PUNATSANGCHHU-II HYDROELECTRIC PROJECT AUTHORITY

BIDDING DOCUMENT

FOR

SUPPLY, ERECTION, TESTING AND COMMISSIONING OF MECHANICAL & ELECTRICAL WORKSHOP EQUIPMENT

Tender No.: PHPA-II/CE(P&C)/232/2026/01 Dated: 24.03.2026

MARCH 2026

BLANK

NOTICE INVITING TENDER (NIT)

BLANK

DETAILED NOTICE INVITING TENDER (NIT)

Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) invites sealed Bids from eligible Bhutanese/ Indian bidders for "***Supply, Erection, Testing and Commissioning of Mechanical and Electrical Workshop Equipment***".

1. Detailed specifications, scope of Work and terms and conditions are given in the Bidding Documents which are enclosed as per the following schedule:

NIT No.	:	PHPA-II/CE(P&C)/232/2026/01 Date: **24.03.2026**
Document availability date & time	:	**24.03.2026** to **23.04.2026**
Bid receipt date & time	:	On or before **23.04.2026 upto 10:00 Hrs. (BST)**
Bid opening date & time & venue	:	**23.04.2026 at 10:30 Hrs. (BST)** Office of the Chief Engineer, Proc. & Contracts Wing, Punatsangchhu-II Hydroelectric Project, Bjimthangkha, Wangdue Bhutan.

2. A non-refundable tender fee of Nu./Rs. **5,000.00** in the form of a Demand Draft (DD) or Cash Warrant drawn in favor of PHPA-II, shall be submitted during the submission of bids,

   OR

   Shall be deposited directly into PHPA-II's Account No. 102081338 maintained with the Bank of Bhutan, Wangdue, or Account No. 32379019627 (IFSC: SBIN0006278) maintained at SBI Jaigaon, West Bengal, India, and submit the proof of payment during the submission of bids.

3. Issue of Bidding Documents shall not automatically construe that the Bidder fulfils the Qualifying Requirements which shall be determined during Bid evaluation based on data/documents submitted by the Bidder. Bids shall be submitted at the address given in the BDS and shall be opened in the presence of Bidder's representatives who choose to attend.

4. All Bids must be accompanied by Bid Security as specified in the BDS. Bids not accompanied with an acceptable Bid security as specified in Bidding Documents or Bids accompanied with Bid Security of inadequate value and validity shall be rejected at the time of the opening.

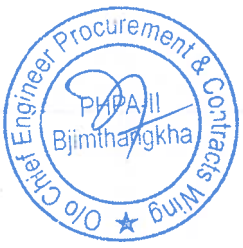
5. Eligibility and Qualification Requirement for Bidders shall be as specified in the BDS.

Chief Engineer Procurement & Contracts Wing O/o PHPA-II Bjimthangkha

6. PHPA-II reserves the right to accept or reject any Bid partly or fully or cancel the bidding process without assigning any reasons thereof and in such case no Bidder/intending Bidder shall have any claim arising out of such action.

Chief Engineer,
Procurement & Contracts,
PHPA-II, Bjimthangkha, Wangdue.

O/o Chief Engineer Procurement & Contracts Wing PHPA-II Bjimthangkha



CONTENTS

SECTION I – INSTRUCTIONS TO BIDDERS

BLANK

A. INTRODUCTION

1. Scope of Works

1.1 The scope of the works shall be as specified in section V, Technical Specifications or BDS. The name and identification number of the contract is provided in the NIT.

2. Site Visit

2.1 The Bidder, at his own interest, responsibility and risk, must visit and examine the Site of Work and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for the Works. The costs of visiting the Site shall be at the Bidder's own expense.

2.2 The bidder or his representative will be granted permission to enter the site of work only upon the condition that the Employer or his personnel or agent will not be responsible for death or personal injury or loss or damage to property and other loss, damage, cost or expenses incurred as a result of inspection/visit.

3. Fraud and Corruption

3.1 As per the RGoB policy, Employer require that the Bidders and Contractors observe the highest standards of ethics during the procurement and execution of contracts. The terms "Corrupt Practice", "Fraudulent practice": "Collusive practice", "Coercive practice" and "Obstructive practice" shall be as per the definition in **GCC Clause 1** In pursuance of this policy, the Employer:

a) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question.

b) will sanction a firm or individual, including declaring them ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that they have, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for, or in executing for the contract.

c) will have the right to require that a provision be included in Bidding Documents and in contracts, requiring Bidders, Contractors, and their Subcontractors to permit the Employer, any organization or person appointed by the Employer to inspect their accounts and records, and other documents relating to their Bid submission and contract

performance and to have them audited by auditors appointed by the Employer.

d) requires that Bidders, as a condition of admission to eligibility, execute and attach to their bids an Integrity Pact Statement in the form provided in Section VI. Failure to provide a duly executed Integrity Pact Statement may result in disqualification of the Bid; and

e) will report any case of corrupt, fraudulent, collusive, coercive, or obstructive practice to the relevant RGoB agencies, including but not limited to the Anti-Corruption Commission (ACC) of Bhutan, for necessary action in accordance with the statutes and provisions of the relevant agency.

4. Eligible Bidders

4.1 A Bidder, and all parties constituting the Bidder, may have the nationality of any country specified in the BDS, subject to the restrictions specified in **ITB Clause 5.** A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including Related Services.

4.2 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. Bidders may be considered to have a conflict of interest with one or more parties in this bidding process if they:

a) are associated, or have been associated in the past, with a firm or any of its affiliates that has been engaged by the Employer to provide consulting services for the preparation of the design, specifications, and/or other documents to be used for the procurement of the Goods and related Service to be purchased pursuant to these Bidding Documents, or

b) submit more than one Bid in this bidding process, except for alternative offers permitted under **ITB Clause 13**. However, this does not limit the participation of subcontractors in more than one Bid.

c) employ or otherwise engage, either directly or through any of their affiliates, a dependent or close relative of the Employer employee or has an authority over it. For the purposes of this Sub-Clause, a close relative is defined as an immediate family which includes a father, mother, brother, sister, spouse, and own children.

d) Have a relationship with each other directly or through common third parties, that puts them in a position to have access to information about or influence in the Bid of another Bidder, or influence the

decisions of Employer regarding this bidding process; or have the same legal authorized representative for purposes of this Bid.

e) An Employer formed by the merger of two or more companies or divisions of such companies engaged in execution of Works as specified in the Bidding Documents can also participate provided the constituent companies or divisions before merger individually or jointly meet the stipulated qualification requirements fully.

4.3 If so, specified in the BDS, if a Foreign/expatriate Bidder, who is currently not doing business within the Kingdom of Bhutan, is awarded the contract, the Bidder may be represented by an agent in the Kingdom of Bhutan. The agent shall be a legal entity, equipped and able to carry out the Contractor's obligations.

4.4 Where an agent is permitted to submit the Bid on behalf of the Foreign Bidder, payment of agency commission, if any, to the Foreign Bidder shall only be made in the local currency. The agent and the Foreign Bidder shall not be permitted to submit separate bids in the same bidding process. On the other hand, an agent shall not be allowed to work with and represent more than one party/Bidder.

4.5 In case of JV with any of the Bhutanese Bidder the payment to the Bhutanese member of the JV for the services from within Bhutan shall be in local currency.

4.6 The Bidder shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

5. Exclusion of Bidders

5.1 A Bidder shall be excluded from participating in this bidding process under the following circumstances:

a) Bidder is insolvent or is in receivership or is bankrupt or is in the process of being wound up; or has entered into an arrangement with creditors; or

b) Bidder's affairs are being administered by a court, judicial officer, or appointed liquidator; or

c) Bidder has suspended business or is in any analogous situation arising from similar procedures under the laws and regulations of his country of establishment; or

d) Bidder has been found guilty of professional misconduct by a recognized tribunal or professional body; or

e) Bidder has not fulfilled his obligations with regard to the payment of taxes, or other payments due in accordance with the laws of the country in which he is established or of the Kingdom of Bhutan; or

f) Bidder has been convicted for fraud and/or corruption by a competent authority, or

g) Bidder is guilty of serious misrepresentation in supplying information in this tender; or

h) The Bidder has been debarred/blacklisted from participation in public procurement by the competent authority; or

i) as a matter of law or official regulation, RGoB prohibits commercial relations with the country in which the Bidder is constituted, incorporated, or registered.

6. Joint Venture Bids

6.1 Bids submitted by a joint venture, if so, permitted in the BDS, formed by a number of legal entities as specified in the BDS subject to the condition that the total number of legal entities shall not exceed three (3) entities, shall comply with the following requirements:

a) The Bid shall be signed by an authorized signatory of the joint venture. who has been authorized by all the other members, so that the bid is legally binding on all members.

b) One of the partners shall be designated as leader who shall have the authority to conduct all business for and behalf of any and all members of the joint venture. This authorization shall be evidenced by submitting with the bid a power of attorney signed by legally authorized signatories of the other members:

c) The leader shall be authorized to receive instructions for and on behalf of any and all members of the Joint Venture and the entire execution of the contract, including payment, shall be done exclusively with the leader;

d) All members of the joint venture shall be liable jointly and severally for the execution of the contract in accordance with its terms; and

e) A copy of the agreement entered into by the joint venture members as per the format provided in the bidding documents shall be submitted with the Bid. In order for JV to qualify. either the lead partner must meet the minimum technical qualification requirements or can be met jointly by the JV partners. as specified in the BDS.

6.2 The financial qualification requirements however may be met jointly by the members of the JV subject to the condition that each member can independently meet at least the minimum financial qualification requirements as specified in the BDS. Failure to comply with this requirement will result in rejection of the Joint Venture's Bid.

6.3 A firm can be a member in only one joint venture: bids submitted by joint

ventures including the same firm as member in more than one JV in the same bidding process shall be rejected.

B. BIDDING DOCUMENTS

7. Contents of Bidding Documents

7.1 The bidding documents are those as stated below and should be read in conjunction with any corrigendum/modification issued on these documents:

- Notice Inviting Tender (NIT)
- Instructions to Bidders
- Bid Data Sheet (BDS)
- General Conditions of the Contract
- Special Conditions of Contract (SCC)
- Forms
- Bill of Quantity (BoQ)
- Drawings

7.2 The bidder is expected to examine carefully the contents of all the above documents. Failure to comply with the requirement of bid submission will be at bidders' own risk. Bids, which are not substantially responsive to the requirement of the bidding document, will be rejected. Prior to last date of submission of tender the Employer, for any reason whatsoever, may modify the tender by issuing corrigendum, which will become a part of tender document. No modification of bid shall be permissible after last date of submission, whatever may be the reason.

7.3 The PHPA-II at its discretion may extend as necessary the deadline for submission of tender, if considered necessary.

8. Clarification of Bidding Documents

8.1 The Bidder shall examine the bidding documents thoroughly in all respects and if any conflict, discrepancy, error or omission is observed, the Bidder may request clarification promptly. A prospective Bidder requiring any clarification on the bidding documents may notify Employer in writing by post or e-mail, to the address mentioned in BDS, not later than the date and time specified in BDS.

8.2 Employer shall issue clarification(s) as it may think fit in writing by post or e-mail prior to the deadline/ extended deadline for submission of Bids prescribed by Employer. All such clarifications shall form part of the bidding documents and shall accompany the Bidder's bid

8.3 For the information of all Bidders, the clarifications (including a description of the enquiry but without identifying its source) will be sent to all prospective bidders.

8.4 Bidders shall not be allowed to seek any clarification on the bidding documents in person or by telephone or other verbal means. Any queries sent by the Bidders after the date and time notified in the BDS or extended date, if any, shall not be entertained.

8.5 Should Employer deem it necessary to amend the bidding documents as a result of a clarification, it shall do so following the procedure under **ITB Clause 10.**

8.6 Any failure on the part of the Bidder to comply with the provisions under **ITB Clause 8** shall not excuse him/her for performing the works in accordance with the contract, in case of award.

9. Pre-Bid Meeting

9.1 A pre-bid meeting shall be conducted only if necessary to clarity doubts and concerns of the Bidders prior to submission of bids. The Bidders who have purchased the bidding documents shall attend pre-bid meeting to be held on the date, time and location specified in BDS.

9.2 Non-attendance at the pre-bid meeting shall not be a cause for disqualification of Bidders but at the same time shall not entitle them to raise any query at a later date.

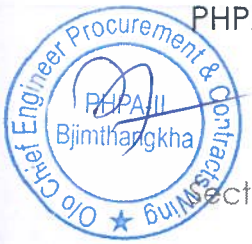
9.3 Minutes of the pre-bid meeting, including the text of the questions raised without identifying the source, and the responses given together with any responses prepared after the meeting, shall be circulated to all Bidders who have downloaded the bidding documents

9.4 Any modification to the bidding documents that may become necessary as a result of the pre bid meeting shall be made by Employer through the issue of an addendum pursuant to **ITB Clause 10.**

10. Amendment of Bidding Documents

10.1 At any time prior to the deadline for submission of bids, the PHPA-II may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the Bidding Documents by the issuance of a Corrigendum/Addendum.

10.2 The corrigendum/addendum will be sent in writing to all prospective bidders and the bidders shall promptly acknowledge receipt thereof to the PHPA-II.



10.3 In order to afford prospective bidders reasonable time required to consider a corrigendum/addendum in preparing their bids, the PHPA-II at its discretion may extend the deadline for the submission of bids.

C. PREPARATION OF BIDS

11. Cost of Bidding

The Bidder shall bear all costs, direct or indirect associated with the preparation and submission of his bid (including site visits and attending pre-bid meetings) and Employer in no case shall be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

12. Language of Bid

The bid prepared by the bidder and all correspondence and documents relating to the bid exchanged by the bidder and the PHPA-II shall be written in the English language only.

13. Alternative Bids

Alternative bids shall not be considered, unless specifically allowed in the BDS.

14. Documents Comprising the Bid

The tender to be prepared and submitted by the bidder for consideration shall comprise of the following: -

a) Complete set of bidding document, BoQ & forms duly filled in and signed, wherever required, without altering the formats.

b) Bid Security in accordance with **ITB Clause 18.**

c) Integrity Pack Statement duly executed by the bidder as per form no.5

d) Documentary evidences establishing Bidder's Eligibility and Qualification stipulated in BDS.

e) Alternative bids if permitted in BDS

f) Any other documents required in the BDS

15. Bid Prices and Discounts

15.1 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract or subject to variation, as specified in the BDS.

15.2 The Bidder shall fill in unit rates/ prices for all items of the Works described in the BoQ in figures. The unit rates/ prices quoted in the BoQ shall also be deemed to include any incidentals not shown or specified but reasonably implied or necessary for the proper completion and functioning of the whole specified item of the Works in accordance with the Bidding

Documents and shall also deem to include the cost of construction of infrastructural facilities required for execution of the Contract and not included in the Works. The Contract shall be for the whole Works based on the unit rates and prices in the Priced BoQ submitted by the Bidder.

15.3 If, in accordance with the BDS, prices quoted by the Bidder are subject to adjustment during the performance of the Contract:

a) The prices quoted by the Bidder shall reflect changes in the cost of labour, material, etc. in accordance with the procedures specified in **GCC Clause 70.1**

b) The Employer shall indicate the name, source and origin of indices along with their base values and corresponding coefficients as per SCC.

15.4 Unless otherwise specified in the BDS, the unit rates/ prices quoted in the BoQ shall be inclusive of all taxes, duties, levies & charges (including those levied on the construction material quarried from land owned by Employer or otherwise), as of thirty (30 days) days prior to the deadline for submission of Bids.

15.5 The total price at the bottom of the Priced BoQ shall be indicated both in figures and words.

15.6 If rebate/discount is offered, the overall discount in percentage shall be brought out in the Priced BoO. Conditional rebates/discount, if any, offered by any Bidder shall not be considered during Bid evaluation.

15.7 Items for which no rate or price is entered by the Bidder in the Priced BoQ shall not be paid by Employer when executed and shall be deemed covered by the other rates and prices mentioned in the Priced BoQ.

16. Currencies of Bid and Payment

16.1 The unit rates and prices shall be quoted by the Bidder in any of the currency (ies) specified in the BDS.

16.2 The reference exchange rate (selling rate) prevailing on the day of Bid opening or the immediate preceding date as posted by the Royal Monetary Authority of the Kingdom of Bhutan shall be used for the conversion of prices.

16.3 The payment to the Contractor shall be made in the currency of Bid and any banking charges related to payment shall be borne by the Contractor.

17. Bid Validity Period

17.1 Bids shall remain valid till the date specified in the BDS. A bid valid for a shorter period shall be liable for rejection by Employer as non-responsive.

17.2 In exceptional circumstances, prior to the expiry of the Bid validity period, Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing to all the participating Bidders. A Bidder may refuse the request to extend the validity of its Bid without forfeiting its Bid Security. In such a case, the Bid of the Bidder, refusing to extend the validity of its Bid, shall not be considered for evaluation and award. A Bidder granting the request shall be required to extend the validity of their Bid securities correspondingly but shall not be required or permitted to modify its Bid.

17.3 The provision of **ITB Clause 18** regarding discharge and forfeiture of the Bid Security shall continue to apply during the extended period of the Bid validity.

18. Bid Security

18.1 The Bidder shall furnish, as part of its Bid, a Bid Security in original form, denominated in the currency and the amount specified in the BDS.

18.2 The Bid Security shall at the Bidder's option, be in any forms stipulated in the BDS.

18.3 Bid Security shall be issued by financial institution stated in the BDS.

18.4 Bid security shall be in its original form and copies shall not be accepted. Bid Security shall be valid for a period thirty (30) days beyond the bid validity period, as extended, if applicable, in accordance with **ITB Clause 17.2.** Accordingly. the Bid security shall remain valid till the date specified in the BDS.

18.5 Any Bid not accompanied by adequate Bid Security shall be rejected by Employer as non-responsive.

18.6 The Bid Securities of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder furnishing the Performance Security pursuant to **ITB Clause 36.**

18.7 In the case of a single-stage-two envelope and two-stage mode of tendering, the Bid Security of non- responsive Bidders shall be returned immediately after technical evaluation.

18.8 The Bid Security shall is liable for forfeiture if:

a) Bid is withdrawn during the period of its validity

b) The bidder has been found practicing corrupt or fraudulent or collusive o coercive practices during the bidding process

c) If the successful bidder fails to:

i) Corrections of Bid prices is not accepted by the bidder

ii) submit an acceptable performance security

iii) sign the Contract.

18.9 The Bid Security of a JV/C must be in the name of the JV/C that submits the bid.

19. Bidding Condition

The bidder shall submit offers which comply fully with the requirements of the Bidding Documents. Any deviation in submitted bid for the bidding documents shall be liable for rejection.

20. Format and Signing of Bid

20.1 The Bidder shall prepare **ONE Original** document comprising the Bid as described in **ITB Clause 14** and clearly mark it "ORIGINAL." In addition, the Bidder shall submit copies of the Bid, in the number specified in the BDS. In the event of any discrepancy between the Original and the Copies, the Original shall prevail.

20.2 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder.

20.3 Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the authorized person signing the Bid.

D. SUBMISSION OF BIDS

21. Submission of Bids

21.1 Bids shall be delivered by hand, courier, registered post so as to reach the Employer at the address specified in the BDS. The Employer shall not be responsible for any delay in receipt of the bid where sent by post or carrier.

21.2 The Bids shall be submitted in envelops, signed and sealed in the manner stipulated here under or as mentioned in the BDS. The outer Envelope shall:

a) be marked "CONFIDENTIAL".

b) be addressed to the Employer provided in the BDS.

c) bear the Tender name and number; and

d) provide a warning not to open before the time and date for Bid Opening.

21.3 Single-Stage Two Envelope process:

a) The Inner Envelope-I shall contain:

i. Technical bid, Bid Security and be signed across their seals by the person authorized to sign the Bid on behalf of the Bidder; and

ii. Be marked "ORIGINAL" "ALTERNATIVE" (if permitted) and "COPY"

b) The inner envelope-II shall contain:

i. Financial bids and be signed across their seals by the person authorized to sign Bid on behalf of the Bidder, and

ii. Be marked "ORIGINAL" "ALTERNATIVE" (if permitted) and "COPY"

21.4 Where bids are invited under the single stage single envelope, both technical and financial bid shall be in one envelope.

21.5 In addition to the identification required in **ITB Clause 21.2,** the inner envelopes shall indicate the name and address of the Bidder; to enable the Bid to be returned unopened in case it is declared late pursuant to **ITB Clause 23.**

21.6 If the outer envelope is not sealed and marked as above, the Employer shall assume no responsibility for the misplacement or premature opening of the Bid.

21.7 In the Two-Stage Process, Bidders shall be advised to submit only the technical bids in the first stage. In the second stage, Bidders shall be requested to submit both their technical bids as modified and agreed upon with the Employer, and the financial bids based on the modified technical bids simultaneously in two separate sealed envelopes.

21.8 When so specified in the BDS Bidders shall have the option of submitting their Bids electronically. Bidders submitting Bids electronically shall follow the procedures specified in the BDS.

22. Deadline for Submission of Bids

22.1 Bids must be received by the Employer in accordance with **ITB Clause 21,** no later than the date and time indicated in the BDS. In the event of the specified date for submission of Bids being declared a holiday for the Employer, the bids will be received up to the specified time on the next working day. Such postponement of the date will not have any impact on the other dates specified bidding document (Bid Validity and validity of Bid Security).

22.2 The Employer may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

22.3 In the event of the deadline for submission of Bid extended by Employer, the Bidders shall have the option to submit their revised Bid in substitution either in full or in part of earlier Bid. In the absence of a revised Bid, the

original Bid shall be considered for opening and subsequent evaluation if otherwise in order. Wherever. the Bidder has submitted the revised Bid in modification of earlier Bid. the earlier Bid shall be returned unopened to the Bidder.

23. Late Bids

Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected and returned unopened to the Bidder.

24. Modification and Withdrawal of Bids

24.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative. Bids requested to be withdrawn shall be returned unopened to the Bidders.

24.2 The substitution or modification of the Bid must accompany the respective written notice and must be:

a) submitted in accordance with **ITB Clause 20 and 21** in addition, the respective envelopes shall be clearly marked "WITHDRAWAL", "SUBSTITUTION" or "MODIFICATION;" and

b) Received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with **ITB Clause 22.**

24.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiry of the period of Bid validity or any extension thereof.

24.4 Withdrawal, substitution, or modification of a bid between the deadline for submission of bids and expiration of the period of bid validity specified as extended pursuant to **ITB Clause 17.1**, may result in the forfeiture of the Bid Security pursuant to **ITB Clause 18.8**. If the lowest or the lowest evaluated Bidder withdraws his bid between the periods specified in this clause, the bid security of the Bidder shall be forfeited.

E. BID OPENING AND EVALUATION

25. Bid Opening

25.1 The Employer shall conduct the Bid Opening in public, in the presence of Bidder-designated representatives who choose to attend, and at the address, date, and time specified in the BDS.

25.2 Bidders, their representatives, and other attendees at the Bid Opening shall not be permitted to approach any members of the Bid Opening Committee or any of the Employer employees.

25.3 First, envelopes marked "WITHDRAWAL" shall be read out and the envelope with the corresponding Bid shall not be opened but shall be returned to the Bidder. No Bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at Bid Opening.

25.4 Next, envelopes marked "SUBSTITUTION" shall be opened, read out, and exchanged with the corresponding Bid being substituted. The substituted Bid shall not be opened but shall be returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Bid Opening.

25.5 Envelopes marked "MODIFICATION" shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid Opening.

25.6 All other envelopes shall be opened one at a time. The Bidders' names, the Bid prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, bid withdrawals, substitutions or modifications, the presence or absence of Bid Security, responses to any Bidding Documents addenda, and such other details as the Employer may consider appropriate shall be announced by the Employer at the Bid Opening.

25.7 No Bid shall be rejected at Bid Opening except for late Bids pursuant to **ITB Clause 23** and Bid Security not in accordance with **ITB Clause 18.**

25.8 Substitution Bids and modifications submitted pursuant to **ITB Clause 24** that are not opened at Bid Opening shall not be considered for further evaluation.

25.9 The Bidders' representatives and attendees who are present shall be requested to sign the record of Bid Opening. The omission of a Bidder's or other attendee's signature on the record shall not invalidate the contents and effect of the record.

25.10 In the case of the Single Stage Two Envelope Bid, the technical bid shall only be opened on the bid opening date. The date for opening the financial bid shall be intimated to the Bidders whose Bid is found responsive in the technical evaluation.

26. Confidentiality of Bids

26.1 After the public opening of bids, information relating to the examination, clarification, evaluation and comparison of bids and recommendations concerning the Award of Contract shall not be disclosed to bidders or other persons not officially concerned with such process.

26.2 Any effort by a bidder to influence the Employer in the process of examination, clarification, evaluation and comparison of bids, and in decisions concerning Award of Contract, may result in the rejection of his bid.

27. Clarification of Bids

To assist in the examination, comparison and evaluation of bid the PHPA-II may ask bidders for clarification of the bids, if any. But no change in price or substances of bid will be sought, agreed or permitted. The request for clarification and its response shall invariably be in writing.

28. Preliminary examination of bids and Determination of Responsiveness

28.1 The Employer shall examine the Bids to confirm that all documents and information requested in **ITB Clause 14** have been provided and to determine the completeness of each document submitted.

28.2 Prior to the detailed evaluation of bids, the Employer shall determine whether each bid:

a) Meets the eligibility criteria defined in **ITB Clause 4**

b) has been properly signed

c) is accompanied by required bid security

d) is substantially responsive to the requirement of bidding document.

28.3 A substantially responsive document is one which conforms to all the terms & conditions and specifications without material deviation or reservation which;

a) affects in any substantial way the quality or scope of the work.

b) limits in any substantial way the scope of work.

c) is inconsistent with the bidding document.

d) affects unfairly the competitive position of other bidders.

28.4 Bids not found substantially responsive are liable to be rejected. Conditions if added by the bidder, which have adverse bearing on the cost and scope of tendered work shall make the tender liable for disqualification.

29. Corrections of Errors in Bids

The price bids shall be checked by the Employer for any arithmetic errors in computation and summation. Where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit rate and the quantity, the unit rate as quoted will govern and the total

amount shall be corrected. If the bidder does not accept the corrected amount of bid, his bid will be rejected.

30. Detail Evaluation and Comparison of Bids

30.1 The Employer shall evaluate each Bid that has been determined up to this stage of the evaluation, to be substantially responsive.

30.2 To evaluate and compare Bids, the Employer shall consider the following:

a) the final bid price, as quoted in accordance with **ITB Clause 15**

b) price adjustment for correction of arithmetic errors in accordance with **ITB Clause 29**

c) price adjustment due to discounts offered in accordance with **ITB Clause 15**

d) adjustments due to the application of the evaluation criteria specified in the BDS

e) adjustments due to the application of a margin of preference, in accordance with **ITB Clause 33**, if applicable

30.3 Employer's evaluation of a bid shall exclude and not take into account any allowance for price adjustment during the period of execution of the contract, if provided in the Bid.

30.4 The evaluation shall be based on the evaluated cost of fulfilling the Contract in compliance with all commercial, contractual and technical obligations under the Bidding Documents.

30.5 For the purpose of comparison, the total price offered by all substantially Responsive bids of qualified Bidders shall be compared to determine the lowest evaluated Bid.

31. Abnormally High / Low Bids

31.1 An abnormally low bid is one where the bid price, in combination with other elements of the bid, appears to be so low that it raises concerns as to the capability of the Bidders to perform the contract for the offered bid price.

31.2 If the lowest evaluated Bid appears abnormally low and/or serious is unbalanced, Employer may require the Bidder to produce written explanations of justifications and detailed price analysis for any or all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. Abnormally low Bid may or may not be accepted.

31.3 If Employer decides to accept the abnormally low Bid for the Bid with seriously unbalanced rates after considering the above, the Bidder shall be required to provide additional differential security in addition to the

performance security, an equivalent to the difference between the estimated and quoted price to a maximum of (ten percent) 10% of the quoted price to protect Employer against any financial loss in the event of default of the successful Bidder under the Contact.

31.4 If the lowest evacuated Bid is abnormally high in the discretion of the Employer, then the Employer may seek justification for the high rates and if necessary. negotiate with the lowest evaluated Bidder and may reject the bid if considered to be abnormally higher than the estimate.

32. Margin of preference

32.1 If specified in the BDS, domestic Contractors may receive a margin of preference in during evaluation, for which this clause shall apply.

32.2 A domestic Bidder shall provide all evidence necessary to prove that it meets the following criteria to be eligible for a margin of preference in the comparison of its Bid with those Bidders who do not qualify for the preference. A domestic Bidder shall:

a) be registered within Bhutan, constituted under and governed by the civil, commercial or public law of Bhutan, and have its statutory office, central administration or principal place of business there.

b) have majority ownership by nationals of Bhutan.

c) not subcontract more than twenty percent (20%) of the initial Contract Price. Excluding provisional sums, to foreign contractors, suppliers and/or consultants.

32.3 Joint Ventures, Consortia and Associations of domestic firms may be eligible for the margin of preference provided that:

a) the individual partners satisfy the criteria of eligibility of **ITB Clause 32.2 (a)** and the JV/C/A is registered in Bhutan:

b) the JV/C/A does not subcontract more than ten percent (10%) of the initial Contract Price, excluding provisional sums, to foreign firms, and the JVIC/A satisfies any other criteria specified for the purpose of domestic preference eligibility, as specified in the BDS. The procedure used to apply the margin of preference shall be as stipulated in the BDS.

33. Employer's Right to Accept Any Bid, and Reject Any or All Bids

33.1 The Employer reserves the right to accept or reject any Bid and to annul the bidding process and reject all Bids at any time prior to Contract award, without thereby incurring any liability to Bidders.

