफा ११ बमोजिम इच्छुक परामर्शदाताले मिति २०८३/०४/१८ गते कार्यालय समयभित्र तपशिल बमोजिमका कागजात सहित आर्थिक प्रस्ताब पेश गर्नु हुन अनुरोध छ | TOR यसै पत्रसाथ संलग्न गरिएको छ |

तपशिल :

| क्र.स | आवश्यक कागजात | कै . |
|---|---|---|
| 1 | Request letter(financial) | Mandatory |
| १ | Company Registration | Mandatory |
| २ | Business Registration | Mandatory |
| 3 | PAN/VAT Document | Mandatory |
| 4 | Tax Clearance Document 2082/83(or Time Extention) | Mandatory |
| 5 | Experience Related Document( | At least one Experience on Detailed Engineering Survey, Design, Drawing and Cost Estimate of Long Span Trail Bridge - Mandatory |

चेत नाथ गिरी

प्रमुख प्रशासकीय अधिकृत

Tansen Municipality
Office of Municipal Executive
Lumbini Province
Tansen ,Palpa

# Terms of Reference (TOR)

Consulting Services

for

Detailed Engineering Survey, Design, Drawing and Cost Estimate

of

Long Span Trail Bridge (LSTB) along with the Landscape Beautification
Of
Tansen Municipality

चेतनाथ गिरी
प्रमुख प्रशासकीय अधिकृत

**Table of Contents**

# Terms of Reference

## 1. Introduction

Nepal is a landlocked country situated in the central part of the Himalayas in south east Asia. It has diverse geology and river system which are intricately linked, shaping not only the topography but also the lives of the people. The country's unique geological setting, with its dynamic geological processes, has led to a diverse array of rivers, valleys, and landforms. The study has revealed that Nepal has more than 6000 rivers with length about 45000 km which has enhance the beauty and energy potential in one hand and on other they have created huge hindrance in socioeconomic development of people and the country due to difficulty in easy connectivity. To overcome such difficulties Nepal has been developing trail bridges since last six decades. Trail bridges play a crucial role in the geography and society of Nepal, providing essential connectivity in a country with challenging terrain, remote villages, and diverse ecosystems.

Nepal is home to some of the most rugged terrains in the world, with steep mountains, deep river valleys, and numerous rivers. These geographical features make traditional road infrastructure difficult to develop, especially in rural and remote areas. Trail bridges are vital for connecting villages and facilitating the movement of people, goods, and services. Trail bridges also has helped people from remote villages access nearby hospitals, clinics, and schools. In Nepal, many rural areas rely on agriculture, trade, and tourism. Trail bridges facilitate the transport of goods, agricultural products, and marketable items, helping local economies thrive. Without trail bridges, communities would struggle to trade with neighboring towns, resulting in a lack of essential goods and resources. Nepal is a multi-ethnic and multi-lingual country. Trail bridges provide a platform for different communities to connect with each other, exchange cultural practices, and foster social integration. In remote regions, where transportation can be scarce, bridges promote a sense of unity and cooperation among neighboring settlements. Nepal is a popular destination for trekkers and tourists, especially in the Himalayas. Trail bridges are essential in trekking routes, providing safe crossings over rivers and gorges. Without these bridges, trekkers would face serious challenges in their journey, potentially deterring tourism. This industry contributes significantly to the national economy.

Trail bridges are not just infrastructure; they are lifelines in Nepal, supporting the physical, social, and economic well-being of remote communities. They are integral to reducing isolation, promotion development, and improving the quality of life in one of the most geographically diverse countries like our country Nepal.

## 2. Objectives of the Assignment

### 2.1 Objectives

The main objective of the project is to execute Detail Engineering Survey and Detail design of LSTB bridge in Tansen Municipality located at Tansen-06,tudikhel Connected to Tansen - 02,meheldhara,Palpa. Objective of this job is to design a safe, reliable and cost-effective bridge using the appropriate technology. The bridge is to be designed considering the availability of skilled manpower, construction material, condition of accessibility and other prevailing working conditions.

