

TERMS OF REFERENCE (TOR)

For Detailed Architectural Drawings and Engineering Design and Drawings for the Technical Training Institute-Chumey, Bumthang

I. Background

1. The Royal Government of Bhutan has received for a Grant from the Asian Development Bank (ADB) for the Skills Training and Education Pathways Upgradation Project and intends to apply part of the Grant for developing Technical Training Institute (TTI), Chumey.
2. TTI in Chumey has available land for expansion and the Ministry of Labour and Human Resource (MOLHR) and ADB had engaged international architectural firm to develop a structural master plan including conceptual drawings of new infrastructure at 30.66 acres of available land. TTI Chumey currently offers courses such as (i) basic furniture making (short 6-month course); (ii) carpentry (national certificate (NC-II & III)); (iii) masonry (NC-II & III); (iv) plumbing (NC-II & III); and (v) welding (NC-II) but has a plan to develop construction management diploma course with the technical expert's inputs from Australia. The government expects TTI Chumey to grow into a center of competency for construction sector in Bhutan. The government aspirations of new TVET infrastructure quality are at par with higher education institutions in Bhutan to transform TVET into an attractive learning and career pathways.
3. TTI in Chumey experiences cold climate conditions with warm summer and cold winter being located at the altitude of EL 2,470 m. The monthly average temperature during winter (month January) can dip as low as (-) 11°C. The month of July received the highest rainfall (192 mm) and in winter, it received little or no rainfall. The Chumeychhu flows besides the TTI campus and the elevation difference between river bed level and ground surface is not much of a difference. Therefore, it imposes great threat from flooding during monsoon seasons.

II. Objectives

4. The main objectives of the consultant are to assist the MOLHR to:
 - 4.1 review conceptual drawing and structural master plan prepared by international architectural firm
 - 4.2 prepare detailed architectural, structural, mechanical, electrical, plumbing and sanitation design and drawings; incorporation of energy efficiency in the buildings within the framework of conceptual architectural /structural master plan.
 - 4.3 carryout structural analysis and design optimization calculations and drawings.
 - 4.4 prepare detailed design for the site development works including landscaping and use of renewable energy for street lighting;
 - 4.5 prepare detailed specifications for the various items of works;
 - 4.6 prepare the detailed cost estimates and bill of quantities; and

- 4.7 explore incorporation of the energy efficiency concept in the buildings and use of renewable energy including estimation of CO2 reduction.

III. Detail Design, Drawing and Estimation

5. **Scope of Work:** The consultancy firm is expected to complete the detailed engineering design of following infrastructure based on the approved structural master plan and conceptual architectural drawings. The infrastructures includes existing administrative (block-3), new administrative (block-14), grand lecture theatre and display center (block-11), amphitheater (block-13), canteen and convenience store (block-7, 8 & 9), hostel (block-20), masonry shed (block-5), warden/matron quarter (block-22), support staff quarter (block-29), dining & kitchen (block-19), multi-purpose hall (block-16), principals quarter (block-28), raw material storage (block-25,26& 27), changing room (block-30), creche (block-32), outdoor sports and field track (block-18, 23, 24 & 31), bridges (pedestrian and vehicular) and river protection walls.
 - 5.1 Refer the conceptual drawing included for further clarity.
6. **Scope of Services:** The selected consultant shall provide the following services:
 - 6.1 Prepare detailed design and drawings of infrastructures specified in clause 5 based on the structural master plan. The design shall have sufficient natural lighting and ventilation system, natural insulation system to save energy. The selected consultant will have to work in close coordination with the client in order to incorporate energy efficiency principles in the building design to suit the local harsh weather conditions.
 - 6.2 Prepare detailed architectural design, structural design and drawings with structural optimization analysis considering soil investigation report, future expansion and seismic zone V conditions.
 - 6.3 Plan the project so as to keep the existing structures functional and integrate the same in the overall master plan, if necessary. The consultant shall also plan demolition of any existing structures, additional or alterations to the existing building/structures, if required, as to integrate with the new construction.
 - 6.4 Prepare detailed electrical design/drawings incorporating green energy design concepts. The design should be based on demand forecast for adequate electrical tools and equipment and source identification/needed for substation.
 - 6.5 Prepare detailed water supply/plumbing design and drawings. The design should consider demand forecast and source identification.
 - 6.6 Prepare detailed sanitation/sewerage design and drawings.
 - 6.7 Prepare adequate provisions for Fire Detection and Suppression.
 - 6.8 Prepare detailed technical specifications for all the items of building works (civil, electrical, plumbing and mechanical) based on the final approved design. The proper selection of building materials will have to be eco-friendly and as per the standard of the Bhutan Standards Bureau (BSB).
 - 6.9 Based on the final approved plan and working drawings, the consultant shall provide detailed sequence of construction schedule, machinery, manpower, material procurements and the phase in which the project work proposed would