F. AWARD OF CONTRACT

34. Award Criteria

34.1 Employer shall award the Contract to the successful Bidder whose bid has been determined to be substantially responsive and to be the lowest evaluated Bid, further provided that the Bidder is determined to be eligible and qualified and has the capacity and capability to fulfil the contract in accordance with relevant provisions of the bidding document.

35. Notification of Award

35.1 Prior to the expiry of the period of bid validity, Employer shall notify the successful Bidder, through a Letter of Award (LoA), that its bid has been accepted indicating the award price. The successful bidder shall return a copy of the LoA to Employer after duly recording "Accepted Unconditionally" under the signature of the authorized signatory within seven (7) days of the date of notification of award.

35.2 Until a formal contract is prepared and secured, the LoA shall constitute a binding contract between the successful Bidder and Employer.

35.3 Upon the furnishing of performance security pursuant to **ITB Clause 36** by the successful Bidder. Employer shall promptly notify each unsuccessful Bidder and return their bid security.

36. Performance Security

36.1 Within the time specified in the BDS, the successful Bidder shall submit Performance Security equal to 10% of the Contract Price and in the form stipulated in the BDS.

36.2 Failure of the successful Bidder to comply with the requirements of **ITB Clause 37** and shall constitute sufficient grounds for cancellation of the award and forfeiture of the Bid Security

36.3 Upon the successful Bidder's signing of the Contract and furnishing of the Performance Security, the Employer shall promptly notify unsuccessful Bidders and shall discharge their Bid Securities.

37. Signing of Contract

37.1 Upon accepting the Letter of Award (LoA), the successful Bidder shall submit the Performance Security and sign the Contract as per form no. 1 within the time specified in the BDS.

BLANK

SECTION II -BID DATA SHEET (BDS)

BLANK

BID DATA SHEET

The Bid Data Sheet (BDS) contains information and provisions that are specific to this bidding process only. For clarity in the BDS, its clauses are numbered with the same numbers as the corresponding ITB clauses.

Wherever there is a conflict, the provisions herein shall prevail over those in the ITB

ITB Clauses	Particulars
1.1	Scope of the work: As specified in the TS.
5.1 (i)	Names of the countries from which contracting works or any payments to persons or entities in that country are prohibited: ***NIL***
6	Joint Venture/consortium (JV/C) Bids are permitted: ***No***
8.1, 8.4 & 10.1	For Bid clarification purposes, the Employer's address is: *The Chief Engineer,* *Proc. & Contracts Wing,* *Punatsangchhu-II Hydroelectric Project,* *Bjimthangkha, Wangdue Bhutan.* *Phone number: 02-471744/471713* *Email-ID : contracts@phpa2.gov.bt* **Bid Clarification requests will be received ON or BEFORE:** Date & Time: **16.04.2026, 17:30 Hrs (BST)**
9.1	A pre-bid meeting : ***shall not take place***
12	The language of a bid is: ***English***
13	Alternative Bids: ***shall not be permitted***
14.d	The following minimum Qualifying Requirement has to be met by the Bidder: 1) Average Annual financial turnover during the latest 3 financial years should be at least **Nu. 12.43 Million.** ***Note: Bidder shall submit copy of reports on financial standing of the bidder such as profit and loss statements, balance sheets and auditor's report of the past three years***

O/o Chief Engineer Procurement & Contracts Wing PHPA-II Bjimthangkha

	2) Experience of having successfully completed similar works during last 7 years ending on 28.02.2026 should be either of the following: - a) *Three similar completed works costing not less than the amount equal to* ***Nu. 16.57 Million;*** ***or*** b) *Two similar completed works costing not less than the amount equal to* ***Nu. 20.71 Million;*** ***or*** c) *One similar completed work costing not less than the amount equal to* ***Nu. 33.14 Million.*** ***Note:*** ***i. "Similar Work (s)" shall mean work (s) comprising of Supply, Erection/Installation, Testing and Commissioning of Mechanical or Electrical equipment for workshop, industrial, building, or infrastructure facilities.*** ***ii. Bidder shall submit copy of the work order (s) & completion certificate (s).***
14 (f)	1) Copy of a Valid Trade License or other documents to prove the legal status and place of registration of the business. 2) Latest Tax Clearance Certificate
15.1 & 15.3	The prices quoted by the Bidder ***shall not*** be adjustable.
15.4	The applicable GST in Bhutan is: **5%**
16.1	The currencies of the Bid shall be: ***Ngultrum/Rupees***
17.1	The Bid validity period shall be: ***90 days*** *from the last date of bid submission.*
18.1	The Bidder shall furnish a bid security in the amount of **Nu. 0.83 Million**
18.2	The Bid Security shall be provided in any one of the following forms: a) An unconditional and Irrevocable Bank Guarantee as per form no.3. b) A Demand Draft

	c) A Banker's Cheque/Cash Warrant d) Direct Deposit in PHPA-II's Account No. **102081338** maintained with Bank of Bhutan or Account no. **32379019627** maintained with SBI, Jaigaon, WB, India.
18.3	The Bid Security shall be issued by: **Any financial institution in Bhutan or any foreign bank acceptable and enforceable through a financial institution in Bhutan.**
18.4	The Bid security shall remain valid till: **120 days** from the date of bid opening
20.1	In addition to the original Bid, the number of copies is: ***One***
21.1	For bid submission purposes only, the Employer's address is: *The Chief Engineer,* *Proc. & Contracts Wing,* *Punatsangchhu-II Hydroelectric Project,* *Bjimthangkha, Wangdue Bhutan.* *Phone number: 02-471744/471713* *Email-ID : contracts@phpa2.gov.bt*
21.3	**Single-Stage Two Envelope process** The Bidder shall seal the Bids in separate inner envelopes contained within one outer envelope. All envelopes shall be sealed with adhesive or other sealant. **Superscript of Cover Envelope:** "CONFIDENTIAL" Bid for:_____*[insert name of work]* Tender No.:_____ *[insert Tender No.]* Addressed to: *The Chief Engineer,* *Proc. & Contracts Wing,* *Punatsangchhu-II Hydroelectric Project,* *Bjimthangkha, Wangdue Bhutan.* Not to be opened Before: **23.04.2026, 10:30 Hrs (BST)** **Superscript of Envelope 1:** Envelope 1: **'Technical Bid'**

Chief Engineer Procurement & Contracts Wing O/o PHPA Bjimthangkha

	Name of bidder:_____ Address:_____ **Superscript of Envelope 2:** Envelope 2: '**Financial Bid**' Name of bidder:_____ Address:_____
21.8	Submission of Bids electronically: ***NA***
22.1	The deadline for the submission of the Bid is: **23.04.2026 *at 10:00 Hours (BST).***
25.1	The bid Opening shall take place at: Venue: *Office of Chief Engineer,* *Proc. & Contracts Wing,* *Punatsangchhu-II Hydroelectric Project,* *Bjimthangkha, Wangdue, Bhutan.* Date and Time: ***23.04.2026, 10:30 Hours (BST).***
32.1	A margin of domestic Preference: ***shall not apply.***
36.1	The Performance Security shall be provided in any one of the following forms, issued by **any financial institution in Bhutan or any foreign bank acceptable and enforceable through a financial institution in Bhutan:** a) An unconditional and Irrevocable Bank Guarantee as per form no.3. b) A Demand Draft c) A Banker's Cheque/Cash Warrant d) Direct Deposit in PHPA-II's Account No. **102081338** maintained with Bank of Bhutan or Account no. **32379019627** maintained with SBI, Jaigaon, WB, India.
36.1 & 37.1	The successful Bidder shall submit the performance security and sign the Contract within **fifteen (15) days** from the date of issue of the Letter of Award.

Chief Engineer Procurement & Contracting PHPA-II Bjimthangkha

SECTION III – GENERAL CONDITIONS OF CONTRACT

BLANK

CONTENTS

DEFINITIONS AND INTERPRETATIONS

Clause – 1 Definitions

In the Contract, as hereinafter defined, the following words and expressions shall have the meanings hereby assigned to them, except where the context otherwise requires:

i) 'PHPA-II'/ 'Employer' /'Purchaser' / 'Project Authority' means the Punatsangchhu-II Hydroelectric Project Authority and the legal successor in title to the PHPA-II who will employ the Contractor.

ii) "RGoB" means the Royal Government of Bhutan.

iii) 'Contractor'/ 'Supplier' means the person or persons, firm or company, group of firms or Joint Venture, whose bid has been accepted by the PHPA-II and includes the Contractor's personal representatives, successors and permitted assigns.

iv) "Engineer-in-Charge" means the Engineer-in-Charge appointed from time to time by the PHPA-II and notified in writing to the Contractor to act as the Engineer-in-Charge for the purposes of the Contract.

v) "Engineer-in-Charge's Representative" means any Resident Engineer or assistant of the Engineer-in-Charge appointed from time to time by the PHPA-II or the Engineer-in-Charge to perform the duties set forth in Clause-2 hereof, whose authority shall be notified in writing to the Contractor by the Engineer-in-Charge.

vi) "Works" shall include both Permanent Works and Temporary Works.

vii) "Temporary works" means all temporary works of every kind required in or about the execution or maintenance of Works.

viii) "Permanent Works" means the permanent works to be executed and maintained in accordance with the Contract.

ix) "Contract" means the Conditions Governing the Contract, Technical Specifications, Drawings, priced Bill of Quantities, Letter of Award and the Contract Agreement.

x) "Contract Price" or "Contract value" means the sum indicated in the Letter of Award. The Contract Price when exceeds the awarded value (without escalation), it shall be revised at 6 (six) monthly intervals comprising BoQ items actually executed plus the extra/deviated items valued at base date without escalation for the purpose of regulating percentage based issues.

xi) "Constructional Plant", "Plant and Equipment" or "Machinery" means and include plant, equipment, machinery, tools, appliances, other implements of all description or things of whatsoever nature required in or about the execution, or maintenance of the Works but does not include materials or other things intended to form or forming part of the Permanent Works.

xii) "Specifications" means the Technical Specifications and other Specifications referred to in the Bidding Documents and any modification thereof or addition thereto or deduction therefrom as may, from time to time, be furnished/decided by PHPA-II and/or submitted by the Contractor and approved in writing by the Engineer-in-Charge.

xiii) "Drawings" means the drawings referred to in the Specifications and any modification of such drawings approved in writing by the Engineer-in-Charge and such drawings, as may, from time to time, be furnished by PHPA-II and/or submitted by the Contractor and approved in writing by the Engineer-in-Charge.

xiv) "Site" means the land and other places on, under, in or through which the Permanent Works or Temporary Works, designed by the Engineer-in-Charge are to be executed and any other lands and places provided by the PHPA-II for the purposes of working space or any other purpose as may be specifically designated in the Contract or subsequently approved as forming part of site.

xv) "Approved" means approved in writing, including subsequent written confirmation of previous verbal approval and "approval" means approval in writing, including as aforesaid.

xvi) "Consultant" means WAPCOS Ltd., its legal successors or permitted assigns.

xvii) "Chief Engineer" means the Chief Engineer-in-Charge of the Works or his successor and to whom the Engineer-in-Charge reports.

xviii) "Managing Director" means the Technical and Administrative head of the Project.

xix) "GoI" means Government of India.

xx) "Sub-Contractor" means the party or parties having direct contract with the Contractor and to whom any part of the Contract has been sublet by the Contractor with the consent, in writing, of the Engineer-in-Charge.

O/o Chief Engineer Procurement & Contracts Wing ★ PHPA-II Bjimthangkha

xxi) "Manufacturer" means the party proposing to design and/or manufacture the equipment and materials as specified complete or in part.

xxii) "Letter of Award" means the letter from the PHPA-II conveying acceptance of the bid subject to such reservations as may have been stated therein.

xxiii) "Tonne or Metric Tonne" means 1,000 kgs (one thousand kilograms). Metric system shall be followed in all interpretation and execution of Works under this Contract. Any conversion found necessary shall be in accordance with the figures given in 'Indian Standard', IS 786-1967 and subsequent revision(s) of this Standard.

xxiv) "I.S" means Indian Standard Specifications with latest amendments or revisions as currently in force at the time of execution of the Works.

xxv) "Day" means a day from midnight to midnight.

xxvi) "Month" means from the beginning of a given date of a calendar month to the end of the preceding date of the next calendar month.

xxvii) "Week" means seven consecutive days.

xxviii) "Quarter" means a period of three consecutive months starting from January, April, July and October i.e. January to March, April to June, July to September and October to December.

xxix) "C.W.C" means Central Water Commission, Government of India.

xxx) "C.E.A" means Central Electricity Authority, Government of India.

xxxi) "Near Relative" means wife/husband, parents and grandparents, children, first cousins, brothers-in-law, sisters-in-law and parents-in-law.

xxxii) "Rupees" means Rupees in Indian Currency.

xxxiii) "Ngultrum" means Ngultrum in Bhutanese Currency.

xxxiv) Words in singular number shall include the plural number and vice-versa where the context so requires. "He" shall include "She" and vice-versa.

xxxv) "Cost" mean all expenditure properly incurred or to be incurred whether on or off the site including overhead and other charges allocable thereto but does not include any allowance for profit.

xxxvi) The "Goods" means all the gates, hoists, equipment, machinery and/or other materials which the Contractor is required to supply to PHPA-II under the Contract.

xxxvii) "Services" means services ancillary to the supply of Goods such as transportation and insurance and any other incidental services such as installation, performance of onsite erection, testing, painting, commissioning for the supplied goods, training and other such obligations of the Contractor covered under the Contract.

xxxviii) "Project Manager" means the person appointed from time to time by the Contractor and notified in writing to the PHPA-II to act as the in-charge for the purpose of the Contract.

xxxix) Bid Data Sheet (BDS) means the proforma sheet, which contains data and information specific to a particular work.

xl) SCC means the Special Conditions of Contract.

xli) Joint Venture (JV) means a joint venture, association or consortium of not more than three (3) legal entries that pool their resources and skills to undertake a large or complex Contract in the role as a Contractor, with all legal entries (members in the JV being legally liable, jointly and severally, through a joint venture agreement between the members of the JV for the execution of the Contract in the event of a member's withdrawal.

ENGINEER-IN-CHARGE AND ENGINEER-IN-CHARGE'S REPRESENTATIVES (S)

Clause – 2 Duties and powers of Engineer-in-Charge and Engineer-in-Charge's Representative(s)

i) The Engineer-in-Charge shall carry out such duties in issuing decisions, certificates and orders as are specified in the Contract.

ii) The Engineer-in-Charge's representative(s) shall be responsible to the Engineer-in-Charge, and his duties are to watch and supervise the works and to test and examine any materials to be used or workmen employed in connection with the Works. He shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract nor, except as expressly provided hereunder or elsewhere in the Contract, to order any Work involving delay or any extra payment by the Engineer-in-Charge, nor to make any variation of or in the Works.

iii) The Engineer-in-Charge may, from time to time in writing, delegate to the Engineer-in-Charge's Representative(s) any of the powers and authorities vested in the Engineer-in-Charge and shall furnish to the Contractor a copy of all such written delegations of Powers and authorities. Any written instructions or approval given by the Engineer-in-Charge's Representative(s) to the Contractor within the terms of such delegation, but not otherwise, shall bind

the Contractor as though it had been given by the Engineer-in-Charge. Provided always as follows:

a) Failure of the Engineer-in-Charge's Representative(s) to disapprove any Work or materials shall not prejudice the powers of the Engineer-in-Charge thereafter to disapprove such Work or materials and to order the pulling down, removal or breaking up thereof.

b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer-in-Charge's Representative(s), he shall be entitled to refer the matter to the Engineer-in-Charge, who shall thereupon confirm, reverse or vary such decision.

Clause – 3 Assignment

The Contractor shall not assign the Contract or any part thereof, or any benefit or interest therein or thereunder, otherwise than by a charge in favour of the Contractor's bankers of any money due or to become due under this Contract, without the prior written consent of the PHPA-II.

Clause – 4 Sub-letting

Unless stated in the SCC, the Contractor shall not sub-let the whole of the Works. Except where otherwise provided by the Contract, the Contractor shall not sub-let any part of the Works without the prior written consent of the Engineer-in-Charge, which shall not be unreasonably withheld, and such consent, if given, shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor, his agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents, servants or workmen. Provided always that the provision of labour on a piece work basis shall not be deemed to be a sub-letting under this Clause.

CONTRACT DOCUMENTS

Clause – 5 Language and Law

5.1 The Contract as well as all the correspondence and documents relating to the bid, exchanged by the bidder and the PHPA-II, shall be submitted in the language prescribed in the SCC. All supporting documents and printed literature in connection with the bid shall be in the language specified in the SCC.

5.2 The law to which the Contract is to be subject and according to which the Contract is to be construed shall be as specified in the SCC.

5.3 Documents Mutually Explanatory

Several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies, the documents shall take precedence in the order in which they are set out in the Proforma of Agreement (form no. 1).

Clause – 6 Drawings

6.1 Custody of Drawings

The drawings shall remain in the sole custody of the Engineer-in-Charge, but one copy thereof shall be furnished to the Contractor free of charge. The Contractor shall provide and make, at his own expense, any further copies required by him. At the completion of the Contract, the Contractor shall return to the Engineer-in-Charge all drawings provided under the Contract.

6.2 One copy of drawings to be kept on site.

The drawings, furnished to the Contractor as aforesaid, shall be kept by the Contractor on the Site and the same shall, at all reasonable times, be available for inspection and use by the Engineer-in-Charge and the Engineer-in-Charge's Representative and by any other person authorized by the Engineer-in-Charge in writing.

Clause – 7 Further Drawings and Instructions

The Engineer-in-Charge shall have full power and authority to supply to the Contractor from time to time, during the progress of the Works, such further drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and maintenance of the Works. The Contractor shall carry out and be bound by the same.

GENERAL OBLIGATIONS

Clause – 8 Contractor's General Responsibilities

8.1 The Contractor shall, subject to the provisions of the Contract, and with due care and diligence, execute and maintain the Works and provide all labour, including the supervision thereof, materials, constructional plant and all other things, whether of

a temporary or permanent nature, required in and for such execution and maintenance, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.

8.2 The Contractor shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction, provided that the Contractor shall not be responsible, except as may be expressly provided in the Contract, for the design or specification of the Permanent Works, or for the design or specification of any Temporary Works prepared by the Engineer-in-Charge.

8.3 The Contractor shall promptly inform the Engineer-in-Charge of any error, omission, fault and other defect in the design of or specifications for the Works which are discovered when reviewing the Bidding Documents or in the process of execution of the Works.

8.4 Where no specifications have been laid down, the materials used and the Work done shall conform to the relevant I.S. Code or any internationally accepted Standards or as directed by the Engineer-in-Charge.

8.5 All instructions and orders given by the Engineer-in-Charge at Site are to be maintained in the Site Instruction Book and shall be taken to have been conveyed to the Contractor for his compliance.

8.6 The Contractor must have a site office to receive normal correspondence between 10 AM and 5 PM on working days and urgent correspondence at any time on all days.

Clause – 9 Contract Agreement

The Contractor Shall, when called upon so to do, enter into and execute a Contract Agreement, to be prepared and completed at the cost of the PHPA-II in the Proforma annexed at form no.1, with such modification as may be necessary.

Clause – 10 Performance Security

10.1 For the due performance of the Contract, the Contractor shall furnish to the PHPA-II a performance security equivalent to 10% of the contract price in the form as specified in SCC.

10.2 The proceeds of the performance security shall be payable to PHPA-II as compensation for any loss, resulting from

O/o Chief Engineer Procurement & Contracts Wing PHPA-II Bjimthangkha

Contractor's failure to complete his obligation under the Contract.

10.3 The performance security shall be valid until 30 days after the date of issue of Maintenance Certificate.

10.4 Should the Contract period, for whatever reasons be extended, the Contractor, on receipt of written request from the Engineer-in-Charge, shall at his own cost get the validity period of Bank Guarantee in respect of Performance Security furnished by him extended and shall furnish the extended/revised Bank Guarantee to the Engineer-in-Charge before the expiry date of the Bank Guarantee originally furnished. However, the Bank Guarantee charges for the extended period will be reimbursed at actuals if the Bank Guarantee period is extended for execution of BoQ amount due to the reasons not attributable to the Contractor.

10.5 The Performance Security will be released by the PHPA-II, after the issue of the Maintenance Certificate.

Clause – 11 Inspection of Site

11.1 The PHPA-II shall have made available to the Contractor with the Bidding Documents such data on subsurface conditions as shall have been obtained by or on behalf of the PHPA-II from investigations undertaken relevant to the Works and the Bid shall be deemed to have been based on such data, but the Contractor shall be responsible for his own interpretation thereof.

11.2 The Contractor shall also be deemed to have inspected and examined the Site and its surroundings and information available in connection therewith and to have satisfied himself, so far as is practicable, before submitting his Bid, as to the form and nature thereof, including the subsurface conditions, the hydrological and climatic conditions, the extent and nature of work, and materials necessary for the completion of the Works, means of access to the Site and the accommodation he may require and, in general, shall be deemed to have obtained all necessary information, subject as above mentioned, as to risks, contingencies and all other circumstances which may influence or affect his Bid.

Clause – 12 Sufficiency of Bid

The Contractor shall be deemed to have satisfied himself before bidding as to the correctness and sufficiency of his Bid for the Works and of the rates and prices stated in the priced Bill of Quantities and the Schedule of Rates and Prices, if any, which Bid rates and prices shall, except in-so far as it is otherwise provided in the Contract, cover all his obligations under the Contract, and all matters and things necessary for the proper execution and maintenance of the Works.

Clause – 13 Works to be to the Satisfaction of Engineer-in-Charge

Save in-so-far as it is legally or physically impossible the Contractor shall execute and maintain the Works in strict accordance with the Contract to the satisfaction of the Engineer-in-Charge and shall comply with and adhere strictly to the Engineer-in-Charge's instructions and directions on any matter whether mentioned in the Contract or not, touching or concerning the Works. The Contractor shall take instructions and directions only from the Engineer-in-Charge, or, subject to the limitations referred to in Clause- 2 hereof, from the Engineer-in-Charge's Representative.

Clause – 14 Programme to be Furnished

14.1 Before the date of commencement, the Contractor shall, after the acceptance of his Bid, submit to the Engineer-in-Charge for his approval, a construction programme and quality assurance plan.

14.1.1 Construction Programme

a) The detailed construction programme submitted by the Contractor for orderly completion of the Works, shall show planned sequence of operations and the dates for commencement and completion of all salient feature of the Works.

b) The programme shall cover activities on the Site and procurement and delivery activities.

c) The programme shall be orderly and realistic, and shall be revised at three monthly intervals or as necessary, as the work progresses to meet this requirement and should include a chart of the principal quantities of Work forecast for execution monthly, and a schedule of payments expected to be made to the Contractor by the PHPA-II.

d) If at any time it should appear to the Engineer-in-Charge that the actual progress of the Works does not conform to

the approved programme, the Contractor shall produce, at the request of the Engineer-in-Charge, a revised programme showing the modifications to the approved programme necessary to ensure completion of the Works within the time for completion as defined in **Clause – 43 hereof.**

e) The construction programme shall be in the form of a network diagram and activity listing. The network diagram shall show in detail and in orderly sequence all activities, their descriptions, durations, and dependencies or precedencies, necessary to the completion of the Works.

f) The construction programme and each revision thereof shall be subject to review and approval by the Engineer-in-Charge for conformity with the requirements of this clause. The Contractor shall assist the Engineer-in-Charge in reviewing and evaluating each programme furnished. Disapproved programmes will be returned to the Contractor which shall be revised by him to correct the defects noted, and shall be resubmitted to the Engineer-in-Charge within 15 days after receipt by the Contractor.

g) The Contractor shall, whenever required by the Engineer-in-Charge or Engineer-in-Charge's Representative also provide in writing, for his information a general description of the arrangements such as deployment of modern and efficient machinery, skilled and unskilled labour and methods, which the Contractor proposes to adopt for the execution of Works.

h) The Contractor shall have to obtain prior approval of the Engineer-in-Charge for the sequence of construction which he proposes to adopt.

14.1.2 Quality Assurance Plan

a) The quality assurance program and procedures should be in line with the requirements specified in the Technical Specifications.

b) All costs associated with testing of materials required as per Technical Specifications shall be deemed to be included in the rates/prices in the Bill of Quantities.

14.2 The submission to and approval by the Engineer-in-Charge or Engineer-in-Charge's Representative of such programmes or the furnishing of such particulars shall not relieve the

Contractor of any of his duties or responsibilities under the Contract.

Clause – 15 Contractor's Superintendence

The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer-in-Charge may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor, or a competent and authorized agent or representative approved in writing by the Engineer-in-Charge, which approval may at any time be withdrawn, is to be constantly on the Works and shall give his whole time to the superintendence of the same. If such approval shall be withdrawn by the Engineer-in-Charge, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving written notice of such withdrawal, remove the agent from the Works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another agent approved by the Engineer-in-Charge. Such authorized agent or representative shall receive, on behalf of the Contractor, directions and instructions from the Engineer-in-Charge or subject to the limitations of Clause 2 hereof, the Engineer-in-Charge's Representative.

Clause – 16 Contractor's Employees

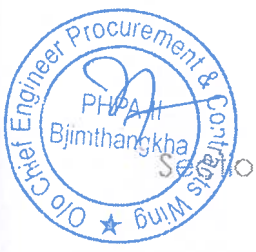
16.1 The Contractor shall provide and employ on the Site in connection with the execution and maintenance of the Works:

a) only such technical assistants as are skilled and experienced in their respective trades and such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise, and

b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the Works.

c) Experienced Safety Officer to maintain and supervise safety requirements at the site of Works. Safety standards shall be followed as provided in these documents.

16.2 The Engineer-in-Charge shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person employed by the Contractor in or about the execution or maintenance of the Works who, in the opinion of the Engineer-in-Charge, misconducts himself, or is incompetent or



negligent in the proper performance of his duties, or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable and such persons shall not be again employed upon the Works without the written permission of the Engineer-in-Charge. Any person so removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Engineer-in-Charge.

Clause – 17 Setting out

The Contractor shall be responsible for the true and proper setting out of the works in relation to original points, lines and levels of reference given by the Engineer-in-Charge in writing and for the correctness, subject as above mentioned, of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in connection therewith. If, at any time during the progress of Works, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required so to do by the Engineer-in-Charge or the Engineer-in-Charge's Representative, shall at his own cost, rectify such error to the satisfaction of the Engineer-in-Charge or the Engineer-in-Charge's Representative, unless such error is based on incorrect data supplied in writing by the Engineer-in-Charge or the Engineer-in-Charge's Representative, in which case the expense of rectifying the same shall be borne by the PHPA-II. The checking of any setting out or of any line, alignment, grade, dimensions or level by the Engineer-in-Charge or the Engineer-in-Charge's Representative shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all bench marks, pegs and other things used in setting out the Works.

Clause – 18 Boreholes and Exploratory Excavation

If, at any time during the execution of the Works, the Engineer-in-Charge shall require the Contractor to make boreholes or to carry out exploratory excavation, such requirement shall be ordered in writing and shall be deemed to be an addition ordered under the provisions of **Clause-51** hereof, unless a provision in respect of such anticipated work shall have been included in the Bill of Quantities.

Clause – 19 Watching and Lighting

19.1 The Contractor shall, in connection with the Works, provide and maintain at his own cost, all lights, guards, fencing and watching when and where necessary or required by the Engineer-in-Charge or the Engineer-in-Charge's

Representative, or by any duly constituted authority, for the protection of the Works, or for the safety and convenience of the public or others.

19.2 The Contractor shall also be responsible for temporary roadways, footways, guards, fences, caution notices etc. as far as the same may be rendered necessary by reason of the Work for the pedestrians or other traffic and of owners and occupiers of the adjacent property and of the public and shall remain responsible for any accidents that may occur on account of his failure to take proper and timely precautions. In default thereof, the Engineer-in-Charge may provide such fencing, lights, ventilation and watchmen as he may deem necessary and charge the cost thereof to the Contractor.

Clause – 20 Care of Works

20.1 The Contractor shall take full responsibility for the care of the Works from the date of Commencement of Works until the date of issue of the Completion Certificate for the whole of the Works when the responsibility for the said care shall pass to the PHPA-II.

20.2 In the event of any loss or damage to the Works or any part thereof, during the period for which the Contractor is responsible for the care thereof, from any cause whatsoever, other than the risks defined in **Sub-Clauses 20.5 & 20.6** of this Clause, the Contractor, at his own cost, shall rectify such loss or damage so that the Permanent Works conform in every respect with the provisions of the Contract to the satisfaction of the Engineer-in-Charge. The Contractor shall also be liable for any loss or damage to the Works occasioned by him in the course of any operation carried out by him for the purpose of complying with his obligations under **Clause – 49 & 50.**

20.3 In the event of any loss or damage to the Permanent Works which may occur or arise out of any of the Risks defined in Sub-**Clause 20.5** of this Clause, the same shall be made good/rectified by the Contractor, if and to the extent required by the Engineer-in-Charge, at the cost of the PHPA-II which sum shall be determined by the Engineer-in-Charge in accordance with **Clause -51 and Clause -52.**

20.4 In the event of any loss or damage which may occur or arise out of any of the risks defined in **Sub-Clause 20.6** of this Clause, neither party to the Contract shall be liable to the other for any such loss or damage. However, in the event of any loss or

damage to the Permanent Works arising as a consequence of the risk(s) defined in **Sub-Clause 20.6** of this Clause the same shall be made good/rectified by the Contractor at the cost of the PHPA-II which sum shall be determined by the Engineer-in-Charge under the provisions of the Contract.