The specific objectives of this project for local inhabitants are as follows:

i. To provide safe crossing over river/stream throughout the year.
ii. To connect villages and facilitating the movement of people, goods, and services.
iii. To provide access to healthcare and education.
iv. To support local economy with easy transport of local goods, agricultural products to market.
v. To maintain cultural and social integrity and promote a sense of unity and cooperation among neighboring settlements.
vi. To promote tourism of bridge site location and neighboring villages

## 3. Scopes

To fulfill the above objective of the said job, the scope of work to be carried out is underlined as such:

- Review of existing study reports (if available), standards, specifications etc.
- Bridge site selection, keeping in mind the requirement expressed by the local people
- Choice of technically feasible alignment /axis in the area, keeping in mind the future vision of traffic and transportation net work
- Preparation of topographical maps of the project area, using latest techniques for precise transformation of site condition
- Hydrological, geotechnical and seismological studies, using several methods for selecting realistic results
- Site investigation with due consideration of all viable outcomes
- Detailed technical/economic feasibility study or alignment study or engineering design of bridge(s) whichever is applicable
- Preparation of architechtural drawings/working drawings/Electrical drawing of trail Bridge(lightining purpose) and landscape park in both side as per the requirement
- Preparation of cost estimates and Bill of quantities; etc.

**Desk study:**

Collection, Compilation, Computation and processing all the geological, hydrological, meteorological, hydro-geological, social and institutional data, using all available new means of computations, international data bank etc. The proposed and possible alternate site has to be clearly apprehended

based on the desk study of relevant documents, maps including aerial photographs giving due consideration of traditional crossing point, influence area of the bridge, geology and geomorphology of the site.

**Technical Feasibility study:**

A cost comparison of different types of bridge shall be made and discussed with the OFFICE before proceeding to bridge site for soil investigation. The work must be done in scheduled time. Sufficient time must be allocated for discussing with the Client for finalizing the bridge type and required investigation at site particularly. In this study the following points related to the river, its catchment area and all the considered bridge sites shall be studied in detail.

(i) Topography
(ii) Nature and structure of the surface soil
(iii) Nature and structure of local as well as regional geology
(iv) Approach to the bridge site and local peoples' views
(v) River morphology around the bridge axis
(vi) Other information as needed.

*Bridge Site Selection*

The exact site location and the bridge axis based on decision reached out of desk study and site investigation shall be fixed. Necessary field surveys and geological investigation of the bridge sites augmented by test pits shall be performed. Hydrological information regarding the nature of the river, HFL shall be gathered. The survey shall be carried out according to the "Survey Form and Checklist of LSTB Technical Manual, Vol. A: Design and Vol. B: Survey". The most suitable site for the bridge based on the above characteristics of the site as well as the catchment area shall be selected and all the characteristic features of the chosen bridge be clearly indicated in the map. Long term suitability of the site must be considered.

a) At the Site (For detail refer to "Survey Farm and Check List")

- Geology and geo-technical study with exploration pits for each structure. as per survey forms and designs guidelines;
- Topographical survey with fixing of reference point and bench marks;
- Local participation minute 'MUCHULCA' with contact person phone number, VDCs and DDC's recommendation & district rate; muchulka will include voluntarily land handover to the bridge site by the owner of the land, if applicable.
- Co-ordinate of bridge axis by GPS in D◦M'S" format.
- Photographs reflecting the bridge sites and other including followings:
  - overall slope conditions of right bank of all alternative bridge sites;
  - overall slope conditions of left bank of all alternative bridge sites;
  - both banks view from upstream;
  - both banks view from downstream;

- view towards upstream of the proposed site with both banks visible; view towards downstream of the proposed site with both banks visible; overall view of all bridge sites;
- view of probable anchorage locations of the optimum bridge site (close up views);
- instability features, if any;
- any other photograph which might be of interest.

If one photo graph cannot cover the complete features, use mosaic photographs will take to cover the complete feature. Each photograph will be properly described, presented and submitted with the main report. Electronic copy of all Photographs will be submitted together with the final reports.

