འབྲུག་མི་སེར་རྒྱུ་ནོར་གཞིས་བཟུང་ཚོད།
DRUK HOLDING & INVESTMENTS LTD.

STANDARD BIDDING DOCUMENT FOR GOODS AND SERVICES

A dhi Company

Reference no. BT/Jakar-Equipment Building/2023

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1. SECTION-I INVITATION OF BIDS FOR "THE PROJECT FOR BUILDING OF EQUIPMENT BUILDING AT BUMTHANG"

1.1. Notice Inviting Tender

Bhutan Telecom Ltd, hereinafter referred as "Employer" invites sealed bids from potential bidders for **"The Project for Building of Equipment Building at Bumthang".** The Project in brief shall include Design, Supply, Installation and Commissioning of Tier-III Equipment Building.

1.1.1. A complete set of bidding documents in soft copy (PDF format) will be available on our website www.tender.bt and can be downloaded from 13th October 2023, till 24th November 2023.

1.1.2. Bhutan Telecom Ltd would like to inform the potential firms to kindly visit the website www.tender.bt for vendor registration and to submit the proposal online.

1.1.3. The user manual for vendor registration and bidding process is available on the website www.tender.bt or else can be downloaded from following links: -User manual for vendor registration-User manual for Bidding process and User manual for uploading EMD.

1.1.4. All bids must be accompanied by a bid security of not less than two per cent (2%) of Total Bid price and must be delivered together with the bid online and hard copy in accordance with the instructions to Bidders on or before **1100 Hours 24th November 2023** and will be publicly opened in the conference of hall of BT 24th November 2023 at 11:30 hrs.

1.1.5. The pre-bid meeting shall be held on 27th October 2023 at BT conference hall from 1400-1700Hrs.

NIT No.	**BT/Jakar-Equipment Building/2023**
Bid Submission & EMD Submission Date & Time	On or before 24th November 2023 (11:00 hrs)
Bid Opening Date & Time	24th November 2023 (11:30 hrs)
RFP shall be available at	www.tender.bt

1.1.6. Bhutan Telecom Ltd shall not be responsible for any costs or expenses incurred by bidders in connection with the preparation or delivery, of bids.

1.1.7. All correspondences about the above shall be made in writing or email to the following address.

ADDRESS FOR COMMUNICATION/ CONTACT

PROJECT MANAGER **Email: pmjakareqptbldg@bt.bt**

BUMTHANG EQUIPMENT BUILDING PROJECT

BHUTAN TELECOM LIMITED

PO BOX NO. 134 **PHONE NO. +975-2-343434**

THIMPHU, BHUTAN

1.2. QUALIFICATION CRITERIA (ELIGIBILITY) OF BIDDERS

1.2.1. Bidder should have a registered office with legal presence in South Asia and have valid Sales Tax No. & VAT No. as applicable.

1.2.2. Bidder's annual turnover during last three financial years, ending 31st Dec-March of the previous financial year should be at least US$1 million and above in each year.

1.2.3. Bidder should be ISO 9001:2000, ISO27001 and ISO ISO 14001:2015 Certified.

1.2.4. Bidder should have its own service center within 3 days travels by flight to location city (Bumthang, Bhutan) to provide support and offer 99.982% uptime as per Tier-III TIA-942 standards.

1.2.5. Bidder must be an OEM and/or authorized Business Partner of all infrastructure components of Equipment Building – which are specified in BoQ/BoM. Business partners should provide certificate or letter of authorization from OEM on original letter.

1.2.6. The bidder should have planned, designed, installed, and commissioned, equipment Buildings/Disaster Recovery in South Asia on a complete turnkey project and have at least two Equipment Buildings of Tier-III standards.

1.2.7. The bidder should have built Equipment Buildings primarily consisting of Layout, Precision Air-conditioning, Comfort Cooling, UPS System, Electrical Distribution and Lighting, Fire Detection and suppression, Access control and CCTV, Building Management System, VESDA, Rodent Repellent System, Civil and Interiors, Power Systems, DG Set, Passive Components, Cabling, Racking/Caging, Access Control, Security, BMS, etc. and all the allied works required for successful installation, commissioning &handover of the Equipment Building.

1.2.8. Bidder should have experience of successfully executing on a complete turnkey project at least two Tier-III Equipment Buildings costing not less than US$ 1(one) million each.

1.2.9. Bidders should have built equal to 2500 Sqft or larger Equipment Building (Raised Floor). Documents to this effect i.e. copy of PO or relevant Completion Certificate must be submitted in support of the proof.

1.2.10. The bidder should have experience in providing Facility Management services to at least two Equipment Buildings, supporting documents to this effect to be provided along with bid document.

1.2.11. The bidder must have a project manager with PMP certified professionals which should be valid during the submission of the bid.

1.2.12. Bidder should have its own or authorized access to manufacturing and testing facility for Inspection of major items/components of Equipment Building.

2. SECTION – II: INSTRUCTION TO BIDDERS

2.1. GENERAL

2.1.1. SCOPE OF BID

2.1.1.1. The Scope of bid shall include works and services described in clause 2.1.1.3 under "The Project for Building of Equipment Building at Bumthang"

2.1.1.2. Throughout these Tender documents, the terms "writing" means any handwriting, typewritten, or printed communication, including email, and "day" meaning a calendar day. Singular also means plural. The word "bid" is synonymous to "tender" and the words "bidding documents" synonymous to "tender documents."

2.1.1.3. The scope of work in brief shall include: **Design, build and commission a Tier-III equivalent Equipment Building Infrastructure**

2.1.1.4. All the Bids are to be completed and returned to the Employer in accordance with the instructions to Bidders.

2.1.1.5. The work shall be completed as per the following schedule: - **6 months from the date of signing of contract or issue of purchase order.**

2.1.1.6. The Bidder shall include in his proposal a work schedule for his programme for building the Equipment Building covered in the technical Specifications. The Programme shall include all necessary activities including identification of key phases in various areas of the total work like procurement, manufacture and field activities in such a way that it is commissioned within the period identified in sub clause 2.1.1.5.

Further, the work schedule shall include any other information/activities deemed necessary for the project implementation.

2.1.2. SOURCE OF FUNDS

2.1.2.1. Bhutan Telecom shall finance the works/supply of goods named in the Invitation to Bid under the contract for which these tender documents are issued.

2.1.3. ELIGIBILITY

2.1.3.1. The Invitation for Bids is open to all interested bidders. Further bidders will have to meet all the qualification criteria listed in clause 1.2 of Invitation for Bids to be eligible to submit bids.

2.1.4. COST OF BIDDING

2.1.4.1. The Bidder shall bear all costs associated with the preparation and delivery of its Bid, and the Employer shall in no case be responsible or liable for those costs.

2.1.5. JOINT VENTURES

2.1.5.1. Bids submitted by a joint venture of two or more companies as partners shall comply with the following requirements:

(a) the Bid, and in case of successful Bid, the Contract from, shall be signed so as to be legally binding on all partners;
(b) one of the partners shall be authorized to be in charge; and this authority shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners;
(c) the partner in charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture;
(d) all partners of the joint venture shall be liable jointly and severally for the execution of the Contract in accordance with the Contract terms, and a relevant statement to this effect shall be included in the authorization mentioned under (b) and as well as in the Bid Form and the Form of Agreement (in case of a successful Bid), and
(e) a copy of the agreement entered into the joint venture partners shall be submitted with the Bid.

2.1.6. SITE VISIT

2.1.6.1. The bidder, at the Bidder's own responsibility and risk is encouraged to visit the site of works and its surroundings to obtain any information that may be necessary for preparing the Bid and a contract for the Works or Supply of Goods. The cost of visiting the sites shall be at Bidder's own expense.

2.2. THE BIDDING DOCUMENTS

2.2.1. BIDDING DOCUMENTS

2.2.1.1. The Goods/Services required, bidding procedures and Contract terms are prescribed in the Bidding Documents. In addition to the Invitation for Bids, the Bidding Documents include:

I Instructions to Bidders
II Conditions of Contract
III Sample Forms
Bid Submission Form
Performance Security Form
Contract Form
Integrity pact
IV Technical Specifications

2.2.1.2. The Bidder is expected to examine the Bidding Documents, including all instructions, forms, terms and specifications. Failure to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the bidding documents in every respect will result in rejection of the Bid.

2.2.2. CLARIFICATION OF BIDDING DOCUMENTS

2.2.2.1. Prospective bidders requiring any further information or clarification of the Bidding Documents may notify the Purchaser in writing or by fax (hereinafter, the term "fax" is deemed to include electronic transmission such as facsimile or scanned soft copy) at the Purchaser's mailing address indicated in the Invitation for Bids. The Purchaser will respond in writing to any request for information or clarification of the Bidding Documents which it receives no later than 1700 hrs, 22nd November **2023** prior to the deadline for the submission of Bids prescribed by the Purchaser. The Purchaser's response (including an explanation of the query) will be sent in writing or by fax to all prospective bidders who have received the Bidding Documents.

2.2.3. AMENDMENT OF BIDDING DOCUMENTS

2.2.3.1. At any time prior to the deadline for submission of Bids, the Employer 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 amendment.

2.2.3.2. The amendment shall be part of the bidding documents, pursuant to clause 2.2.1.1 and will be notified in writing or by fax to all prospective Bidders who have received the bidding documents and will be binding on them.

2.2.3.3. In order to afford prospective bidders reasonable time in which to take the amendment into account for preparing their bids the Employer may at its discretion, extend the deadlines for the submission of Bids.

2.3. PREPARATION OF BIDS

2.3.1. LANGUAGE OF BID

2.3.1.1. The Bid prepared by the Bidder, and all correspondence and documents relating to the Bid exchanged by the Bidder and the Employer, shall be written in English. Any printed literature furnished by the Bidder may be written in another Language, provided that this literature is accompanied by an English translation, in which case, for purposes of interpretation of the Bid, the English translation shall govern.

2.3.2. DOCUMENTS COMPRISING THE BID

2.3.2.1. The Bid prepared by the Bidder shall comprise the following components:

a) Bid Form, Bid Schedule and other Schedules completed in accordance with clause 2.3.3, 2.3.4, 2.3.5 and Technical Specifications;
b) Compliance statement to bidding documents in accordance to clause 2.3.9;
c) Documentary evidence establishing in accordance with clause 2.3.6, that the Bidder is qualified to perform the Contract if its bid is accepted;
d) Documentary evidence establishing, in accordance with clause 2.3.7, that the Goods and Services to be supplied by the Bidder conform to the Bidding Documents;
e) Bid security furnished in accordance with clause 2.3.10;

f) Power of Attorney indicating that the person(s) signing the Bid have the authority to sign the Bid and thus that the Bid is binding upon the Bidder during the full period of its validity, in accordance with clause 2.3.13.

2.3.3. BID FORM

2.3.3.1. The Bidder shall complete an original and 2 copies of the Bid Form and the appropriate price, BOQ Bid Schedule and other Schedules furnished in Section-IV, Annexure-I to III as well as provide the details of the requirements specified in TECHNICAL SPECIFICATIONS of the Bidding Documents. Bidder shall also submit a soft copy (PDF) of the bidding documents mentioned above in USB.

2.3.4. BID PRICES

2.3.4.1. The bidder shall complete the appropriate Price Schedules included herein, stating the unit prices, total price per item, the total amount and the expected countries of origin of the Goods to be supplied under the Contract.

2.3.4.2. Prices quoted in the Price Schedules should be entered separately in the following manner.

For Goods to be offered from outside Bhutan:

(i) the price of the Goods, quoted shall be CIF/CIP Bumthang including the taxes, Bhutan; and

(ii) other local costs incidental to delivery of the Goods at Bumthang

2.3.4.3. Prices quoted by the bidder shall remain fixed and valid until completion of the Contract performance and will not be subject to variation on any account except as provided for in Sub-Clause 3.1.3.2 of the General Conditions of Contract. A bid submitted with price adjustment condition will be treated as non-responsive and will be rejected.

2.3.4.4. As per existing taxation policy of the Royal Government of Bhutan, successful bidder is required to pay 3% Foreign Contract Tax (FCT) on the total bid price. The Employer shall deduct this FCT at source while making the payment to the contractor/bidder and certificates for such deduction shall be issued to contractor.

2.3.5. BID CURRENCIES

2.3.5.1. Prices shall be quoted in INR for goods from India and US $ for goods offered from other countries.

2.3.6. DOCUMENTS ESTABLISHING ELIGIBILITY OF THE BIDDER

2.3.6.1. The bidder shall furnish, as part of its Bid, certification establishing the bidder's eligibility to bid pursuant to Clause 2.1.3 and clause 2.1.6 of Invitation of bids.

2.3.7. DOCUMENTS ESTABLISHING THE BIDDER'S QUALIFICATIONS TO PERFORM THE CONTRACT

2.3.7.1. The documentary evidence of the bidder's qualifications to perform the Contract, if its Bid is accepted, shall establish to the purchaser's satisfaction prior to award of Contract:

(a) that, in the case of a bidder offering to supply Goods under the Contract which the bidder do not manufacture or otherwise produce, the bidder has been duly authorized by the Goods' manufacturer or producer to supply the Goods to Bhutan;

(b) that the bidder has the financial, technical and production capability necessary to perform the Contract; and

(c) that, in the case of a bidder not doing business in Bhutan, the bidder is, or will be (if the Contract is awarded to it), represented by authorized representative in South Asia equipped and able to carry out the maintenance, repair and spare parts-stocking obligations prescribed by the Contract.

2.3.8. DOCUMENTS ESTABLISHING THE GOODS CONFORMITY TO THE BIDDING DOCUMENTS

2.3.8.1. The documentary evidence of the Goods' conformity to the Bidding

2.3.8.2. Documents may be in the form of literature, drawings and data, and shall furnish:

(a) a detailed description of the Goods' essential technical and performance characteristics.