20.5 The PHPA-II's risks are as under;

a) loss or damage due to the use or occupation by the PHPA-II of any section or part of the Permanent Works except as may be provided for in the Contract.

b) loss or damage to the extent that it is due to the design of the Works other than any part of the design provided by the Contractor.

20.6 Force Majeure/Excepted risks are as under:

a) War, hostilities (whether war be declared or not), invasion, act of foreign enemies, act of public enemies.

b) ionizing, radiations or contamination by radio activity from any nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly.

c) Pressure waves caused by aerial devices traveling at supersonic speeds.

d) Riot, commotion, disorder, strike or lockout by persons other than the Contractor's personnel.

e) Any operation of the forces of nature against which an experienced Contractor could not reasonably have been expected to take precautions.

Clause – 21 Insurance of Plant & Equipment

The Contractor shall take insurance cover to the replacement value, for the Constructional Plant, equipment and other things brought on to the site by him.

Clause – 22 Damage to persons and Property

The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the PHPA-II against all losses and claims in respect of injuries or damage to any persons or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution and maintenance of the Works and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation or damages for or with respect to injuries or damage to persons or property resulting from

any act or neglect of the PHPA-II, his agent, servants, or other Contractors, not being employed by the Contractor, or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the Contractor, his servants or agents, such part of the compensation as may be just and equitable having regard to the extent of the responsibility of the PHPA-II, its servants or agents or other Contractors for the damage or injury.

Clause – 23 Third Party Insurance

23.1 Before commencing the execution of the Works the Contractor, but without limiting his obligations and responsibilities under **Clause – 22** hereof, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the PHPA-II, or to any person, including any employee of the PHPA-II, by or arising out of the execution of the Works or in the carrying out of the Contract.

23.2 The Contractor shall, whenever required, produce to the Engineer-in-Charge or the Engineer-in-Charge's Representative the original policy or policies of insurance and the receipts for payment of the current premiums and furnish attested copies thereof.

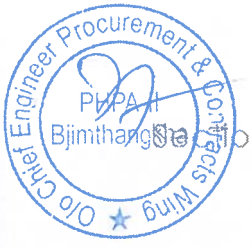
23.3 Provision to Indemnify PHPA-II

The terms shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive indemnity under the policy being brought or made against the PHPA-II, the insurer will indemnify the PHPA-II against such claims and any costs, charges and expenses in respect thereof.

Clause – 24 Accident or Injury to Workmen

24.1 The PHPA-II shall not be liable for or in respect of any damages or compensation payable according to law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any sub-Contractor, save and except an accident or injury resulting from any act or default of the PHPA-II, its agents, or servants.

The Contractor shall indemnify and keep indemnified the PHPA-II against all such damages and compensation, save and except as aforesaid, and against all claims, proceedings,



costs, charges and expenses whatsoever in respect thereof or in relation thereto.

24.2 On the occurrence of accident arising out of the Works which result in death, or which is so serious as to be likely to result in death, the Contractor shall, within twenty four hours of such accident, repot in writing to the Engineer-in-Charge and other statutory bodies of the Government the facts stating clearly and in sufficient details the circumstances of such accident and the subsequent action. All other accidents on the Works involving injuries to persons or damage to property other than that of the Contractor shall be promptly reported to the Engineer-in-Charge and other statutory bodies of the Government stating clearly and in sufficient details of the facts and circumstances of the accidents and the action taken. In all cases the Contractor shall indemnify the PHPA-II against all loss or damage resulting directly or indirectly from the Contractor's failure to report in the manner aforesaid. This includes penalties or fines, if any, payable by the PHPA-II as a consequence of failure to give notice or failure to conform to the provisions of any Act in regard to such accidents.

24.3 Insurance against Accident, etc. to Workmen

The Contractor shall insure against such liability with any insurance companies in Bhutan, which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall, when required, produce to the Engineer-in-Charge or the Engineer-in-Charge's Representative such policy of insurance and the receipt for payment of the current premium. Provided always that, in respect of any persons employed by any sub-contractor, the Contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the PHPA-II is indemnified under the policy, but the Contractor shall require such sub-contractor to produce to the Engineer-in-Charge or the Engineer-in-Charge's Representative, when required, such policy of insurance and the receipt for the payment of the current premium.

Clause – 25 Remedy on Contractor's Failure to Insure

If the Contractor shall fail to affect and keep in force the insurances referred to in **Clauses – 21, 23 and 24** hereof, or any other insurance which

he may be required to affect under the terms of the Contract, then and in any such case the PHPA-II may affect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the PHPA-II as aforesaid from any money due or which may be become due to the Contractor, or recover the same as a debt due from the Contractor.

Failure of the Contractor to maintain adequate insurance cover as set out under **Clause – 21, 23 and 24** hereof or any other insurance which he may be required to affect under the terms of the Contract, shall not relieve him of any Contractual responsibility.

Clause – 26 Giving of Notices, Payment of Fees and Compliance with Statutes and Regulations etc.

26.1 Giving of Notices and Payment of Fees

The Contractor shall give all notices and pay all fees required to be given or paid by any Statute, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution of Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works.

26.2 Compliance with Statutes, Regulations etc.

The Contractor shall conform in all respects with the provisions of any such Statute, Ordinance or Law as aforesaid and the regulations or bye-laws of any local or other duly constituted authority which may be applicable to the Works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the PHPA-II indemnified against all penalties and liability of every kind for breach of any such Statute, Ordinance or Law, regulation or by-law.

26.3 The PHPA-II will repay or allow to the Contractor all such sums as the Engineer-in-Charge shall certify to have been properly payable and paid by the Contractor in respect of such fees.

Clause – 27 Fossils etc.

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the Site of the Works shall, as between the PHPA-II and the Contractor, be deemed to be the absolute property of the PHPA-II/RGoB. The Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall

immediately upon discovery thereof and, before removal, acquaint the Engineer-in-Charge or the Engineer-in-Charge's Representative of such discovery and carry out, at the expenses of the PHPA-II, the Engineer-in-Charge's or the Engineer-in-Charge's Representative's orders as to the disposal of the same.

Clause – 28 Patent Rights and Royalties

28.1 The Contractor shall save harmless and indemnify the PHPA-II from and against all claims and proceedings for or on account of infringement of any patent rights, designs, trademark or name or other protected rights in respect of any Constructional Plant, machine, work, or material used for or in connection with the Works or any of them and from and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. Except where otherwise specified, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay, timber or other construction materials required from Bhutan for the Project.

28.2 In the event of any claims made under or action brought against the PHPA-II in respect of any such matters as aforesaid, the Contractor shall be immediately, notified thereof and the Contractor shall be at liberty, at his own expense, to settle any disputes or to conduct any litigation that may arise therefrom. Provided that the Contractor shall not be liable to indemnify the PHPA-II if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

Clause – 29 Interference with Traffic and Adjoining Properties

All operations necessary for the execution of the Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the convenience of the public, or the access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the PHPA-II or of any other person. The Contractor shall save harmless and indemnify the PHPA-II in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters in-so-far as the Contractor is responsible there for.

Clause – 30 Extraordinary Traffic

28.1 Protection of Highways and Bridges

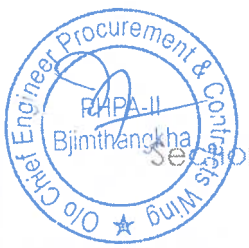
The Contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his sub-contractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic, as will inevitably arise from the moving of plant and material from and to the Site, shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such highways and bridges.

28.2 Special Loads

Should it be found necessary for the Contractor to move one or more loads of Constructional Plant, machinery or pre-constructed units or parts of units of work over part of a highway or bridge, the moving whereof is likely to damage any highway or bridge unless special protection or strengthening is carried out, then the Contractor shall, before moving the load on to such highway or bridge, give notice to the Engineer-in-Charge or Engineer-in-Charge's Representative of the weight and other particulars of the load to be moved and his proposals for protecting or strengthening the said highway or bridge. Unless within fourteen days of the receipt of such notice, the Engineer-in-Charge shall, by counter-notice, direct that such protection or strengthening is unnecessary, then the Contractor will carry out such proposals or any modification thereof that the Engineer-in-Charge shall require and, unless there is an item or are items in the Bill of Quantities for pricing by the Contractor of the necessary works for the protection or strengthening aforesaid, the costs thereof shall be paid by the PHPA-II to the Contractor.

28.3 Settlement of Extraordinary Traffic Claims

If during the execution of the Works or at any time thereafter the Contractor shall receive any claim arising out of the execution of the Works in respect of damage or injury to highways or bridges, he shall immediately report the same to the Engineer-in-Charge and thereafter the PHPA-II shall negotiate the settlement of and pay all sums due in respect of such claim and shall indemnify the Contractor in respect thereof and in respect of all claims, proceedings, damages,



costs, charges and expenses in relation thereto. Provided always that if and so far as any such claims or part thereof shall, in the opinion of the Engineer-in-Charge, be due to any failure on the part of the Contractor to observe and perform his obligations under sub-clauses 30.1 and 30.2 of this Clause, then the amount certified by the Engineer-in-Charge to be due to such failure shall be paid by the Contractor to the PHPA-II.

Clause – 31 Opportunities for other Contractors

The Contractor shall, in accordance with the requirements of the Engineer-in-Charge, afford all reasonable opportunities for carrying out their works to any other Contractors employed by the PHPA-II and their workmen and to the workmen of the PHPA-II and of any other duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any Contract which the PHPA-II may enter into in connection with or ancillary to the Works.

Clause – 32 Contractor to keep Site clear

32.1 During the progress of the Works, the Contractor shall keep the site reasonably free from all unnecessary obstructions and shall store or dispose of any Constructional plant and surplus materials and clear away and remove from the site any wreckage, rubbish or Temporary Works no longer required.

32.2 In case the Contractor does not keep the area clean and if found necessary to get the area cleaned, the Engineer-in-Charge shall issue a notice of forty eight hours, and in the event of non-compliance by the Contractor, get the area cleaned by some other agency. The cost of such cleaning shall be borne by the Contractor. In case of rubbish accumulating due to deposition by more than one Contractor, the share of charges to be borne by the Contractors as indicated by the Engineer-in-Charge shall be final.

Clause – 33 Clearance of Site on Completion

On the completion of the Works, the Contractor shall clear away and remove from the Site all Constructional Plant, surplus materials, rubbish and Temporary Works of every kind, and leave the whole of the site and Works clean and in a workman like condition to the satisfaction of the Engineer-in-Charge.

LABOUR

Clause – 34 Labour

34.1 Engagement of Labour

The Contractor shall make his own arrangements for the engagement of all labour local or otherwise, and, save in-so-far as the Contract otherwise provides, for the transport housing, feeding and payment thereof. The Contractor shall not employ in connection with the Works any person who has not completed 18 years of age. No female labour shall be employed in night shifts. The Contractor shall have to arrange permits for the labour/staff for their entry into Bhutan, at his own cost. The recruitment of labour force, technical, administrative and other personel of the contractor engaged on the project will be confined to nationals of Bhutan and India. However, the Contractor shall recruit local manpower (skilled and unskilled) and use local resources to the extent possible

34.2 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site, to the satisfaction of the Engineer-in-Charge or his Representative, an adequate supply of drinking and other water for the use of the Contractor's staff and workmen.

34.3 Alcoholic Liquor & Drugs

The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances and Government Regulations or orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor, or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his Sub-Contractors, agents or employees.

34.4 Disorderly Conduct, etc.

The Contractor shall, at all times, take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his employees and for the preservation of peace and protection, of persons and property in the neighbourhood of the Works against the same.

34.5 Contractor to Follow Labour Laws

The Contractor shall, in respect of labour employed by him, comply with the provision of the various labour laws, Minimum Wages as per regulations issued by RGoB and shall indemnify

the PHPA-II in respect of all claims that may be made against the PHPA-II for non-compliance thereof by the Contractor.

Notwithstanding anything contained herein, the Engineer-in-Charge may take such actions as may be necessary for compliance of the various labour laws and recover the costs thereof from the Contractor.

34.6 Observance by Sub-Contractors

The Contractor shall be responsible for observance by his Sub-Contractors of the foregoing provisions.

Clause – 35 Returns of labour etc.

The Contractor shall, deliver to the Engineer-in-Charge or his Representative, a return in detail in such form and at such intervals as the Engineer-in-Charge may prescribe showing the supervisory staff and the number of the several classes of labour from time to time employed by the Contractor on the site and such information in respect of constructional plant as the Engineer-in-Charge may require.

MATERIALS AND WORKMANSHIP

Clause – 36 Materials and Workmanship

36.1 Materials and Workmanship

a) The Contractor shall be responsible for arranging all the materials required for the construction of the Works from the source(s) acceptable to the PHPA-II. He shall also be responsible for proper transportation and storage of these materials to the satisfaction of the Engineer-in-Charge and shall bear all related costs.

b) The Engineer-in-Charge shall be entitled at any reasonable time, to inspect or examine all such materials. The Contractor shall provide reasonable assistance for such inspection or examination as may be required.

c) The Contractor shall initiate timely action to procure the materials well in advance so as to ensure that the progress of Works does not suffer for want of the materials on the site at least thirty days before these are intended to be used on Works. Any setback to the progress of the Works and consequent delay in completion of the Works on account of non-availability of materials on Site shall be the sole responsibility of the Contractor.

O/o Chief Engineer Procurement & Contracts PHPA-II Bjimthangkha

d) Any assistance that the Engineer-in-Charge can give to the Contractor for arranging the materials shall be provided on a "no responsibility basis".

36.2 Quality of materials and Workmanship and Tests

(a) The Contractor shall, provide the materials of the quality, kind and specifications as provided in the Contract. The Contractor shall produce to the Engineer-in-Charge, certified quality test reports in respect of the materials procured by him.

(b) In case the materials procured by the Contractor are not to the satisfaction of the Engineer-in-Charge and do not conform to the specifications laid in the Contract, such materials shall be rejected by the Engineer-in-Charge and the cost incurred on such procurement shall be responsibility of the Contractor.

(c) The Bidders shall specify, in their Bid, the source of supply of the key materials to satisfy the PHPA-II that the materials of standard quality and specifications are procured. In case the source specified by the Bidder is not acceptable to the PHPA-II, the Bidder shall be required to substitute the source by an acceptable source. Additional suppliers and change of suppliers shall be subject to the approval of the Engineer-in-Charge.

(d) The workmanship shall be of the kind described in the Contract and in accordance with the Engineer-in-Charge's instructions.

(e) All the materials and the workmanship shall be subjected, from time to time, to such tests as the Engineer-in-Charge may require at the place of manufacture, fabrication or preparations, or on the Site or at such other place or places as may be specified in the Contract, or at all of any of such places. The Contractor shall provide such assistance, instruments, machines, labour and materials as are required for examining, measuring and testing any material and shall supply samples of materials, before incorporation in the Works, for testing, as may be selected and required by the Engineer-in-Charge.

36.3 Cost of Samples

All samples shall be supplied by the Contractor at his own cost.

36.4 Cost of Tests

The cost of making any test intended by or provided for in the Contract shall be borne by the Contractor.

36.5 Cost of Tests not provided for etc.

If any test is ordered by the Engineer-in-Charge which is either:

a. Not so intended by or provided for, or

b. (In the cases above mentioned) is not so particularized, or

c. (though so intended or provided for) is required by the Engineer-in-Charge to be carried out at any place other than the site or the place of manufacture or fabrication or preparation, of the materials tested, shows the workmanship or materials not to be in accordance with the provisions of the Contract or the satisfaction of the Engineer-in-Charge, then the cost of such test shall be borne by the Contractor.

Clause – 37 Inspection of Operations

The Engineer-in-Charge or any person authorized by him shall, at all times, have access to the Works and to all workshops and places where the Work is being prepared or from where materials, manufactured articles or machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

Clause – 38 Examination of Work before covering up

38.1 No Work shall be covered up or put out of view without the approval of the Engineer-in-Charge or his Representative and the Contractor shall afford full opportunity for the Engineer-in-Charge or the Engineer-in-Charge's Representative to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereof. The Contractor shall give due notice whenever any such work or foundations is or are ready or about to be ready for examination and the Engineer-in-Charge or the Engineer-in-Charge's Representative shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or of examining such foundations.

38.2 Uncovering and making Openings

The Contractor shall uncover any part or parts of the Works or make openings in or through the same as the Engineer-in-Charge or Engineer-in-Charge's Representative may, from time to time, direct and shall reinstate and make good such part or

parts to the satisfaction of the Engineer-in-Charge and all such costs shall be borne by the Contractor.

Clause – 39 Removal of Improper Work and Materials

34.1 The Engineer-in-Charge shall have power to issue instructions from time to time for;

a) the removal from the Site, within such time or times as may be specified in the instructions, of any materials which, in the opinion of the Engineer-in-Charge, are not in accordance with the Contract,

b) the substitution of proper and suitable materials, and

c) the removal and proper re-execution, notwithstanding any previous test thereof or interim payment there for, of any work which in respect of materials or workmanship is not, in the opinion of the Engineer-in-Charge, in accordance with the Contract.

34.2 Default of Contractor in Compliance

In case of default on the part of the Contractor in carrying out such instruction, as specified in **sub-clause 39.1** of this clause, the Engineer-in-Charge shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Engineer-in-Charge or may be deducted from any money due or which may become due to the Contractor.

Clause – 40 Suspension of Work

34.1 The Contractor shall, on the written order of the Engineer-in-Charge, suspend the progress of the Works or any part thereof for such time or times and in such manner as the Engineer-in-Charge may consider necessary and shall, during such suspension, properly protect and secure the Works, or such part thereof, so far as is necessary in the opinion of the Engineer-in-Charge. The extra cost incurred by the Contractor in giving effect to the instructions of the Engineer-in-Charge under this Clause shall be borne and paid by the PHPA-II unless such suspension is:

a) otherwise provided for in the Contract, or

b) necessary by reason of some default of or breach of Contract by the Contractor, or

c) necessary by reasons of climatic conditions on the Site, or

d) necessary for the proper execution of the Works or for the safety of the Works or any part thereof in so far as such necessity does not arise from any act or default by the Engineer-in-Charge or from any of the risks defined in **Sub-Clause – 20.6** hereof.

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives written notice of his intention to claim to the Engineer-in-Charge within twenty eight days of the order of the Engineer-in-Charge. The Engineer-in-Charge shall settle and determine such extra payment and/or extension of time under **Clause-44** hereof to be made to the Contractor in respect of such claim as shall, in the opinion of the Engineer-in-Charge be fair and reasonable.

34.2 Suspension lasting more than 90 days

If the progress of the Works or any part thereof is suspended on the written order of the Engineer-in-Charge and if permission to resume work is not given by the Engineer-in-Charge within a period of ninety days from the date of suspension, then, unless such suspension is within paragraph (a), (b), (c) or (d) of **sub-clause 40.1** of this Clause, the Contractor may serve a written notice on the Engineer-in-Charge requiring permission within twenty eight days from the receipt thereof to proceed with the Works, or that part thereof in regard to which progress is suspended and if such permission is not granted within that time, the Contractor by a further written notice so served may, but is not bound to, elect or treat the suspension where it affects part only of the Works as an omission of such part under **Clause – 51** hereof, or, where it affects the whole Works, as an abandonment of the Contract by the PHPA-II.

COMMENCEMENT AND DELAYS

Clause – 41 Commencement of Works

The Contractor shall commence the Works on Site within a period specified in the SCC and shall proceed with the Works with due expedition and without delay.

Clause – 42 Possession of Site

34.1 Save in so far as the Contract may prescribe, the extent of portions of the Site of which the Contractor is to be given possession from time to time, and the order in which such

portion shall be made available to the Contractor, and subject to any requirement in the Contract as to the order in which the Works shall be executed, the Engineer-in-Charge will after issuing written order to commence the Works, give to the Contractor possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the programme referred to in **Clause – 14 hereof,** if any, and otherwise in accordance with such reasonable proposals of the Contractor as he shall, by written notice to the Engineer-in-Charge, make and will, from time to time as Works proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due despatch in accordance with such programme or proposals, as the case may be. If the Contractor suffers delay or incurs cost from failure on the part of the Engineer-in-Charge to give possession in accordance with the terms of this Clause, the Engineer-in-Charge shall grant an extension of time for the completion of the Works and certify such sum as, in his opinion, shall be fair to cover the cost incurred, which sum shall be paid by the PHPA-II.

The Contractor shall not be allowed to occupy other Government and/or PHPA-II land for temporary uses or otherwise without the prior consent of the Engineer-in-Charge.

34.2 Rights of Way and Facilities

The Contractor shall bear all costs and charges for special or temporary rights of way required by him in connection with access to the Site. The Contractor shall also provide, at his own cost, any additional facilities outside the Site required by him for the purpose of the Works.

Clause – 43 Time for Completion

The period of completion of the whole of the Work shall be as mentioned in the SCC and LOA or such extended time as may be allowed under **Clause – 44** hereof. The period of completion shall be reckoned from the date of signing of contract.

Clause – 44 Extension of Time for Completion

Should the amount of extra or additional work of any kind or any cause of delay referred to in these Conditions, or exceptional adverse climatic conditions, or other special circumstances of any kind whatsoever which

may occur, other than through a default of the Contractor, be such as fairly to entitle the Contractor to an extension of time for the Completion of the Works, the Engineer-in-Charge shall determine the period of such extension and shall notify the Contractor accordingly. Provided that the Engineer-in-Charge is not bound to take into account any extra or additional or other special circumstances unless the Contractor has, within 28 days after such work has been commenced, or such circumstances have arisen, or as soon thereafter as is practicable, submitted to the Engineer-in-Charge, full and detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time. The Contractor shall not be entitled to any payment for the time related costs incurred by him, if any, except those provided under the Contract, during the extended period for completion of Works.

Clause – 45 Shift Works

45.1 To achieve the required progress, the Work may be required to be carried out round the clock. The period of completion and number of working days shall not be affected by the number of shifts each day. No extra amount on account of any shift work is payable to the Contractor.

45.2 Whenever the Work is carried out at night, adequate lighting of working areas and access paths shall be provided by the Contractor at his cost. Sufficient notice shall be given by the Contractor to the Engineer-in-Charge regarding details of Works in shifts so that necessary supervision could be provided.

Clause – 46 Rate of Progress

46.1 To ensure proper progress during the execution of the Works, the Contractor shall complete 1/8th of the Works before 1/4th of the whole time allowed in the Contract has elapsed, 3/8th of the Works before one half of such time has elapsed and 3/4th of Works before 3/4th of such time has elapsed.

46.2 If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works of any section at any time is not commensurate with the rate of progress stipulated in **Sub-clause 46.1** of this Clause and in the opinion of the Engineer-in-Charge does not ensure completion by the prescribed time or extended time for completion, the Engineer-in-Charge shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as are necessary and the Engineer-in-Charge may approve to

expedite progress so as to complete the Works or such section by the prescribed time or extended time. The Contractor shall not be entitled to any additional payment for taking such steps.

Clause – 47 Liquidated Damages for Delay

47.1 If the Contractor shall fail to achieve completion of the Works within the time, then the Contractor shall pay to the PHPA-II, the sum stated in the SCC as liquidated damages for such default for every day or part of a day which shall elapse between the time prescribed in the contract and the date of certified completion of the Works. The PHPA-II may without prejudice to any other method of recovery, deduct the amount of such damages from any money in its hands, due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

47.2 The aggregate of the liquidated damages payable to the PHPA-II under this clause shall be subject to a maximum of ten percent of the Contract Price.

Clause – 48 Certification of Completion of Works

When the whole of the Works have been completed and have satisfactorily passed any final test that may be prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer-in-Charge or to the Engineer-in-Charge's Representative(s). Such notice and undertaking shall be in writing and shall be deemed to be a request by the Contractor for the Engineer-in-Charge to issue a Certificate of Completion in respect of the Works. The Engineer-in-Charge shall, within twenty-one days of the date of delivery of such notice either issue to the Contractor, a Certificate of Completion stating the date on which, the Works are completed in accordance with the Contract or give instructions in writing to the Contractor specifying all the Works which, in the Engineer-in-Charge's opinion, are required to be done by the Contractor before the issue of such Certificate. The Engineer-in-Charge shall also notify the Contractor of any defects in the Works affecting completion that may appear after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such Certificate of Completion within twenty-one days of completion to the satisfaction of the Engineer-in-Charge of the Works so specified and making good any defects so notified.

MAINTENANCE AND DEFECTS

Clause – 49 Maintenance and Defects

49.1 Period of Maintenance

In these Conditions, the expression "Period of Maintenance" shall mean a period defined in the SCC calculated from the date of completion of the Works, certified by the Engineer-in-Charge in accordance with **Clause – 48** hereof.

49.2 Execution of Work of Repair, etc.

To the intent that the Works shall, at or as soon as practicable after the expiration of the Period of Maintenance be delivered to the PHPA-II in the condition required by the Contract, fair wear and tear excepted, to the satisfaction of the Engineer-in-Charge, the Contractor shall complete the work, if any, outstanding on the date of completion, as certified under **Clause – 48** hereof, as soon as practicable after such date and shall execute all such work of repair, amendment, reconstruction, rectification and making goods defects, imperfections, shrinkages or other faults as may be required of the Contractor in writing by the Engineer-in-Charge during the Period of Maintenance or within fourteen days after its expiration, as a result of an inspection made by or on behalf of the Engineer-in-Charge prior to its expiration.

49.3 Cost of Execution of Works of Repair, etc.

All repair works shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer-in-Charge, be due to the use of materials or workmanship not in accordance with the Contract, or due to neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract. If, in the opinion of the Engineer-in-Charge such necessity shall be due to any other cause, the value of such work shall be ascertained and paid for as if it were additional work.

49.4 Remedy on Contractor's Failure to carry out Work Required

If the Contractor shall fail to do any such work as aforesaid required by the Engineer-in-Charge, the PHPA-II shall be entitled to employ and pay other persons to carry out the same and if such work is the work which, in the opinion of the Engineer-in-Charge, the Contractor was liable to do at his own expense under the Contract, then all expenses consequent

there on or incidental thereto shall be recoverable from the Contractor by the Engineer-in-Charge from any money due or which may become due to the Contractor.

Clause – 50 Contractor to Search

The Contractor shall, if required by the Engineer-in-Charge in writing, search under the directions of the Engineer-in-Charge for the cause of any defect, imperfection or fault appearing during the progress of the Works or in the Period of Maintenance. Unless such defect, imperfection or fault is one for which the Contractor is liable under the Contract, the cost of work carried out by the Contractor in searching as aforesaid shall be borne by the PHPA-II. If such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of **Clause – 49** hereof.

ALTERNATIONS, ADDITIONS, OMISSIONS AND EXTRA ITEMS

Clause – 51 Variations

51.1 The Engineer-in-Chare shall make any variation in the form, quality or quantity of the Works or any part thereof or substitution for original specifications, design, drawings and instructions that may, in his opinion be necessary and for that purpose, or if for any other reason it shall, in his opinion be appropriate, he shall have power to order the Contractor to do and the Contractor shall do any or all of the following:

a) increase or decrease the quantity of any work included in the Contract,

b) omit or substitute any such work,

c) change the character or quality or kind of any such work

d) change the levels, lines, positions and dimensions of any part of the works

e) execute, additional work of any kind necessary for the completion of the Works, and

f) Change any specified sequence, or timing of construction of any part of the Works.

No such variations shall in any way vitiate or invalidate the Contract, but the effect if any, of all such variations shall be valued in accordance with **Clause – 52** hereof.

Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of Contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor. Any altered, additional or substituted work which the Contractor may be directed to do in the manner above specified as part of the Work, shall be carried out by the Contractor on the same conditions in all respects on which he agreed to do the main Work.

51.2 The Unit Rates entered in the Bill of Quantities for the individual items shall apply for the quantities of Work increased or decreased by not more than thirty percent (30%) for each item.

51.3 Should the quantity of Work actually executed under any item exceed by more than thirty percent (30%) of the quantity provided in the Bill of Quantities for that item, the rate for such excess over 130% quantity under the item may be revised in accordance with the procedure indicated under **Clause – 52** hereof.

51.4 Should the quantity of work actually involved under any item, get reduced by more than 30% of the quantity provided in the Bill of Quantities for that item, the rate for that item may be revised in accordance with the procedure indicated in **Clause – 52.** The payment for this item will continue to be made at the original rate till revised rate is decided.

Clause – 52 Extra Items

52.1 The rates for such items of Work as are required to be executed due to variations, as stated in **Clause – 51** above shall be payable in the manner as stated hereunder:

52.2 The rates already provided in the Bill of Quantities, shall apply in respect of the same item(s) of Works to be executed due to variation subject to provisions of **Clause – 51.2** above.

52.3 For the variation in quantities in respect of item(s) exceeding the prescribed limits of ± 30% as aforesaid, the rates for such item(s) and the rates for extra items not existing in the Bill of Quantities for the respective sub-head shall be determined by the Engineer-in-Charge on the basis of actual analysed cost comprising of the cost of materials to be supplied by the Contractor (including transportation and taxes, levies if paid), wages of labour actually engaged for the particular work and 80% (skilled labour) & 55% (unskilled labour) thereof on the cost

of such labour component so as to cover the fringe benefits and other indirect/incidental expenses required to be actually incurred on the labour by the Contractor including cost on account of compliance with all the Acts, Laws, Statutes, Regulations or Bye Laws pertaining to labour, cost of ownership and operation and maintenance of plant and machinery used for the work plus 20% to cover the Contractor's overheads, profits. The above indirect labour charges are as per CWC guide lines. If, as and when, there is any revision of the CWC guidelines in these percentages of hidden charges, such revised percentages shall be made applicable. The profit element shall be 10 (ten) percent. The hourly use rate of equipment shall be worked out as per latest CWC guidelines.