- local Material and Transportation survey;
- Miscellaneous (Labour availability);
- Land requirement survey;
- River training Work
- Nearby Permanent crossing at U/S and D/S (distance & time required to reach from the proposed site)

b) In the Office

The official task will begin after receiving of field repot. Office work majorly incorporates following task:

- Interpretation and analysis of survey data;
- Plotting of contour line drawing and cross section (scale 1:200/1:400);
- Preparation of draft report and geological report including draft design.

*Topographical Survey*

The topographical survey of the area should cover a minimum distance of **300 m** upstream, **200 m**. downstream and **200 m** from the riverbanks on either side of the river at the proposed bridge site. The details point of critical locations must be taken. Many photographs have to be taken from different angles. Overall view of both banks, view towards up/down streams, close up views of critical situations shall be cached in the photographs.

**The Topographic map shall be provided following information:**

(i) Contours at 1(one) m. intervals in hilly area and at 0.25-0.5 m in plain area.
(ii) Flood lines on either sides of the river in the entire area surveyed.
(iii) Lines with spot levels along which the bed slope of the river is taken
(iv) Both banks of the river
(v) Lines along which cross section of the river is taken
(vi) Govt. and/or public establishments

(vii) Traverse lines, benchmarks reference lines and/or points with respect to which the present topo map is prepared.

(viii) The angle and direction of skew, if the bridge is proposed to be aligned skew.

(ix) The Names of the nearest identifiable villages/towns etc. in either ends of the bridge.

(x) Other information relevant to design, construction and/or maintenance of the bridge.

*Hydrological Study*

Detail hydrological investigation study need not to be carried out however correct HFL should be examined and collected form site with local enquiry and site marks:

*Consideration on Environment Protection*

The consultant shall predict damages to the Environment and attempt to mitigate or minimize the damages by choosing appropriate site, cross-section, type of structures etc. and suggest appropriate measures in the design for protection of surrounding Environment.

*Test pits for geological investigation*

Test pits of 1.5m depth shall be excavated in each block location and the soil explored form the pit will be identified at site.

**Other information**

Availability of construction materials like, sand gravel boulders, timber, etc. with their engineering properties, quantities and lead up to the bridge site. Quarry site of materials with their available quantities should be shown on a sketch plan with reference to Bridge site.

**Analysis of Data, Conclusion and Recommendation of Design Parameters.**

Based upon the above-mentioned studies and investigations the consultants shall make the best use of their technical know-how and professional skill to arrive at and recommend the most cost-effective design parameters. The consultant shall discuss in detail at least three different options and shall recommend the most appropriate option.

**Detailed design and quantity/cost estimates**

Based on the collected information and results of the discussions mentioned above the Consultants shall design the bridge following the standard codes of practice, norms and guidelines. The consultants shall produce detailed quantity estimate of the bridge and its accessories. They shall collect information on sources of materials and their lead distances and prepare rate schedules and cost estimates based on the standard norms and prevailing district rates.

Engineering design will begin with the selection of the type of the bridge based on the survey report. The design shall be executed according to the standardized bridge, material specifications and the Standard Drawings as per LSTB Technical Manual, Volume A: Design and Volume C: Standard Design Drawings, published by MoFALD /DoLIDA R/LBS. The bridge engineering design will incorporate following task.

- Rechecking of bridge site selection, axis line and high flood level.
- Detailed design of the bridge considering scour depth if applicable;
- Apply bio-engineering technique for slope stabilization measures wherever applicable;
- Preparing complete "General Arrangement" drawings (1:400/1:200)
- Preparation of all necessary steel and structural standard drawings.
- Quantity calculation and Cost Estimation as per LSTB Norms and Standard (refer Cost Estimate Norms/Formats, LSTB Technical Manual, Volume A: Design)

**Use of Standard Design(s)**

Depending upon the site condition and other factors the Consultants can use the Standard Design of the part(s) of the bridge, which shall be made available by the OFFICE. If such Standard Design is used, the Consultants shall adjust the design of other parts of the bridge to incorporate the parameters of the Standard Design.