(b) A list, giving full particulars, including available sources and current prices, of all spare parts, special tools, etc., necessary for the proper and continuing functioning of the Goods for a period of two years; and

(c) A clause-by-clause commentary on the Specifications, demonstrating the Goods' responsiveness to those Specifications or a statement of deviations and exceptions to the provisions of the Specifications.

For purposes of the commentary to be furnished pursuant to Sub-Clause (c) above, the bidder shall note that standards for workmanship, material and equipment, and references to brand names or catalogue numbers, designated by the Purchaser in the Specifications, are intended to be descriptive only and not restrictive. The bidder may substitute other authoritative standards, brand names and/or catalogue numbers in its Bid, provided that it demonstrates to the Purchaser's satisfaction that the substitution are equivalent or superior to those designated in the Specifications.

2.3.8.3. In order to prove that the Goods offered are of acceptable quality and standard, the bidders shall furnish the documentary evidence that the Goods offered have been in production for at least 10 years and have been in operation satisfactorily to the end users for at least 7 years.

2.3.9. COMPLIANCE TO BIDDING DOCUMENT

2.3.9.1. The Bidder shall provide a Table of Compliance statement in the sample format table (Table No. 1) given below to indicate the compliance status. The Bidder shall indicate compliance

status to each section, clause, sub-clause and sub-clause part number, if any, of the commercial and technical bidding documents. Compliance to a section or a clause number shall be treated as compliance to all the sub-clauses and their parts for that section/clause number unless clearly indicated otherwise. Those sections/clauses, which are provided for information and not requiring compliance, may be noted and indicated as such.

Any deviations from the specified requirements shall be clearly mentioned under each of the clause or sub-clauses with reasons for deviations.

Table 1: Sample Compliance Statement Format

Section No.	**Clause No.**	**Sub-Clause No.**	**Sub-Clause Part No.**	**Compliance (Yes/No)**	**Any Deviations and reasons**	**Price for Compliance**
1 or I	1.0	-	-	Yes		
1	1.1.1	-	-	Yes		
1	..					
1	..					
1	1.1.3	(c)	-	Yes		
1	1.7.1	(b)	(iii)	Yes		
1	..					
2	..					
..	..					
4	4.5.5.2	(a)	(i)	Yes		
4	4.5.5.2	(a)	(ii)	Yes		

2.3.10. BID SECURITY

2.3.10.1. Pursuant to clause 2.3.2, the bidder shall furnish, as part of its Bid, a bid security in the amount of not less than two percent (2%) of Total Bid Price.

2.3.10.2. The bid security shall be denominated in the currency of the Bid. It shall be valid for thirty (30) days beyond the validity of the Bid and shall be in one of the following forms acceptable to the purchasers:

(a) Bank guarantee issued by a reputable bank acceptable to the Purchaser in the form provided in the Bidding Documents or another form acceptable to the Purchaser, sample shown in Annexure 4 (Clause 4.4).
(b) Banker's certified cheque cash warrant, demand draft

2.3.10.3. Any Bid not secured in accordance with Sub-Clause 2.3.10.1 and 2.3.10.2 above will be rejected by the Purchaser as non-responsive, pursuant to Clause 2.5.4.

2.3.10.4. An unsuccessful bidder's bid security will be discharged/returned as promptly as possible upon award of Contract, but in any event not later than thirty (30) days after the expiration of the period of bid validity prescribed by the Purchaser, pursuant to Clause 2.3.11.

2.3.10.5. The successful Bidder's Bid security will be discharged/returned upon the Bidder's executing the Contract pursuant to Clause 2.5.12, and furnishing the performance security, pursuant to Clause 2.5.13.

2.3.10.6. The Bid security may be forfeited:

a) if a Bidder withdraws its Bid during the period of Bid validity specified by the Bidder on the Bid form: or
b) in case of a successful bidder, if the bidder fails

i) to sign the Contract in accordance with clause 2.5.12; or
ii) to furnish the performance security in accordance with clause 2.5.13.

2.3.11. PERIOD OF VALIDITY OF BIDS

2.3.11.1. Bids shall remain valid for ninety days after the date of Bid closing prescribed by the Purchaser, pursuant to clause 2.4.2.

2.3.11.2. Notwithstanding clause 2.3.12.1 above the Purchaser may solicit the Bidder's consent to an extension of the period of Bid validity. The request and the responses thereto shall be made in writing or by fax. If the bidder agrees to the extension request, the validity of the bid security provided under clause 2.3.10.2 shall also be suitably extended. A bidder may refuse the request without forfeiting its bid security. A bidder granting the request will not be required or permitted to modify its Bid.

2.3.12. ALTERNATIVE BIDS

2.3.12.1. No alternative bids shall be accepted

2.3.13. FORMAT AND SIGNING OF BID

2.3.13.1. The original Bid form and accompanying documents (as specified in Clause 2.3.2), clearly marked "Original Bid" plus two copies along with a soft copy in USB must be received by the Purchaser at the date, time and place specified pursuant to clause 2.4.1 and 2.4.2. In the event of any discrepancy between the original and the copies, the original shall govern.

2.3.13.2. The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written power of attorney accompanying the Bid. All pages of the Bid, except for un-amended printed literature, shall be initialed by the person or persons signing the Bid. The name and position held by each person signing must be typed or printed below the signature.

2.3.13.3. The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

2.3.13.4. The Bidder shall furnish the information as described in the Form of Bid on commissions or gratuities, if any, paid or to be paid relating to this Bid and to contract execution if the Bidder is awarded the contract.

2.4. SUBMISSION OF BIDS

2.4.1. SEALING AND MARKING OF BIDS

2.4.1.1. The bidder shall seal the original and each copy of the Bid in an inner and an outer envelope duly marking the envelopes as "Original" and "Copy"

2.4.1.2. The inner and outer envelopes shall:

(a) be addressed to the Purchaser at the following address

GENERAL MANAGER
CORPORATE SUPPORT SERVICES
BHUTAN TELECOM LTD
2/28 DROPHEN LAM
PO BOX NO 134
THIMPHU, BHUTAN and

(b) bear the words ""**"The Project for Building of Equipment Building at Bumthang"** the Contract Number, and the words **"DO NOT OPEN BEFORE** 1100 hrs, 24th November 2023.

In addition to the information required in Sub-Clause 2.3.2 (a), (b) and (c) above, the inner envelope 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 Clause 2.4.4.

2.4.1.3. If the outer envelope is not sealed and marked as required by Sub-Clause 2.4.1.2, the Purchaser will assume no responsibility for the bid misplacement or premature opening.

2.4.1.4. All inner envelopes shall also indicate the name and address of the Bidder, so that the bid can be returned unopened in case it is declared late.

2.4.1.5. All envelopes containing the originals, the copies and the bid security must be delivered in one package marked Tender for **""The Project for Building of Equipment Building at Bumthang"** to the address indicated in clause no 2.3.2 (a)

2.4.1.6. The Bidders have the option of sending the Bids by post/ courier services or in person. Bids submitted by Telex/Telegram/Fax/email will not be accepted. No request from any Bidder to the Employer to collect the proposals from Airlines/Cargo agents etc. shall be entertained by the Employer.

2.4.2. DEADLINE FOR SUBMISSION OF BIDS

2.4.2.1. The original Bid, together with the required copies, must be received by the Purchaser at the address specified in Sub-Clause 2.3.2, no later than 1100 hrs on 24th November 2023.

2.4.2.2. The Purchaser may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with clause 2.4.1, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

2.4.3. ONE BID PER BIDDER

2.4.3.1. Each bidder shall submit only one bid either by itself, or as a partner in a joint venture or as a responsible officer in the management of the company. A bidder who submits or participates in more than one Bid will be disqualified.

2.4.4. LATE BIDS

2.4.4.1. Any bid received by the Purchaser after the deadline for submission or Bids prescribed by the Purchaser, pursuant to clause 2.4.2.0, will be declared "Late" and rejected and returned unopened to the Bidder.

2.4.5. MODIFICATION AND WITHDRAWAL OF BIDS

2.4.5.1. The Bidder may modify or withdraw its bid after the Bid's submission, provided that written notice of the modification or withdrawal is received by the Employer prior to the deadline prescribed for submission of Bids.

2.4.5.2. The Bidder's modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions of clause 2.4.1. A withdrawal notice may also be sent by fax but must be followed by an original signed confirmation copy.

2.4.5.3. No bid may be withdrawn in the interval between the deadline for submission of Bids and the expiration of the period of Bid validity specified by the bidder on the Bid form.

2.4.5.4. Bidders may only offer discounts to or otherwise modify the prices of their bids by submitting Bid modification in accordance with this clause.

2.5. BID OPENING AND EVALUATION

2.5.1. OPENING OF BIDS BY THE EMPLOYER

2.5.1.1. The Employer shall open Bids, in the presence of Bidder's representatives who choose to attend at 11:30 hrs on 24th November 2023 at the following location.

CONFERENCE HALL OF
BHUTAN TELECOM
DROPHEN LHAM 2/28
THIMPHU BHUTAN

The bidders' representatives who are present shall sign a register evidencing their attendance.

2.5.1.2. The bidders' names, prices of bids, all discounts offered, modifications and bid withdrawals, and the presence or absence of the requisite bid security, and such other details as the Purchaser, at its discretion, may consider appropriate will be announced and recorded at the opening. Any bid price, or discount, which is not read out and recorded at bid opening, will not be taken into account in bid evaluation.

2.5.2. PROCESS TO BE CONFIDENTIAL

2.5.2.1. Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Employer's and/ or the Employer's processing of bids or award decisions may result in the rejection of the bidder's bid.

2.5.3. CLARIFICATION OF BIDS

2.5.3.1. To assist in the examination, evaluation and comparison of bids, the Employer may, at its discretion, ask the bidder for a clarification of its bid. All responses to request for clarification shall be in writing and no change in the price or substance of the bid shall be sought, offered or permitted.

2.5.4. PRELIMINARY EXAMINATION OF BIDS

2.5.4.1. The Purchaser shall examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed and whether the Bids are generally in order.

2.5.4.2. Arithmetical errors shall be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price per item will be corrected. If there is a discrepancy between the total amount and the sum of total price per item, the sum of the total price per item shall prevail and the total amount will be corrected.

2.5.4.3. Prior to detailed evaluation, pursuant to 33 the Purchaser will determine the substantial responsiveness of each bid to the Bidding Documents including production capability and acceptable quality of the goods offered, pursuant to sub-clause 2.3.8.2. A substantially responsive Bid is one, which confirms to all terms and conditions of the Bidding Documents without material deviation or reservation. A material deviation or reservation is one

i) which effects in any substantial way the scope, quality or performance of goods;
ii) which limits in any substantial way, inconsistent with the provision of the Bidding documents, the Purchaser's rights or bidder's obligations under the contract; or
iii) whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive bids

2.5.4.4. A bid determined not substantially responsive will be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non-conformity.

2.5.5. CONVERSION TO NGULTRUM

2.5.5.1. To facilitate evaluation and comparison, the Purchaser will convert all bid prices, expressed in other currencies, to Ngultrum at the Telegraph Transfer selling exchange rate established by the Royal Monetary Authority of Bhutan for similar transactions on the date of opening of Bids.

2.5.6. EVALUATION AND COMPARISON OF BIDS

2.5.6.1. The Employer will evaluate and compare the bids previously determined to be substantially responsive, pursuant to clause 2.5.4 and 2.5.5.

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

a) The comparison of price shall be CIF/CIP Bumthang including taxes.

2.5.6.3. The scoring parameter for the evaluation of bidder response is segregated into different bid areas, which will include every bid area defined in the RFP. The evaluation will be carried out in discreet manner covering two major attributes, the Technical and Financial.

a) **Technical Bid**– the evaluation criteria set for construction of Equipment Building is subjected to with wide range of scoring parameters such as company expertise, human resource, financial capability, maintenance, warranty, etc.
The following are the major components for the overall technical evaluation procedure:
- Meeting the specified technical specifications of the products proposed by the Client and compliance statement.
- Company profile of the bidding firm.
- Technical manpower of the firm trained experienced and qualified personnel for the performance and completion of all the Contractual Obligations, arising out of this document
- OEM authorization letter/certificates by the manufacturer of the products proposed.
- Technical evaluation will consist 40% of the total score. · Detail evaluation criteria is indicated below:

Technical Evaluation (40%)

Sl/No	Criteria	Score	Bidder's Evaluated Score (100)
1	Experience in setting up Equipment Buildings (or Data center) meeting the standards of Tier-III.		
a	5 and above Equipment Buildings (or Data center) meeting the standards of Tier-III and above	**4**	
b	1 to 4 Equipment Buildings (or Data center) meeting the standards of Tier-III and above	**2**	
2	Key Personnel for the project		
a	Project Manager-1 Experience in setting more 3 Equipment Building of TIER III standards	**3**	
b	HVAC-1	**3**	

	Experience in more 3 Equipment Building of TIER III standards		
c	Racks and Cabling- Experience in more than 3 Equipment Building of TIER III standards	**3**	
d	Power supply- Experience in more than 3 Equipment Building of TIER III standards	**3**	
e	surveillance and access control- Experience in more than 3 Equipment Building of TIER III standards	**3**	
f	DC control and Management- Experience in more than 3Equipment Building of TIER III standards	**3**	
g	Interior/civil - 1 Experience in more than 2 tier-III	**3**	
3	AMC/Support with Break up cost		
a	Less than 5%	**7**	
b	5%-9%	**3**	
c	10%-15%	**1**	
4	Compliance to Bidding document		
a	Any deviation	**2**	
b	No deviations	**8**	

2.5.6.4. The bidders will need to obtain a minimum score of 70% out of 100% for technical to further qualify for financial evaluation. Those bids which doesn't meet this minimum score will not be considered for further evaluation

b) **Financial bid**-- The financial bid score will consist 60% of the total evaluation score. The lowest bidder will be awarded 60% directly.

c) **Overall score**-- The consolidation will be based on the following formula:

E= (F_l/F*60)+ (T*40)

Where
E Total score for the bidder response combining technical and financial bids
F Financial bid quoted by a particular bidder
F_l Lowest of all evaluated bid prices among the responsive
bidders T Technical score awarded to a particular bidder

The Client reserves the right to alter the evaluation criteria at any point in the process. The highest scoring firm shall be invited for negotiation. Should the negotiation fail, the next highest scoring firm shall be invited for negotiation. The representative, other than the proprietors themselves, conducting negotiations on behalf of the selected bidder must have written authority to negotiate and to conclude a binding agreement.