For the purpose of Price adjustment, the rates analysed as above will be de-escalated to base date and Price adjustment will be applied as per **Clause-70.**

The decision of Engineer-in-Charge in deriving rates as aforesaid, shall be conclusive and binding on the Contractor.

52.4 If requested by the Contractor the time for completion of the work shall, in the event of any variation resulting in additional cost over the Contract Price, be extended in the proportion which the altered, additional or substituted work bears to the original Contract Price plus such further additional time as may be considered reasonable by the Engineer-in-Charge whose decision shall be conclusive as to such provision.

52.5 Under no circumstances, the Contractor shall at any stage suspend the work on account of non-settlement of rates of such varied Work.

PLANT, TEMPORARY WORKS AND MATERIALS

Clause – 53 Plant, Temporary Works and Materials

53.1 Contractor to Provide Plant

The Contractor shall provide at his own expense all Constructional Plant, Temporary Work and materials including Equipment, Materials and Camps required for the execution of the Works.

53.2 Plant etc., Exclusive Use for the Works

All Constructional Plant, Temporary Works and materials provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the

O/o Chief Engineer Procurement & Contracts Wing PHPA-II Bjimthangkha

Work and the Contractor shall not remove the same or any part thereof, except for the purpose of moving it from one part of the Site to another, without the consent, in writing, of the Engineer-in-Charge.

53.3 Removal of Plant etc.

Upon completion of the Works, the Contractor shall remove from the Site all the said Constructional Plant and Temporary works remaining thereon and any unused materials provided by the Contractor.

53.4 PHPA-II not Liable for Damage to Plant etc.

The PHPA-II shall not at any time be liable for the loss of or damage to any of the said Constructional Plant, Temporary Works or materials save as mentioned in **Clause – 20** and **Clause – 65** hereof.

53.5 Customs Clearance

The PHPA-II will assist the Contractor where required, in obtaining import license and import duty exemption certificate for third country imports of Constructional Plant and other things required for the works. The Contractor shall be responsible for customs clearance at the port of destination and payment of customs fee and customs clearance charges etc.

Clause – 54 Approval of Materials etc. not implied

The operation of **Clause – 53** hereof shall not be deemed to imply any approval by the Engineer-in-Charge of the materials or other matters referred to there-in nor shall it prevent the rejection of any such materials at any time by the Engineer-in-Charge.

MEASUREMENT

Clause – 55 Quantities

The quantities set out in the Bill of Quantities are the estimated quantities of the Work, but they are not to be taken as the actual quantities of the Works to be executed by the Contractor in fulfillment of his obligations under the Contract.

Clause – 56 Works to be measured

The Engineer-in-Charge shall, except as otherwise stated, ascertain and determine by measurement the value in terms of the Contract of work done in accordance with the Contract. He shall, when he requires any part

or parts of the Works to be measured, give notice to the Contractor's authorized agent or representative, who shall forthwith attend or send a qualified agent to assist the Engineer-in-Charge in making such measurement, and shall furnish all particulars required by either of them. Should the Contractor not attend, or neglect or omit to send such agent, then the measurement made by the Engineer-in-Charge or approved by him shall be taken to be the correct measurement of the work. For the purpose of measuring such permanent work as it to be measured by records and drawings, the Engineer-in-Charge's Representative shall prepare records and drawings month by month of such work and the Contractor, as and when called upon to do in writing, shall, within fourteen days, attend to examine and agree such records and drawings with the Engineer-in-Charge's Representative and shall sign the same when so agreed. If the Contractor does not so attend to examine and agree such records and drawings, they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree with the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor shall, within fourteen days of such examination, lodge with the Engineer-in-Charge's Representative for decision by the Engineer-in-Charge, notice in writing of the respects in which such records and drawings are claimed by him to be incorrect.

Clause – 57 Method of Measurement

The Works shall be measured net, not withstanding any general or local custom, except where otherwise specifically described or prescribed in the Contract.

Clause – 58 Security Rules

The Project shall be a protected Area. The Contractor, his employees and labourers shall have to follow the Security Rules as may be imposed from time to time by the Engineer-in-Charge. If the Contractor, his employees or labourers are found to be reluctant to follow the Rules, the Engineer-in-Charge will have the right to prohibit such persons from entering into the Project Area.

Clause – 59 Personnel

59.1 The Contractor shall submit to the PHPA-II, the details and bio-data of all personnel he proposes to bring into Bhutan for the performance of the Works under the Contract. Such data for each person shall, besides the proof of his citizenship, contain the name, his present address, his assignment and responsibility in connection with the Works, and a short resume of his

qualifications, experience etc. in relation to the Works to be performed by him.

59.2 Any person unsuitable and unacceptable to the PHPA-II shall not be brought to Bhutan. Any person, if found unsuitable or unacceptable to the PHPA-II on a later date, shall within a reasonable time, be repatriated by the Contractor, who shall make alternative arrangements for providing a suitable replacement

59.3 No person brought to Bhutan for the purposes of the Works shall be repatriated without the consent of the PHPA-II in writing, which shall be based on a written request from the Contractor for such repatriation giving reasons for such an action to the Engineer-in-Charge. The PHPA-II may give permission for such repatriation provided it is satisfied that the progress of Works shall not suffer due to such repatriation/replacement.

59.4 The Contractor and his expatriate personnel shall observe/respect all Bhutanese Acts, Laws, Rules and Regulations and shall not in any way interfere with Bhutanese political and religious affairs and shall meticulously follow any other Rules and Regulations which the RGoB, the PHPA-II and the Engineer-in-Charge may impose on them from time to time. The Contractor's expatriate personnel shall work and live in close co-operation with their co-workers and the community and shall not engage themselves in any other employment either part time or full time nor shall they take part in any local politics.

59.5 The PHPA-II will assist the Contractor, to the extent possible, in obtaining necessary permits to travel to Bhutan and back by issue of necessary certificates and other information needed by the RGoB and other agencies.

CERTIFICATES AND PAYMENT

Clause – 60 Payment

60.1 Terms of payment

60.1.1 The payment, including any advance, if applicable, shall be paid as specified in the SCC.

60.1.2 The Contractor's request for payment shall be made to Employer in writing accompanied by invoices and documents, describing, as appropriate, the work done and related services

performed in fulfilment of the obligation stipulated in the Contract.

60.1.3 Payments shall be made promptly by the Employer, no later than thirty (30) days after receipt of bills and documents, provided that the documents are complete with all the requirements of Employer.

60.1.4 No payment made by Employer here shall be deemed to constitute acceptance by Employer of the works or any parts) thereof.

60.1.5 The currency or currencies in which payments are made to the Contractor under this Contract shall be those in which the Contract Price is expressed in the Contractor's Bid.

60.1.6 Wherever applicable, the release of first progressive interim payment shall be subject to submission of documentary evidence by the Contractor towards having taken the insurance policy (ies) and acceptance of the same by the Engineer-In-Charge.

60.2 Advance Payments

60.2.1 Mobilization Advance

a. If stated in SCC, the employer may grant interest free mobilization advance to the extent of **10% (ten percent)** of the Contract Price on production of the irrevocable Bank Guarantee for an equivalent amount of advance as per the Proforma at form no. 4.

b. The advance is recoverable and the deduction of the advance shall be made on pro-rata percentage basis from the interim payments certified by the Engineer-in-Charge under the Contract. The entire amount of advance shall be fully recovered by the time 80% (eighty percent) of the Contract is executed.

60.2.2 Secured Advance

a. If stated in the SCC, the employer may provide the secured advance to the contractor against the construction materials provided that;

1. the materials are in accordance with the Specification for the Permanent Works,

2. Such materials have been delivered to site, and are properly stored and protected against loss or damage or deterioration to the satisfaction of the Engineer-in-Charge.

3. the Contractor's records of the requirements, orders, receipts and use of materials are kept in a form approved by the Engineer-in-Charge and such records shall be available for inspection by the Engineer-in-Charge,

4. the Contractor shall submit with his monthly statement the estimated value of the materials on Site together with such documents as may be required by the Engineer-in-Charge for the purpose of valuation of the materials and providing evidence of ownership and payment therefor;

5. ownership of such materials shall be deemed to vest in the PHPA-II, and

b. The sum payable for such materials on Site shall not exceed 75 percent of the ex-factory/ex-warehouse price of manufactured materials or stockpile value of locally produced materials such as sand, aggregates and crushed stone.

c. The advance is recoverable and the deduction of the advance shall be made on pro-rata percentage basis from the interim payments certified by the Engineer-in-Charge under the Contract. The entire amount of advance shall be fully recovered by the time 80% (eighty percent) of the Contract is executed.

60.2.3 Retention Money

a) A retention amounting to **10% (10 percent)** of the amount included in any monthly Interim Payment Certificate pursuant to **sub-clause (i)** of this Clause due to the Contractor on account of Permanent Works executed by him shall be made by the Engineer-in-Charge.

b) The Retention Money shall be certified due for payment after the expiration of the Period of Maintenance, notwithstanding that at such time there may be outstanding claims by the Contractor against the PHPA-II. Provided always that, if at such time there shall remain to be executed by the Contractor any Works ordered during such period pursuant to **Clause – 49 and 50** hereof, the PHPA-II shall be entitled to withhold payment until the completion of such Works or so much of the Retention Money as shall, in the opinion of the Engineer-in-Charge represent the cost of the Works so remaining to be executed.

c) If the Contractor expressly requests in writing, he shall be permitted to convert the Retention Money deducted from his Interim Payment Certificates into a Bank Guarantee issued in favour of the Punatsangchhu-II Hydroelectric Project Authority by the Bank of Bhutan, the State Bank of India, or any scheduled Bhutanese or Indian bank. The Bank Guarantee shall be in the Proforma attached at form no.5.

d) The Bank Guarantee shall remain valid for at least thirty days beyond the period of maintenance.

60.2.4 Taxes and Duties

a) The prices bid by the Contractor shall include all duties, taxes, , and levies that may be levied in accordance with the laws and regulations in force as of the date 30 days prior to the closing date of submission of bids. As such, except as otherwise specifically provided in the SCC, the Contractor shall bear and pay all taxes, duties, levies and charges assessed on the contractor, it subcontractors or their employees by all municipal, state or national government authorities in connection with works in and outside of the Kingdom of Bhutan.

b) At the time of release of payment, tax shall be deducted at source (TDS) from Bhutanese Bidders and International Bidders as specified in the SCC from the gross amount of bills.

c) The Contractor's staff, personnel and labour shall be liable to pay personal income tax in Bhutan in respect of such of their salaries and wages as are chargeable under the laws and regulations in force and the Contractor shall perform such duties with regard to such deductions thereof as may be imposed on him by such laws and regulations.

Clause – 61 Approval only by Maintenance Certificate

No certificate other than the Maintenance Certificate referred to in **Clause – 62** hereof shall be deemed to constitute approval of the works.

Clause – 62 Maintenance Certificate

62.1 The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Engineer-in-Charge stating that the Works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer-in-

Charge within twenty eight days after the expiration of the Period of Maintenance, or, if different periods of maintenance shall become applicable to different sections or parts of the Works, the expiration of the latest such period, or as soon thereafter as any works ordered during such period, pursuant to **Clause – 49 and 50** hereof, shall have been completed to the satisfaction of the Engineer-in-Charge and full effect shall be given to this Clause, notwithstanding any previous entry on the Works or the taking possession, working or using thereof or any part thereof by the PHPA-II. Provided always that the issue of the Maintenance Certificate shall not be a condition precedent to payment to the Contractor of the retention money in accordance with the conditions set out in **Clause – 60 hereof**.

62.2 Cessation of PHPA-II's Liability'

The PHPA-II shall not be liable to the Contractor for any matter or thing arising out of or in connection with Contract or execution of the Works unless the Contractor shall have made a claim in writing in respect thereof before the giving of the Maintenance Certificate under this Clause.

62.3 Unfulfilled Obligations

Notwithstanding the issue of Maintenance Certificate, the Contractor and, subject to **sub clause 62.2** of this Clause, the PHPA-II shall remain liable for the fulfillment of any obligation incurred under the provisions of the Contract prior to the issue of the Maintenance Certificate which remains unperformed at the time such Certificate is issued and, for the purpose of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties hereto.

REMEDIES AND POWERS

Clause – 63 Remedies and Powers

63.1 Default of Contractor

If the Contractor shall become bankrupt, or have a receiving order made against him, or shall present his petition in bankruptcy, or shall make an arrangement with or assignment in favour of his creditors, or shall agree to carry out the Contract under a committee of inspection of his creditors or, being a corporation, shall go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or

reconstruction), or if the Contractor shall assign the Contract, without the consent in writing of the PHPA-II first obtained, or shall have an execution levied on his goods, or if the Engineer-in-Charge shall certify in writing that, in his opinion, the Contractor;

a) has abandoned the Contract, or

b) without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for twenty-eight days after receiving, from the Engineer-in-Charge, written notice to proceed, or

c) has failed to remove materials from the site or to pull down and replace work for twenty eight days after receiving from the Engineer-in-Charge's written notice that the said materials or work had been condemned and rejected by the Engineer-in-Charge under these conditions, or

d) despite previous warnings by the Engineer-in-Charge's in writing, is not executing the Works in accordance with the Contract, or is persistently or flagrantly neglecting to carry out his obligations under the Contract, or

e) has, to the detriment of good workmanship, or defiance of the Engineer-in-Charge's instruction to the contrary, sub-let any part of the Contract;

then the Engineer-in-Charge may, after giving fourteen day's notice in writing to the Contractor, enter upon the Site and Works and expel the Contractor, from the entire Works or part thereof, without thereby voiding the Contract, or releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and powers conferred on the PHPA-II or the Engineer-in-Charge by the Contract, and may itself complete the entire Work or part thereof as the case may be or may employ any other Contractor to complete the Works. The PHPA-II or such other Contractor may use for such completion so much of the Constructional Plant, Temporary works and materials, which have been deemed to be reserved exclusively for the execution of the works, under the provisions of the Contract, as he or they may think proper, and the PHPA-II may, at any time, sell any of the said Constructional Plant, Temporary works and unused materials and apply the proceeds of sales in or towards the satisfaction of any sums due or which may

become due to him from the Contractor under the Contract.

63.2 Valuation at Date of Forfeiture

The Engineer-in-Charge shall, as soon as may be practicable after any such entry and expulsion by the PHPA-II, fix and determine ex-party, or by or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute, and shall certify what amount, if any, had at the time of such entry and expulsion been reasonably earned by or would reasonably accrue to the Contractor in respect of work actually done by him under the Contract and the value of any of the said unused or partially used materials, any Constructional Plant and any Temporary Works.

63.3 Payment after Forfeiture

If the PHPA-II shall enter and expel the Contractor under this Clause, it shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the Period of Maintenance and thereafter until the costs of execution and maintenance, damages for delay in completion, if any, and all other expenses incurred by the PHPA-II have been ascertained and the amount thereof certified by the Engineer-in-Charge. The Contractor shall then be entitled to receive only such sum or sums, if any, as the Engineer-in-Charge may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the PHPA-II the amount of such excess and it shall be deemed a debt due by the Contractor to the PHPA-II and shall be recoverable accordingly.

In the event of the above course being adopted by the Engineer-in-Charge, the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any Constructional Plant, material or entered into any agreements or made any advances on account or with a view to the execution of the Works or the performance of the Contract.

Clause – 64 Urgent Repairs

If, by reasons of any accident, or failure, or other event occurring to in or in connection with the Works or any part thereof, either during the execution

of the Works or during the Period of Maintenance, any remedial or other work or repair shall, in the opinion of the Engineer-in-Charge or the Engineer-in-Charge's Representative, be urgently necessary for the safety of the Works and the Contractor is unable or unwilling at once to do such Work or repair, the PHPA-II may employ and pay other persons to carry out such work or repair as the Engineer-in-Charge or the Engineer-in-Charge's Representative may consider necessary. If the work or repair so done by the PHPA-II is work which, in the opinion of the Engineer-in-Charge, the Contractor was liable to do at his own expense under the Contract, all expenses properly incurred by the PHPA-II in so doing shall be recoverable from the Contractor by the PHPA-II, or may be deducted by the PHPA-II from any money due or which may become due to the Contractor. Provided always that Engineer-in-Charge or the Engineer-in-Charge's Representative, as the case may be, shall, as soon after the occurrence of any such emergency as may be reasonably practicable notify the Contractor thereof in writing.

SPECIAL RISKS/TERMINATION

Clause – 65 Special Risks/Termination of Contract

65.1 Special Risks

The special risks are war, hostilities (whether war be declared or not), invasion, act of foreign enemies, the nuclear risks described in **Clause – 20.6** hereof.

65.2 Termination of the Contract

d) If, during the currency of the Contract any of the Special Risks mentioned hereinabove which, whether financially or otherwise, materially affects the execution of the Works, the Contractor shall unless and until the Contract is terminated under the provisions of this Clause, continue to use his best endeavours to complete the execution of the Works. Provided always that the PHPA-II shall be entitled at any time after occurrence of such Special Risks to terminate the Contract by giving written notice to the Contractor and, upon such notice being given, this Contract shall, except as to the right of the parties under this Clause and to the operation of **Clause – 67** hereof, terminate, but without prejudice to the rights of either party in respect of ay antecedent breach thereof.

e) Termination of Contract for PHPA-II's Convenience

f) The PHPA-II shall be entitled to terminate this Contract at any time for the PHPA-II's convenience after giving sixty days prior

notice to the Contractor, with a copy to the Engineer-in-Charge.

65.3 Removal of Plant on Termination

If the Contract shall be terminated under the provisions of the last preceding sub-clause, the Contractor shall, with all reasonable despatch, remove from the Site all Constructional Plant and shall give similar facilities to his sub-Contractors to do so.

65.4 Payment upon Contract Termination

If the Contract shall be terminated as aforesaid, the Contractor shall be paid by the PHPA-II, in so far as such amounts or items shall not have already been covered by payments on account made to the Contractor, for all works executed prior to the date of termination at the rates and prices provided in the Contract and in addition:

a) The amounts payable in respect of any preliminary items, so far as the work or service comprised therein has been carried out or performed, and a proper proportion as certified by the Engineer-in-Charge of any such items, the work or service comprised in, which has been partially carried out or performed.

b) The cost of materials or goods reasonably ordered for the works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery, such materials or goods becoming property of the PHPA-II upon such payments being made by it.

c) A sum to be certified by the Engineer-in-Charge, being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the works insofar as such expenditure shall not have been covered by payments in this sub-clause before mentioned.

d) The reasonable cost of removal of Constructional Plant under **sub-clause 65.3** of this Clause.

Provided always that against any payments due from the PHPA-II under this sub clause, the PHPA-II shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of Constructional Plant and materials and any other sums which at the date of termination were recoverable by the PHPA-II from the Contractor under the terms of the Contract.

FRUSTRATION

Clause – 66 Payment in Event of Frustration

If a war, or other circumstances outside the control of both parties, arises after the Contract is made so that either party is prevented from fulfilling its Contractual obligations, or under the law governing the Contract, the parties are released from further performance, then the sum payable by the PHPA-II to the Contractor in respect of the work executed shall be the same as that which would have been payable under **Clause – 65** hereof if the Contract had been terminated under the provisions of **Clause – 65** hereof.

SETTLEMENT OF DISPUTES & ARBITRATIONS

Clause – 67 Dispute Resolution

Except where otherwise provided in the Contract all questions and disputes relating to the meaning of the specifications, design, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used on the Work or as to any

other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the Contract, design, drawings, specifications, estimates, instructions, orders to these conditions or otherwise concerning the Works or the execution or failure to execute the same whether arising during the progress of the Work or after the cancellation, termination completion or abandonment thereof shall be dealt with as mentioned hereinafter.

i) If the Contractor considers any work demanded of him to be outside the requirements of the Contract, or considers any decision of the Engineer-in-Charge on any matter in connection with or arising out of the Contract or carrying out of Work to be unacceptable, he shall promptly ask the Engineer-in-Charge in writing, for written instructions or decision. There upon the Engineer-in-Charge shall give his written instructions or decision within a period of thirty days of such request.

Upon receipt of the written instructions or decision, the Contractor shall promptly proceed without delay to comply with such instructions or decision.

If the Engineer-in-Charge fails to give his instructions or decision in writing within a period of thirty days after being requested for or if the Contractor is dissatisfied with the instructions or decision of the Engineer-in-Charge, the Contractor may within thirty days after receiving the instructions of decision file a written appeal to the Managing Director, PHPA-II who will constitute a Committee of which

the Director (Technical) will be convenor, to resolve the dispute. The Committee shall afford an opportunity to the Contractor to be heard and to offer evidence in support of his appeal within forty five days of the receipt of the appeal by the Director (Technical). The Director (Technical) shall give a decision on behalf of the Committee within a period of thirty days after the Contractor has been heard and the Contractor has given evidence in support of his appeal. If the Director (Technical) does not give a decision within thirty days, the Contractor will have the right to refer the dispute to arbitration.

If the Contractor is dis-satisfied with the decision of the Director (Technical), the Contractor, within a period of thirty days from receipt of the decision, shall indicate his intention to refer the dispute to arbitration failing which the said decision shall be final and conclusive.

ii) Except where the decision has become final, binding and conclusive in terms of Sub Para (i) above, disputes or difference shall be referred for adjudication in accordance with the provision specified in the SCC.

NOTICES

Clause – 68 Notices

68.1 Service of Notices on Contractor

All certificates, notices or written orders to be given by the Engineer-in-Charge to the Contractor under the terms of the Contract shall be served either by sending by post or delivering the same to the Contractor's office on Site or his principal place of business, or such other address as the Contractor shall nominate for this purpose.

68.2 Service of Notices on PHPA-II or Engineer-in-Charge

All notices to be given to the PHPA-II or to the Engineer-in-Charge under the terms of the Contract shall be served by sending by post or delivering the same to the respective address given in the SCC.

68.3 Change of Address

Either party may change a nominated address to another address by prior written notice to the other party.

DEFAULT OF PHPA-II

Clause – 69 Default of PHPA-II

69.1 In the event of the PHPA-II failing to pay to the Contractor the amount due under any certificate of the Engineer-in-Charge within ninety days after the same shall have become due under the terms of the Contract, subject to any deduction that the PHPA-II is entitled to make under the Contract, the Contractor shall be entitled to issue a notice to the Engineer-in-Charge stating that he shall be terminating his Works after thirty days from the issue of such notice, for the reasons stated therein. However, if within the said period of thirty days, the Engineer-in-Charge notifies the Contractor that the reasons stated in the notice of the Contractor are not valid or that the alleged event of default of the PHPA-II has been remedied or no longer exists, then the Contractor shall not entitled to terminate the Contract.

69.2 If the Contractor becomes entitled to terminate the Contract in terms of **sub clause 69.1** of this Clause, after expiry of the notice of thirty days, he may, notwithstanding the provisions of **Clause – 53.2** hereof, remove from the Site all Constructional Plant brought by him.

69.3 In the event of such termination, the PHPA-II shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions in **Clause – 65** hereof, but in addition to the payments specified in **Clause – 65.4** hereof, the PHPA-II shall pay to the Contractor the amount of any loss or damage to Contractor arising out of or in connection with or by consequence of such termination.

CHANGES IN COSTS AND LEGISLATION

Clause – 70 Increase or Decrease of Costs

70.1 Contract Price Adjustment

a) The regulation and payment of Contract Price Adjustment under the Contract shall be governed by the provisions herein under if the prices are permitted to be quoted with price adjustment formula.

b) The Contract Price as awarded shall be the base Contract Price.

c) A certain fixed percentage of the base Contract Price shall not be subject to any Contract Price Adjustment. The balance percentage to be specified shall be of identified components towards labour, material(s) and H.S. diesel oil, hereinafter called the variable component, shall be subject to Contract Price Adjustment.

d) The fixed component and the variable components shall be specified in SCC.

e) The amount of Contract Price Adjustment payable/ recoverable for the work done during the relevant period shall be calculated as under:

CPA = APC - BCP

Where,

CPA = Control Price Agreement
BCP = Base Contract Price
ACP = Adjusted Contract Price

ACP shall be computed as under:

$$ACP = BCP * \left[F + \frac{l * L_1}{L_0} + \frac{m * M_1}{M_0} + \frac{m * M_2}{M_0}\right]$$

$$F + l + m = 1$$

F = Fixed component expressed in percentage of the Base Contract Price which shall not be subject to any adjustment as quantified and stipulated in the SCC generally 20%

L = Labour component expressed in percentage of Base Contract Price which shall be subject to Price Adjustment as quantified and stipulated in the SCC generally upto 15% to 30%

M= Material component expressed in percentage (excluding material issued by Employer) of the Base Contract Price which shall be subject to Price Adjustment as quantified and stipulated in the SCC, generally 30% to 60%

L = Labour Index as stipulated in SCC

M = Material Index as stipulated in SCC

SUBSCRIPT

'0'= refers to the value of the above-mentioned labour/material indices as on thirty (30) days prior to the Bid opening date.

'1'= refers to the value of the corresponding labour/material indices as applicable for the preceding month in which the work is executed for which the adjustment is applicable, respectively.

f) The total amount payable on the Base Contract Price on account of *the* Contract Price Adjustment as indicated in above shall not exceed the maximum of twenty percent (20%) of the Contract Price as awarded.

g) Contract Price Adjustment(s) shall be calculated for the value of Works executed for the billing month as per agreed work schedule. For the purpose of payment/recovery of price Adjustments, such payment/refund shall be operative and payable in accordance with the schedule completion period(including authorized extensions, if any) or actual completion period, whichever is earlier Provided further that the Contractor would be eligible for such price adjustment claims or shall be liable for refund on the quantum of Works scheduled or the actual quantum of works done provided always that the work done is more than or equal to the scheduled of works as per agreed work schedule.

h) The Contractor shall not be eligible for the payment of the price adjustment claims or liable for refund of Contract Price adjustment for the period beyond the schedule date of execution of works if the works has been delayed beyond the scheduled date(s) for reasons attributable to the Contractor. However, for quantities of works executed beyond the scheduled dates of execution, the contractor would be liable for the refund of Contract Price Adjustment(s) for such delayed work based on the value of the indices as applicable to the scheduled dates of execution, provide that if the indices of the actual dates of execution are lower than the indices as on scheduled dates of execution, then lower indices shall be applicable. In cases where the execution of works is delayed for reasons attributable to Employer, the Contractor shall be eligible for payment or refund of price adjustment on such delayed execution of Works based on the indices prevailing as on the date of execution of such works.

i) Rates of items included in the Bill of Quantities, whose quantities have varied beyond the permissible deviation limits and rates of extra items derived and agreed from the items included in the Bills of Quantities shall also be subject to price adjustment as per this clause.

j) The Contractor shall, every month after commencement of the Works, submit to the EIC a written notice of the changes, if any, that have occurred in the specified indices of materials, and Labour or that of Diesel price etc. during the previous reporting period containing the effective date of such change, with authenticated documentary evidence of the relevant applicable published indices/diesel price, etc.

k) Monthly bills for Contract Price Adjustment shall be made by the Contractor commencing first, from the month when all the relevant/applicable indices/diesel price are available and not later than fifteen (15th) day of every month thereafter. The period for processing and making payment for these bills shall also be governed by the provisions as applicable on-account progressive interim payments.

70.2 Subsequent Legislation

If, after the date thirty days prior to the latest date of submission of bids for the Works there occur changes to any Statute, Ordinance, Decree or other Law or any regulation or by-law of any local or other duly constituted authority, or the introduction of any such Statute, Ordinance, Decree, Law, Regulation or bye-law which causes additional or reduced amount to the Contractor, other than under **Clause 70.1** , in the execution of the Works, such additional or reduced amount shall be certified by the Engineer-in-Charge after examining the record provided by the Contractor and shall be paid by or credited to the Employer. Notwithstanding the foregoing, such additional or reduced amount shall not be separately paid or credited if the same shall already have been taken into account in the indexing of any input to the price adjustment formulae.

70.3 Compliance with Statutes, Regulations, Acts, Laws etc.

The Contractor shall conform in all respects, with the provisions of all Acts, Laws, Statutes, Regulations, Ordinance etc. of the RGoB which may be applicable to the Works and with such rules and regulations of Public bodies or other duly constituted authority and shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such Act, Law, Statute, Regulation or bye-law etc.

SECTION IV – SPECIAL CONDITIONS OF CONTRACT (SCC)

BLANK

SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract (SCC) shall supplement and/or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail.