**The Checklist**

The Consultant shall follow the detailed requirements of the design report as per given checklist in the ToR. Before submitting the report, the Consultants shall verify whether compliance with the checklist.

## 4. Submission of Reports

The Consultant shall prepare and submit the reports accordance with standard procedures.

**Approval of Design**

After accomplishment of design work and quantity calculations following documents should be submitted for approval.

- Complete sets of drawings
- Calculation sheets
- Survey report, checklist, tachometric. and triangulation readings and photos
- One set of quantity calculation

Cost estimate will be prepared based on approved design/drawings, a rate analysis. Rate analysis for each item will be based on the approved district rates, approved district labour rates. As per recommendation website, www.nepaltrail bridges.org will be surfed for steel parts, fixtures, wire ropes and GI wires. The porter distance from road head to bridge site "PD" will be calculated as

PD = 2 x normal walking distance without load.

In cost estimate volume of the report will contain: -

- Cost Estimate
  - Summary
  - Abstract of cost

- Detail quantity calculation
- Rate analysis
- Copy of district rate

- Schedule of Works (SoW)
- Checklist of materials

**Personnel**

For sequential conduction, all the task as maintained above following set of intellectuals will be employed. Key professionals will have sufficient relevant experience for successful conduction of the task. Our team will comprise of: -

- Team Leader (Coordinator)
- Design Engineer
- Geo-Technical Engineer
- Architechtural Engineer
- Electrical Engineer
- Senior Surveyor

**Reports**

The Consultant shall present the draft design report in specified format and defend it prior to the submission of the final report. The Consultant shall discuss and review the issues raised during the presentation while finalizing the report and make necessary amendments/corrections if needed.

**Final Report**

**Hard Copy**

As per the requirement following reports will be submitted for different phases to the Office. The report will be concise and transparent with photographic evidence of the work.

a) One set of Draft report, summarizing all work carried out under the service including Firm's findings, conclusion, and recommendations. The draft report will majorly include:
   - Complete bridge survey, design calculations with supporting information
   - Quantity Calculation, Cost Estimate, SoW and list of materials
   - All relevant drawings

b) Three sets of Final Report, with revisions/ amendments proposed by Office and will contain:
   - Salient feature of the project
   - Summary of facts and experience made during survey/design
   - Project description
   - Geological report
   - Complete bridge survey with photographs and bridge location maps
   - Design calculation with supplementary documents
   - Facts and experiences made during survey/design with reference to LSTB Manuals and liaison with EMPLOYER (a critical review).

c) Three sets of drawings;

d) Three sets of cost estimate as per standard format

e) The original drawing or a transparent film copy of the General Arrangement.

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**Soft Copy**

Our firm will provide soft copies (electronic copies) of the final report (including GA Drawing, Design & Cost Estimation) in CD-ROMs clearly labelled with package name and bridge name on the CD box. The soft copy shall be in its original format used.

**Time Schedule**

The Consultant shall complete the assigned works as per the following schedule:

- Draft Report within 3 month from the date of Agreement
- Final Report within 1 month after submission of the draft report (incorporating comments office, if any)

## 5. The payment schedule:

(i) Payment I : Fifty percent (50%) of contracted amount upon satisfactory submission and approval of draft reports.

(ii) Payment II : Fifty percent (50%) of contracted amount upon satisfactory submission and approval of final reports.

From each of the above payments necessary tax deduction shall be made as per prevailing government rules and the deducted amount shall be forwarded to the Tax authorities.

The consultant is required to furnish to the client documents evidencing deposit of VAT to the concerned tax office.

If any of the bridge/s is/are found to be

**1)** Unfeasible then feasibility report should be submitted and half of the quoted price for that bridge shall be paid.

**2)** Short span Trail Bridge, then feasibility report should be submitted and half of the quoted price for that bridge shall be paid.

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