2.5.7. CONTACTING THE PURCHASER

2.5.7.1. Subject to Clause to 2.5.3, no bidder shall contact the Purchaser on any matter relating to its Bid, from the time of bid opening to the time the Contract is awarded.

2.5.7.2. Any effort by a bidder to influence the Purchaser in the Purchaser's decisions in respect of bid evaluation, bid comparison or Contract award will result in rejection of the bidder's Bid.

2.5.8. PURCHASER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

2.5.8.1. The Purchaser reserves the right to accept or reject any Bid and to annual the bidding process and reject all Bids at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the Purchaser's action.

2.5.9. AWARD OF CONTRACT

Post qualification and Award

2.5.9.1. The Purchaser will determine to its satisfaction whether the bidder selected as having submitted the lowest-evaluated, responsive Bid is qualified to satisfactorily perform the Contract.

2.5.9.2. The determination will take into account the bidder's financial, technical and production capabilities. It will be based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to Clause 2.3.8, as well as such other information as the Purchaser deems necessary and appropriate.

2.5.9.3. An affirmative determination will be a prerequisite for award of the Contract to the bidder. A negative determination will result in rejection of the bidder's Bid.

2.5.9.4. The Purchaser will award the Contract to the successful bidder whose Bid has been determined to be the lowest-evaluated responsive Bid, provided further that the bidder is determined to be qualified to satisfactorily perform the Contract.

2.5.10. PURCHASER'S RIGHT TO VARY QUANTITIES AT TIME OF AWARD

2.5.10.1. The Purchaser reserves the right at the time of award of Contract to increase or decrease by up to twenty-five per cent (25%) the quantity of Goods specified in the Specifications, without any change in price or other terms and conditions.

2.5.10.2. The Purchaser reserves the right at the time of award of Contract to amend/ change of the scope of work.

2.5.11. NOTIFICATION OF AWARD

2.5.11.1. The Purchaser will notify the successful bidder in writing by email, that its bid has been accepted and on which basis the bid has been accepted.

2.5.11.2. The notification of award will constitute the formation of a contract, until the Contract has been affected pursuant to Clause 2.5.12.

2.5.12. SIGNING OF CONTRACT

2.5.12.1. At the time of notification of award, the Purchaser will send the successful bidder the Contract Form provided in those Bidding Documents, incorporating all agreements between the parties.

2.5.12.2. Within fifteen (15) days of receipt of such Contract Form, the successful bidder shall sign and date the Contract and return it to the Purchaser.

2.5.13. PERFORMANCE SECURITY

2.5.13.1. Within fifteen (15) days of the receipt of notification of award from the Purchaser, the successful bidder shall furnish the performance security, in accordance with the Conditions of Contract, in the Performance Security form provided in the Bidding Documents or another form acceptable to the Purchaser.

2.5.14. CORRRUPT/ FRAUDULENT PRACTICES

2.5.14.1. The Employer requires that the Bidders/ Contractors observe the highest standard of ethics during the procurement and execution of such contract. In pursuance of this policy, the Employer;

a) defines, for the purpose of this provision, the terms set forth below as follows:

i) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

ii) "fraudulent practice" means misrepresentation of facts in order to influence a procurement process or the execution includes collusive practice among Bidders (prior to or after Bid submission)

designed to establish Bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.

b) will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

c) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a contract.

Furthermore, Bidders shall be aware of the provision stated in sub-clause 2.3.12.1 of the General Conditions of Contract.

2.5.15. PROJECT OFFICE

2.5.15.1. The successful bidder shall be required to set up a Project Office at Bumthang for coordination and implementation of Project activities till commissioning and handing over. The office shall be staffed with Project Manager and relevant personnel. The successful Bidder shall be fully responsible for its functioning and management.

3. SECTION – III: GENERAL CONDITIONS OF CONTRACT

3.1. GENERAL

The following General Conditions of Contract shall govern the entire contract agreement.

3.1.1. DEFINITIONS

3.1.1.1. In this Contract, the following terms shall be interpreted as indicated:

a) **"The Bid"** means the proposal submitted by the Bidder

b) **"The Contract"** means the agreement entered into between the Employer and the Contractor, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.

c) **"The Contract Price"** means the price payable to the Contractor under the Contract for the full and proper performance of its contractual obligations.

d) **"The Goods"** means all the materials required for erection of towers, equipment shelters and lightening protection system, which the Contractor is required to supply to the Employer under the Contract.

e) **"The Services"** means those services ancillary to the supply of the Goods, such as transportation and insurance and any other incidental services, such as installation, commissioning, provisions of technical assistance, training and other such obligations of the Contractor under the Contract.

f) **"Employer"** means Bhutan Telecom Ltd., (to be referred as "BT") and includes the legal successors in title to and assignee of the Employer.

The address of the Employer is:

Bhutan Telecom
Ltd 2/28
Drophen Lam
PO. Box No. 134
Thimphu Bhutan

Phone No: +975 2 322678 Fax. No. +975 2 324312

g) The **"Contractor"** means ……..

The address of the Contractor is:

[name, address, telephone and fax number of contractor to be inserted]

The Contractor's Project Manager is *[name of project manager to be inserted and contact information if different from*

the above]

h) "**Employer's Country"** means the Kingdom of Bhutan

i) **"Commencement Date"** means the date mentioned in the award letter (or as agreed during contract negotiations)

j) **"Contractor's Equipment"** means all plant, equipment, machinery, tools, appliances or things of every kind required in or for the purposes of execution of the works and which are to be provided by the Contractor, but does not include goods/equipment or other things intended to form or forming part of the works.

k) **"Warranty Period" or "Defect Liability Period"** means the period of validity of guarantee following taking over certificate/final acceptance, during which the Contractor is responsible for making good, at his own cost, the defects and damages occurred to the works or part thereof, in accordance with Clause 2.3.7.

l) **"Employer's Representative"** means any representative of the Employer appointed in writing by the Employer to perform the duties of the Employer.

m) **" Letter of Award/ Purchase Order "** means the formal award by the Employer incorporating all the adjustments or variations to the Bid agreed between the Employer and the Contractor. The Letter of Award/Purchase Order will constitute the formation of Contract until the signing of the Contract Agreement.

n) **"Works"** means and includes Goods, and Materials to be supplied and installed (the Goods supplied by the Contractor) as well as all the Services to be carried out by the Contractor under the Contract.

o) **"Site"** means the Land & other place or places upon which works is to be carried out by the Contractor and such other land or places as may be specified in the Contract as forming part of the site.

p) **"Specification"** means the specification of the Supplies, Services, and Works included in the Bidding Documents as included in the Contract including any modification thereof by the Employer during the tender period.

q) **"Government"** means the Royal Government of Bhutan.

r) **"Project"** means the **"The Project for Building Tier-III Equipment Building for BT at Bumthang"**

s) **"Site Acceptance Test (SAT)"** shall refer to the satisfactory completion of final acceptance tests as per Technical Specification at a site.

t) **"As Built Drawings"** shall refer to the drawings of floor, rack, cable, fire-alarm, HVAC, PAC, Power supply, Power distribution, surveillance, monitoring, building management system etc layouts along with proper labels for easy identification.

3.1.1.2. Interpretation
Words importing persons or parties shall include Firms and Corporations and any Organization having legal entity. Words importing the singular also include the plural and vice versa where the context requires.

3.1.1.3. Communications
Wherever in the Contract provision is made for a communication to be "written" or "in writing" this means any hand written, type written or printed communication including facsimile transmission.
Wherever in the Contract provision is made for the giving of notice, consent or approval by any person, such consent or approval shall not be unreasonably withheld, unless otherwise specified, such notice, consent or approval shall be in writing and the word "notify" shall be construed accordingly. Communication related to this Contract shall be between the Employer's representative and the Contractor's Representative, unless otherwise agreed upon between the parties.

3.1.1.4. Measures
The Metric System of measurement shall be used exclusively in the Contract.

3.1.1.5. Inco-terms
Unless inconsistent with any provision of Contract, the meaning of any shipping term and the rights and obligations of parties there under shall be ascribed by "INCOTERMS".
"INCOTERMS" means international rules for interpreting trade terms published by the International Chamber of Commerce (latest edition).

3.1.2. USE OF CONTRACT DOCUMENTS AND INFORMATION

3.1.2.1. The Contractor shall not, without the Employer's prior written consent, disclose the contract, or any specification, drawings, pattern, sample or information furnished by or on behalf of the Employer in connection therewith, to any person other then a person employed by the Contractor in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only, so far as may be necessary for purposes of such performance.

3.1.2.2. The Contractor shall not, without the Employer's prior written consent, make use of any Document or information specified in Clause 2.1.2 above, except for purpose of performing the contract.

3.1.2.3. Any Document, other than the contract itself, specified in Clause 2.1.2 above, shall remain the property of the Employer and shall be returned (in all copies) to the Employer, on completion of the Contractor's performance under the contract, if so required by the Employer.

3.1.2.4. The Contract shall consist of duly executed Contract Form given under Section-IV Annexure-VI and the following documents including other documents referred to therein (hereinafter referred as the "Contract Documents"):

(a) Letter of Award/Purchase Order

(b) General Conditions of Contract;

(c) Specifications, Bill of Quantities and Drawings;

(e) The Contractor's bid.

The aforesaid documents shall be taken as complimentary and mutually explanatory of one another. However, in the event of any discrepancy or inconsistency within the Contract Documents, then the Documents shall prevail in the order listed above, no (a) being the top priority.

3.1.3. CHANGE ORDERS

3.1.3.1. The Employer may at any time, by written notice to the Contractor, make changes within the general scope of the contract in any one or more of the following:

a) Drawings, designs or specifications, where Goods to be furnished under the contract are to be specifically manufactured for the Employer.
b) The place of delivery.

3.1.3.2. Upon notification by the Employer of such change, the Contractor shall submit to the Employer an estimate of costs for the proposed change (hereinafter referred to as the Change), within ten (10) calendar days of receipt of notice of the change, and shall include an estimate of the impact (if any) of the change on the delivery dates under the contract, as well as a detailed schedule for the execution of the change, if applicable.

3.1.3.3. The Contractor shall not perform changes in accordance with clause 3.1.3.1 above until the Employer has authorized a change order in writing on the basis of the estimate provided by the Contractor as described in clause 3.1.3.2 above.

3.1.3.4. Changes mutually agreed upon as a change shall constitute a part of the work under this contract, and the provisions and conditions of the contract shall apply to the said change.

3.1.3.5. The Employer, in addition to situation described in clause 3.1.3.1 above, reserves the right to increase or decrease the quantity of goods and services specified to the extent of 20% (Twenty percent) of original contract price, by way of a suitable amendment to the Contract, without any change in unit price or other terms and conditions during the execution of the Contract. However, the quantities of individual items and services may vary up to any extent. The provisions of sub-clause 3.1.3.2, 3.1.3.3 and 3.1.3.4 shall not be applicable in case of the Employer's decision to exercise its right under this sub-clause for quantity variation.

3.1.4. CONTRACT AMENDMENTS

3.1.4.1. Subject to clause 3.1.3, no variation in or modification of the conditions and terms of the contract shall be made except by written amendment signed by the parties and agreed by the Employer.

3.1.4.2. All changes to the Contract, including Change Orders in accordance with clause 3.1.3 shall have the Employer's approval before becoming effective.

3.1.5. SUB-CONTRACTS

3.1.5.1. The Contractor shall not sub-contract all or any part of the contract without first obtaining the Employer's approval in writing of the sub-contracting and the sub-contractor.

3.1.5.2. The Contractor guarantees that any and all sub-contractors of the Contractor for performance of any part of the work under the contract will comply fully with the terms of

the contract applicable to such part of the work under the contract.

3.1.6. COUNTRY OF ORIGIN

3.1.6.1. The goods can originate from any country.

3.1.6.2. For purposes of this clause, "Origin" shall be considered to be the place where the goods are mined, grown or produced. Goods are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized new product results that is substantially different in basic characteristics or in purpose or utility from its components.

3.1.7. INSPECTION AND TESTS

3.1.7.1. The Employer or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Specifications. The General Conditions of Contract and/or the specifications shall specify what inspections and tests the Employer requires and where they are to be conducted. The Employer shall notify the Contractor in writing of the identity of any representatives retained for these purposes.

3.1.7.2. The Inspections and tests may be conducted on the premises of the Contractor or its sub-contractor at point of delivery or at the Goods' final destination. When conducted on the premises of the Contractor, or its sub-contractor all reasonable facilities and assistance including access to drawing and production data, shall be furnished to the inspectors at no charge to the Employer.

3.1.7.3. Should any inspected or tested Goods/works fail to conform to the Specifications, the Employer may reject them, and the Contractor shall either replace the rejected Goods or make all alterations necessary to meet the requirements of the Specifications, free of cost to the Employer.

3.1.7.4. The Employer's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival in the Bhutan shall in no way be limited or waived by reason of the Goods' having previously been inspected, tested and passed by the Employer or its representatives prior to the goods' shipment from the country of origin

3.1.7.5. Nothing in Clause 7 shall in any way release the Contractor from any Warranty or other obligations under the Contract.

3.1.8. Dates for Inspection and Testing

3.1.8.1. The Contractor shall give the Employer reasonable notice in writing, at least thirty (30) days in advance, of the date on and the place at which any Goods/Works will be ready for testing as provided in the Contract. The Employer shall attend at the place so named within fifteen (15) days of the date, which the Contractor has stated in his notice. The Employer shall give the Contractor twenty-four (24) hour's notice in writing of his intention to attend the tests.