GCC Ref., if any	Particulars
1 (vi)	The Engineer In-Charge : ***[To be intimated at the time of Award]***
1 (xiii)	The site is located at: ***Kamichu, Wangdue, Bhutan.***
4	Sub-letting: ***not allowed.***
5.1	The language shall be: ***English.***
5.2	The law that applies to the Contract is: ***The laws of the Kingdom of Bhutan***
10.1	The amount of the Performance Security shall be: ***10% of the Contract Price***. The types of acceptable Performance Securities are: (i) *Unconditional bank guarantee issued by a financial institute of Bhutan or any foreign bank acceptable and enforceable in any financial institution of Bhutan.* (ii) *Cash warrant, or* (iii) *Demand Draft, or Banker's Cheque.* *The* Performance Security *shall be issued by any financial institution in Bhutan or any foreign bank acceptable and enforceable in any financial institution in Bhutan.*
41	Commencement Date: *The Works shall commence on the* ***7th day*** *from the date of issue of the LoA.*
43	*The Completion Date for the whole of the Works shall be:* ***6 months*** *from the date of commencement.*
49.1	The maintenance period shall be: ***12 months*** *from the date of completion.*
47.1	The applicable rate for liquidated damages (LD) for delay shall be: ***0.1% per day*** *of the Contract Price.* The maximum amount of LD shall be: ***10% of the Contract Price***

60.1.1	Payments Terms: **A. Supply of Goods** 80% of the Contract Price (Ex-works) of the goods shall be paid upon receipt of the goods at site and submission of the following documents: • Supplier's commercial invoice; • Copy of Material Despatch Clearance Certificate (MDCC); • Material Receipt Certificate issued by the Engineer-in-Charge confirming receipt of goods at site; and • Copy of insurance policy(s) taken by the Contractor as per the provisions of the Contract. **B. Transportation, Storage & Preservation, Handling and Insurance Charges** 90% of the Contract Price in respect of transportation, storage & preservation, handling and insurance charges shall be paid in monthly instalments on a pro-rata basis against the value of Services completed. **C. Installation, Testing and Commissioning** 90% of the Installation, Testing and Commissioning charges shall be paid in monthly instalments on a pro-rata basis against the value of work completed and certified by the Engineer-in-Charge.
60.2.2	The mobilization advance : ***10% (ten percent)*** *of the Contract Price of Goods (Ex-works) shall be paid as mobilization advance on production of the irrevocable Bank Guarantee as per the Proforma at form no.4, issued by any financial institution in Bhutan or any foreign bank acceptable and enforceable in any financial institution of Bhutan.*
60.2.2	The secured advance : ***Not applicable*** **(NA)**
60.2.3	The proportion of payments retained is: ***10% (ten percent)*** *shall be retained as retention money.*
60.2.4 (a)	The applicable GST in Bhutan is : **5%**
60.2.4 (b)	The Tax Deducted at Source (TDS) is: **a) 5% for non-residents** b) **3% for residents**

67	The rules of procedure for dispute resolution: *Except where the decision has become final, binding and conclusive in terms of Sub Para 67 (i), disputes or difference shall be referred for adjudication or arbitration in accordance with the Alternative Dispute Resolution Act of Bhutan.* The place of arbitration shall be: ***Thimphu, Bhutan***
68.2	For notices, the addresses shall be: Attention: ***[To be intimated at the time of Award]*** Address:
70 (A)	Contract Price adjustment: *The Contract Price is* ***not subjected*** *to price adjustment.*

BLANK

SECTION V – TECHNICAL SPECIFICATION

BLANK

CONTENTS

1.1 GENERAL TECHNICAL CONDITIONS

1.1.1 This technical specification covers design, manufacturing, testing at manufacturer's works before dispatch, supply, transportation, insurance till defect liability period, delivery at project site in Bhutan, handling, storage & preservation at site for Electrical Workshop Equipment/ instruments at Punatsangchhu-II HE Project, Bhutan based on established design as per applicable IS or equivalent standards and guaranteed for two years of trouble free and safe operation in climatic conditions as specified in Volume-I of the bidding documents.

The bidder shall submit a proposal based on his experience on the type of equipment and tools to be put in the Electrical Workshop in the power house while taking into consideration that the workshop facilities will be required for essential maintenance works and on-site repairs of the power house equipment.

The details and specific technical requirements regarding engineering, manufacture, supply, erection, testing and commissioning are covered in the following sections of the specifications.

1.2 SERVICE CONDITIONS

1.2.1 Climatic Conditions

The equipment to be supplied shall be designed to operate satisfactorily in the climatic conditions specified in Section-4, Volume-I of the bidding documents i.e. 'Project Features'. However, the broad atmospheric conditions are as follows:

i)	Maximum ambient temperature	35°C
ii)	Relative humidity (max.)	100%
iii)	Service Bay Level (above mean sea level)	EL. 582m

1.2.2 Seismic Design Criteria

The Power House site is located in Seismic Zone-IV. As such, various equipment shall be designed for installation and operation in earthquake prone area. The seismic loads occur due to the horizontal and vertical accelerations which may be assumed to act non-concurrently. The coefficients for horizontal acceleration as 0.4g and vertical acceleration as 0.2g shall be used for design purposes. The seismic loads shall be equal to the static loads corresponding to the weights of the parts/ accessories multiplied by the coefficient of the acceleration.

1.2.3 Auxiliary Power Supply

The equipment operating mechanisms, various motors, illumination & heating devices, control & protection devices, sensors, alarms etc. shall be suitable for operation with the following LT power supply:

a) 415 V ± 10%, three phase, 4-wire, 50 Hz (-5% to +3%), AC power supply;

b) 240 V ± 10%, single phase, 2-wire, 50 Hz (-5% to +3%), AC power supply;

c) 220 V ± 10%, 2-wire, ungrounded DC power supply.

1.3 ELECTRICAL SYSTEMS OF THE PROJECT

The technical details of the electrical systems of the project are here as under:

1.3.1 Punatsangchhu-II H. E. Project envisages installation of 6 generating units each of 170 MW (188.8 MVA) with 10% continuous additional overload capacity. The power generated at 13.8 kV by these units will be stepped up to 420 kV through 6 banks of transformers each comprises of 3 single Phase (3x70 MVA), 13.8 / 420 / □3 kV generator transformers. These transformers will be connected to generators through 17.5kV Isolated Phase Bus-Ducts.

1.3.2 The generator transformers on HV side shall be connected to 420 kV SF6 Gas Insulated Switchgear (GIS) comprising 16 No. of bays.

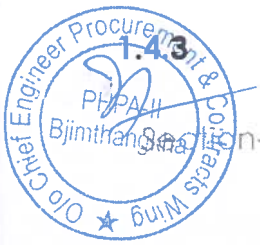
1.3.3 The GIS shall be connected through 400kV XLPE insulated, single phase copper conductor cables to Pothead Yard from where the power shall be further transmitted to pooling station at Alipurduar in India through two D/C transmission lines. One D/C transmission line shall be connected to Jigmeling Sub-station and the other one D/C line shall be connecting Punatsangchhu-I HEP with Punatsangchhu-II HEP.

1.4 SCOPE OF WORK

1.4.1 This section of the specification covers various instruments mentioned in Annexure-I.

1.4.2 The scope of supply shall include all equipment, instruments, tools, tackles, accessories, auxiliaries, and mountings, including all electrical works required for the commissioning of equipment described hereunder. Electric wiring of equipment with their control switchboards including electric protective devices, starting devices etc. shall be covered in the scope of supply, if required.

1.4.3 All tools and tackles required for operation and use of the equipment shall be supplied and handed over to the Purchaser in



new condition after commissioning of the same.

1.4.4 Other works incidental to and connected with the commissioning of equipment mentioned hereunder shall be in the scope of supply. Services of installation and commissioning staff and the services of testing engineer and provision of necessary instruments required during testing and training shall be covered in the scope of supply.

1.4.5 Deleted.

1.4.6 Any testing and measuring instrument which is not included in scope of supply and is required for maintenance of power station is also to be considered in the scope of supply. The bidder shall furnish the technical parameters in bid.

1.4.7 The ratings and features of testing and measuring instruments shall be compatible to the equipment installed in the power plant. The technical specification of testing and measuring instruments indicated in this section is bare minimum. However, the contractor shall supply the instruments of latest available technical specification.

1.5 GENERAL TECHNICAL REQUIREMENTS

1.5.1 Standards & Regulations

i. All equipment shall conform to the latest edition of the applicable Indian Standards or equivalent IEC standards. The Contractor shall specify the standard of equipment to which it conforms and shall supply a copy of the same. Similar components of the equipment shall be interchangeable with each other.

ii. The design and workmanship of the equipment offered shall be in accordance with the best and latest engineering practices and in compliance to relevant safety codes to ensure satisfactory performance throughout their service life.

1.5.2 General Information for Instruments

i. All the instruments shall be suitable to work under hostile electrical conditions i.e. in live 400 kV switchyard, high ground currents, high level of interfering stray voltages etc. Therefore, accuracy of instrument shall not be variable/ varied beyond permissible prescribed limits.

ii. All the instruments shall be provided with suitable case comprising to minimum IP54 for preservation, easy transportation and to house all the accessories. Trolley arrangement shall be provided to house and carriage of instruments, wherever required.

iii. The equipment shall have inbuilt provision for voltage regulation and stabilization and shall have minimum internal power losses. All the equipment shall have proper protection against over voltage and electric shock to the operator. In case the equipment is supported with rechargeable batteries, the charging equipment shall also be in the scope of supply.

iv. The equipment shall be robust in design, portable type and must be suitable for climatic conditions at site. All the accessories required for efficient and full operation of equipment are included in the scope of supply. The bidder shall furnish the list & details of accessories being supplied with equipment as per Annexure- VI.

v. Suitable serial/ USB ports and accessories compatible with Laptop along with suitable software to compute and interpret the output or results shall be in the scope of supply. The contractor shall load all the software in the laptop provided by them at site along with latest available operating system.

vi. a. The bidder may quote for other equipment not mentioned hereunder with proper justification and are mandatorily required for testing, commissioning and maintenance of the plant indicating their rates separately as per **Annexure-III** for optional items. The description of the optional equipment shall be supported with technical details etc.

b. The bidder may quote for the other accessories required for enhancing the features and capability of the equipment as optional in **Annexure- III** indicating their rates separately.

c. The items covered in **Annexure-III** for optional items shall not be considered for evaluation.

1.5.3 Completeness of Equipment

Any material and equipment, not specifically stated in this specification but which are necessary for satisfactory operation and commissioning of the equipment for the completeness of the equipment separately or Electrical Workshop, shall deem to be included in the scope of supply, unless specifically brought out in deviation statement and shall be supplied without any extra cost.

1.5.4 Recommended Spare Parts

The Bidder shall list the recommended spare parts in **Annexure- IV** required for five years of operation and maintenance of each equipment. Recommended spares shall not be considered for evaluation of the price bid.

1.6 TESTING AND MEASURING INSTRUMENTS

Detailed specifications of equipment covered under this section are

as follows:

1.6.1 Capacitance and Dissipation Factor Test Set (Capacitance and Tan Delta)

1.6.1.1 The equipment offered shall be suitable and convenient for measuring the Capacitance & Dissipation factor (Tan Delta) in transformers, shunt reactor, generator components, bushings, circuit breakers, cables, CTs, VTs, motor coils, protective surge arrestors etc. The equipment shall permit direct reading of the measured dissipation factor without further calculations. The equipment shall be fully automatic and shall be designed to provide a comprehensive insulation capacitance and dissipation factor test. The equipment shall include interference suppression circuit that ensures accurate measurements even under severe interference or noise condition.

1.6.1.2 The equipment shall have provision to display the test voltage, insulation current, capacitance, Tan Delta, inductance, power, power loss, power factor, leakage current, internal partial discharges etc. The equipment shall be complete with various terminals and sockets for connection of the test specimen and required cable set.

1.6.1.3 The test set shall have data storage facility not less than 100 sets of test results for retrieval and analysis. Standard results shall be easily transferable to Laptop using the suitable interface to be supplied along with equipment. Necessary software for receipt and storage of data on Laptop is also in the scope of supply. Data logging with graph of voltage v/s Tan delta to know and compare with old results/ manufacturer's data is also required.

1.6.1.4 Accessories

1. Calibrator for capacitance and Tan Delta.
2. 1 No. Oil test cell
3. 1 No. Solid test cell
4. Resonating inductor to extend the range of Capacitance and Tan Delta. Etc.

1.6.1.5 General Requirements

1. The equipment shall have automatic / switching facility for following modes:
   - Ungrounded specimen test (UST mode).
   - Grounded specimen test (GST mode)
   - Grounded specimen test with guard/ shielding (GST-G).
2. Suitable protection shall be provided for short circuit & breaking down of test specimen. The equipment shall shut down quickly without any voltage surge at output.

3. The equipment shall be provided with audio visual alarm to indicate abnormal condition.
4. Provision to change overload limits for voltage or current or both, if required. All operator controls shall be at earth potential.
5. Protective circuit breaker and transformer thermal sensor to guard against sustained overloading of the power supply.
6. An interlock shall be provided to actuate safety barrier, warning lights (audio-visual alarm) etc.
7. Capacitance & dissipation measuring bridge with direct reading of capacitance and dissipation factor.

1.6.1.6 Technical Requirements

The equipment shall comply to the following minimum specifications:-

S. No.	Parameters	Rating/Range
1.	**Transformer** Type	High voltage transformer with controlled output complete with protection circuit and necessary shielding.
	Output voltage	0-12kV AC (Continuously adjustable)
	Resolution	10 V
	Accuracy	± 1% of reading
2.	Output current Resolution Accuracy	0-250mA (continuous) 1 mA or better. ±1% of reading
3.	Capacitance Range Accuracy Resolution	0 to 10μF (multi ranges) ± 0.5% of reading or better 0.1 pF
4.	Dissipation factor a) Range b) Accuracy c) Resolution	0 to 200% (Direct) ± 1% of reading or better. 1x 10^{-4} or better.
5.	Shielded Standard Capacitor	100 pF ±5%, 12kV

PHPA-II Bjimthangkha O/o Chief Engineer Procurement & Contracts Wing

6.	Display	LCD display / LED display
7.	Safety Features	Open grounded, Zero start control & Short circuit protection, Over Voltage protection, interlock for HV output.

1.6.2 PORTABLE ULTRASONIC FLAW DETECTOR

1.6.2.1 The equipment having microprocessor based control, shall be mainly suitable for following applications:

1. To detect flaws in welded and brazed joints.
2. To locate internal anomalies in energized oil filled equipment such as power transformers, shunt reactor etc.
3. To detect corona, partial discharge, pump cavitation and loosening of internal parts.
4. To detect leakage in valves and compressed air leaks and to detect the bad bearings.
5. To monitor flow and valve position and air borne ultrasonic noise.
6. It shall be suitable for indoor as well as outdoor operations.

1.6.2.2 High/ Low Frequency Selection

The equipment shall have provision for selection of high frequency (ultrasonic (20 kHz to 250 KHz)) and low frequency (sonic (100Hz to 20 kHz)) range.

1.6.2.3 The equipment shall be provided with audio and jacks to hear the internal beat of frequency oscillator. A headphone of superior quality of reputed make shall also be in the scope of supply.

1.6.2.4 Filter

1. The equipment shall comprise of 3-position switch that affects sonic band in different frequency ranges to detect faults in sub- station, leak detector to eliminate low frequency background noise and additional background noise.
2. The system/ equipment must have provision of viewing spectra and waveforms on inbuilt oscilloscope. The oscilloscope shall also have provision to view the waveform of incoming signals.
3. All type of probes that shall be required for applications mentioned above and other possible applications are also in the scope of supply.
4. Accelerometer/ Transducers (Air probe) shall be sensitive to both sonic and ultrasonic frequency ranges. The transducers shall be capable to detect activity in either range by heterodyning into the head set, the spike energy and electrical noise from corona and

partial discharges. The transducers shall also detect valve leaks, worn bearings etc. The suitable extension stick to provide safe and easy access of test surface shall also to be supplied.

1.6.2.5 Technical Requirements

The equipment shall comply to the following minimum specifications:

S. No.	Parameters	Rating/Range
1.	Gain/ Sensitivity Adjustment	Up to 100 db, adjustable in 1 db steps.
2.	Battery	8 Hours running period.
3.	Accuracy	±1%.
4.	Display	LCD/LED
5.	Frequency range	100 Hz to 250 kHz.
6.	Test Range	10mm to 1 m in steel – in 5mm steps.
7.	Computer Compatibility	Relevant ports and links shall be provided.

1.6.3 HAND HELD VIBRATION METER

1.6.3.1 The equipment shall be suitable to measure the Vibration frequency, Vibration Velocity, Vibration displacement, vibration acceleration, bearing conditioning unit, process-able relative shaft vibration & speed and sound level of rotating machines particularly in turbine pit and near draft tube.

1.6.3.2 The equipment shall be portable type, one-hand operated, user friendly and usable in ambient conditions. The instrument shall be covered with suitable portable weatherproof case for transportation to site of application and a container for its preservation in site store. The equipment shall be modular with enhanced features.

1.6.3.3 The instrument shall have following features:

1. Numerical live display of measurements.
2. Graphic display of amplitude and phase of measurement.
3. Instrument shall have feature of sufficient data storage along with further expansion facility.
4. Instrument shall have facility of connecting vibration acceleration sensor, velocity sensor and displacement sensor (eddy current sensor) & process parameter sensor (transducer).
5. Instrument shall be battery operated with charger suitable for power operation and charging.

6. Instrument shall have in-built self–test function.
7. Averaging function for noise influence and beat effect reduction.

1.6.3.4 The equipment shall be supplied with all accessories including power supply, ear phone, case etc. and all types of testing probes including 5 meter extension cable length along with all types of sensors and transducers required for proper functioning of instrument.

1.6.3.5 Technical Requirements

The equipment shall comply to the following minimum specifications:

S. No.	Parameters	Rating/Range
1.	Measurement range.	
	1. Acceleration	0-200 m/s^2
	2. Velocity	0-50 mm (minimum)
	3. Displacement	0-20 mm
2.	Frequency Range	1-5000 Hz.
3.	Accuracy	± 3%

1.6.4 MAGNETIC PARTICLE TESTING INSPECTION EQUIPMENT

1.6.4.1 The equipment shall be portable type, mainly suitable to detect the surface defects in casting, welding and forging of equipment of Power House i.e. runner blades, guide vanes, rotor shaft, cheek plates etc.

1.6.4.2 The equipment shall comprise of portable magnetic inspection unit, magnetic paste application device and other accessories. The equipment must have built-in system, which shall be stable and shall regulate the operating power supply system. All the accessories such as cables (probes), connectors etc. those required to operate the equipment shall also be in the scope of supply. The cable shall be provided with proper lugs compatible to equipment.

1.6.4.3 The equipment shall comprise of suitable current control varying from zero to maximum output.

1.6.4.4 The magnetic paste application device shall be capable to apply the paste evenly on the surface under test. The equipment shall have the facility by which the quantity of paste can be controlled and monitored.

1.6.4.5 Wet method and fluorescent inspection materials shall be used for magnetic particle inspection.

1.6.5 MICRO OHM-METER (Digital)

1.6.5.1 This test kit shall be portable light weight, robust and tropicalized to

suit outdoor application for monitoring condition of bushings, isolators, circuit – breakers, bus-bars etc. by measuring contact resistance and shall include all accessories like probes, test leads & clamps. The test instrument shall provide contact resistance in digital display.

1.6.5.2 The equipment offered shall have the feature to measure the resistance in normal mode, auto mode, continuous mode, inductive mode and unidirectional mode.

1.6.5.3 The instrument shall be suitably packed in a portable leather case or in a case of such material as is able to resist wear during its use. Calibration shunts of different ranges shall also be in scope of supply.

1.6.5.4 Technical Requirements

Micro ohm meter shall meet the following minimum technical requirements:

S. No.	Parameters	Ratings
1.	Resistance range	0.1µ Ohm -1000m Ohm
2.	Resolution	0.1 micro ohm
3.	Accuracy	+/- 1% of last digits of display value
4.	Current	Up to 600A
5.	Cable set	As required
6.	Display	LED/LCD

1.6.6 MEGGER (Digital)

1.6.6.1 The equipment shall be digital type and shall be able to generate voltage up to 5000 V and suitable selection switch for voltage to be applied shall be provided in the equipment. The equipment shall rapidly display the test voltage, test current, leakage current, time duration of test, PI Value and Insulation Resistance, external voltage and capacitance. For data downloading to Laptop, suitable serial/ USB Ports along with suitable leads are also to be provided. Necessary software, if required, to download and online display on Laptop shall also to be provided. Equipment shall have memory to store last 50 tests performed, indicating time and date of test performed.

1.6.6.2 Scale shall be calibrated in ohms/ kilo ohms/ mega/ terra ohms for different ranges of insulation measurement. It shall be free from induction effect. The equipment shall have a provision of third terminal called guard terminal. The terminal shall effectively pass the leakage current from the earth system to ground. The equipment shall be able to take the measurements on dead circuit

while adjoining circuits/ system shall be in charged condition and voltage range of adjoining system shall vary from 415 V to 420kV AC (3-phase).

1.6.6.3 All accessories meant for the full, efficient and accurate use of the equipment shall be covered in the scope of supply. There shall be suitable container to house all components.

1.6.6.4 The earthing device of suitable rating for draining the charge to earth shall also be in scope of supply

1.6.6.5 Technical Requirement

The equipment shall comply to the following minimum specifications:-

S. No.	Parameters	Ratings
1.	Output Voltage	Up to 5000 V
2.	Test current range	Up to 5 mA
3.	Insulation resistance measuring range.	0 - 10 Terra Ohm or higher.
4.	IP Rating	IP-65
5.	Accuracy	Voltage- ± 3%, Insulation resistance- ± 2%
6.	Timer Mode	15 Second to 60 minutes or higher

1.6.7 TONG TESTER (Digital)

1.6.7.1 The instrument shall be self-contained of rugged construction, suitable for field applications and easy to handle and transport.

It shall be able to measure and display the current, power, power factor, frequency, capacitance etc. The range selection device shall be capable of operation without disturbing the external circuit, during changeover from one position to other.

1.6.7.2 The split core current transformer shall generally be according to IS-2705.

1.6.7.3 All test leads and test probes shall be in the scope of supply. The length of each test lead shall not be less than 1 meter in length, flexible single core and suitably colors coded. The test probes shall be insulated with pointed ends and rust proof metal coating.

1.6.7.4 The equipment shall be provided with data hold facility, low battery indication, overload protection, Continuity test facility, Diode test facility.

1.6.7.5 Technical Requirements

The equipment shall comply with the following minimum specifications:-

S. No.	Parameters	Range
1.	**Range** Current Voltage	 0-1000 A 0-1000V
2.	Accuracy	± 3%
3.	Display	LCD
4.	Jaw Capacity	55 mm dia
5.	Power Source	Chargeable Battery Operated

1.6.8 MULTIMETER (Digital)

1.6.8.1 The instrument shall be able to display all reading in digital form on the screen. The instrument must use single meter movement with a scale calibrated in Volts, Ohms and Amp.

1.6.8.2 The instrument shall have inbuilt provision for the different functions of voltage, current and resistance to be measured. One selector switch for different functions measurement on AC/DC voltage shall be provided in the instrument and other to select the range. The instrument shall be battery operated. The instrument shall be suitably packed in portable leather case having least wear down during the use. All accessories required like cables/ probes, crocodile clips, etc. shall be supplied along with then equipment. Provision for zero setting and Auto ranging shall be inbuilt with the meter.

1.6.8.3 The offered equipment shall be able to measure DC Voltage, DC current, AC Voltage, AC Current & Resistance, check the continuity of circuit, test capacitor, diodes, transistors etc. to know their condition, measure the current drawn by the circuit.

1.6.8.4 Technical Requirement

The equipment shall comply to the following minimum specifications:

S. No.		Ranges	Accuracy
1.	**AC measurement Range**		
	Voltage	0V to 1kV	±0.4 % + 40 digits
	CURRENT	0A to 10 Amps	± 0.07% + 5 digits
2.	**DC measurement Range**		
	Voltage	0V to 1 kV	±0.25% + 5 digits
	Current	0A to 10A	±0.15% + 2 digits

3.	**Resistance** : 0-50 M-ohms or larger range in the scale of Ohm, KOhm & MOhm **Accuracy** : ±0.05% of reading +2 digits or better
4.	The quantity measured shall be displayed in the form of a (minimum) four digit number with a properly placed decimal number.
5.	When D.C. quantities are measured the polarity shall be identified by means of a positive or negative sign displayed to the left of the number.

1.6.9 TACHO METER & STROBOSCOPE (DIGITAL)

1.6.9.1 The digital tachometer & stroboscope shall be rugged, reliable and accurate instrument to measure rotational & surface speed. The instrument offered shall be easy in handling and contained in leather case for easy transportation. The equipment shall be operable in either clockwise or anticlockwise direction.

1.6.9.2 The tachometer shall have provision for both type of measurement i.e. contact and contactless. It shall also be considered to provide two high speed life lubricated precision ball bearing for minimum loading and long life.

1.6.9.3 The Stroboscope shall have adjustable Flash Rate by push button on the instrument.

1.6.9.4 The screen of the instruments shall be suitably protected from the stray magnetic fields. Provision for hold on reading shall be made in the instruments. All the accessories shall be supplied along with the instruments.

1.6.9.5 Technical Requirements

The equipment shall comply with the following minimum specifications:-

S. No.	Parameters	Tachometer Ratings	Stroboscope Ratings
1.	Range	0-9999 RPM	Flash Rate: 0-9999
2.	Resolution	0.1 RPM	
3.	Accuracy	±1RPM	
4.	Display	LED/LCD	
5.	Memory (min)	50	10
6.	Power Supply	Chargeable battery operated	
7.	Auto Cut Off Circuit	To be Provided	
8.	Indication Of Low/normal condition	To be Provided	

1.6.10 EARTH RESISTIVITY TESTER (Digital)

The earth tester shall be used for measuring the earth/ ground resistance, ground continuity. The equipment shall be light in weight, handy portable, having liquid crystal display and suitable for four terminals testing.

1.6.10.1 The instrument shall be equipped with rechargeable type Nickel/ Cadmium batteries. The instrument shall have a set of safety plug to contain cable adopters, accessories like testing leads etc. The cables shall be rolled in reels; grounding rods shall be packed in holder. The whole instrument and the associated accessories kit shall be suitably packed in a durable material packing case.

1.6.10.2 Mode of Operation

The test lead/ cables shall be of 2.5mm dia nickel coated copper. The lengths of the cables/ leads shall be 30m suitably rolled on an insulated cable reel and four spikes of adequate length to be buried in the ground as per standards norms. The depth to which spike shall be buried ground shall be marked on the spikes.

The instrument shall be designed such that it shall prevent loading of the earth/ ground resistance wire during test. The equipment shall conform to its latest IS/IEC/BS Standards.

1.6.10.3 Technical Parameters

The equipment shall comply with the following minimum specifications:

S. No.	Parameters	Range
1.	Earth resistance range	0 Ohm – 30 k Ohm (auto ranging)
2.	Accuracy	±4% of reading ±3Digits
3.	Display	LCD/ LED

1.6.11 PHASE SEQUENCE INDICATOR

The instrument shall be used to check the phase sequence in a power system.

1.6.11.1 The system shall have the following provisions:

i. There shall be a provision for making the measuring circuit active only at the time of test so that meter does not operate continuously.

ii. It shall be suitable for working on 40 to 60 Hz, 500 volts AC. The standard accessories such as leads, clamps, and carrying case shall be in the scope of supply.

1.6.11.2 Technical Requirements

The following technical requirements shall be met by the equipment offered:

i. Voltage presence - Indicated by lighting of LEDs

ii. Phase/ Neutral search - Signaling by indicator light.

iii. Phase angle rotation - Signaling via LEDs freeing of neutral/ LED

iv. Alligator insulated - Enabling a contact on all clips difficult areas of access.

1.6.12 POWER AND INSTRUMENT TRANSFORMER ANALYSER

1.6.12.1 The equipment shall be mainly suitable to measure the

a) Ratio, winding resistance, leakage reactance and short circuit impedance and polarity of power transformers, Shunt Reactor and distribution transformers,

b) Ratio, burden and polarity of instrument transformers (CT & PT) installed in the power plant.

c) The equipment shall also measure the phase and magnitude deviation between Primary and Secondary windings of transformers.

1.6.12.2 The equipment shall come with test display along with software interface having a facility to create automatic customizable reports. The equipment shall be rugged, robust. The equipment shall conform to relevant standards in all respect.

1.6.12.3 It shall be suitable to be operated with chargeable batteries. It shall be equipped with data storage facility up to 200 test results and shall be provided with compatible ports to be connected with Laptop and printer. Any software, if required, is also in the scope of supply.

1.6.12.4 The equipment shall have facility to display transformer turn ratio, excitation current, ratio-error and phase angle deviation.

1.6.12.5 The equipment shall have an emergency shut off button and shall have at least over voltage and overload protection on all inputs and outputs

1.6.12.6 The minimum technical requirement of equipment shall be as below:

S. No.	Parameters	Range
1.	**Measurement Range**	
	Turn Ratio	0.75 to 20000
	Phase Angle Deviation	±90 degree

	Excitation Current	0 to 500 mA
2.	Accuracy	±0.5%
3.	Display	Digital LCD/ LED

1.6.13 DIGITAL PORTABLE UNIVERSAL BRIDGE (LCR METER)

1.6.13.1 The equipment shall be mainly suitable to measure the Inductance, Capacitance and Resistance of various electrical equipment installed in the power plant. The equipment shall be rugged, robust and suitable to be used under harsh environment.

1.6.13.2 The equipment shall be fully automatic and digital type. It shall also be suitable to be operated with chargeable batteries. It shall be provided with compatible ports to be connected with Laptop and printer.

1.6.13.3 The minimum technical requirement of equipment shall be as below:

S. No.	Parameters	Range
1.		**Measurement Range**
	i) Resistance	20Ω to 200 MΩ
	ii) Capacitance	200pF to 20mF
	iii) Inductance	20 µH to 20kH,
2.	Accuracy	±0.2%
3.	Frequency range	100Hz to 300kHz
4.	Display	Digital LCD back lit type

1.6.14 SILICA GEL DRYING OVEN

1.6.14.1 The oven shall be suitable to dry the silica gel of two Power Transformers ingressed with moisture. Interior housing of oven shall be of stainless steel. External body shall be of electrolytically coated galvanized steel coated with epoxy/ polyester paint.

1.6.14.2 The oven shall have digital control and display features. The oven shall be provided with variable temperature controller device, timer, forced draft circulation to heat the silica gel, alarm and protection against overload & over heating etc. All the accessories required for operation and maintenance of equipment are in scope of supply.