be completed within the stipulated time frame calculated by the consultant as per above clause 6.9.

- 6.10 Prepare detailed cost estimates and segregated Bill of Quantities for each category of infrastructure using the latest Bhutan Schedule of Rates (BSR) and/or market rates. For items not covered in the BSR, rate analysis shall be submitted and approved brand list available on the Bhutan Standard Bureau's website shall be served as a reference. The incorporation of BSB certified domestic construction materials in the designs, estimates, and Bill of Quantities (BoQ) is also compulsory.
- i) The BoQ should be explicit covering all items of works. It should be as exhaustive as possible to avoid changes, additions, deletions and substitutions during execution and therefore the undesired disputes and claims.
 - ii) The detailed technical and material specifications should be a part of the BoQ. One copy of the technical specifications shall be submitted to the procuring agency for its comments and suggestions before including in the BoQ and estimation.
 - iii) The quantities should be worked out as accurate as possible to avoid unnecessary variations during the execution of work.
 - iv) The availability of the materials may also be specified for those that are unique in features. As far as possible, the materials should be readily available in Bhutan and India. The materials may be suggested to suit to the climate condition of the TTI Chumey location.
7. The consultant shall follow prevailing local norms and guidelines regarding building regulations governing plot coverage, setbacks, number of floors and traditional architecture. It shall be the responsibility of the consultant to provide necessary clarifications/details to the satisfaction of the local bodies including National Environment Commission, whenever required for obtaining approval of the plans, designs and drawings from the statutory authorities.
8. The consultant needs to consider that TTI Chumey is in Bumthang district where all buildings need to preserve Bhutanese construction tradition as per local construction regulatory requirement. Thus, the consultant shall have full understanding of the national and local architectural codes.
9. The consultant shall visit the proposed site and study the environment to prepare and submit the proposal. The consultant shall include such cost of carrying out all the above responsibilities, inter alia, in the Financial Proposal.
- IV. Support Service and Facilities** (to be provided by the Client)
10. The consultant shall be provided with detailed topographical survey, conceptual design, structural master plan of the campus, soil investigation reports, site plan and other available data of the project. If the consultant requires any additional information, the firm should acquire the requirements at their own expenses.
11. The list of the power tools and equipment installed in the facility/ workshop for the purpose of electrical load estimate will be provided by the procuring agency.

12. The procuring agency will facilitate communication with local authorities and other stakeholders to fast track the approval process.

v. Report and Time Schedule

13. The design and detailed working drawings should be submitted within 90 days from the date of contract signing and the specifications of work and detailed estimation/BOQ should be submitted within **120** days from the date of notice to proceed;
14. The selected consultant shall be required to submit and present the following reports for the Client's review and approval;
 - 14.1 **Inception Report** (within **5** days from the date of Notice to Proceed). This report shall include formation of design team, work plan approach, and methodology.
 - 14.2 **Interim Report** (within **50** days from the date of Notice to Proceed). This shall include: (a) preliminary structural design and drawings of all new and modified infrastructures; (b) concept of green building/energy efficient building used; and (c) Fire detection and suppression schematic diagram.
 - 14.3 **Draft Final Report** (within **75** days from the date of Notice to Proceed). This shall include all of the followings in addition to the contents of the interim reports; (a) detailed structural design and drawings; (b) detailed electrical design and drawings including telephone and LAN line layout; (c) detailed water supply/plumbing design and drawings; (d) detailed sanitation/sewerage design and drawings; and (e)
 - 14.4 **Final Report for Design and Drawings** (within **90** days from the date of Notice to Proceed). The consultant shall duly incorporate all comments of the client in the final report. This shall include all components listed under the above reports.
 - 14.5 Final specifications of the materials/works, segregated bills of quantities for all works and cost estimates need to be submitted within **120** days.
 - 14.6 The actual contract duration is 120 days but any loss of time due to delay in providing approval by procuring agency will be compensated.