3.1.8.2. The Contractor shall notify the Employer on Factory acceptance tests, site acceptance test and operational acceptance test in accordance with the above clause.

The Contractor shall provide the Employer with a certified report of any such tests and/or inspections

3.1.8.3. If the Employer fails to attend test and/or inspections, the Contractor may proceed with the

tests and/or inspections in the Employer's absence and provide the Employer with the reports from the tests and/or acceptance.

3.1.8.4. The Employer shall sign the reports received from the Contractor within 15 days after reception of the reports. If a test and/or inspection fail the Employer shall not sign the report but inform the Contractor on the reasons for not signing the report. The Contractor shall immediately make necessary improvements in order to rectify the facilities.

3.1.9. Employer's Permission to Deliver

3.1.9.1. No Goods may be supplied and delivered to the Site without the Employer's written permission in the form of "Material Inspection & Clearance Certificate" (MICC) for Dispatch. The Employer shall without unnecessary delay submit the permission upon request of the Contractor.

3.1.10. PACKING

3.1.10.1. The Contractor shall provide such packing of the Goods as is required to prevent damage or deterioration during transit to their final destination, as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit, and exposure to extreme weather conditions, temperatures, salt and precipitation during transit, and open storage. Packing case size and weights shall be taken into consideration, and where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.

3.1.10.2. The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the contract, including additional requirements.

3.1.11. TRANSPORTATION

3.1.11.1. The Contractor shall at its own risk and expense transport all the goods and the Equipment to the site by the mode of transport, which the Contractor judges most suitable under all circumstances.

3.1.11.2. Unless otherwise provided in the contract, the Contractor shall be entitled to select any safe mode of transport operated by any person to carry the goods and the Contractor's equipment.

3.1.11.3. Upon dispatch of each shipment of the goods and the equipment, the Contractor shall notify the Employer by email of the description of the goods and the equipment, the point and means of dispatch, and estimated time and point of arrival in the country where the site is located, if applicable, and at the site. The Contractor shall furnish the Employer with relevant shipping documents specified in clause 3.1.12.

3.1.11.4. The Contractor shall be responsible for obtaining, if necessary, approvals, form the authorities for transportation of the goods and the equipment to the site. The Employer shall use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining such approvals, if requested by the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any claim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the goods and the Contractor's equipment to the site.

3.1.12. For Goods supplied from outside the Employer's country

Upon shipment, the Contractor shall notify the Employer and the Insurance Company by Fax the full details of the shipment, including PO/Contract number, description of goods, quantity, the name of vessel, the bill of lading number and date, port of loading, date of shipment, port of discharge etc. The Contractor shall mail the following documents to Employer to process for payment in the Contractor's favor:

(i) Application for payment

(ii) Contractor's invoice (one original + 4 copies) showing PO reference, Goods' description, quantity shipped, unit price, total amount, amount payable on dispatch.

(iii) Original and five (5) copies of the negotiable, clean on-board Bill of Lading marked freight prepaid and five (5) copies of non-negotiable Bill of Lading.

(iv) Five (5) copies of packing list identifying contents of each package

(v) Insurance certificate in 3 copies

(vi) Manufacturer's/Contractors' Guarantee Certificate of quality.

(vii) Material Inspection & Clearance Certificate (MICC) for dispatch issued by the Employer's Representative and the Contractor's factory inspection report (3 copies); and

(viii) Certificate of origin (3 copies)

The Contractor shall also send the above documents by Airmail to reach the Employer within ten (10) days from the date of shipment to enable the Employer to make necessary arrangement for import licenses and import duty exemption certificates or payment of custom duties etc. if any in Bhutan. The above documents shall be received by the Employer at least fifteen days before arrival of the Goods at the Port or place of arrival and, if not received, the Contractor will be responsible for any consequent expenses.

3.1.13. PATENT AND INTELLECTUAL PROPERTY RIGHTS

3.1.13.1. The Contractor shall indemnify and hold the Employer harmless against all third-party claims of infringement of patent, trademark, industrial design rights or intellectual property rights arising from use of the goods or any part thereof.

3.1.14. PERFORMANCE SECURITY

3.1.14.1. The Contractor, at his own cost, shall cause an unconditional Performance Security to be furnished to the Employer in the amount of ten percent (10%) of the Contract Price. Such Performance Security shall be provided, in the form satisfactory to the Employer, within fifteen (15) days after the Contractor's receipt of the Notification of Award of Contract/Letter of Award.

3.1.14.2. The proceeds of the Performance Security shall be payable to the Employer as compensation for any loss resulting from the Contractor's failure to complete its work under the Contract. The Performance Security shall be payable on first demand itself without conditions or proof.

3.1.14.3. The Performance Security shall be denominated in the currency of the Contract and shall be in the form of a bank guarantee, issued by a bank acceptable to the Employer as per the form enclosed in Section-IV of this chapter.

3.1.14.4. The Performance Security shall be initially valid till 90 days after the expiry of the Warranty Period, and shall be extended appropriately as Warranty Period is extended in accordance with Clause 16. The Performance Security shall be kept valid until the Contractor has executed, completed and remedied defects in the Works in accordance with the Contract. No claim shall be made against the Performance Security after the issue of the Defect Liability Certificate and the Performance Security shall be returned to the Contractor within 30 days of the issue of the Defects Liability Certificate.

3.1.15. INDEMNITY

3.1.15.1. The Contractor shall indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages and costs and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss or damage to any property (other than the works whether accepted or not), arising in connection with the execution of the work and by reason of the negligence of the Contractor or its Sub-Contractors, or their employees, officers or agents, except any injury, death or property damage caused by the negligence of the Employer, its other Contractors, employees, officers or agents.

3.1.15.2. If any proceedings are brought or any claim is made against the Employer which might subject the Contractor to liability under Clause 3.1.15.1 above, the Employer shall promptly give the Contractor a notice thereof and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Contractor fails to notify the Employer within thirty (30) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the thirty (30) days period, the Employer shall make no admission, which may be prejudicial to the defense of any such proceedings or claim.
The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

3.1.16. INSURANCE

3.1.16.1. The Contractor at his own cost except to Clause 3.1.16.5 shall arrange, secure and maintain all insurance as may be pertinent to the Works and obligatory in terms of law to protect his interest and interests of the Employer against all perils detailed herein. The form and the limit of such insurance as defined herein together with the under writer in each case shall be acceptable to the Employer. However, irrespective of such acceptance, the responsibility to maintain adequate insurance coverage at all times during the period of Contract shall be of the Contractor alone. The Contractor's failure in this regard shall not relieve him of any of his contractual responsibilities and obligations. The insurance covers to be taken by the Contractor shall be in the joint name of the Employer and the Contractor. The Contractor shall, however, be authorized to deal directly with the Insurance Company or Companies and shall be responsible in regard to maintenance of all insurance covers. Further the insurance should be in freely convertible currency.

3.1.16.2. Any loss or damage to the Goods to be supplied by the Contractor during air/ocean transportation, handling, transportation, storage, erection, putting into satisfactory operation and all activities to be performed till the successful completion of commissioning and taking over of all the Project work shall be to the account of the Contractor. The Contractor shall be responsible for preference of all claims and make good the damages or loss by way of repairs and/or replacement of the goods/ materials/ equipment, damaged or lost. The transfer of title shall not in any way relieve the Contractor of the above responsibilities during the period of Contract. The Contractor shall provide the Employer with copy of all insurance policies and documents taken out by him in pursuance of the Contract. Such copies of documents shall be submitted to the Employer immediately after such insurance coverage. The Contractor shall also inform the Employer in writing at least thirty (30) days in advance regarding the expiry/cancellation and/or change in any of such documents and ensure revitalization, renewal etc. as may be necessary well in time.

3.1.16.3. The Employer shall assist the Contractor to obtain licenses/port clearances in respect of supplies to be made by the foreign Contractor from outside Bhutan required for purposes of replacement of materials lost in transit and/or during erection and/or during storage. The Contractor shall be required to follow the statutory procedure as may be laid down to arrange such licenses/clearances. The perils required to be covered under the insurance shall include, but not be limited to fire and allied risks, miscellaneous accidents (erection risks), workman compensation risks, loss or damage in transit, theft, pilferage, riot and strikes and malicious damages, civil commotion, weather conditions, accidents of all kinds, war risks (during ocean transportation only) etc. The scope of such insurance shall be adequate to cover the replacement/reinstatement cost of the materials for all risks up to and including delivery of goods on CIF Bhutan port basis and shall also cover customs duty, inland transportation and other costs till the equipment is delivered and installed, at Site and taken over by the Employer. The insurance policies to be taken should be on replacement value basis. Notwithstanding the extent of insurance cover and the amount of claim available from the underwriters, the Contractor shall be liable to make good the full replacement/rectification value of all equipment/materials and to ensure their availability as per project requirements.

3.1.16.4. All costs on account of insurance liabilities covered under the Contract except to clause 3.1.16.5 shall be on the Contractor's account and will be included in Contract Price. However, the Employer may from time to time, during the duration of the Contract, ask the Contractor in writing to limit the insurance coverage, risks and in such a case, the parties to the Contract will agree for a mutual settlement, for reduction in Contract price to the extent of reduced premium amount. The Contractor, while arranging the insurance, shall ensure to obtain all discounts on premium, which may be available for higher volume or for reason of financing arrangement of the project.

3.1.16.5. Further, all the materials being supplied by the Employer for, the Equipment Building Project shall also be kept insured by the Contractor for replacement/reinstatement value against loss, damage, theft, pilferage, fire etc. for the complete period of storage, erection and commissioning up to the time of taking over time by the Employer. The premium paid to the insurance company shall be borne by the Contractor. The Contractor shall obtain competitive quotations for such insurance and shall take prior approval from the Employer before taking the insurance.

It will be the responsibility of the Contractor to lodge, pursue and settle all claims (for all the equipment and materials including the Employer supplied items) with the Insurance Company and the Employer shall be kept informed about it. The Contractor shall replace

the lost/damaged goods (own or the Employer supplied both) promptly irrespective of the settlement of the claims by the underwriters and ensure that the work progress is as per agreed schedules. The losses, if any, in such replacement will have to be borne by the Contractor.

3.1.16.6. An illustrative list of insurance covers normally required is given below. It will be the responsibility of the Contractor to maintain all necessary insurance coverage to the extent both in time and amount to take care of all his liabilities either direct or indirect, in pursuance of the Contract and statutory requirements applicable in Bhutan.

a) Cargo Insurance during Transport:

Shall be covering loss or damage occurring, whilst in transit from the Contractor's or Sub-Contractor's works or stores until arrival at the Site, to the Goods and to the Construction Equipment to be provided by the Contractor or its Sub-Contractors. The policy shall be on Warehouse to Warehouse plus 60 days period.

b) Installation All Risks Insurance:

Shall be covering physical loss or damage to the works at the Site, occurring prior to taking over of the works.

c) Third Party Liability Insurance:

Shall be covering bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property) and any parts of the works, which have been accepted by the Employer occurring in connection with the supply and installation of the Goods. The insurance covers up to US $25,000 or Rupees/Ngultrum 1,000,000 per person per occasion.

d) Workmen's Compensation Insurance:

Shall protect the Contractor against all claims applicable under the Laws of Kingdom of Bhutan. This policy shall also cover the Contractor against claims for injury, disability, disease or death of his or his Sub-Contractor's employee. This policy is to be taken in line with statutory requirement applicable in Kingdom of Bhutan.

e) Automobile Liability Insurance:

Shall be covering use of all vehicles used by the Contractor or its Sub-Contractor (whether or not owned by them) in connection with the supply and installation of the goods, comprehensive insurance in accordance with statutory requirements is to be taken.

g) Other Insurance: The Contractor is also required to take out and maintain at its own cost other insurances not specified above but are necessary in the opinion of the Contractor.

3.1.17. TRANSFER OF TITLE

3.1.17.1. Transfer of the title in respect of Goods supplied by the Contractor to the Employer pursuant to the terms of the Contract shall pass on to the Employer with negotiation of shipping documents at foreign port of embarkation of that Goods in case of Goods supplied from outside the Employer's country and on negotiation of dispatch documents (Ex-works basis) in case of Goods supplied from within the Employer's country.

3.1.17.2. This transfer of Title shall not be construed to mean the acceptance and the consequent "Taking Over"/"Final Acceptance" of Goods. The Contractor shall continue to be responsible for the quality and performance of such Goods and for their compliance with the specifications until "Taking Over"/"Final Acceptance" and the fulfilment of warranty provisions of this Contract.

3.1.17.3. This Transfer of Title shall not relieve Contractor from the responsibility for all risks of loss or damage to the Goods as specified under Clause 3.1.16 (Insurance).

3.1.18. ACCEPTANCE

3.1.18.1. Upon completion of the work under the contract, a meeting shall be held for the purpose of accepting the goods and services (hereinafter called the Acceptance). Such meeting shall constitute the final acceptance of the goods and services under the contract, unless the Employer during the meeting shows defects or shortcomings or both. In case of defects or shortcomings or both which in the Employer's opinion are considered essential, a new meeting shall be convened when the Contractor has given notice of completion of the corrective work carried out with regard hereto. Otherwise, the Employer may accept the goods if the defects or shortcoming or both are not considered essential and the Contractor has agreed to carry out the repairs in conformity with this contract.

3.1.18.2. Upon final acceptance of the Work, the Employer shall issue a "Final Acceptance Certificate" in the form of "Taking Over Certificate" to the Contractor. Separate certificates may be issued for each of the packages of the project.

3.1.19. WARRANTY

3.1.19.1. The Contractor warrants to the Employer that the Goods and services supplied under the Contract will comply strictly with the technical specifications and it shall be free of any manufacturing defects. The Contractor warrants to the Employer that all materials and supplies furnished by the Contractor or its sub-contractors for the purpose of the goods will be new, merchantable of the most suitable grade, and fit for their intended purposes.