1.6.14.3 All type of power cables, mounting arrangement etc. are in the scope of supply.

1.6.14.4 The minimum technical requirement of equipment shall be as below:

S. No.	Parameters	Requirement
1	Capacity	Suitable to dry the silica gel of two no. Power Transformers
2	Temperature Setting	60 deg. To 250 deg C
3	Time Setting	0 – 999 minutes
4	Display	Digital LED/LCD

1.6.15 REMOTE ENGINEERING STATION/ Laptop

1.6.15.1 One remote engineering station (Laptop) and 1 no. Mono Colour Laser Printer with all the hardware and software shall be in the scope of supply. The system shall contain latest version of Hardware and software. The system needs be compatible for all the software provided for workshop equipment/ instruments. The contractor shall load all the software in the Laptop provided by them at site along with latest available operating system.

1.6.15.2 The Laptop shall be provided with built-in wireless, Wi-Fi LAN support interfaces and USB ports and other accessories.

1.6.15.3 Laptop shall be of reputed brand like Dell, HP etc.

1.6.15.4 The minimum technical requirement of system shall be as below:

S. No.	Parameters	Requirement
1.	Processor	Intel i7 or above
2.	Memory (RAM)	16GB
3.	Screen Size	14 inch
4.	Hard Drive	Minimum 1 TB
5.	Battery life	At least 8hr

1.7 OTHER TECHNICAL REQUIREMENTS

1.7.1 Seismic Behavior

Seismic behavior under seismicity is stipulated in Section-4, Volume-I. The equipment shall be expected to behave as below:

a. The physical alignment of the equipment along with supporting structures shall not get disturbed and there shall not be any internal flashover and/ or electrical faults.

b. No relays, instruments and indicators shall mal-operate.

c. Current carrying parts, supporting structures and earth connection etc. shall not get disturbed and/ or shall not break or distort.

1.7.2 Drawings & Data

a. The Bidder shall fill-in the technical data particulars as per Annexure-II. Separate sheet for all types of equipment shall be furnished.

b. The Contractor upon completion of detailed design shall review the data supplied by him in the bid and obtain approval to the data based on detailed design from the Purchaser. In this review, the contractor, however, shall not change the basic parameters given in the specification.

c. In addition, technical literature, photos, relevant standard etc. shall be supplied to give the maximum possible information of the equipment offered.

1.7.3 Makes of Bought out Equipment/ Items

Bidder may indicate/ offer only reputed makes of products/ equipment preferably from ISO certified companies.

The offered equipment shall be of reputed make like M/s Megger Ltd. (U.K.), M/s Doble, M/s HT Italia (Italy), M/s Bruel & Kjare, (Denmark), M/S H.Tinsley & Co (UK), Time Electronics (U.K.), Isotech (U.K.), M/S FLUKE INDIA, M/s METRAVI etc. and ISO certified only.

The names of vendors other than the ones listed above shall be subject to the approval of the Purchaser. The information and experience of the proposed vendor shall be furnished by the bidder.

1.7.4 Inspection and Tests

a. All the equipment and materials specified are subject to Inspection by Purchaser and/ or his authorized Inspection agency. The tests shall be conducted as per the relevant IS/ IEC standards.

b. All data copies of relevant standards shall be made available to the Inspector during testing process.

c. The Contractor shall submit the copies of all the Type and Routine Tests carried out at manufacturer's works.

d. All test data reports, certificates shall be marked with contract order number and Equipment Item Number.

e. All test data, reports, etc. shall be furnished in seven copies. Purchaser's representative shall witness all tests. In case tests fail, retest shall be conducted after rectification. Reports of failure of tests shall also be recorded for future reference. For testing and trial runs, all arrangement and consumables shall be provided by the Contractor. Routine Test reports for minor components will be acceptable.

f. A written notification shall be sent to the Purchaser at least 30 days in advance, indicating the time and place of factory tests so that the purchaser or his representative could witness these tests. For witnessing the tests, 4 engineers shall be deputed.

g. Acceptance of materials, parts and assemblies, or the waiving of the inspection thereof by Purchaser, shall in no way relieve the Supplier from the responsibility of furnishing equipment in accordance with the requirements of these specifications.

1.7.5 Rating Plate

Each equipment shall be provided with a rating plate having all information as per IS requirement and indicating all technical data on it.

1.7.6 Painting

All painted parts of the equipment and accessories shall be painted with approved shade as per relevant IS.

1.7.7 Operation and Maintenance Manuals

For guidance during installation of the work and subsequently for guidance of the plant operating and maintenance staff, the Contractor shall prepare manuals for operation. Five suitably hard bound copies of these manuals (in English only) shall be provided to Purchaser before the dispatch of the equipment. In addition, the Contractor shall supply soft copy of operation & maintenance manual of each equipment.

1.7.8 Training

The Contractor shall provide training facility to at least five persons to use the supplied testing instrument/ equipment, its maintenance and/ or operation and routine maintenance of power house equipment at site without any additional cost.

ANNEXURE-I

SCHEDULE OF REQUIREMENT		
SL. No.	**Description**	**Qty. (Nos.)**
1.	Capacitance & Dissipation Factor Test Set	1
2.	Portable Ultrasonic Flaw Detector	1
3.	Hand held Vibration meter	2
4.	Magnetic Particle Testing Inspection Equipment	1
5.	Micro-ohm Meter (Digital)	1
6.	Megger (Digital)	2
7.	Tong Tester (Digital)	2
8.	Multi-Meter (Digital)	3
9.	Tacho-Meter and Stroboscope (Digital)	3 (2+1)
10.	Earth Resistivity Tester (Digital)	1
11.	Phase Sequence Indicator	1
12.	Power & Instrument Transformer Analyser	1
13.	Digital Portable Universal Bridge (LCR meter)	1
14.	Silica Gel Drying Oven	1
15.	Laptop with Hardware and Operating System along with monochrome Laser Printer	1

ANNEXURE-II

SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS

(Particulars to be filled by Bidder)

S. No.	Description	Particulars
1.	**CAPACITANCE & DISSIPATION FACTOR TEST SET** (Capacitance & Tan Delta) 1. Type 2. Make & Model 3. Standard to which it conforms 4. Specific Technical features of equipment 5. Partial discharge detection (Volts) 6. Test Frequency 7. Test (output) voltage 8. Voltage range 9. Output Current i) Continuous ii) Intermittent 10. Resolution range 11. Accuracy class 12. Shielded Standard Capacitor i. Capacitance ii. Dissipation factor 13. Display 14. Measuring Range 15. Storage capacity of test results. 16. Safety features/ Protection provided in the equipment 17. Whether compatible with Laptop	

	PORTABLE ULTRASONIC FLAW DETECTOR 1. Type 2. Make & Model 3. Standard to which conforms 4. Range of measurement 5. Test range. 6. Accuracy 7. Resolution 8. Frequency Range 9. Battery rating 10. Battery backup time 11. Whether compatible with Laptop. 12. Interface arrangement with Laptop 13. Display features.	
3.	**HAND HELD VIBRATION METER** 1. Type 2. Make 3. Standard to which conforms. 4. Operating features i. Vibration velocity ii. Vibration acceleration iii. Relative Shaft displacement Speed iv. Bearing Condition Unit. v. Vibration displacement 5. Display features LCD/LED 6. Data storage capacity 7. Whether compatible with Laptop 8. Interface arrangement with Laptop 9. Details of sensors to be supplied with equipment	

	10. Cables to be supplied i. Size in mm^2 ii. Rating iii. Length iv. Quantity	
4.	**MAGNETIC PARTICLE TESTING INSPECTION EQUIPMENT** 1. Type 2. Make & Model 3. Standard to which conforms 4. Power Pack i. Input voltage ii. input current iii. Output current iv. Current control v. Magnetizing current details vi. Accuracy vii. Resolution 5. Back Light System i. Bulb details ii. UV intensity iii. Main Power Supply iv. Weight 6. Details of Magnetic Particle material. 7. Cables i. Conductor material ii. Length iii. Function 8. Whether compatible with Laptop	

5.	**MICRO OHM METER (Digital)** 1. Type 2. Make 3. Standard to which conforms 4. Measurement Range (μ Ohm) 5. Display Features 6. Test Current Range 7. Data Storage Capacity 8. Type and rating of Calibrating standards 9. Weight 10. Whether compatible with Laptop	
6.	**MEGGER (DIGITAL) 5kV** 1. Type 2. Make & Model 3. Standard to which conforms 4. Output Voltage i) Measuring range ii) Step voltage 5. Test current measuring range 6. Leakage current measuring range 7. PI value measuring range 8. Time measuring range 9. External Voltage measuring range 10. Capacitance measuring range 11. Insulation resistance measuring range at different steps of voltage.	
	12. Type of display 13. Accuracy 14. Operating Voltage	

	15. Type & Battery rating (AH) 16. Storage capacity of test results	
7.	**TONG TESTER (Digital)** 1. Type 2. Make & Model 3. Standard to which conforms 4. Core Gap 5. Measuring Range a. Voltage b. Current 6. Weight 7. Dimensions 8. Whether compatible with Laptop	
8.	**MULTIMETER (Digital)** 1. Type 2. Make & Model 3. Standard to which conforms 4. Measuring Range Voltage AC &DC Current AC & DC 5 Resistance 6 Accuracy 7 Resolution 8 Whether compatible with Laptop 9 Weight 10Standard accessories	
9.	**I. TACHOMETER (Digital)** 1. Type 2. Make & Model 3. Standard to which conforms 4. Material of tip 5. Accuracy class	

	6. Measuring Range 7. Whether compatible with Laptop 8. Weight **II. STROBOSCOPE (Digital)** 1. Type 2. Make & Model 3. Standard to which conforms 4. Material of tip 5. Accuracy class 6. Flash Rate 7. Whether compatible with Laptop 8. Weight	
10.	**EARTH RESISTIVITY TESTER (Digital)** 1. Type 2. Make & Model 3. Standard to which conforms 4. Measuring Capacity/Range 5. Dimensions 6. Operating System 7. Accuracy 8. Weight 9. Whether compatible with Laptop	
11	**PHASE SEQUENCE INDICATOR** 1. Type 2. Make & Model 3. Standard to which conform 4. Dimensions 5. Input voltage ranges 6. Display 7. Whether compatible with Laptop	
12.	**POWER & INSTRUMENT TRANSFORMER**	

ANALYSER

1. Type
2. Make & Model
3. Measuring Range

a) Powerand Distribution Transformer

i) Turn Ratio

ii) Winding resistance

iii) Leakage Reactance

iv) Short circuit impedance

b) Current Transformer

i) Ratio

ii) Burden

c) Voltage Transformer

i) Ratio

ii) Burden

d) Phase Angle Deviation between primary and secondary

i) Power and Distribution

ii) Transformer

iii) Current Transformer iii) Voltage Transformer

e) Magnitude Deviation between primary and secondary

i) Power and Distribution Transformer

ii) Current Transformer

iii) Voltage Transformer

4. Resolution
5. Accuracy
6. Display
7. Dimensions (LxWxH)
8. Weight
9. Any other Details

13.	**DIGITAL PORTABLE UNIVERSAL BRIDGE (LCR METER)** 1. Type 2. Make & Model 3. Measuring Range i) Resistance ii) Capacitance iii) Inductance 4. Resolution 5. Accuracy 6. Display 7. Dimensions (LxWxH) 8. Weight 9. Any Other Details	
14.	**SILICA GEL DRYING OVEN** 1. Type 2. Make & Model 3. Capacity 4. Temperature Setting Range 5. Time Setting 6. Display 7. Dimensions (LxWxH) 8. Weight 9. Any Other Details 10. Dimensions (LxWxH) 11. Weight	
15.	Laptop with latest available hardware configuration and Operating System & application software etc. 1. Make 2. Model 3. Processor 4. RAM	

	5. Hard Disk 6. Operating System **Printer** 1. Make 2. Model 3. Type 4. Printing Speed 5. Monthly Duty Cycle 6. Resolution	

ANNEXURE-III

SCHEDULE OF OPTIONAL ITEMS

(Particulars to be filled by Bidder)

SL. No.	Item	Make & Model No.	Quantity (Nos.)	Rate (Nu/Rs)	Amount (Nu/Rs)
1.					

Signature of Bidder

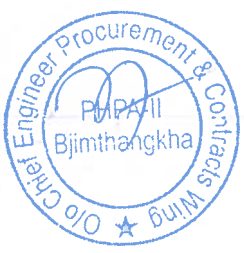
ANNEXURE-IV

SCHEDULE OF RECOMMENDED SPARE PARTS

Bidder must quote for the set of recommended spare parts for five years trouble free service for each item

Sl. No.	Description/Make	Quantity (Nos.)	Rate (Nu/Rs)	Amount (Nu/Rs)

Signature of Bidder



ANNEXURE-VI

SCHEDULE OF ACCESSORIES

(To be filled in by the Bidder)

The Bidder shall quote the list of accessories to be supplied along with each equipment.

S. No.	Description	Quantity (Nos.)

Signature of Bidder

CONTENTS

2.1 Scope of Works

Scope of work under this section covers the provision of labour, tools, plants, materials and performance of work necessary for the design, manufacture, quality assurance , quality control, shop assembly, shop testing, delivery at site, site storage and preservation, installation, commissioning, performance testing, acceptance testing, training of Employer's personnel, handing over to PHPA-II and guarantee for two years of mechanical workshop equipment, as per the specifications hereunder, each complete with all auxiliaries, accessories, spare parts and warranting a trouble free safe operation of the installation.

For the storage of the tools, testing devices and equipment, suitable number of lockers, racks, shelves and dust and moisture proof instrument boards shall be delivered and installed in the workshop.

The scope of work shall be a comprehensive functional system covering all supply and services including but not be limited to following:

2.1.1 Mechanical Workshop Equipment

i) Four (4) nos. electrical hand drilling machine,

ii) One (1) no. radial drilling machine

iii) One (1) no. long lathe of bed length 2500 mm,

iv) One (1) no. short lathe of bed length 1200 mm with copying attachment,

v) One (1) no. universal milling machine,

vi) One (1) no. double ended pedestal mounted grinding machine,

vii) One (1) no. power hacksaw,

viii) One (1) no. Portable diesel welding set,

ix) One (1) no. Portable Arc welding machines,

x) Two (2) nos. Gas welding,

xi) One (1) no. electrode storage oven & One (1) no. Portable electrode drying oven,

xii) Two (2) nos. pipe bending machines, (size 12.5 mm to 100 mm),

xiii) One (1) no. battery operated fork lifter of 3T,

xiv) One (1) no. battery operated four wheeled platform trolley (2T),

xv) One (1) no. Hydraulic platform of 1T with provision up to 3m height,

xvi) Workbenches, lockers. Racks, shelves and dust proof instrument boards for storing of the tools and testing instruments,

xvii) One (1) lot of hand tools and testing instruments,

xviii) Hydraulic transverse Jacks (Capacity 5T & 10T)

xix) Chain Pulley blocks

xx) One (1) no. Tripod

xxi) Spare parts in accordance to clause 2.8 "spare Parts" of this section,

xxii) 5 MT EOT crane

Any other item(s) not mentioned specifically but necessary for the satisfactory completion of scope of work defined above, as per accepted standard(s) /best international practices.

2.1.2 The scope shall include all components of equipment and auxiliaries which are required for satisfactory operation even though not individually or specifically stated in these specifications. Any item of supply not explicitly listed but otherwise implied by the contents of the specifications or essential for smooth operation of the equipment shall be construed as forming part of the supply and no additional charges shall be payable for the same. All specifications and capacities of various machine tools stated herein could be modified to the nearest or higher sizes and type available and as per manufactures practice these shall be based on the applicable IS or equivalent standard.

2.1.3 The scope of supply shall also include all special tools tackles, devices & sling, which are specially made and / or required for complete installation, dismantling, adjustment and maintenance of all equipment.

2.1.4 All lubricants, grease and coolants in sufficient quantity with 10% extra shall also be supplied for meeting the needs of various machines and equipment for at least one year period after commissioning of the same. The scope of supply shall include all mandatory spares sufficient for normal operation of equipment for 5 years. The list of such spares shall be mentioned in schedule of mandatory spare parts annexure-IV.

2.1.5 However, if the bidder feels that certain additional spares/ devices are required, he may give his recommendations separately in optional spare parts schedule and state each device, item, etc. The mandatory/recommended spares/devices shall be of same material, dimension, workmanship & finish as that of the original.

2.2 Rating and Functional Characteristics

Unless otherwise stated, rating, characteristics, test and test procedures, etc. of the workshop equipment shall comply with the provisions and requirements of the latest applicable International/Indian Standards.

2.3 Performance Guarantee

The mechanical workshop equipment along with all auxiliaries and accessories shall be capable of performing intended duties under specified conditions. The Contractor shall guarantee the reliability and performance of the individual equipment as well as of the complete system.

2.4 Power Supply

2.4.1 415 Volts, 3 phase, 4 wire, 50 Hz, grounded neutral A.C. supply shall be made available at the power station by the purchaser. This supply is subjected to following variations:

A.C. Voltage	:	± 10%
Frequency	:	-5% to +3 %
Voltage & Frequency values	:	Any combination of the above

2.4.2 Cables for 415 volts, 3 Phase, 4 wires, 50 Hz, grounded neutral A.C. supply will be made available by the project authority up to the main distribution board in the mechanical workshop. The scope of supply starts for the bidder from the main electric distribution board which shall be part of supply, and will further provide all power sources necessary for the workshop area. The bidder will supply all cubicles, switchgear including cables, cable racks/conduits as required. All the cables shall confirm to the relevant applicable standards and shall be Fire Retardant Low Smoke (FRLS) with stranded copper conductor.

2.4.3 A.C. switchgear shall be indoor, dust and water-proof with vermin protection, metal clad, air insulating, floor mounting type. A.C. Switchgear complete with two incoming, three phase, 0.415 KV circuit breakers (connected with the power supply from 415V LT switchgears), and requisite number of outgoing 0.415 / 0.240 KV MCCB's according to the number of Machine tools / work benches shall be provided. The switchgear shall be complete with necessary protection against electrical shock and fitted with earth leakage circuit breaker. The bidder's scope covers the power wiring and fixing of outlets up to the devices / bidder tools.

2.4.4 The bidder shall indicate the estimated AC power requirements for the equipment covered by these specifications in the bid.

2.5 Design and Construction

2.5.1 Standards

The system and equipment shall be designed, built, tested and installed to the latest revisions of the applicable standards. In the event of other standards being applicable they will be compared for specific

requirement and specifically approved during detailed engineering for the purpose:

2.5.2 Drilling Machine

2.5.2.1 Electrical Hand Drilling Machine

Each drilling machine shall have drilling capacity of 20 mm in steel. The drilling shall have overload protection and speed control. Each drilling machine shall be supplied along with one (1) set of HSS drills of best quality covering the whole drilling range.

Weight of the machine shall not be more than 5 kgs.

2.5.2.2 Radial drilling machine

Radial drilling machine shall be suitable for upto 60 mm diameter capacity in steel complete with accessories etc. The worktable shall at least be of 1000x750mm. The maximum and minimum distance from the base plate to spindle shall be 1600mm and 400 mm respectively. The no. of spindle speed should not be less than 12. The machine shall have electro-hydraulic clamping for column, arm and drill head.

The drilling machine shall at least be supplied with:

i) One (1) vice for drilling machine

ii) One (1) no. box table

iii) Two (2) drill chucks with keys of different sizes,

iv) Two (2) sets of Morse Taper Adapter from nos. 5 to 1 in step of one

v) One (1) Complete set of cooling equipment with built in tank and machine lamp

vi) (1) Universal table for angular work settings

vii) One (1) tilting table tapping attachment

viii) One (1) no. boring attachment for rough boring in steel upto 140mm,

ix) Five (5) sets of carbide tipped twist drills of best quality covering the whole drilling range of 2 – 60 mm.

2.5.3 Lathe Machine

2.5.3.1 Long Lathe

The long Lathe shall be centre lathe, all geared, heavy duty type. The contractor shall recommend and supply the lathe machine in accordance of the machining requirement of not less than 2.0m job

length along with travelling and fixed steadies and following tools & accessories.

i) One (1)set Taper turning attachment,

ii) One (1) no. each 3 jaw self centering chuck (20") and 4 jaw independent chucks (20"),

iii) Two (2) nos. corresponding dead centre

iv) Two (2) nos. drive dogs

v) Two (2) nos. each driving plate, face plates (24" and 30")

vi) One (1) set Quick change tool

vii) One (1) set machine lamp

viii) One (1) set tool post,

ix) Four (4) sets each of HSS and high carbon tool bits with tool base

x) Four (4) sets tool kit consisting of turning tools, parting tools, external threading tool with a set of corresponding inserts,

xi) Two (2) drum of lube oil for gear box,

xii) One (1) set coolant pump complete with coolant tank & swarf tray,

xiii) One (1) set of reduction sleeves, various sizes of sleeves to accommodate turning of different dear taps

xiv) One (1) set dog plate each of 24 inch and 30 inch,

xv) One (1) set each of revolving centre (MT-5), centre adaptor, along with standard tools & accessories,

xvi) One (1) set of copying attachment

2.5.3.2 Short Lathe with copying attachment

The Short Lathe shall be hollow spindle centre lathe with

i) Bed length of 1200 or higher and swing over bed of minimum 500mm diameter, with travelling and fixed steadies,

ii) One (1) no. each 3 jaw self centred and 4 jaw independent chucks (10"),

iii) Two (2) nos. face plates (12")

iv) One (1) set Coolant pump with tank and swarf tray

v) One (1) no. Machine lamp

vi) Two (2) nos. each dead (MT-4) and live centres (MT-4),

vii) Two (2) nos. each drive dogs and driving plates

viii) One (1) set copying attachment of suitable length

ix) Four (4) sets tool kit consisting of turning tools, parting tools, external threading tool with a set of corresponding inserts,

x) Four (4) sets each of HSS and high carbon tool bits with tool base

xi) One (1) set quick change tool post

xii) One (1) set long cross slide with tool post

xiii) One (1) set taper turning attachment,

xiv) One (1) set Tools holders, centre adaptor, electric motor and other standard tools and accessories.

xv) One (1) set of change wheel for metric threads

2.5.4 Universal Milling Machine

Universal milling machine for both horizontal and vertical milling shall be suitable for table size of 2000 mm x 300 mm. Longitudinal, cross and vertical travel/traverses should not less than 950 mm, 375mm and 320 mm respectively. The machine shall be supplied with 18 spindle speed ranging 45-1800 rpm and complete with following:

i) All accessories including arbors, milling vice, swivel base, tools and tackles etc,

ii) Universal Dividing head attachment

iii) Clamping tool set, mandrills,

iv) Vertical milling head, side vertical head, rack cutting attachment, rotary table, service set,

v) Collet chuck and collet set,

vi) Over brace and arbour support bearing bracket,

vii) Complete coolant equipment and machine lamp

viii) Base tray and low voltage lighting etc.

ix) Two (2) sets of HSS and cemented carbide tip cutters for milling operation.

2.5.5 Double Ended Pedestal Mounted Grinding Machine

The double ended, heavy duty grinding machine shall be capable of grinding, turning tools and drills made of H.S.S., carbide, alloys and for general purpose grinding work. The machine shall be provided with IS approved motors. The grinder shall be provided with dust exhaust equipment for dry grinding operation. The dust exhaust unit shall consist of motor driven suction fan and dust collection and the dust so formed

from wheel head shall be collected by dust collection unit through flexible hose pipe attached to the wheel guard on one side only and coolant pump piping and through for wet grinding on another wheel. The main dimensions and characteristics of the machine shall be generally as specified below, but marginal variation will be acceptable at the discretion of the purchaser.

- Number of grinding wheels & diameter (mm) 2 Nos. of 350 mm diameter
- Distance between machine foot and spindle axis (mm) 915
- Distance between wheel centre to centre 630
- Smallest dia of spindle (mm) 38
- Spindle speed (rpm) 1600

Accessories

- Spare protection for dry grinders (both wheels) 1 set
- Work light 1 set
- Spare wheels
  - Rough 2 sets
  - Fine 2 sets
- Grinding wheel dresser 1 set
- To make grinding wheel to come to its original spare
- Maintenance tools 1 set
- Wet grinding attachment at one end 1 set
- Standard spare parts 1 set

2.5.6 Power Hacksaw

Power hacksaw shall be suitable for operation with 415V±10%, 50Hz (-5% to +3%) power supply with following particulars:

Cutting capacity:

i)	Round section (mm)	300
ii)	Rectangular section (mm)	250x250
iii)	Stroke per minute	60 to 100

The following standard accessories shall be provided with the hacksaw:

a) One (1), coolant tank (with chips separator),

b) One (1) set of electrically driven coolant Pump with motor and coolant piping and nozzle.

c) Fifty (50) power blades extra

d) One (1) adjustable bar rest,

e) One (1) V shape vice jaws to cut material in bundle,

f) Emergency stop push button.

2.5.7 Welding Set

2.5.7.1 Portable Diesel Welding Set

The wheel mounted directly coupled to diesel engine with necessary flywheel, 300 Amp generator welding set shall be supplied with all the necessary accessories required for the manual start of engine by hand. The current of the welding generator can be adjusted by a regulator mounted on the set. The diesel tank mounted on the set shall have sufficient capacity for the 8 hours operation of the set. The generator winding shall be of standard quality and "F"-class insulation.

There shall inbuilt provision for the cooling of engine and generator. All the components used for the assembly of set shall conform to respective ISS. The flywheels shall be guarded by necessary wire mesh. The maneuver ring of set shall be suitably designed.

The engine and generator shall be painted with high quality gray paint.

Necessary accessories with the welding set

Number units 1 no.

a) Welding screen with 1 no. additional goggle

b) Welding electrodes holder with 5 mts. Long 300 Amp

Welding cable lead & 1 no. spare

c) Chip pine hammer 1 no.

d) Welder hand glove pair

e) One set of maintenance tool such as spanner set, etc.

f) Wire brush 1 no.

g) Starting handle to engine 1 no.

2.5.7.2 Portable Arc Welding Set (Pin type)

The welding transformer shall be of pin, regulator taps, oil type and housed in steel tank with heavy wounded primary and secondary coils. The coils shall be made of pure copper. The transformer shall be provided with variable choke for current control and manufactured in accordance with (IS:1851). The transformer shall be suitable to operate on 400/440V, 50 cycle A.C. supply. The transformer shall be mounted on four rubber wheels and handle for easy mobility inside the power house.

The transformer shall have the following specification but marginal variation will be acceptable at the discretion of the purchaser.

No. of units	1 no.
Welding current regulator taps	7 nos.
Max. Output (amp)	350
Max. Continuous hand welding current at 60% duty cycle (Amp)	300
Welding current at 100% duty cycle (Amp)	180
Min. Hand welding current (Amp)	50
Max. /Min. Electrode size (SWG)	6/14
Open circuit voltage (Volt)	65
Max. Welding voltage (Volt)	34
Min. Welding voltage (Volt)	22
Insulation class	A

Accessories

-	Copper welding cable conforming to IS:9857, 30 mts length	2 Nos.
-	Earthing clamps	2 Nos.
-	Wire brush SS 5 rows	2 Nos.
-	Chipping hammer	1 No.
-	Spare lenses, plain and dark each	20 Nos.
-	Hand gloves	3 Pairs
-	Armor head screen	1 No.
-	Head screen	1 No.

2.5.7.3 OXY – Acetylene Gas Welding Equipment

The gas welding equipment shall be used for welding and cutting with acetylene/oxygen gas. The main dimensions and characteristics of the set shall be generally as specified below but marginal variation will be acceptable at the discretion of the purchaser.

Number of units		2 sets
-	Oxygen cylinder of standard size (gas filled)	1 no.
-	Double stage gas regulator with two gauge	2 nos.
-	Acetylene cylinder of standard size	1 no.
-	Double stage gas regulator with two gauge	2 nos.
-	Wheel cart for carrying standard size two gas cylinders	1 no.

Accessories

-	Standard spare parts	1 Set
-	Standard operation and maintenance tools	1 Set
-	Gas hose with hose clamps	50m
-	Welding torch complete with assorted welding head, welding range (mm)	0.5 To 30
-	Cutting head, assorted for cutting range (mm)	3 To 100
-	Welding chipping hammer	1 Set
-	Welding armour head screen	1 No.
-	Welding armour head screen (as per IS:1179)	1 No.
-	Chipping brush with 5 rows of SS wire	2 Nos.

2.5.7.4 Electrode ovens

The electrode storage oven and portable electrode drying oven shall be suitable for remoisturizing and heating the welding electrodes at a pre-specific temperature. It shall be robust in construction and designed to meet the stringent demand of continuous operation.

Oven bodies

The CRGA sheet of size not less 18 than 18 SWG used for manufacturing of the oven shall be of best quality. The oven body shall ensure the

minimum heat loss due to convection. The inner medium (i.e. between inner and outer wall of the oven shall be reinforced with heat insulant material such as glass wool/mineral wool etc. the door shall be of turntable hinges construction with a provision of heat insulation sealing washer which shall ensure no heat loss and have tendency auto closer.

Heating element and their control

The heater element shall be of nichrome wire filament material. This shall be arrangement such a way so as to avoid localized heating and hot spot in the oven. The construction of oven shall be such that each element shall be accessible easily and can be changed without requiring any special tool.

To maintain the temperature inside the oven, the heating element shall cut off automatically at pre-specified temperature by means of thermostatic control. The range of temperature shall be adjustable with the knob control mounted outside the oven. Provision of indicating lamps shall be made. All controls, supply leads, protective equipment shall be in the scope of supply.

General technical requirement

1)	No. of unit Operating voltage	1 no. each AC 230V 50 Hz
2)	Capacity	3kW for electrode storage oven 1kW portable electrode drying oven
3)	Control	50-400 deg. C thermostat for portable electrode drying oven (coil & rod type)
4)	No. of sleeves	3 for electrode storage/one for drying oven
5)	Indicating lamps	Red and green
6)	Capacity	30 Kg for electrode storage oven/10 kg for drying oven
7)	No. of unit	1 no. (each type used)

2.5.8 Pipe Bending Machine

Pipe bending machine shall be hydraulic hand operated type for bending of mild steel pipes of dimensions 12.5 mm to 100 mm with bending guides of different sizes covering whole range and complete in all respect.