vi. Report Format

15. All reports shall be submitted in editable soft copy versions (in USB stick) along with hard copy of all drawings in A3 and descriptive report in A4 format for each stage of works. All drawings should be in "dwg" or "dwt" format readable in AutoCAD 2010. Design calculations, details of measurements and estimates, abstracts of estimated costs, and segregated Bill of Quantities in MS Excel format and all other content of the reports in MS Word format.
16. The drawings should be done in an appropriate style and the scales suitably fixed so that they are easily readable at site or workshop by naked eye. Except for the general views, the drawings should preferably be made to the scale of 1:50 and for showing minute details 1:20/1:10 where necessary.
17. Adequate number of drawings should be produced to appropriately represent all the necessary details, views, etc.

18. The detailed reinforcement schedule will be a part of the drawings.
19. Except for similar components, each different component shall have separate drawings in cross section, elevations and plan.
20. For the purpose of tendering, drawings printed on A3 sizes would be accepted. However, the drawings should be easily readable by naked eye.
21. All drawing dimensions shall be in metric system (i.e. meter, cm, mm).
22. Period required for approval by the client at each stage shall be a maximum of one week after submission by the consultant, which is not considered in the above-mentioned time schedule.

VII. Expected Outputs/Deliverables

23. The expected outputs of the services are detailed engineering designs, structural analysis and optimization calculation, drawings, estimates, and segregated Bill of Quantities for all categories of infrastructures detailed under the scope of services.
24. Consultant should submit, as part of outputs, the followings;
 - 24.1 Three (3) sets of printed hard copy of BoQ/Materials/Technical specifications in bound conditions (bound volume separately for different packages of work).
 - 24.2 Three (3) sets of detailed design drawings printed on A3 size paper for the purpose of tendering and record (bound volume separately for different packages of work).
 - 24.3 Three (3) printed hard copies of cost estimate and rate analysis of all items of work (bound volume separately for different packages of work).
 - 24.4 Three (3) printed hard copies of detailed structural analysis and optimization calculation of the buildings for the reference of Client's engineers (bound volume separately for different packages of work).
25. A copy of a complete set of reports shall be submitted in editable soft copy versions (in USB stick). All drawings should be in "dwg" or "dwt" format readable in AutoCAD 2010. Design calculations, details of measurements and estimates, abstracts of estimated costs, and segregated Bill of Quantities in MS Excel format and all other content of the reports in MS Word format.

VIII. Focal Person

26. The focal person from the procuring agency will be named in the "contract agreement". All matters should be dealt with the focal person during the contract implementation.

IX. Selection Procedure

27. The consulting firm will be selected following the ADB's Procurement Policy – Goods, Works, Nonconsulting and Consulting Services (2017, as amended from time to time) and ADB's Procurement Regulations for ADB Borrower – Goods, Works, Nonconsulting and Consulting Services (2017, as amended from time to time) and consultant selection method would be Consultants Qualifications Selection (with Lump Sum Contract).
28. More than ten (5) years of experience in the field of architecture, engineering and construction, including experiences with the Royal Government of Bhutan, and including

prior successful engagements in the design and construction of education or training institutions.