3.1.19.2. The Contractor further warrants that the services to be carried out under this contract will confirm with generally accepted professional standards and engineering principles.

3.1.19.3. This Warranty of the goods shall remain valid for eighteen months (18) after the final site acceptance test and handing over to the Employer.

3.1.19.4. The Employer shall promptly notify the Contractor in writing of any claim arising under this warranty.

3.1.19.5. Upon receipt of such notice, the Contractor shall promptly repair or replace the defective goods or parts thereof, inclusive of, where applicable, the cost of inland delivery of the

repaired or replaced goods or parts from the port of entry to the final destination and their installation.

3.1.19.6. Without prejudice to clauses 3.1.19.2 and 3.1.19.4 above, the Contractor shall promptly correct, at no cost to the Employer any defect in any work of correction performed pursuant to clauses 3.1.19.2 and 3.1.19.4 above upon receipt of written notice of defect within six (6) months from acceptance of the indicated defect.

3.1.19.7. If the Contractor, having been notified, fails to remedy the defect(s) in accordance with the contract, the Employer may proceed to take such remedial action as may be necessary, at the Contractor's expense. The Contractor's warranty pursuant to this clause 3.1.19 is without prejudice to any other rights or remedies, which the Employer may have against the Contractor under the contract.

3.1.19.8. A verification certificate must be issued and approved by the Employer in accordance with the Employer's "Guidelines for inspection/verification" at the end of the warranty period. In case of defects the Contractor must remedy any such defects as part of his warranty obligations until no defects are found. The warranty period is extended correspondingly without any costs for the Employer.

3.1.20. PAYMENT

3.1.20.1. The Methods, Conditions and Terms of Payment are indicated below:

3.1.20.1.1. The payments to the Contractor for the performance of the Contract will be made by the Employer in the currency identified in the Contract as per the methods, terms and conditions specified herein.

(i) **Advance Payment:** Fifteen Percent (15%) of the Contract price shall be paid within 30 days of submission of proforma invoice.

(ii) For Supply of Goods:

CIF price of Goods identified in the Purchase Order/Letter of Award will be paid as under:

(a) **Progressive Payment**

Thirty percent (30%) of the CIF price component for all the equipment and materials shall be paid within 30 days on submission of documents specified in Clause 3.1.11 (Transportation).

(b) **Final Payments:** The balance Fifty Five percent (55%) of the CIF price for materials as identified in price schedule enclosed with the Purchase Order /Letter of Award shall be paid within 30 days of Site Acceptance, proof of submission of the approved drawings, data sheets, test reports, and pamphlets, as per the Contract and on submission of claim by the Contractor and verification by the Employer in accordance with clause 3.1.18.

(iii) For Services

Expatriate supervision & local service charges i.e. inland transportation, insurance, erection testing & commissioning charges shall be paid as follows:

(a) Forty percent (40%) of the service charges shall be paid after installation at Site and on certification by the Employer's Representatives.

(b) Forty five percent (45%) of the charges shall be paid within 30 days of site acceptance tests

(ii) Verification shall be made in accordance with clause 3.1.20.1.2

3.1.20.1.2. Mode of Payment
All payments to Contractor shall be made by the Employer through telegraphic transfer. Therefore, all invoices including documentary evidence/ documents shall be addressed and submitted to the Employer.

3.1.20.2. A verification certificate in accordance with clause 3.1.18.2 must be issued before any final payments in accordance with clause 3.1.20.1.1 can be made.

3.1.21. PRICE

3.1.21.1. Prices charged by the Contractor for goods delivered and services performed under the contract shall not vary from the prices quoted by the Contractor in its bid, with the exception of any change in price resulting from a change order issued in accordance with clause 3.1.3 or if applicable, adjustments authorized in accordance with the price adjustment provisions.

3.1.21.2. Prices quoted by the Contractor shall be fixed during the Contractor's performance of the contract and not subject to any variation on any account except for provision of quantity variation as per clause 3.1.3.

3.1.22. EXTENSIONS IN THE CONTRACTOR'S PERFORMANCE

3.1.22.1. Delivery and installation of the Goods shall be made by the Contractor in accordance with the Work Schedule, pursuant to the General Conditions of Contract.

3.1.22.2. The Contractor may claim extension of the time limits as set forth in the work schedule in case of:

a) Changes in the goods ordered by the Employer pursuant to clause 3.1.3.
b) Delay of any materials, drawings or services, which are to be provided by the Employer; services shall be interpreted to include all approvals by the Employer under the contract;
c) Force majeure pursuant to clause 3.1.29; and
d) Delay in performance of work caused by orders issued by the Employer.

The Contractor shall demonstrate to the Employer's satisfaction that it has used its best endeavors to avoid or overcome such causes for delay, and the parties will mutually agree upon remedies to mitigate or overcome such causes for delay.

3.1.22.3. Notwithstanding clause 3.1.22.2 above, the Contractor shall not be entitled to an extension of time for completion, unless the Contractor, at the time of such circumstances arising, immediately has notified the Employer in writing of any delay that it may claim as caused by circumstances pursuant to clause 3.1.22.2 above; and upon request of the Employer, the Contractor shall substantiate that the delay is due to the circumstances referred to by the Contractor.

3.1.23. LIQUIDATED DAMAGES

3.1.23.1. Subject to Clause 3.1.29, Force Majeure, if the Contractor fails to comply with the Time for Completion in accordance with agreed Work Schedule for the whole of the Works or, if applicable, for any part thereof then the Employer shall without prejudice to its other remedies under the Contract, deduct from the Contract Price a sum equivalent to 0.1% of the Contract Price as liquidated damages for such default and not as a penalty, for each day or part thereof of delay, until actual performance up to a maximum deduction of ten 10% of Contract Price. The Payment or deduction of such damages shall not relieve the Contractor from its obligation to complete the works or from any other of its obligations and liabilities under the Contract. Once the maximum is reached, the Employer may consider termination of the Contract pursuant to Clause 3.1.24, Termination for Default.

3.1.24. TERMINATION FOR DEFAULT

3.1.24.1. The Employer may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Contractor, terminate the contract in whole or in part:

a) If the Contractor fails to deliver any or all of the Goods and to perform Services within the time period(s) specified in the Contract, or any extension thereof granted by the Employer, pursuant to Clause 3.1.22; or

b) if the Contractor fails to perform any other obligations(s) under the contract; and c) if the Contractor, in either of the above circumstances, does not cure its failure within a period of ten (10) calendar days (or such longer period as the Employer may authorize in writing) after receipt a notice of default from the Employer specifying the nature of the default(s).

d) if the Contractor, in the judgement of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the contract.

3.1.24.2. In the event the Employer terminates the contract in whole or in part, pursuant to clause 3.1.24.1 above, the Employer may procure, upon such terms and in such manner, as it deems appropriate, goods similar to those undelivered, and the Contractor shall be liable to the Employer for any excess costs for such similar goods. Notwithstanding the above, the Contractor shall continue performance of the contract to the extent not terminated.

3.1.25. TERMINATION FOR INSOLVENCY

3.1.25.1. The Employer may at any time terminate the Contract by giving written notice to the Contractor, without compensation to the Contractor, if the Contractor becomes bankrupt or otherwise insolvent. Notwithstanding the above, such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the Employer.

3.1.26. RESOLUTION OF DISPUTES

3.1.26.1. The Contractor shall proceed with the decision and instructions given by the Employer or his representative for performance of the Contract. The decision/instruction of the Employer shall deem to have been accepted by the Contractor unless notified by the Contractor of his intention to refer the matter for Adjudication within thirty (30) days of such decision/instruction.

3.1.26.2. If the Contractor is dissatisfied with the decision/ instruction of the Employer or any dispute or difference of any kind has arisen between the Employer and the Contractor and the parties fail to resolve such a dispute or difference by mutual consultation within thirty (30) days then the dispute shall be resolved through the process of Adjudication and Arbitration as per the mechanism described herein below.

3.1.27. Adjudication

3.1.27.1. The Contractor shall request the Employer in writing for nomination of an 'Adjudicator' to decide upon such dispute matters in case of any dispute raised by the Contractor. The Employer may inform the Contractor on start of process of nomination of an 'Adjudicator' to decide upon dispute matters which cannot be solved in accordance with clause 2.1.26.2.

3.1.27.2. The Employer, within fifteen (15) days of such request made by the Contractor, shall propose an Adjudicator. After the Contractor's approval the dispute shall be referred to in writing by the Contractor to the Adjudicator.

3.1.27.3. The Adjudicator shall give its decision with reasons in accordance with the Contract in writing to both parties within thirty (30) days of a dispute being referred to it. If the Adjudicator has done so, and no notice of intention to commence arbitration has been given by either the Employer or the Contractor within forty-five (45) days of such reference, the decision shall become final and binding upon the Employer and the Contractor. Any decision that has become final and binding shall be implemented by the parties forthwith.

3.1.27.4. The Adjudicator shall be paid his fee, plus reasonable expenditures incurred in the execution of its duties as Adjudicator, and these costs shall be divided equally between the Employer and the Contractor.

3.1.27.5. Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not fulfilling its functions in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer within thirty (30) days.

3.1.28. APPLICABLE LAW

3.1.28.1. The Contract shall be governed by and interpreted in accordance with the laws of the Kingdom of Bhutan.

3.1.29. FORCE MAJEURE

3.1.29.1. In the event which are beyond the reasonable control of the Contractor and the Employer is delayed in performing any of their respective obligations under the Contract, and such delay is caused by Force Majeure, including but not limited to war, civil insurrection, fires, floods, epidemics, earthquakes, quarantine restrictions and freight embargoes, such delay may be excused as provided in Clause 3.1.22, the period of such delay may be added to the time of performance of the obligation delayed.

3.1.29.2. If a Force Majeure situation arises; the Contractor shall promptly notify the Employer in writing of such condition and the cause thereof within 15 days after the occurrence of such event. Unless otherwise directed by the Employer in writing, the Contractor shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

3.1.29.3. The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed.

3.1.29.4. No delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall:

(a) constitute a default or breach of the Contract; or

(b) give rise to any claim for damages or additional cost or expense occasioned thereby.

If and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure.

3.1.29.5. Notwithstanding Clause 3.1.29.4 above, Force Majeure shall not apply to any obligation of the Employer to make payments to the Contractor hereunder.

3.1.30. ASSIGNMENT

3.1.30.1. The Contractor shall not assign, in whole or in part its obligations to perform under the contract, except with the Employer's prior written consent.

3.1.31. CONTRACT LANGUAGE

3.1.31.1. The Contract shall be in the English language, and all documentation related hereto will also be in the English language, except if otherwise specifically agreed in writing between the parties.

3.1.32. TAXES AND DUTIES

3.1.32.1. The Contractor shall be entirely responsible for payment of all taxes, duties, license fees etc. incurred until delivery of the contracted Goods to the Employer and completion of Works as per law in Bhutan including 3% FCT of the total contract price, which will be deducted at source from the contractor's claims.

3.1.32.2. The Contractor shall be solely responsible for the taxes that may be levied on the Contractor's persons or on earnings of any of his employees and shall hold the Employer indemnified and harmless against any claims that may be made against the Employer. The Employer does not take any responsibility whatsoever regarding taxes under Bhutan Income Tax Act, for the Contractor or his personnel.

3.1.32.3. The Contractor shall in good time submit a detailed list of all the Goods to be imported into Bhutan under the Contract to enable the Employer to obtain the Import License/Bhutan Sales Tax Exemption, certificates/endorsement of Project imports for availing exemptions of customs and import duties or otherwise.

3.1.33. WAIVER

3.1.33.1. Failure of either party to insist upon strict performance by the other party of any provision of the Contract shall in no way be deemed or construed to affect in any way the right of that party to require such performance.

3.1.34. CARE OF WORK

3.1.34.1. The Contractor shall be responsible for the care and custody of the work or any part thereof until the date of taking over certificate pursuant to Clause 3.1.18 hereof and shall make good at its own cost any loss or damage that may occur to the work or the relevant part thereof from any cause whatsoever during such period. The Contractor shall also be responsible for any loss

or damage to the works caused by the Contractor or its Sub-Contractors in the course of any work carried out pursuant to General Condition of Contract Clause 3.1.19 (Warranty) hereof. Notwithstanding the foregoing, Contractor shall not be liable for any loss or damage to the works or that part thereof caused by any use or occupation by the Employer or any third party (other than a Sub-contractor) authorized by the Employer of any part of the works.

3.1.35. RESPONSIBILITIES OF THE EMPLOYER

3.1.35.1. The Employer shall be responsible for acquiring and providing the following services and facilities:

a) Acquisition and access to all sites required for the project
b) Environment Clearance required for project execution
c) Storage yards wherever the Employer's facilities exist
d) Communication facilities on payment

3.1.35.2. The Employer shall use its best endeavors to assist the Contractor in obtaining in a timely and expeditious manner all permits, approvals and/or licenses necessary for the execution of the Contract, including work permits, visas, etc from all local, state or national government authorities or public service undertakings that such authorities or undertakings require the Contractor to obtain.

3.1.36. OBLIGATIONS OF THE CONTRACTOR

3.1.36.1. The Contractor shall, in accordance with the Contract, with due care and diligence, carry out the Works as per the scope of work defined in the Technical Specifications and within the specified Time for Completion. The Contractor shall also provide all necessary Contractors' equipment, superintendence, labour and all necessary facilities thereof.

3.1.36.2. The Contractor shall be deemed to have carefully examined the Bidding Documents, the Site and the existing installations, as applicable, and to have satisfied himself to the nature and character of the Work to be executed, the prevailing meteorological conditions as well as the local uses and conditions and any other relevant matters and details. Any information received from the Employer shall not in any way relieve the Contractor from his responsibility for supplying the Goods and executing his work in terms of the Contract, including all details and incidental work and supply of accessories or apparatus which may not have been specifically mentioned in the Contract but are necessary for ensuring the complete installation and a safe and efficient operation of the Plant.