2.5.9 Battery Operated Fork Lifter

One battery operated fork lifter of 3 ton capacity for use inside the powerhouse along with drum handling and crane arm attachments. The Battery operated fork lifter will be as per IS:10517 and other relevant applicable latest BIS standards for accessories including Battery & Battery Charger.

S.No.	Capacity	3000 Kg minimum
1.	Power source	Electric with Power Steering
2.	Battery and Battery Charger	Suitable Battery of reputed make with test certificate and battery charger
3.	Drive Motors	AC motors with manufacturer's test certificate
4.	Mast Type	Suitable to have free lift of 1000 mm or more
5.	Maximum Fork Height (MFH)	3000mm
6.	Features	Lights package (head/tail/brake/side indicator, reverse), reverse horn and rear view mirror)

2.5.10 Battery Operated Four Wheeled Platform Trolley

Platform trolley shall be used to carry heavy machine parts/jobs to various locations inside the power house. The platform type trolley shall have the following specifications but marginal variation will be acceptable at the discretion of the purchaser. The trolley shall be made of welded construction with not less than 50 x 50 x 6 mm M.S. angle frame body and 3 mm M.S. sheet platform. Suitable stiffener and cross members shall be provided to the platform to take care of bulging due to heavy loads. It shall be provided with 4 Nos. of 30.0 x 8.0 cms. of solid rubber bonded wheels fitted with double ball- bearings. Turntable shall be of heavy duty.

- No. of units 1
- Capacity (Tonne) 2
- Platform size (mm) 1500 x 1000
- Spare Wheels (with ball bearings) 2 Nos.

2.5.11 Hydraulic Platform

A working mobile type Hydraulic platform shall be provided which shall be hydraulic operated of 1T capacity for a height upto 3m.

2.5.12 Work Benches, Lockers, Rack, Shelves and Dust Proof Instrument Boards

Wooden Work Bench

- No. of units 1 no.
- Size (LxWxH) (mm) 2000x1000x800

a) Material & construction details

It shall be made of seasoned good quality wood. The wood shall be sufficiently hard to withstand rough usage. Cross members shall be suitably placed to provide additional strength to the work bench. The bench shall have minimum four straight legs. The top surface of the bench shall not be less than 65mm thick and shall be finished true. Three tire lockable drawer cabinets shall be provided on both sides of the front face of work bench. The bench shall be given two coats of wood polish.

Rear top portion of one of the work bench shall be equipped with instruments and current supplying board. The metal enclosure of the board shall be composed of sheet-steel with minimum thickness 2.5mm. The board shall be dust and vermin proof. It shall be completely equipped, wired and painted and shall have rated insulation in accordance with the Electricity Act. The overall dimensions of the board shall be such that it can accommodate all the equipment as specified. The equipment to be flush mounted on the front cover shall be as given below:

- Main power switch , three pole, hand operated
- Indicating lamp showing ON/OFF position of 415 C AC incoming supply
- Current operated earth leakage circuit breaker in the circuit before the distribution AC supply.
- Instruments with anti-glass having instrument size of 48x48mm, measuring range 1.25x rated value and accuracy class 1.5.

The power supply unit shall be provided with

- Sockets for 415/240 V, 50Hz power source
- 270 V, 48 V, 24 V DC

Ammeter and voltmeters for each source with indicating light

- 240 V, 50Hz, series/direct current supply source with 200 Watt lamp connection for testing minor jobs.

b) Four (4) storage locker cabinets of appropriate size each having six (6) lockers of at least 350mm x 457mm size.

c) Four (4) tools storage cabinets of sheet steel construction each with at least six (6) numbers full extension lockable drawers. The overall size of each unit shall not be less than 1000(H) mm x 710(W) mm x 700(D) mm.

d) Six (6) racks each with six nos. shelves having overall 2500 mm (min.) height and 2000 mm length (min.)

e) Four (4) machine tool cabinets with full extension lockable drawers and doors in sheet steel construction. The overall size of each unit shall not be less than 1600(H) mm x 710(W) mm x 770(D) mm.

2.5.13 Hand Tools and Testing Instrument

Following hand tools of approved make shall be supplied:

1) Two (2) sets of heavy duty alloy steel Ring-headed spanners of size M6 to M64 mounted on a wrench board or tool box,
2) Two (2) sets of heavy duty alloy steel open-headed spanners of size M6 to M64 mounted on a wrench board or tool box,
3) Two (2) sets of heavy duty alloy steel socket wrench (12 sides) of appropriate drive of the size M6 to M64 mounted in a wrench board or in a toolbox.
4) Two (2) sets of heavy duty alloy steel single-headed ring spanners of size M24 to M64 mounted in a wrench board or tool box,
5) Two (2) sets of heavy duty alloy steel open-ended slogging spanner of size M24 to M110 in a wrench board or in a tool box,
6) Two (2) sets of double acting wrench handles having drive sizes ¼", ½", ¾", 1" and 1 ½".
7) Two (2) sets of heavy duty alloy steel sockets of various size for each of above drive sizes in a tool box,
8) Two (2) sets of universal joints and extensions of the size 100 mm, 200mm, 300 mm, of the drive sizes similar to above ratchets handles,
9) Two (2) sets of torque wrenches with adjustable torque setting for the above drive sizes,
10) Two (2) sets of torque multipliers with input of above drive sizes and output of corresponding next higher drive size,
11) Two (2) nos. of pneumatic wrench with torque adjustment for above drive sizes,

12) Four (4) Spirit levels (coarse and bubble type) (Accuracy min. 0.5mm/meter),

13) Two (2) nos. of Digital thermometers,

14) Two (2) nos. of Mechanical Tachometer,

15) Outside Micrometer (least count 0.01mm)

Size (mm)	Mechanical
0-25mm	4
0-100	2
100-200	2
200-1000 (covering all the ranges in step of 100)	1 no. each

16) Inside (stick) Micrometer (least count 0.01mm)

Size (mm)	Mechanical
50-200mm	2
50-1000	1
1000-5000	1

17) Digital Vernier Calliper (least count 0.02 mm or better)

Size (mm)	Nos.
150	2
300	2

18) One (1) set of Optical precision level instrument of high accuracy for precise levelling and height measurement along with associated accessories, with following specification:

i)	Telescope magnification	-	42x
ii)	Objective aperture	-	50mm
iii)	Sensitivity of telescope level	-	8"/2mm
iv)	Levelling accuracy	-	0.2"
v)	Minimum reading of microscope	-	0.02mm
vi)	Standard Deviation for double run per km	-	+/-0.2mm

19) One (1) set of Mechanical Height Gauge for measurement upto 600mm (Accuracy +/-0.05mm)

20) Depth Gauge (Accuracy of +/-0.04mm or better)

Size (mm)	Mechanical
150	2
300	1

21) Two (2) nos. of Master Level 200mm (least count 0.02 mm /m)

22) One (1) no. of Square level 200mm (lease count 0.02 mm /m)

23) One (1) set of slip gauge (set of 87)

24) Two (2) set of 500x500mm master surface plate,

25) One (1) set of 1000x1000mm master surface plate,

26) One (1) set of roughness measuring instruments,

27) One (1) set of straight edge camel back 3000mm

28) Set of nylon slings (endless) having minimum factor of safety as 7

Size	Quantity
Minimum 6 m length sling each for	
5 Ton	4 nos.
10 Ton	4 nos.
20 Ton	4 nos.
Minimum 8 m length sling each for	
40 Ton	4 nos.
60 Ton	4 nos.
80 Ton	4 nos.

29) 8 set each D-shackles of 5, 10, 20, 40, 60, 80 ton

30) 8 set each eye bolts of sizes M6 to M36 and M48, M56

31) Pressure testing device pump motor operated along with provision of manual operation up to 40bars

2.5.14 Hydraulic Transverse Jacks (Capacity 5T & 10T)

2.514.1 The jack shall be robust and simple in construction, manufactured with stringent quality control measures at every stage of production and in accordance with acceptable standards. The body, piston, pumps and all other accessories shall be conforming to standards mark and design. All the accessories shall be in the scope of supply. The equipment shall be complete in all respects.

2.5.14.2 The body of the jacks containing the hydraulic oil shall be as per the IS standard and shall be able to withstand the pressure and load upto the marked capacity. The steel used shall be of good quality and high performance during loading condition. A suitable size handle shall be fixed on the body for handling the jack.

2.5.14.3 The piston operating head shall be suitably hinged to the base of the jack body and shall give friction free movement to the piston meant for pressing the oil from the jack sump.

2.5.14.4 The operating rod of standard length made of drop forged steel with proper hand ripping cross cuts at one end, shall be supplied alongwith the jacks.

2.5.14.5 The top of the jack shall be suitably flame hardened and shall ensure no chipping with the shift operation of the equipment.

The technical requirements are as follows:

Capacity	Height	Lift	Transverse	No. of Unit
5T	500 mm	300 mm	250 mm	1 No.
10T	500 mm	300 mm	250 mm	1 No.

2.5.15 Chain Pulley Blocks

2.5.15.1 The chain pulley blocks shall be robust in construction and shall be housed in rugged frame. The equipment shall conform to Indian standards in quality and test performance. The frame hooks, load chains, load break. Etc. shall be included in the scope of supply. All chain hoists shall conform to test requirements as per IS-3832.

2. 5.15.2 The frame shall be steel fabricated, shaped so that it may occupy minimum head room and shall ensure permanent alignment of spindles and gears. The frame shall enclose and protect the load chain wheel and brake unit. There shall be a detachable steel cover totally enclosing the gears.

2. 5.15.3 The hooks shall be of forged steel construction and fine machined to have proper shape. For material composition and its strength, the hooks shall conform to IS-8.

2. 5.15.4 The top hooks shall swivel in a crown head forming the part of the frame and the bottom hooks shall rotate on balls housed in a cross head wheel.

2. 5.15.5 Bottom hook shall be equipped with safety latch.

2. 5.15.6 The load chain wheel shall be fabricated from malleable cast iron and shall have pockets accurately cased to receive calibrated load chain. It shall be conforming to IS-2108.

2. 5.15.7 All gears shall be accurately machined cut from alloy steel and case hardened to ensure long life. The load spur wheel shall be mounted

on two lubricated ball bearings. The axles shall be of ground carbon steel.

2. 5.15.8 The load chain shall be higher tensile steel grade 40 and conforming to IS-3109. All chains shall be electrical resistance welded and heat treated to give ductility toughness and wear resistance. Each chain link shall be tested to twice the safe working load and shall withstand shock loads also.

2.5.15.9 The load brake shall be self actuating sorer and disc type. The mechanical brake shall engage instantly and shall provided uniform performance with rated loads or less than the rated capacity.

2.5.15.10 The hand chain wheel shall be made from Grey iron grade Fe-260 and shall conform to IS-210. The hand chain wheel shall have a bore with square threading and pockets accurately casted to receive calibrated hand chain. There shall be provision for hand chain guards o prevent the chain from snagging and fouling. The hand chain guards shall be removable type for easy refilling of chains.

2. 5.15.11 There shall be adequate lubricating/greasing provision in the totally enclosed gear case. The driving pinion shall be provided with grease nipples for bearing lubrication and between load spur wheel bore and driving pinion to ensure smooth and trouble free operation.

Technical Requirements:

Capacity	Quantity
2 T	1 no.
3 T	1 no.
8 T	1 no.

2.5.16 Tripod

The tripod shall be made from G.I. pipes of IS mark, suitable to hold the load at the height of 5.0 m. All central axles, hooks etc. shall be in the scope of supply. The equipment shall be able to lower and lift the load safely. One of the pipes shall have climbing arrangement to approach the lifting hook for fixing of pulley etc.

The hook shall be made of tested quality steel preferably from drop forged steel, the end eyes of the hooks shall be machined to close tolerance to ensure free movement of hook. The axle of the tripod shall be case hardened and made up of carbon steel, threaded at one end for adopting the nut.

No of Unit. 1 No.

2.5.17 EOT Crane

The crane shall be complete in all respects including bridge girders, end carriages, trolley assembly, hoisting machinery, wire rope, hook block, motors, gearboxes, brakes, electrical panels, control system, limit switches, power supply arrangement, safety devices and all accessories required for safe and reliable operation.

The crane shall be suitable for handling mechanical components, maintenance tools and workshop materials.

a. Basic Technical Parameters

- Rated Capacity (SWL): 5 Ton
- Type of Crane: Electric Overhead Travelling Crane (EOT)
- Crane Configuration: Double Girder
- Service Location: Indoor Mechanical Workshop
- Span: 10 meters
- Maximum Height of Lift: 7 meters
- Long Travel Length: 20 meters
- Duty Classification: Class II / M5 (Medium Duty)
- Power Supply: 415 V ±10%, 3 Phase, 50 Hz AC
- Control Voltage: 110 / 230 V
- Ambient Temperature: 5°C to 45°C

b. Applicable Standards

The crane and all its components shall be designed and manufactured in accordance with the latest applicable standards including but not limited to:

- IS 3177 – Electric Overhead Travelling Cranes and Gantry Cranes
- IS 807 – Design, Erection and Testing of Cranes
- IS 2266 – Steel Wire Rope for General Engineering
- IS 5749 – Forged Hooks
- IS 2062 – Structural Steel
- IS 325 – Three Phase Induction Motors
- IS 2148 – Flameproof Electrical Equipment (where applicable)
- IS 800 – General Construction in Steel

Equivalent international standards such as ISO, DIN or FEM may also be followed where applicable.

c. Design Requirements

The crane structure shall be designed for strength, rigidity and stability. All structural members shall be designed considering dynamic loads, impact factors and fatigue stresses.

The design shall consider:

- Rated load plus weight of hook block and lifting tackle
- Self weight of crane components
- Impact load during lifting
- Wind load (for indoor condition minimal consideration)
- Lateral forces during travel
- Fatigue due to repetitive operations

Maximum permissible deflection of the bridge girder shall not exceed 1/600 of the span under rated load.

d. Crane Bridge

The crane bridge shall consist of two fabricated steel box girders interconnected by rigid end carriages. The girders shall be fabricated from rolled steel plates conforming to IS 2062.

Features:

- Box girder construction with stiffeners
- Rail mounted on top of girders for trolley movement
- Walkways with chequered plates
- Handrails and toe guards for operator safety
- Access ladder for maintenance

All welds shall be performed using qualified welding procedures.

e. End Carriages

End carriages shall support the bridge girders and transmit loads to crane rails. Each end carriage shall consist of:

- Fabricated steel frame
- Crane wheels
- Drive shafts
- Bearings
- Gearboxes and motors for long travel motion

The wheels shall be forged steel with hardened tread surfaces. Double flanged wheels shall be provided to prevent derailment.

f. Trolley Mechanism

The trolley assembly shall move on rails mounted on the crane bridge. The trolley frame shall be fabricated from structural steel sections.

The trolley shall include:

- Hoisting motor
- Gearbox
- Rope drum
- Wire rope
- Hook block
- Trolley wheels
- Trolley drive motor and gearbox
- Limit switches
- Guards and covers

The trolley wheels shall run on machined rails mounted on the crane girder.

g. Hoisting Machinery

The hoisting unit shall consist of an electric motor coupled with reduction gearbox driving a grooved rope drum.

Features:

- Electric hoisting motor suitable for crane duty
- Heavy duty reduction gearbox
- Grooved rope drum
- High strength steel wire rope
- Hook block with safety latch
- Upper and lower limit switches
- Electromagnetic fail-safe brake

The factor of safety for wire rope shall not be less than 6.

h. Hook Block Assembly

The hook block shall consist of forged alloy steel hook conforming to IS 5749. The hook shall be mounted on thrust bearings to allow free rotation. The hook shall include a spring loaded safety latch. Adequate safety factor shall be maintained for hook and suspension components.

i. Motors

All motors shall be squirrel cage induction motors suitable for crane duty.

Features:

- Totally enclosed fan cooled construction (TEFC)
- Class F insulation
- IP55 protection
- Suitable for frequent starting, reversing and braking

Separate motors shall be provided for:

- Hoisting motion
- Cross travel (trolley)

- Long travel (bridge)

j. Gearboxes

All gearboxes shall be totally enclosed oil lubricated type. Helical gears made from alloy steel shall be used.

Gearboxes shall be designed for:

- Smooth transmission
- Minimum noise
- Long service life

k. Braking System

Electromagnetic fail-safe brakes shall be provided for all motions. The brakes shall automatically apply in case of power failure.

Brakes shall be provided for:

- Hoisting mechanism
- Trolley travel
- Bridge travel

l. Electrical System

The crane electrical system shall include:

- Main control panel
- Motors and starters
- Variable Frequency Drives (VFD)
- Limit switches
- Emergency stop circuits
- Overload protection
- Short circuit protection

Power supply to crane shall be through insulated conductor bars or festoon cable system.

m. Control System

The crane shall be operated using a pendant push button station suspended from the trolley or through a wireless radio remote control system.

The control station shall include:

- Hoist up/down controls
- Cross travel controls
- Long travel controls
- Emergency stop push button

n. Safety Devices

The crane shall be provided with adequate safety devices including:

- Overload protection device
- Upper and lower hoist limit switches
- Emergency stop push buttons
- Mechanical end stops
- Rubber buffers
- Rail sweepers
- Safety guards for rotating parts

o. Painting and Surface Protection

All steel surfaces shall be cleaned by shot blasting or mechanical cleaning.

Painting system shall include:

- One coat zinc rich primer, Minimum thickness 50 Micron
- Two coats epoxy/industrial enamel paint, Minimum thickness 100 Micron
- Color of crane shall be safety yellow unless specified otherwise.

p. Inspection and Testing

The crane shall undergo factory inspection and site testing.

Tests shall include:

- No load test
- Full load test
- Overload test (125% of rated capacity)
- Functional testing of all motions
- Electrical insulation test
- Brake test

Test certificates shall be submitted to the purchaser.

q. Documentation

The Contractor shall provide the following documents:

- General Arrangement Drawings
- Structural drawings
- Electrical schematic diagrams
- Operation and Maintenance Manual
- Spare parts list
- Test certificates
- Warranty certificates

2.6 Drawings, Documents and Design Calculations

2.6.1 Design Memorandum

The Contractor shall submit to the Employer a design memorandum prepared in accordance with standard industry practice

2. 6.2 Drawings and documents

The Contractor shall submit all the drawings and documents in accordance with requirements stipulated in General Conditions.

2.7 Delivery, Installation and commissioning

The Contractor shall perform the delivery, installation, and commissioning in accordance with standard industry practice.

2.8 Spare Parts

Recommended spare parts shall be supplied in accordance to Annexure – IV of this Section.

2.9 Special Tools

The Contractor shall list and supply all special tools. List of such tools including their make and detailed specification, shall be submitted for acceptance by the Employer.

2.10 Quality Assurance and Testing

The Contractor shall submit the quality assurance plans for all equipment listed under scope of work for approval of the Employer.

2.11 Bidder will be required to train at least Five (5) technical personnel of PHPA at site for (20) twenty days **(FREE OF COST)** for on site operation and maintenance of the equipment installed in the workshop.

a) Bidder shall indicate/ offer only reputed makes of product/ equipment.

b) The offered equipment shall be of reputed make like:-

Sl.No.	Item of Facilities	Make/Brand
1	**MECHANICAL WORKSHOP**	
1.1	ELECTRICAL HAND DRILLING MACHINE	BOSCH/ HITACHI/ METABO/ RALLYWOLF
1.2	RADIAL DRILLING MACHINE	BATLIBOI/HMT/NAGMATI/EIFCO/ATLAS
1.3	LONG LATHE	BATULIBOI/ HMT/ NAGMATI/ ATLAS
1.4	SHORT LATHE	BATULIBOI/ HMT/ NAGMATI/ ATLAS
1.5	UNIVERSAL MILLING	BATULIBOI/ HMT/ NAGMATI/ SAGAR

	MACHINE	
1.6	DOUBLE ENDED GRINDING MACHINE	BATULIBOI/ EIFCO/ NAGMATI/ ELMACO
1.7	POWER HACKSAW	KASTO/ EIFCO/ SAGAR
1.8	WELDING MACHINE	ADOR/ ESAB/ L&T/ STERCO/ NATIONAL PANASONIC/ HONDA/CRUXWELD
1.9	PIPE BENDING MACHINE	HYDROBEND/ HMT /BATLIBOI/ ATLAS/INDER
1.10	BATTERY OPERATED FORK LIFTER	GODREJ/ VOLTAS/ JOST
1.11	BATTERY OPERATED TROLLEY	GODREJ/ VOLTAS/ JOST / MAHINDRA STILTER
1.12	HYDRAULIC PLATFORM	GODREJ/ VOLTAS/ JOST / MAHINDRA STILTER
1.13	GENERAL HAND TOOLS	GEDORE/ MEKASTER/ FACOM
1.14	PRECISION MEASURING INSTRUMENTS	MITUTOYO
1.15	POWER TOOLS	BOSCH/ HITACHI/ SHARP/ RALIWOLE
1.16	HYDRAULIC/ PNEUMATIC TOOLS	GEDORE/ MEKASTER/ FACOM
2	**GENARAL ELECTRICAL ITEMS**	
2.1	MCBs / MCCBs	ABB/ GE/ SCHNEIDER/ L&T/ C&S/ SIEMENS
2.2	PTS/CTS	KAPPA/PRAYOG/PRAGATI/AE
2.3	STARTERS	ABB/GE/SCHNEIDER/L&T/C&S/SIEMENS
2.4	CONTACTORS	ABB/GE/SCHNEIDER/L&T/C&S/SIEMENS
2.5	GENERAL AUXILIARY RELAYS	ALSTOM/ABB/L&T/VATECH/BHEL/ SIEMENS/SCHNEIDER/TELEMECANIQUE
2.6	GENERAL PROTECTION RELAYS	ALSTOM/ABB/L&T/VATECH/BHEL/ SIEMENS/TOSHIBA
2.7	TERMINAL CONTRACTORS/TERMINAL BLOCKS	WAGO/PHOENIX/ALMEC
2.8	MOTORS	ABB/ALSTOM/KEC/CGL/BBL/ SIEMENS/JYOTI/GE

3.	**GENERAL MECHANICAL ITEMS**	
3.1	GENERAL HAND TOOLS	GEDORE, MEKASTER, FACOM
3.2	VALVES-AIR CIRCUIT * DN 50 AND BELOW	BHEL/FOURESS ENGINEERING/AUDCO INDIA LTD./ LARSEN & TOUBRO/ VICKERS SYSTEM/ REXROTH INDIA/ KEYSTONE/ GELENFIELD & KENNEDY/ HERION FLUIDTRONIC/ TYCO/ YUKEN/ MOONG CONTROL/ MANNESMAN REXROTH/ WANDFLUH
	* ABOVE DN 50	BHEL/FOURESS ENGINEERING/AUDCO INDIA LTD./ LARSEN & TOUBRO/ VICKERS SYSTEM/ REXROTH INDIA/ KEYSTONE/ GELENFIELD & KENNEDY/ HERION FLUIDTRONIC/ TYCO/ YUKEN/ MOONG CONTROL/ MANNESMAN REXROTH/ WANDFLUH
3.3	VALVES – OIL CIRCUIT * DN 50 AND BELOW	BHEL/FOURESS ENGINEERING/AUDCO INDIA LTD./ LARSEN & TOUBRO/ VICKERS SYSTEM/ REXROTH INDIA/ KEYSTONE/ GELENFIELD & KENNEDY/ HERION FLUIDTRONIC/ TYCO/ YUKEN/ MOONG CONTROL/ MANNESMAN REXROTH/ WANDFLUH
	*ABOVE DN 50	BHEL/FOURESS ENGINEERING/AUDCO INDIA LTD./ LARSEN & TOUBRO/ VICKERS SYSTEM/ REXROTH INDIA/ KEYSTONE/ GELENFIELD & KENNEDY/ HERION FLUIDTRONIC/ TYCO/ YUKEN/ MOONG CONTROL/ MANNESMAN REXROTH/ WANDFLUH
3.4	VALVES – WATER CIRCUIT * DN 50 AND BELOW	BHEL/FOURESS ENGINEERING/AUDCO INDIA LTD./ LARSEN & TOUBRO/ VICKERS SYSTEM/ REXROTH INDIA/ KEYSTONE/ GELENFIELD & KENNEDY/ HERION FLUIDTRONIC/ TYCO/ YUKEN/ MOONG CONTROL/ MANNESMAN REXROTH/ WANDFLUH
	*ABOVE DN 50	BHEL/FOURESS ENGINEERING/AUDCO INDIA LTD./ LARSEN & TOUBRO/ VICKERS SYSTEM/ REXROTH INDIA/ KEYSTONE/ GELENFIELD & KENNEDY/ HERION FLUIDTRONIC/ TYCO/ YUKEN/ MOONG CONTROL/ MANNESMAN REXROTH/ WANDFLUH

3.5	PIPES SEAMLESS	
	*STAINLESS STEEL	JINDAL /PRAKASH ISMT/ SUBALAKSHMI/ MAHALAKSHMI
	*CARBON STEEL	JINDAL /PRAKASH ISMT/ SUBALAKSHMI/ MAHALAKSHMI
3.6	PIPES – ERW	
	*STAINLESS STEEL	JINDAL /PRAKASH/SURYA ROSHNI
	*CARBON STEEL	JINDAL /PRAKASH/SURYA ROSHNI
4.	**INSTRUMENTATION**	
4.1	ELECTROMEGNATIC TYPE ULTRASONIC FLOW METER/ RELAY	ENDRESS + HAUSER
4.2	THERMOSTATS	INDFOSS INDUSTRIES
4.3	RTD	SIKA

Annexure – I

Guaranteed Technical Particulars (GTP)

Sl.No.	Description		
1.	**Lathe Machine**	**Long Lathe**	**Short Lathe**
i)	Minimum Bed Length (mm)		
ii)	Minimum Swing Over bed (mm)		
2.	**Radial Drilling Machine**		
i)	Drilling Capacity in Steel (mm)		
ii)	Worktable area (mm) (minimum)		
iii)	No. of spindle speeds (minimum)		
3.	**Electrical Hand Drilling Machine**		
i)	Drilling Capacity in steel (mm)		
4.	**Universal Wiling Machine**		
i)	Travel Length (Minimum) (mm) a) Longitude b) Cross c) Vertical		
ii)	No. of Spindle Speeds (Nos.)		
iii)	Table Size (mm)		
5.	**Double Ended Pedestal Mounted Grinding Machine**		
i)	No. of Grinding Wheels (Nos.)		
ii)	Diameter of Grinding wheel (Minimum) (mm)		
iii)	Smallest dia of spindle (mm)		
6.	**Power Hacksaw**		
i)	Cutting Capacity (mm) a) Round Section b) Rectangular Section		

ii)	Strake/Minute	
7.	**Portable Diesel Welding Set**	
i)	Rated Welding Current (AMP)	
ii)	Diesel Tank Capacity (Hrs.)	
iii)	Class of Installation	
8.	**Portable Arc Welding Machine**	
i)	Welding Current Regulator Taps (Nos.)	
ii)	Max Output (Amps)	
iii)	Welding Current at (Amp) a) At 60% duty cycle b) At 100% duty cycle	
9.	**Electric Oven**	
i)	Capacity (KW) a) Electorate Storage Oven b) Portable Electorate Drying Oven	
ii)	Control (Thermostate) a) Electorate Storage Oven b) Portable Electorate Drying Oven	
10.	**Pipe Bending Machine**	
i)	Max Dia of MS Pipe of bending (mm)	
ii)	Min. Dia of MS Pipe of bending (mm)	
iii)	Pipe Thickness (mm)	
11.	**Battery Operated fork**	
i)	Capacity (T)	
ii)	Max. Fork Height (mm)	

iii)	Mast Type (Minimum) (mm)		
12.	**Battery Operated Trolley**		
i)	Platform Size (mm)		
ii)	Nos. of Wheel (Nos.)		
iii)	Size of the Wheel (cms)		
13.	**Hydraulic Platform**		
i)	Capacity (Tonn)		
ii)	Lifting Height (m)		
14.	**Workbench**		
i)	Size (mm)		
15.	**Hydraulic Transverse Jack**		
i)	Capacity	5 T	10 T
ii)	Height (mm)		
iii)	Lift (mm)		
iv)	Transverse (mm)		
16.	**Chain Pulley Blocks**		
i)	Capacity (T)		
17.	**5 MT EOT Crane**		
i)	Rated Capacity (SWL): (MT)		
ii)	Span of Crane (m)		
iii)	Lifting Height (m)		
iv)	Long Travel Length (m)		
v)	Duty Classification		
vi)	Power Supply		
vii)	Control Voltage		