29. Demonstrated competency in conceptualization, formulation, and execution of projects of similar nature as the one specified here.
30. Consulting firm should bring among its team demonstrated expertise in the following fields: architectural design, structural engineering, construction trades, culturally-sensitive design, and earthquake engineering.

x. Team Composition and Qualifications Requirement of Key Experts

31. A minimum of 17 person months of national experts are required for design. The position qualifications and person-months for the key experts are presented in below table:

Expertise	Qualification	Indicative Job Description and Task	Total Person Months
Key Experts (National)			
Principal Designer (Team Leader) – 1 No.	B. Arch with 10 years' experience out of which 3 years' experience in similar projects as team leader.	Focal point of communication with ADB and MOLHR. Ensure quality of the design work is maintained, and there is strict compliance with the relevant national codes. Review and assessment of designs. Ensure that the overall design component is completed on time and to the required quality.	4
Architect -1	B. Arch with 5 years' experience	Design of campus and individual buildings. Ensure adherence to bye-laws, codes and best practices. Ensure specification tendered and executed are as per the client's requirement. Ensure the building designs and drawings are as per the structural master plan and conceptual drawings. Review and remodeling of existing designs.	2
Civil Engineer– 1 No	B.E/B.Tech Civil with 7 years' experience in water supply/plumbing	Design of all internal and external water supply/ plumbing and sanitation works, focusing on sustainable and environment-friendly system,	2

	and sanitation works	recycling waste water, solid waste disposal. Ensure adequate provisions for Fire Detection and Suppression.	
Structural Engineer- 1 No	MTech in structural design with 7 years experience in structural design	Design of all buildings and facilities as per the latest Codes, focusing on the potential hazards such as seismic, wind, landslide, flash flood, etc.	3
Electrical Engineer- 1 No	B.E/B.Tech Electrical with 5 years' experience in electrical designs	Design of all electrical works, focusing on energy efficient systems as per BEA Codes. Design of electrical security systems. Prepare Bill of Quantities, detailed estimate.	2
Quantity Surveyor- 2 No	B.E/B.Tech/ Diploma in Civil Engineering with 5 years' experience in Quantity Survey jobs	Prepare detailed cost estimates and segregate Bills of Quantity for each category of infrastructure. Submit analyzed rate for items not covered in BSR.	2*2=4

XI. Criteria for the Evaluation

32. The criteria for evaluation have been specified below:

1. EVALUATION CRITERIA		Max. Weight
I. Management Competence		20
a. Single Firm		20
	Quality of Firm's Managing Director	10
	Proposed Management Coordination	5
	Proposed Quality Control	5
b. Association or Joint Venture		20
	Lead Firm	15
	Quality of Managing Director of association or JV	5
	Proposed Management Coordination	5
	Proposed quality control	5
	Associates or JV Partners	5
	Contribution of association or JV partners to management	5
II. Technical Competence		60
a. Single Firm		60
	Firm's specialization vis à vis the sectoral focus of the assignment	10
	Firms experience vis à vis the assignment's TOR	30
	Number of similar projects undertaken where firm as lead partner	15

	Number of similar projects undertaken where firm as sub-consultant	5
b.	Association or Joint Venture	60
	Lead Firm	40
	Lead firm's specialization vis à vis the sectoral focus of the assignment	5
	Lead firms experience vis à vis the assignment's TOR	10
	Number of similar projects undertaken where firm as lead partner	20
	Number of similar projects undertaken where firm as sub-consultant	5
	Associates or JV Partners	20
	Technical rationale for association or JV	5
	Associates or JV partners experience vis à vis the assignment's TOR	15
III. Project Experiences		20
a.	Single Firm	20
	Firm's experience with RGoB	15
	Firm's regional experience	5
b.	Association or Joint Venture	20
	Lead Firm	10
	Firm's experience with RGoB	5
	Firm's regional experience	5
	Associates or JV Partners	10
	Associates or JV partner's experience with RGoB	5
	Associates or JV partner's regional experience	5
	Total Score	100

33. A firm with the best evaluated amplified Expression of Interest (EOI) will be requested for combined submission of **Technical and Financial Proposal**, and subsequently, invited for the negotiation of the contract and the firm will be engaged if the negotiation is successful.