3.1.36.3. The Contractor shall, pursuant to clause 3.1.28, acquire in its name all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located that are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals and/or licenses that are necessary for the performance of the Contract.

3.1.36.4. The Contractor shall comply with all laws in force in the Employer's country where goods are to be supplied and the Installation Services are to be carried out. The laws will include all national, provincial, municipal or other laws that affect the performance of the Contract and bind upon the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from the violation of such laws by the Contractor or its personnel, including the Sub-Contractors and their personnel.

3.1.37. CONTRACTOR/CONTRACTOR'S REPRESENTATIVES

3.1.37.1. The Contractor shall, in addition to a Project Manager as his representative, employ one or more representatives to superintend the carrying out of the Works on Site. They shall be fluent in English language for day-to-day communications. Their names shall be communicated in writing to the Employer before work on Site begins.

3.1.37.2. Any instruction or notice, which, the Employer gives to the Contractor's Representative, shall deemed to have been given to the Contractor.

3.1.38. CONTRACTOR'S CONSTRUCTION MANAGEMENT

3.1.38.1. Contractor's Equipment

The Contractor shall provide all Equipment, haulage and power necessary to complete the Works, including transport at his own cost.

All Contractors' Equipment shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the Works. The Employer shall have lien on all such equipment brought to Site for the purpose of Equipment Building Project. The Contractor shall not remove from the Site any such equipment, except:

(a) when it is no longer required for the completion of the Works, or

(b) when the Employer has given his consent immediately after the Contractor has informed the Employer on the completion of the work

3.1.38.2. Safety Precautions

The Contractor shall observe all applicable regulations as per the relevant acts of Bhutan, regarding safety on the Site.

Unless otherwise agreed, the Contractor shall, from the commencement of work on Site until taking over, provide:

(a) fencing, lighting, guarding and watching of the Works, and

(b) temporary roadways, footways, guards and fences which may be necessary for the accommodation and protection of Owners and occupiers of adjacent property, the public and others.

3.1.38.3. Electricity and Water

The Contractor shall be entitled to use for the purposes of the Works such supplies

of electricity and water as may be available on the Site and shall provide any apparatus necessary for such use. The Contractor shall pay the Employer at the applicable tariff plus the Employer's overheads, if any, for such use. Where such supplies are not available, the Contractor shall make his own arrangement for provision of any supplies he may require.

3.1.38.4. Employer's Equipment

The Contractor shall pay hire charges as may reasonably be levied for the Employer's equipment, if any, and also provide the transport, haulage, power etc. thereof at his own cost.

3.1.38.5. Clearance of Site

The Contractor shall from time to time during the progress of the Works clear away and remove all surplus materials and rubbish. On completion of the Works the Contractor shall remove all Contractor's Equipment and surplus material and garbage and leave the whole of the Site and the Works clean and in a workmanlike condition, to the satisfaction of the Employer. The Contractor shall obtain prior approval of the Employer to remove surplus materials.

3.1.38.6. Opportunities for Other Contractors

The Contractor shall in accordance with the Employer's instructions, cooperate with and afford to other Contractors engaged by the Employer to work on the Site and persons lawfully so engaged upon the Site all reasonable opportunities for carrying out their work provided that the same shall not obstruct or disturb the progress of the Works. The Contractor shall also afford such opportunities to the employees of the Employer.

3.1.38.7. Authority for Access

No persons other than the employees of the Contractor and his Sub-Contractors shall be allowed on the Site except with the written consent of the Employer.

Facilities to inspect the Works shall at all times be afforded by the Contractor to the Employer and his representatives, authorities and officials.

3.1.38.8. Information for Import Permits and Licenses

The Contractor shall submit to the Employer in good time such details of all Goods and Contractor's Equipment as will enable the Employer to assist the Contractor in obtaining all necessary import permits or licenses.

3.1.39. LABOUR

3.1.39.1. Engagement of Labour

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all labour and for their payment, housing, feeding and transport.

The Contractor shall pay rates of wages and allowances according to the nature of the Works and observe hours and working conditions of his employees, so as to be no less favorable to the employees than those generally prevailing in the region where the Works are to be carried out. At the same time, the Contractor shall observe all regulations prescribed by the Laws of the Government and shall strictly comply with any agreement, custom, practice or award relating to the wages.

The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour with the required qualifications and experience from sources within the region of work.

3.1.39.2. Returns of Labour

The Contractor shall submit detailed returns showing the supervisory staff and the numbers of the several classes of labour from time to time employed by the Contractor and Sub-Contractors on the Site. The return shall be submitted in such form and at such intervals as the Employer may prescribe.

The Contractor shall within twenty-four (24) hours of the occurrence of any accident at or about the Site or in connection with the execution of the Works report such accident to the Employer. The Contractor shall also report such accident to the competent authority whenever the law requires such report.

The Contractor shall keep proper wages books and time sheets showing the wages paid to and the time worked by all workmen employed by him in and for the performance of the Contract and shall produce such wages books and time sheets on demand for inspection by any persons duly authorized by the Employer and shall furnish such information relating to the wages and conditions of employment of such workmen as the Employer or his duly authorized representative may from time to time require.

3.1.39.3. Restriction On Working Hours

No work shall be carried out on the Site outside normal working hours or on the locally recognized days of rest, unless:

(a) the Contract so provides, or
(b) the work is unavoidable or necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Employer, or

(c) the Employer gives his consent.

3.1.39.4. The Contractor will be expected to employ on the work only his regular skilled employees with experience of the particular type of work.

3.1.39.5. In case the Employer becomes liable to pay any wages or dues to the labour or any Government agency under any of the provisions of the laws of Kingdom of Bhutan or any other law due to act of omission of the Contractor, the Employer may make such payments and shall recover the same from the Contractor's bills.

3.1.39.6. As per the existing laws of the Kingdom of Bhutan all foreign nationals and expatriate personnel entering Bhutan to execute the Project works need to obtain visa and work permit. The Contractor shall submit detail of persons to be deployed for this project along with the schedule of implementation at least 45 days in advance before starting the work to allow the Employer to process and obtain necessary clearances from the Government. The Employer shall not be held responsible for any delays whatsoever if the application for obtaining the required clearances does not reach the Employer specified above.

3.1.40. NOTICES

3.1.40.1. Notices to Contractor

All certificates, notices or written orders to be given to the Contractor by the Employer under these Conditions shall be sent by email or airmail post or left at the Contractor's principal place of business or such other address as the Contractor shall notify for that purpose, or may be handed over to the Contractor's Representative.

3.1.40.2. Notices to Employer

Any notice to be given to the Employer under these Conditions shall be sent by airmail post or facsimile transmission to or left at the respective addresses notified for that purpose in the Letter of Award, or handed over to the Employer's Representative authorized to receive it.

3.1.40.3. Minutes of Meetings

Instructions or notices to the Contractor and notices from the Contractor to the Employer recorded in a minute or protocol signed by the authorized representative of the giver and of the recipient of such notice or instruction shall be valid notice or instruction for the purposes of the Contract.

3.1.40.4. Copies of all notices and other relevant correspondence between the Employer and the Contractor shall be forwarded to the Employer. The Employer has the right to ask for additional information deemed necessary in order to assess the status and progress of the project.

4. SECTION-IV: ANNEXURES (General)

4.1. Annexure-I Bid Submission Form

[The Bidder shall fill in this form in accordance with the instructions indicated. No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date : …….[*insert date of Bid submission*]

Tender No.: ……[*insert number*].

To : *[insert complete name of the Purchaser]*

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda number:…….. *[Insert the number and date of issue of each addendum]*;

(b) We offer to supply in conformity with the Bidding Documents and in accordance with the Schedule of Supply the following Goods and Related Services: [insert a brief description of the Goods and Related Services];

(c) The total price of our Bid, excluding any discounts offered in item is: [*insert the Bid Price in words and figures, indicating the various amounts and their respective currencies*];

(d) The discounts offered and the methodologies for their application are:

Discounts. If our Bid is accepted, the following discounts shall apply: [*Specify in detail each discount offered and the specific item of the Schedule of Supply to which it applies.*]

Methodology of Application of the Discounts. The discounts shall be applied using the following methodology: [*Specify in detail the methodology that shall be used to apply the discounts*];

(e) Our Bid shall be valid for a period of [*insert number*] from the date fixed for the Bid submission deadline and it shall remain binding upon us and may be accepted at any time before expiry of that period;

(f) If our Bid is accepted, we commit to provide a Performance Security in accordance with Clause 15 for the due performance of the Contract;

(h) We, including any subcontractors or suppliers for any part of the Contract, have nationality from eligible countries, viz: [insert the nationality of the Bidder, including that of all parties that comprise the Bidder if the Bidder is a JV/C, and the nationality each subcontractor and supplier]

(i) We have no conflict of interest;

(j) Our firm, its affiliates or subsidiaries – including any subcontractors or suppliers for any part of the contract – has not been declared ineligible by the Purchaser under the laws or official regulations of Bhutan;

(k) We have read the terms and conditions carefully, understood and agree to comply with all the clauses which are mentioned therein. In case of any breach of any condition on our part, we shall be liable for actions as per terms and conditions of the Contract.

(l) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed.

(m) We understand that you are not bound to accept the lowest evaluated Bid or any other Bid that you may receive.

n) We accept the Vendor Performance Management System.

Signed: _____ [*insert signature of person whose name and capacity are shown*]

In the capacity of _____[*insert legal capacity of person signing the Bid Submission Form*]

Name: _____[*insert complete name of person signing the Bid Submission Form*]

Duly authorized to sign the bid for and on behalf of: _____ [*insert complete name of Bidder*]

Dated on _____day of _____[*insert date of signing*]

4.2. Annexure II- Performance Security Form

[The bank, as requested by the successful Bidder, shall fill in this form in accordance with the instructions indicated] Date: ……. *[Insert date (as day, month, and year) of Bid submission]*
IFB No. and title: ……. *[Insert no. and title of bidding process]*
Bank's Branch or Office: …… *[Insert complete name of Guarantor]*
Beneficiary:…… *[Insert complete name of The Company]*
PERFORMANCE GUARANTEE No.:……*[insert Performance Guarantee number]*
We have been informed that …….. *[Insert complete name of Supplier]* (Hereinafter called "the Supplier") has entered into Contract No…….. *[Insert number]* dated …….. *[Insert day and month],* ……. *[Insert year]* with you, for the supply of ……*[description of Goods and related Services]* (hereinafter called "the Contract").
Furthermore, we understand that, according to the conditions of the Contract, a Performance Guarantee is required.
At the request of the Supplier, we hereby irrevocably undertake to pay you any sum(s) not exceeding ……*[insert amount(s)*[1] *in figures and words]* upon receipt by us of your first demand in writing declaring the Supplier to be in default under the Contract, without cavil or argument, or you needing to prove or to show grounds or reasons for your demand or the sum specified therein.
This Guarantee shall expire no later than the ……. *[Insert number]* day of ……. *[Insert month] [Insert year]*,[2] and any demand for payment under it must be received by us at this office on or before that date. We agree to a one-time extension of this Guarantee for a period not to exceed *[six months] [one year]*, in response to The company's written request for such extension, such request to be presented to us before the expiry of the Guarantee.

[Signatures of authorized representatives of the bank and the Supplier]

4.3. Annexure III- Contract Forms

[The successful Bidder shall fill in this form in accordance with the instructions indicated]

THIS CONTRACT AGREEMENT made the …… *[Insert number]* day of *[insert month]*, *[insert year]*,

BETWEEN

1. (1) ……*[insert complete name of Purchaser*], a ……[*insert description of type of legal entity, for example, an agency of the Ministry of …. of the Government of Bhutan, or corporation incorporated under the laws of Bhutan] and having its principal place of business at [insert address of Purchaser]* (hereinafter called "The company"), and
2. (2) …….. *[Insert name of Supplier]*, a corporation incorporated under the laws of …… *[Insert country of Supplier]* and having its principal place of business at …… *[insert address of Supplier]* (Hereinafter called "the Supplier"). WHEREAS The company invited Bids for certain Goods and ancillary services, viz., ……*[insert brief description of Goods and Services]* and has accepted a Bid by the Supplier for the supply of those Goods and Services in the sum of ……..*[insert Contract Price in words and figures, expressed in the Contract currency/ies]* (hereinafter called "the Contract Price"). NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

The following documents shall constitute the Contract between The company and the Supplier, and each shall be read and construed as an integral part of the Contract, viz.:

(a) This Contract Agreement;
(b) The General Conditions of Contract
(c) Technical Requirements (including Schedule of Supply and Technical Specifications.)
(d) The Supplier's Bid and original Price Schedules;
(e) The company's Notification of Award of Contract;
(f) The form of Performance Security;
(g) The form of Bank Guarantee for Advance Payment;
(h) *[Insert here any other document(s) forming part of the Contract]*

This Contract shall prevail over all other Contract documents. In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed above.

In consideration of the payments to be made by The company to the Supplier as

3. Hereinafter mentioned, the Supplier hereby covenants with The Company to provide the Goods and Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. 5. The company hereby covenants to pay the Supplier in consideration of the provision of the Goods and Related Services 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 times and in the manner prescribed by the Contract.
5. IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of Bhutan on the day, month and year indicated above.
6. For and on behalf of The company Signed: *[insertsignature]*
7. In the capacity of ……*[insert title or other appropriate designation]* in the presence of ……[*insert signature]* ……*[insert*

identification of official witness]

8. For and on behalf of the Supplier Signed:……*[insert signature of authorized representative(s) of the Supplier*]
9. In the capacity of ……*[insert title or other appropriate designation*] in the presence of ……..*[insert signature] [insert identification of official witness]*

4.4. Annexure IV Performance Bank Guarantee

PERFORMANCE BANK GUARANTEE

The Unconditional (or "On-Demand") Bank Guarantee has the merit of simplicity and of being universally known and accepted by commercial banks.