Annexure-II

Schedule of General Technical Particulars

Sr. No	Description		
1.0	**LATHE**	Long	Short
1.1	Name of manufacturer		
1.2	Type, Model & Year of manufacturing		
1.3	Standard to which conforms.		
1.4	Over all weight		
1.5	Metallurgy of each part		
1.6	Rating of each motor		
1.7	Rpm of each motor		
1.8	Length of Lathe Bed		
1.9	Width		
1.10	Height including head stock		
1.11	Admit between centers		
1.12	No. of gears and material composition		
1.13	Spindle speed		
1.14	Spindle bore		
1.15	Max. length of work piece		
1.16	Max. dia of work piece		
1.17	Range of feed		
1.18	Pitch range of thread.		
1.19	**Accessories Details**		
a)	Size of taper turning attachment		
b)	Dimensions of tool post.		
c)	Dimensions of tool post grinder		
d)	Size of self centering chuck		
e)	Dimensions of carriage		
1.20	**Control Gear**		
a)	Type of control gear		

b)	Mode of operation/type of belt used	
c)	Range of speeds	
1.21	Details of coolant pump set	
1.22	Voltage requirement for:	
a)	Main motor	
b)	Post / work light equipment	
1.23	Dimensions of foundation	
2	**Universal Knee Type Milling Machine**	
a)	Name of manufacturer	
b)	Type, Model & Year of manufacturing	
c)	Standard to which conforms.	
d)	Over all weight	
e)	Overall size	
f)	Max. Longitudinal travel.	
g)	Max. cross travel.	
h)	Max. vertical travel.	
1)	Metallurgy of each part.	
2.1	**Drive**	
a)	Motor rating	
b)	Class of insulation.	
c)	Max. speed.	
2.2	**Cooling**	
a)	Type of cooling	
b)	Drive of cooling equipment	
3.	**Radial Drilling Machine**	
3.1	**General**	
a)	Type	
b)	Make	
c)	Model	
d)	Over all weight	

e)	Overall size	
f)	Standard to which conforms	
g)	Year of manufacturing.	
3.2	**Capacity**	
a)	Max. drilling depth in all metal.	
b)	Max. drilling depth in steel	
c)	Max. boring size in steel	
d)	Max. boring size in other material	
e)	Swing of arm	
3.3	**Distances**	
a)	Max. drilling radius	
b)	Max. distance between base plate and spindle	
c)	Min. distance between sleeve and spindle.	
d)	Over all dimension of drilling machines	
3.4	Base Plate	
a)	Length & width (working surface)	
3.5	Type of Lubrication	
3.6	Spindle speed and range	
3.7	Feeds detail / range	
3.8	**Electrical**	
a)	Total power required	
b)	Main motor	
i)	Type	
ii)	Frame size of each motor and mounting	
iii)	Type of duty	
iv)	Class of insulation of motor.	
v)	Type of protection	
vi)	Type of cooling.	
3.9	**Coolant pump Set**	
a)	Type, rating, frame size of motor.	

b)	Speed of motor	
c)	Class of insulation of motor	
d)	Discharge of pump at max. working head	
3.10	**Accessories**	
a)	Size of Arbor	
b)	Foundation bolt size	
4.0	**GRINDING MACHINE**	
a)	Type	
b)	Make	
c)	Model	
d)	Over all weight	
e)	Over all dimension.	
f)	Standard to which conforms	
4.1	**Type of Drive**	
a)	**Rating of motor**	
b)	Speed of motor	
c)	Insulation of motor	
d)	Max. size of job which can be grinded.	
e)	No of grinding wheel	
f)	Dust collector details.	
5.0	**POWER HACK SAW MACHINE**	
a)	Type	
b)	Make	
c)	Weight including base frame.	
c)	Standard to which conforms.	
d)	Weight including base frame	
e)	Maximum length of stroke	
f)	No. of stroke per minute	
g)	Max. size of job which can be cut	
h)	Detail of hydraulic power pack	

l)	Metallurgy of different components	
j)	Size of foundation	
k)	Detail of coolant pump	
l)	Vice opening and width	
m)	Accessories to be supplied with machine	
n)	Type of drive	
o)	Rating of motor	
p)	Speed of motor	
q)	Insulation of motor.	
6.0	**PIPE BENDING MACHINE.**	
a)	Type	
b)	Make	
c)	Model	
d)	Over all weight	
e)	Overall size	
f)	Standard to which conforms	
g)	Year of manufacturing.	
h)	No of mandrels	
i)	Suitable for pipe range.	
7.0	**PORTABLE DIESEL WELDING SET.**	
a)	Type	
b)	Make	
c)	Model	
d)	Over all weight	
e)	Overall size	
f)	Standard to which conforms	
g)	Rating of diesel set.	
h)	Fuel consumption per hour	
i)	Rating of welding set.	
j)	Max. output current.	

k)	Max. output voltage.	
l)	Class of insulation.	
8.0	**PORTABLE ARC WELDING SET(Pin type)**	
a)	Type	
b)	Make	
c)	Standard to which conforms	
d)	Weight of equipment	
e)	Input voltage rating	
f)	Output voltage	
g)	Amperes	
h)	Type of regulation.	
l)	Voltage class	
j)	Type of cooling	
k)	Over all weight	
l)	Type of winding	
m)	Material of winding	
n)	Protection adopted	
9.0	**GAS WELDING SET**	
a)	Type	
b)	Make	
c)	Standard to which conforms	
d)	Weight of equipment	
e)	Capacity of Nitrogen cylinder	
f)	Capacity of Oxygen cylinder	
g)	Design pressure of cylinder	
h)	Test pressure of cylinder.	
k)	IS to which welding / cutting torch.	
10.0	**ELECTRODE STORAGE OVEN**	
10.1	**STORAGE OVEN**	
a)	Type	

b)	Make	
c)	Model No.	
d)	IS to which conform	
e)	Over all dimension	
f)	Over all weight.	
g)	Rating of heating element	
h)	Type of heating element	
I)	Temperature range	
j)	No of shelves	
k)	Operating voltage	
l)	Capacity to store electrode	
m)	Control.	
10.2	**PORTABLE ELECTRODE DRYING OVEN**	
a)	Type	
b)	Make	
c)	Model No.	
d)	IS to which conform	
e)	Over all dimension	
f)	Over all weight.	
g)	Capacity to store electrode	
h)	Temperature range	
I)	Control.	
j)	Heating element material	
k)	Rating of oven	
l)	Voltage class	
m)	Current	
11.0	**WOODEN WORK BENCH**	
a)	Type	
b)	Over all dimension	
c)	Current operated earth leakage circuit breaker provided (Yes / No)	

12.0	**FOUR WHEELED PLATEFORM TROLLY**		
a)	Type		
b)	Make		
c)	Model No.		
d)	IS to which conform		
e)	Over all dimension		
f)	Over all weight.		
g)	Capacity		
h)	Material used		
I)	For table		
j)	Type of wheel.		
13.0	**HYDRAULIC JACKS**	**5T**	**10T**
a)	Type		
b)	Make		
c)	Model No.		
d)	IS to which conform		
e)	Overall Size		
f)	Year of manufacturing		
g)	Over all weight.		
h)	Over all height		
I)	Oil in jack		
j)	Type of oil		
k)	Pressure building system		
m)	Material of ram		
n)	Accessories covered in the scope of supply.		
14.0	**BATTERY OPERATED FORK LIFTER**		
a)	Make		
b)	Model No.		
c)	Capacity		
d)	Power Source		

e)	Batter & Battery Charger detail	
f)	Drive Motors	
g)	Type of tyres	
h)	Travel Speed	
i)	Maximum Fork Height	
j)	Overall Weight	
k)	Year of Manufacturing	
l)	Turning Radius	
m)	Type of Brakes	
n)	Conforming Standard	
15.0	**CHAIN PULLY BLOCKS**	
15.1	**FOR 2T**	
a)	Type	
b)	Make	
c)	Model	
d)	Standard to which conform	
e)	Capacity	
f)	Over all weight.	
g)	Over all Dimension	
h)	Hoisting height	
15.2	**FOR 3T**	
a)	Type	
b)	Make	
c)	Model	
d)	Standard to which conform	
e)	Capacity	
f)	Over all weight.	
g)	Over all Dimension	
h)	Hoisting height	
15.3	**FOR 8 T**	

O/o Chief Engineer Procurement & Contracts Wing PHPA-II Bjimthangkha

a)	Type	
b)	Make	
c)	Model	
d)	Standard to which conform	
e)	Capacity	
f)	Over all weight.	
g)	Over all Dimension	
h)	Hoisting height	
16.0	**TRIPOD**	
a)	Type	
b)	Make	
c)	Model	
d)	Standard to which conform	
e)	Weight.	
f)	Over all Dimension	
17	**PORTABLE LIGHT DUTY ELECTRIC DRILL MACHINE.**	
a)	Type	
b)	Make	
c)	Model No.	
d)	Over all weight	
e)	Over all dimension	
f)	Year of manufacturing	
g)	Power required	
h)	Rating of motor	
I)	Max. depth to be drilled	
j)	Drilling capacity	

ANNEXURE-III

SCHEDULE OF OPTIONAL ITEMS

(Particulars to be filled by Bidder)

SL. No.	Description	Make & Model No.	Quantity (Nos.)	Rate (Nu/Rs)	Amount (Nu/Rs)

Signature of Bidder

ANNEXURE-IV

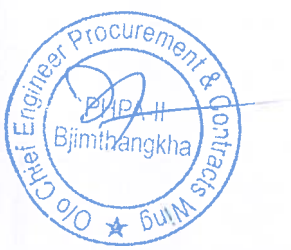
SCHEDULE OF RECOMMENDED SPARE PARTS

Bidder must quote for the set of recommended spare parts for five years trouble free service for each item

Sl. No.	Description/Make	Quantity (Nos.)	Rate (Nu/Rs)	Amount (Nu/Rs)

Signature of Bidder

SECTION VI – FORMS



BLANK

FORM NO. 1

PROFORMA FOR AGREEMENT

[The successful Bidder shall fill in this form in accordance with the instructions indicated]

THIS AGREEMENT MADE the _____ day of _____ BETWEEN Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) _____ of (*Mailing address of PHPA-II*) _____ (hereinafter called "the PHPA-II") of the one part and (*Name of Contractor*) _____of (*Mailing address of Contractor*)_____ (hereinafter called "the Contractor") of the other part.

WHEREAS the PHPA-II is desirous that *[Insert Name of work]* (Herein after referred to as "the Work") should be executed by the Contractor AND WHEREAS by a Letter of Award No._____dated_____the PHPA-II has accepted a Bid by the Contractor for the execution and completion of such Works AND WHEREAS the Contractor has agreed to undertake such work and furnish a performance security pursuant to the Clause 36 of the section 'Instructions to Bidders.'

NOW THIS AGREEMENT WITNESSETH as follows;

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz;
   a) The Agreement
   b) The Letter of Award
   c) Corrigendum/Amendments, if any
   d) Documents furnished by bidder
   e) Notice Inviting Tender (NIT)
   f) Instructions to Bidders (ITB)
   g) Bid Data Sheet (BDS)
   h) General Conditions of the Contract (GCC)
   i) Special Conditions of Contract (SCC)
   j) Technical Specifications (TS)
   k) Bill of Quantities
   l) Any other documents as forming part of the contract

3. The aforesaid documents shall be taken as complementary and mutually explanatory of one another.
4. In consideration of the payment to be made by the PHPA-II to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the PHPA-II to execute and complete the Works in conformity, in all respects, with the provisions of the Contract.
5. The PHPA-II hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein the Contract Price or such other sum as may become payable under the provisions of the contract at the time and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused their respective common Seals to be hereunto affixed (or have hereunto set their respective hands and Seals) the day and year first above written.

SIGNED, SEALED AND DELIVERED

By the said

Name _____

on behalf of the Contractor in the presence of:

_____

Name _____

Address _____

By the said

Name _____

on behalf of the PHPA-II in the presence of

_____

Name_____

Address _____

O/o Chief Engineer Procurement & Contract Wing PHPA-II Bjimthangkha

FORM NO. 2

PROFORMA FOR BANK GUARANTEE FOR PERFORMANCE SECURITY

[The bank, as requested by the successful Bidder, shall fill in this form in accordance with the instructions indicated]

To

The Punatsangchhu-II Hydroelectric Project Authority,
_____(*Address of PHPA-II*)

WHEREAS (*Name and Address of Contractor*) _____(hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. _____ dated_____ to execute (*Name of Contract and Brief Description of Works*) _____ (hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, upto a total of Rs./Nu. _____ (*Amount of Guarantee*) (*in words to be inserted by the Guarantor*), representing the percentage of the Contract Price, specified in the Contract, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Rs./Nu. _____ (Amount of Guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee is valid until the date of 30 days after issuing of the Completion/Taking over Certificate.

SIGNATURE AND SEAL OF THE GUARANTOR

FORM NO. 3

PROFORMA FOR BANK GUARANTEE FOR BID SECURITY

[The Bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated]

To

The Punatsangchhu-II Hydroelectric Project Authority

_____(*Insert Address of PHPA-II*)

WHEREAS, (Insert *name of Bidder*) _____ (hereinafter called "the BIDDER") has submitted his bid dated (_____ for the work of (*Name of Contract*) _____ (hereinafter called "the Bid")).

KNOW ALL MEN by these presents that we (Insert name of Bank) _____ of (*Name of Country*)_____ having our registered office at _____ (hereinafter called "the Bank") are bound unto the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) in the sum of _____ for which payment well and truly to be made to the PHPA-II the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____.

THE CONDITIONS of this obligation are;

i) If the Bidder withdraws his Bid during the period or bid validity.

ii) Correction of Bid Price is not accepted by the bidder.

iii) Successful bidder fails or refuses to execute the Contract.

iv) Successful bidder fails or refuses submit acceptable performance security.

We undertake to pay to the PHPA-II up to the above amount upon receipt of its first written demand, provided that in its demand the PHPA-II will note that amount claimed by it is due to it owing to the occurrence of one or more of the four conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date..... after the closing date for submission of bids as stated in the Invitation to Bid or as extended by you at any time prior to this date, notice of which extension to the Bank being hereby waived, and any demand in respect thereof should reach the Bank not later than the above date.

Chief Engineer Procurement & Contracts Wing PHPA-II Bjimthangkha O/o

SEAL & SIGNATURE

FORM NO. 4

PROFORMA FOR BANK GUARANTEE FOR MOBILISATION ADVANCE

[The Bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated]

1. In consideration of the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II) (*which expression shall unless repugnant to the subject or context include its administrators, successors and assigns*), (hereinafter called the "Employer") having agreed to make advance payment to (*Name and full address of the Contractor*) _____ (hereinafter called "the Contractor(s"), (*which expression shall unless repugnant to the subject or context or meaning thereof include its successors, administrator, executors and permitted assigns*), whose bid for (Name of the Contract) _____ has been accepted and to whom the acceptance of the bid has been communicated by a Letter of Award and who is required to execute a formal agreement on conditions of production of a Bank Guarantee for Nu/ INR.....(Both in figures and words). we, the _____ (*Insert name of Bank*) hereinafter referred to as "the Bank") do hereby undertake promise and guarantee payment to the Employer on demand all the amounts advanced by the Employer to the said Contractor.

2. The Bank further agrees that;

   a) The Employer shall have the fullest liberty without affecting in any way the liability of the Bank under the Guarantee or Indemnity, from time to time, to vary any of the terms and conditions of the said Contract or to extend time for performance by the said Contractor or to postpone for any time and from time to time any of the powers exercisable by it against the said Contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract or the securities available to the Employer and the Bank shall not be released from its liability under these presents by any exercise by the Employer of the Liberty with reference to the matters aforesaid or by reason of time being given to the said Contractor or any other forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor or of any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of a releasing the Bank from its such liability.

   b) These presents shall be governed by and constructed in accordance with Bhutanese laws.

   c) the Bank hereby declares that it has the power to issue this Guarantee and the undersigned has full power to do so.

d) It shall not be necessary for the Employer to proceed against the Contractor before proceeding against the Bank and the Guarantee herein contained shall be enforceable against the Bank, notwithstanding any other security which the Employer may have obtained or obtain from the Contractor, shall at the time when proceedings are taken against the Bank hereunder, be outstanding or unrealized.

e) The Guarantee herein contained shall remain in full force and effect, during the period that would be taken for the performance of the terms and conditions of the said Contract, Letter of Award and the Agreement which is to be executed as aforesaid and that it shall continue to be enforceable until all the dues of the Employer have been duly paid and its claims satisfied and discharged and till the Employer discharges the Guarantee in writing or until_____ whichever is earlier.

3. The Bank lastly undertakes not to revoke this Guarantee until all the dues of the Employer have been duly paid except with the previous consent of the Employer in writing.

Dated the _____ Day of _____20__

[Here affix the Common Seal of the Bank]

FORM NO. 5

PRE-CONTRACT INTEGRITY PACT

[This agreement should be a part of the tender document, which shall be signed and submitted along with the tender document]

1. General:

Whereas .....*(Name of head of the procuring agency or his/her authorized representative, with power of attorney)* representing the Punatsangchhu-II Hydroelectric Project Authority (PHPA-II), hereinafter referred to as the **"Employer"** on one part, and .....*(Name of bidder or his/her authorized representative, with power of attorney)* representing M/s.....*(Name of firm)*, hereinafter referred to as the **"Bidder"** on the other part hereby execute this agreement as follows:

2. Objectives:

Whereas, the Employer and the Bidder agree to enter into this agreement, hereinafter referred to as IP, to avoid all forms of corruption or deceptive practice by following a system that is fair, transparent and free from any influence/unprejudiced dealings in the **bidding process**[1] and **contract administration**[2], with a view to:

2.1 Enabling the Employer to obtain the desired contract at a reasonable and competitive price in conformity to the defined specifications of the works or goods or services; and

2.2 Enabling bidders to abstain from bribing or any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also refrain from bribing and other corrupt practices.

3. Scope:

The validity of this IP shall cover the bidding process and contract administration period.

4. Commitments of the Employer:

The Employer Commits itself to the following:-

4.1 The Employer hereby undertakes that no officials of the Employer, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favor or any material or immaterial benefit or any other advantage from the Bidder, either for themselves or for any

---

[1] Bidding process, for the purpose of this IP, shall mean the procedures covering tendering process starting from bid preparation, bid submission, bid processing, and bid evaluation.

[2] Contract administration, for the purpose of this IP, shall mean contract award, contract implementation, un-authorized sub-contracting and contract handing/taking over.

person, organization or third party related to the contract in exchange for an advantage in the bidding process and contract administration.

4.2 The Employer further confirms that its officials shall not favor any prospective bidder in any form that could afford an undue advantage to that particular bidder in the bidding process and contract administration and will treat all Bidders alike.

4.3 Officials of the Employer, who may have observed or noticed or have reasonable suspicion shall report to the head of the employing agency or an appropriate government office any violation or attempted violation of clauses 4.1 and 4.2.

4.4 Following report on violation of clauses 4.1 and 4.2 by official (s), through any source, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings shall be initiated by the Employer and such a person shall be debarred from further dealings related to the bidding process and contract administration.

5. Commitments of Bidders

The Bidder commits himself/herself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of the bidding process and contract administration in order to secure the contract or in furtherance to secure it and in particular commits himself/herself to the following :-

5.1 The Bidder shall not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favor, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Employer, connected directly or indirectly with the bidding process and contract administration, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding process and contract administration.

5.2 The Bidder shall not collude with other parties interested in the contract to manipulate in whatsoever form or manner, the bidding process and contract administration.

5.3 If the bidder(s) have observed or noticed or have reasonable suspicion that the provisions of the IP have been violated by the procuring agency or other bidders, the bidder shall report such violations to the head of the procuring agency.

6. Sanctions for Violation:

The breach of any of the aforesaid provisions shall result in administrative charges or penal actions as per the relevant rules and laws.

6.1 The breach of the IP or commission of any offence (forgery, providing false information, mis-representation, providing false/fake documents,

bid rigging, bid steering or coercion) by the Bidder, or any one employed by him, or acting on his/her behalf (whether with or without the knowledge of the Bidder), shall be dealt with as per the terms and conditions of the contract and other provisions of the relevant laws, including Debarment Rules.

6.2 The breach of the IP or commission of any offence by the officials of the procuring agency shall be dealt with as per the rules and laws of the land in vogue.

7. Monitoring and Administration:

7.1 The respective procuring agency shall be responsible for administration and monitoring of the IP as per the relevant laws.

7.2 The bidder shall have the right to appeal as per the arbitration mechanism contained in the relevant rules.

We, hereby declare that we have read and understood the clauses of this agreement and shall abide by it.

The parties hereby sign this Integrity Pact at *(place)* ___________ on *(date)* _________

(Affix Legal Stamp)	*(Affix Legal Stamp)*

Employer_______________	Bidder/Representative__________
CID: ___________________	CID: ______________________
Witness: _______________	Witness: __________________
Name: _________________	Name: ___________________
CID: _________________	CID: ______________________

O/o Chief Engineer Procurement & Contracts Wing PHPA-II Bjimthangkha

BLANK

SECTION VII – BILL OF QUANTITY (BoQ)

BLANK

ABSTRACT OF PRICE SCHEDULE

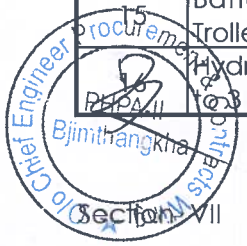
SL.No.	Description	Amount (Nu./Rs.)
1	SUPPLY, ERECTION, TESTING AND COMMISSIONING OF MECHANICAL WORKSHOP EQUIPMENT (A1+A2+A3)	
2	SUPPLY, ERECTION, TESTING AND COMMISSIONING OF ELECTICAL WORKSHOP EQUIPMENT (B1+B2+B3)	
	Grand Total (Figure)	
	Grand Total (In words):	

Chief Engineer Procurement & Contracts Wing
PHPA-I
Bjimthangkha

BLANK

PRICE SCHEDULE A

SUPPLY, ERECTION, TESTING AND COMMISSIONING OF MECHANICAL WORKSHOP EQUIPMENT						
SL.No.	Description	Unit	Qty	Rate (Nu./Rs.)		Amount (Nu./Rs.)
				In figure	In word	
A1	Ex-works prices (inclusive of packing and forwarding charges) for supply of following equipment for mechanical workshop					
1	Electrical Hand Drilling Machines	No.	4			
2	Radial Drilling Machine	No.	1			
3	Long Lathe (Bed Length: 2500 mm)	No.	1			
4	Short Lathe (Bed Length: 1200 mm) with Copying Attachment	No.	1			
5	Universal Milling Machine	No.	1			
6	Double-ended Pedestal Mounted Grinding Machine	No.	1			
7	Power Hacksaw	No.	1			
8	Portable Diesel Welding Set	No.	1			
9	Portable Arc Welding Machine	No.	1			
10	Gas Welding Sets	No.	2			
11	Electrode Storage Oven	No.	1			
12	Portable Electrode Drying Oven	No.	1			
13	Pipe Bending Machines (Size: 12.5 mm – 100 mm)	No.	2			
14	Battery Operated Fork Lifter – 3T	No.	1			
15	Battery Operated Four-wheeled Platform Trolley – 2T	No.	1			
16	Hydraulic Platform – 1T capacity, adjustable up to 3 m height	No.	1			



BLANK

17	Workbenches, Lockers, Racks, Shelves, and Dust-proof Instrument Boards	Lot	1			
18	Hand Tools and Testing Instruments	Lot	1			
19	Hydraulic Transverse Jacks (Capacity: 5T & 10T)	Lot	1			
20	Chain Pulley Blocks	Lot	1			
21	Tripod	No.	1			
22	Mandstory Spare Parts	Lot	1			
23	5 Ton Electric Overhead Travelling (EOT) Crane	No.	1			
A2	**Transportation, Storage & Preservation, Handling and Insurance Charges**	Lot	1			
A3	**Installation, Testing and Commissioning**	Lot	1			
	Total (A1+A2+A3)					
	Total (In words):					

O/o Chief Engineer Procurement & Contracts Wing PHPA-II Bjimthangkha

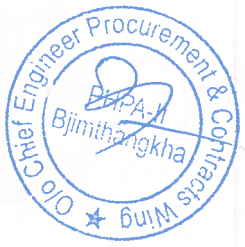
BLANK

PRICE SCHEDULE B

SUPPLY, ERECTION, TESTING AND COMMISSIONING OF ELECTRICAL WORKSHOP EQUIPMENT						
SL.No.	Description	Unit	Qty	Rate (Nu./Rs.)		Amount (Nu./Rs.)
				In figure	In word	
B1	Ex-works prices (inclusive of packing and forwarding charges) for supply of following equipment for Electrical workshop					
1	Capacitance & Dissipation Factor Test Set	No.	1			
2	Portable Ultrasonic Flaw Detector	No.	1			
3	Handheld Vibration Meter	No.	2			
4	Magnetic Particle Testing Inspection Equipment	No.	1			
5	Micro-ohm Meter (Digital)	No.	1			
6	Megger (Digital)	No.	2			
7	Tong Tester (Digital)	No.	2			
8	Multi-Meter (Digital)	No.	3			
9	Tacho-Meter and Stroboscope (Digital) (2+1)	No.	3			
10	Earth Resistivity Tester (Digital)	No.	1			
11	Phase Sequence Indicator	No.	1			
12	Power & Instrument Transformer Analyser	No.	1			

BLANK

13	Digital Portable Universal Bridge (LCR Meter)	No.	1			
14	Silica Gel Drying Oven	No.	1			
15	Laptop with hardware & OS + Monochrome Laser Printer	Set	1			
B2	**Transportation, Storage & Preservation, Handling and Insurance Charges**	Lot	1			
B3	**Installation, Testing and Commissioning**	Lot	1			
	Total (B1+B2+B3)					
	Total (In words):					

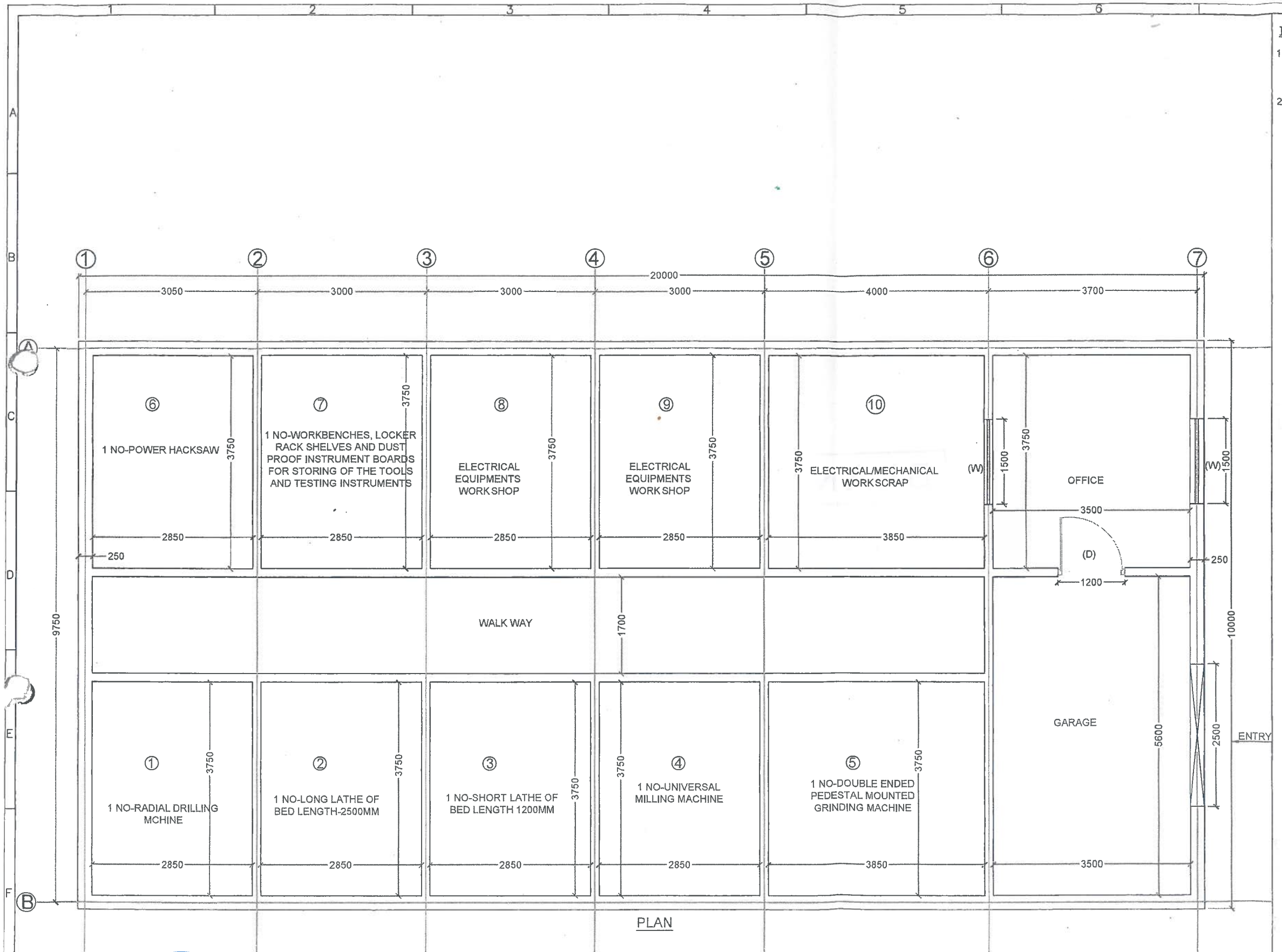


BLANK

SECTION VIII - DRAWINGS

BLANK

CP-01
CP-82
(74)



PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS AND ELEVATIONS IN METERS UNLESS OTHERWISE SPECIFIED.
2. NO DIMENSION SHALL BE MEASURED FROM THE DRAWING. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.

O/o Chief Engineer Procurement & Contracts Wing ★ PHPA-II Bjimthangkha

PUNATSANGCHHU–II HYDROELECTRIC PROJECT AUTHORITY (BHUTAN)

CONSULTANTS
WAPCOS
(A GOVT. OF INDIA UNDERTAKING)

PUNATSANGCHHU–II H.E. PROJECT (BHUTAN)

MECHANICAL WORKSHOP EQUIPMENTS

DRAWN BY	DESIGNED BY HM	CHECKED BY	APPROVED BY
LALIT K. CHAUDHARY	KULDEEP SINGH	KULDEEP SINGH	

PROJECT OFFICE, BJMITHANGKHA
BHUTAN, OCTOBER 2025

DRG. NO. WAP/PHEP-II/