To:

Bhutan Telecom
Drophen Lam 2/28
PO. Box No 134

Thimphu Bhutan

Whereas *[name and address of Contractor]* (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. *[number]* dated *[date]* to execute *".....".* (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, up to a total of *[amount of Guarantee] [amount in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of *[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 shall be valid until a date 12 months from the date of issue of the Certificate of Completion.

Any amount payable shall be in favour of the Employer.

Any dispute arising in connection with this guarantee shall be brought before the Bhutanese Court of Law.

Signature and seal of the Guarantor _____
Name of Bank _____
Address _____
Date _____

5. SECTION -V: TECHNICAL SPECIFICATIONS

5.1. GENERAL TECHNICAL SPECIFICATION FOR FALSE FLOORING, CELLING & INTERIOR DESIGN

5.1.1. Insulation System for floor

The raised flooring system shall have floor height of 450 mm (this shall be subject to change based on Cubic feet meter (cfm) requirement for given racks). The raised flooring system shall comprise 600 mm square modular tiles with anti-static surface.

The framework shall be formed by galvanized stringers and pedestal assemblies. Modular square panels of 600 mm x 600 mm, with Uniform Distributed Load (UDL) of1620Kg/m2 shall then be supported equally along the edges of the rigid grid. This will ensure better cooling throughout the server farm. This is also essential for maintenance power cables.

5.1.1.1. Nitrile Rubber insulation for floor

The actual floor level will be made entirely to Zero level to remove any unevenness, or irregularities on the floor. The floor is recommended to be thermally insulated using specialized rubber with fire retardant properties. The cold air shall be blown from below the false floor and rise into the room void through AC grills. 13 mm thick floor insulation below the false flooring and joints to be provided properly with adhesive tape is recommended.

5.1.1.2. Pedestal

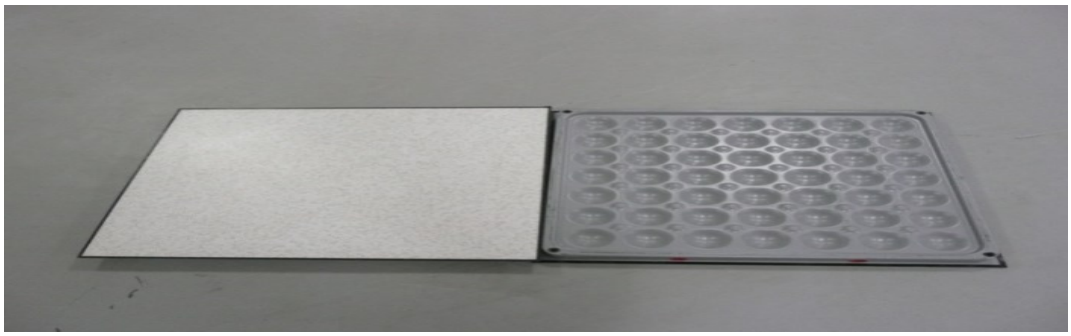
Pedestal shall be installed to support the raised floor tile (panel) to achieve finished floor height of 450 mm. Pedestals proposed shall be of silver zinc electroplated for prevention of corrosion. Pedestal design will confirm speedy assembly and removal for relocation and maintenance. The pedestal flat head shall receive the stringers, which shall be fastened by bolts to the pedestal head to form a rigid grid for raised floor.

5.1.1.3. Stringers

Stringers proposed for the design of raised floor shall be of GI steel; rectangular channels with pre-punched counter sunk holes at both ends for securing the stringers onto the pedestal head ensuring maximum lateral stability in all directions. The grid formed by the pedestal and stringer assembly shall receive the floor tile (panels).



Pictorial View: Stringers





Pictorial View: Floor Tiles

5.1.1.4. Floor tiles

Steel cementitious access floor system shall consist of floor panels 600*600 mm of FFH upto 24 inches finished with antistatic high-pressure laminate in size 600 x 600 mm x 35 mm with point load 500 kg and uniform distribution load (UDL) 1620 kg per sq. meter. The access floor shall also provide adequate air leakage resistance as per the specifications. Panel Type should be M 1000 and Understructure- Edge Support Rigid Grid, Wear resistance (g / cm2) - < 0.08 with Bottom profile of Hemispherical shape, Pedestal – all steel construction & silver zinc plated, exposed surface, special weather coating on entire surface of the tiles. This gives strength and flexural rigidity.

5.1.1.5. Perforated Floor Tile

600 x 600 mm floor grills made out of steel section with capacity to take a UDL load of 1,620 Kgs without outlet aluminum volume control damper shall be provided as per specifications. The final finish of the floor grills will be the same and shall provide look and feel as the floor tiles with antistatic tiles. The proposed perforated tiles shall be with 56%perforations of the surface area of the tile to allow smooth air draft as per the specifications.

5.1.1.6. Tile Lifter

To remove panels, necessary tile lifter with a suction cup on both the ends shall be provided.



Pictorial View: Tile Lifter

5.1.1.7. Floor Tiles

Provide & fix anti-static vinyl floor tiles for the power and battery room, laid on bed of 12mm thick cement mortar 1:3 finished with flush pointing in white cement for 600 x 600 mm anti-skid

5.1.1.8. Partitions

Providing & fixing Siporex/AAC full height wall with cement plaster, construction 100/200mm thick, LIGHT WEIGHT SIPOREX / AAC (Autoclaved Aerated Concrete Blocks) masonry walls in cement and sand mortar proportion 1:4 including RCC band at 1200 mm intervals (concrete grade M -20), with P/F 2 nos. 6mm. Dia reinforcement bar and RCC coping at all top levels, dewatering, striking out joints and unexposed faces and watering, raking out joints on exposed faces, scaffolding etc, complete as per directions and specifications and as per relevant standards. Fire rating should be rated at minimum 2 hours. with Single Coat Cement Plaster of 12mm thick single coat cement plaster on wall, columns etc at all levels/ height, in cement sand mortar 1:4 using screened sand for internal surfaces, applied smoothly and truly vertical & horizontal plan in including scaffolding, staging, curing, trowel ling, finishing smooth etc. complete in all respects and as per directions of Engineer-In-Charge.

5.1.1.9. Fire rated doors

To provide and fix powder coated aluminum doors with a minimum 2150 mm wide for the server area using 100 mm X 38.1 mm X 2 mm sections. Doors will be 2 hours fire rated with clear fire rated glass vision panel and all necessary hardware like EDPM gaskets, heavy duty door closer etc of approved colour, 10" long rectangular S.S. handles, locking device with triplicate keys etc. all complete. The joints between the main door frame and partition shall be filled and sealed with silicon sealant. Emergency door at the server room, doors at UPS & Battery room will be double leaf & fire rated.

Providing and fixing powder coated aluminum doors using 100 mm x 38.1 mm x 2 mm sections for main door frames, 50 mm x 45 mm x 2 mm section for door top, side and middle sections (if any), 95 mm x 45 mm x 2 mm door bottom sections, using 8 mm (unless otherwise specified) clear toughened float glass and all necessary hardware like EDPM gaskets, heavy duty door closer etc of approved colour, 10" long rectangular S.S. handles, locking device with duplicate keys etc. complete as directed by SIA. The joints between the main door frame and partition shall be filled and sealed with silicon sealant.

Appropriate Stainless Steel ball bearing butt hinges, Stainless Steel lever with internal thumb turn, external key, heavy-duty door closer, mortise sash lock, panic bar (for emergency exits only) would be provided as per specifications.

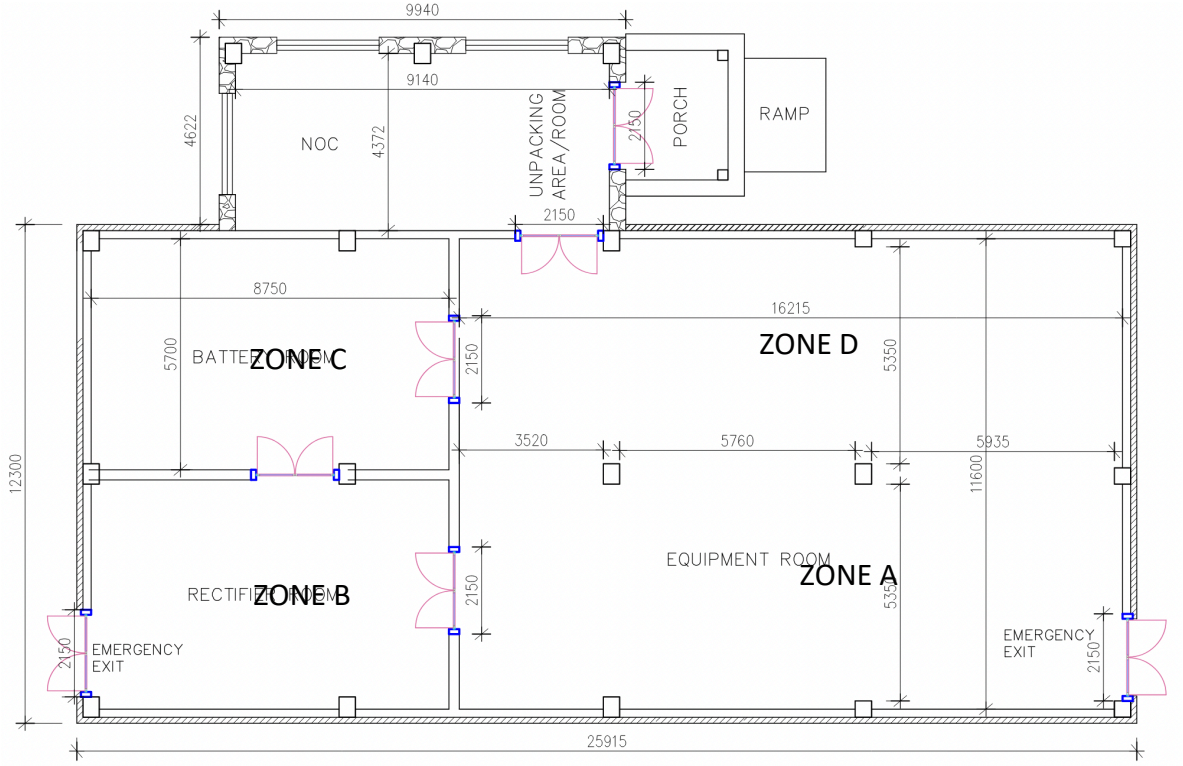
Using 25 mm thick glass wool of 16 kg. Sq. meter density wrapped on both sides with aluminum foil and placed over each tile. The insulation will have fire retardant properties for the reason that the cold air is blown from below the false floor, to rise into the room void through AC grills. The thermal insulation will avoid heat / cool loss into the below floor and avoid inter floor sweating.

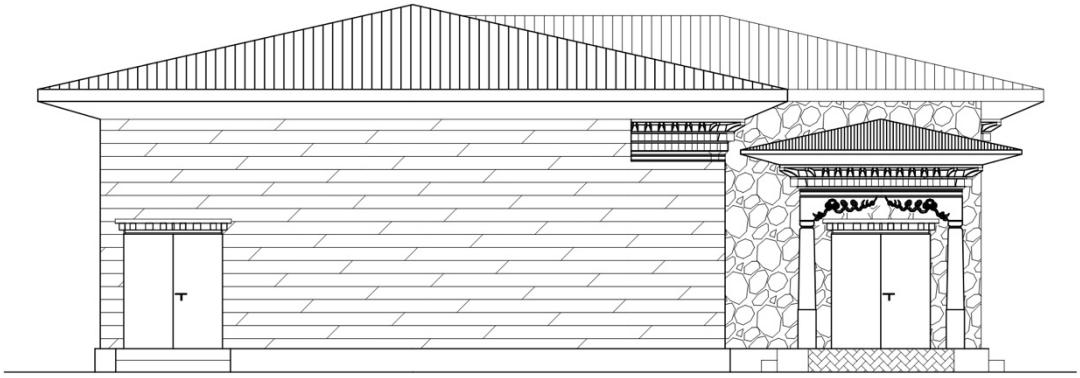
5.1.1.10. Painting

Providing and applying based emulsion painting of approved brand and shade for all internal wall surfaces. Conforming to green seal -11 VOC requirements. (Walls/partitions/ceilings or any other location as directed), to give an even shade to the surface, including thoroughly brushing the surface making free from foreign maters, sand papering, filling in all holes and cracks, applying lambi/palti and rubbing down the surface, lambi/palti sandwiched with two coats of approved primer. The finished surface – 2 primer coats + 3 finishing coats shall be applied including preparing the surface by cleaning, scrapping, smooth filling holes, scaffolding etc complete.

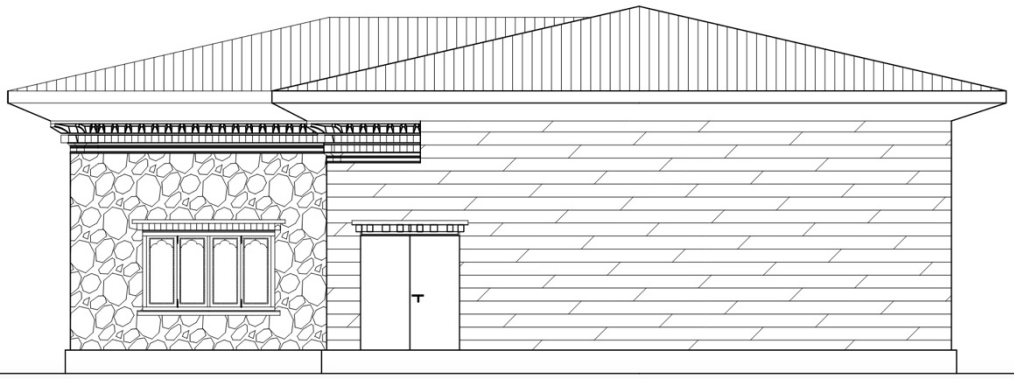
5.1.2. Civil works

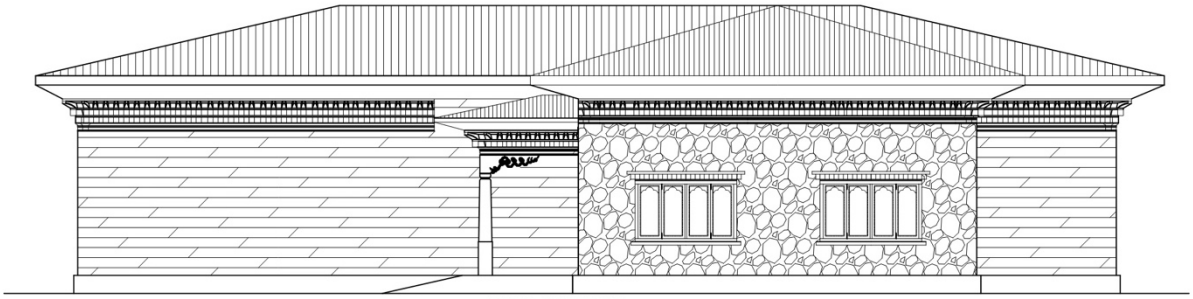
Bumthang Equipment Building layout plan.



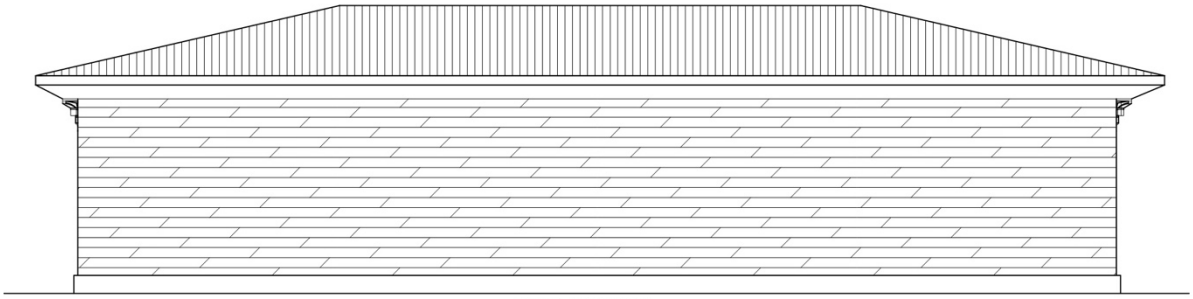


SIDE 1 ELEVATION





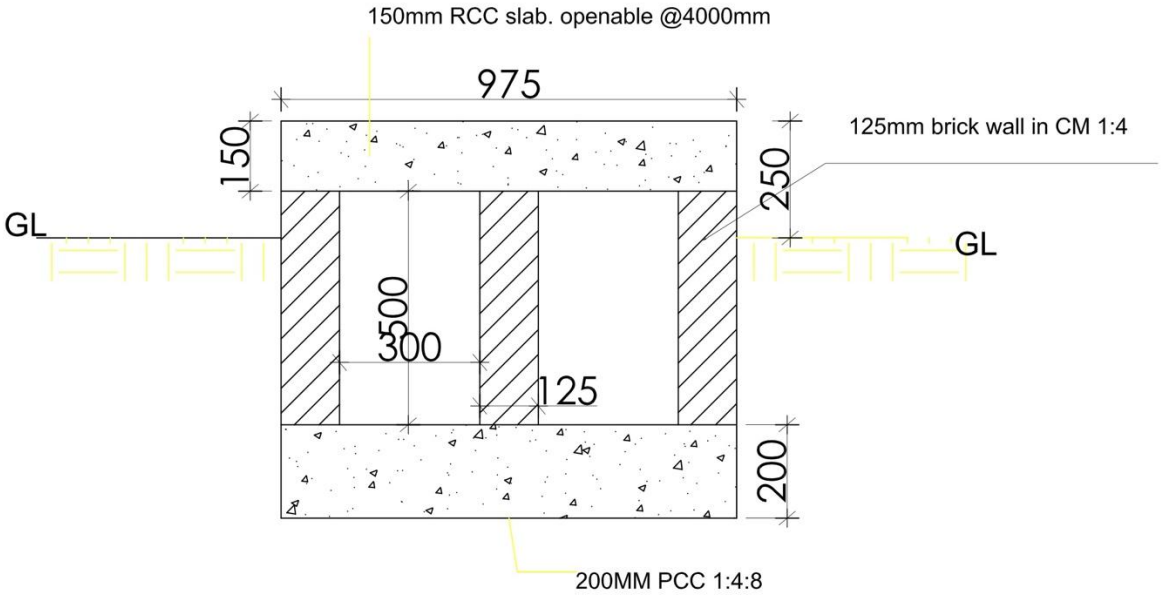
FRONT ELEVATION



BACK ELEVATION

All the necessary demolition and modification of civil works shall be carried to convert the existing building into the proposed layout. The debris shall be removed and moved to site as directed by BT. Care shall be taken to prevent damages of existing pipes, wires, cables while carrying out the civil works required during the building of equipment room.

Power duct from the BPC transformer to the equipment building needs to be constructed by the bidder and the sample drawing is attached.
Bidder is recommended to visit the site.



Length of Duct :- Transformer to AVR = 34 mtrs
AVR to DC Power Room = 53 mtrs

5.2. INTEGRATED BUILDING MANAGEMENT SYSTEM

5.2.1. General

The present requirement is for the EQUIPMENT ROOM& the DRC site; however, the same system should be capable of adding other plant utility (HVAC, Electrical etc.) at a later stage-

The BACS system shall be configured in such a manner that on a single user workstation, information from both the equipment room site shall be available. The control strategies shall be developed to ensure that the specified environmental conditions are maintained, whilst giving due regard to minimizing of energy consumption. The system design shall utilize the latest technology in "open" network architecture, distributive intelligence and processing, and direct digital control. The BACS system offered should be from the latest offerings and should be of freely programmable management and automation stations for the full spectrum of today's building application services.

All peripheral equipment e.g., sensors, pressure switches, control valves and actuators, shall be of the same manufacture as the direct digital control modules and outstations.

The system offered shall be completely modular in structure and freely expandable at any stage from the smallest system through to large distributed systems. Each level of the system shall operate independently of the next level up.

The system shall fully be consistent with the latest industry standards, operating on Linux, allowing the user to make full use of the features provided with these operating systems. Following minimum equipment's at IBMS Room must be considered in the solution.

1. 03 (three) 84" LED wide-screen TV (capable of displaying multi-windows)
2. 05 (Four) PC Workstation ((As per the specification in Section-V1, Sl.No. 9.0, Table-16 with 32" LCD/TFT
3. 01 (One) heavy-duty MFD
4. 01 (One) A3 size heavy-duty colour LaserJet Printer 5. 01
(One) 24 Pin, 132 Column, heavy-duty DMP
6. 24 Port Managed Switch with 10 GBIC Module Slot L-2

To provide maximum flexibility and to respond to changes in the building use, the system offered shall support the use of BACnet, LON-Profibus –and Ethernet TCP/IP communication technologies.

5.2.1.1. Essential functions of system

The system comprises the supply, engineering, testing, and commissioning of an integrated building management system by a specialist manufacturer. The essential functions of the system are as follows:

a) Dynamic and Animated Graphic details.
b) Early recognition of faults
c) Faults statistics for identification
d) Trend register to identify discrepancies, energy consumption, etc.
e) Optimum support of personnel
f) Prevention of unauthorized or unwanted access
g) Own error diagnosis integrated system

5.2.1.2. General System Architecture

The system shall be logically structured into three distinctive levels, which are Management Level, Automation Level, and Field Level. Each level shall be autonomous from the other. Peer to peer communication shall be possible on all system levels and the system design shall be modular in structure to allow straightforward extensions.

5.2.1.3. Use of communication standards

Only the following standards are appropriate to be used at the three levels

a) Management level - BACnet, Ethernet TCP/IP
b) Automation level - BACnet / Modbus on TCP/IP
c) Field level - BACnet / Modbus on TCP/IP

5.2.1.4. Management Level

The head-end management and operation of the plant shall include process visualization, data analysis, and exchange of data with 3rd parties. At the management level, it shall be possible for communication to flow in all directions, across networks and via direct connections. Personal computer-based operator management stations shall be provided for plant supervision and operation, alarm management, information and database management function. All real-time control functions shall be resident in the equipment room controllers to facilitate greater fault tolerance and reliability. The operator management station should be capable of multi-tasking 32-bit programs by utilizing a Linux operating system.

The management level of the system shall consist of one and shall be capable of handling more management station PCs and the associated software modules.

The management station shall be capable of the following:

Display of graphical representations of the plant overlaid with live data. High quality dynamic graphics with true multitasking of all active pages Monitor and operate / influence process devices.

Receiving of alarm messages from the process level and directing them to the appropriate reporting device e.g. SMS, email, social media app (telegram and WhatApp)

5.2.2. Scope and General Description

The Bhutan Telecom Equipment building at Jakar, should have a robust Intelligent Building Management System (IBMS) which is very critical in the overall Equipment room operations.

The solution should encompass the best products & technology aligned to meet stringent controls as desired by BT. The IBMS solution incorporated shall ensure seamless integration of all physical components with the necessary software modules for comprehensive assessment & management through the centralized IBMS room. The various IBMS components shall be planned & organized systematically to ensure flexibility and ease of operations & maintenance.

The Integrated Building Management System should be based on advanced state of art of technology wherein the various sub-systems are seamlessly integrated on a single platform and the IBMS software remains the head-end for all the proposed safety and security system.

The integration shall enable viewing of all the above systems through icons on the Building Automation System Software. Upon selection of each icon, the screen for the respective system shall appear on the Building Automation System Workstation. Seamless integration specifies that all these sub-systems of IBMS has the same head-end and runs on the same application software from the same platform. This ensures that integration between the various sub-systems are independent cables and hardwire connections between the various sub-systems. The seamless integration ensures software signals performing the integration functions between various sub-systems.

The Screen shall incorporate real time values of critical information that may be released by the respective systems. All critical alarms that may be available on the respective system shall pop-up on the Building Automation System Software Screen as and when they appear. The user shall be able to acknowledge the alarms and the information is stored in the Audit trail file of the Building Automation System. The Control functions for each of the above systems depends on the information /data released by the respective system provider for the necessary controls from the Building Automation System. It is assumed that each of the Systems mentioned above, has their own Software & Hardware to communicate with the Building Automation System through suitable protocol. The necessary central server system will have the following hardware specification.

5.2.3. Integrated Building Management System Software

The Intelligent Integrated Building Management System shall be based on distributed architecture to meet the requirements of BT. The GUI software shall be a high-performance building automation system for monitoring and managing building's devices and systems, including HVAC, electrical equipment etc. as per specifications. It shall consist of buildings integrator application platform with open systems standards to seamlessly integrate every control and information system within the facility / enterprise. The EQUIPMENT ROOM Building Integrator platform shall integrate the following subsystems: Access controllers and access card readers

- HVAC monitoring and control
- Life safety monitoring and control
- Energy usage monitoring
- Digital CCTV systems
- LAN / WAN based Digital Video Manager
- Enterprise management systems
- Time and attendance (need to integrate with existing system)
- Asset and people tracking

- Maintenance management
- Web, Internet and intranet pages and systems
- SMS, Alarm paging and SNMP notification systems

The system would provide seamless integration for the following:

- Building Management (IBMS System and HVAC interface)
- Security Management (Security, surveillance devices)
- Life Safety Management (Smoke control and Fire protection)
- Digital Video Management (CCTV cameras, Event recording and viewing)
- Energy Management (Energy utilization reporting)

The BMS system architecture shall be designed utilizing industry standard protocols (e.g. BACnet, OPC, MODBUS) and support communications with a wide variety of control devices and software systems.

The proposed BMS system should be web enabled, so that it can be viewed in either station or in any standard Internet browsers thus providing full control of facility through a web browser.

The proposed BMS system should comply with all the required specifications mentioned here.

5.2.4. Building Automation System Details

5.2.4.1. Energy Management

I . Precision Air conditioning system (use existing system)
II LT / Energy meter- Energy monitoring
III. DG set monitoring
IV. UPS Monitoring
V. Field Accessories-Equipment room controller-
VI Field Devices-Temp & Humidity Sensors (T & Rh sensor).
VII. Switches / Gauges - Low/high level switch / Fuel Gauge for DG tank monitoring integrated with the proposed IBMS software

5.2.4.2. Fire Suppression

The fire suppression system should be as per the National Fire Protection Association 76 (NFPA) 2020 standard for Information Technology Equipment (TIER III Data center)

I. Intelligent Microprocessor-based Fire Alarm System
II. Fire Detection System
III. Clean agent Fire Suppression System

5.2.4.3. Security

I. Digital IP based CCTV Surveillance system
III. Water Leak Detection System

5.2.4.4. Centralized Operation

I. PC based Operator console
II. Main Server based station with EBI Software
III. Integrated user friendly Graphic Central Software
IV. Report generation, Logging, trending and print out.

The IBMS should also be able to monitor the Various Parameters or the following functional sub-systems.

5.2.4.5. Precision Air Conditioning System

Various parameters monitored by the MODBUS/standard interface on the Proposed IBMS software are as follows: -

Sl.No	Parameters
1	Return air temperature
2	Return air Humidity
3	Return air temperature set point.
4	Return air humidity set point.
5	Fan run status.
6	Compressor 1 status
7	Compressor 1 high pre-alarm
8	Compressor 1 low pre-alarm
9	Compressor 2 status
10	Compressor 2 high pre-alarm
11	Compressor 2 low pre-alarm
12	Compressor 3 status
13	Compressor 3 high pre-alarm
14	Compressor 23low pre-alarm
15	Air flow alarm
16	Common alarm
17	Humidifier status
18	Temperature monitoring at various locations

5.2.4.6. UPS System

The UPS parameters needs to be monitored by the IBMS and the parameters shall be monitored by using the MODBUS RTU Protocol or by other protocol provided by each of the system or by hard wired points to establish the communication for the desired functions of BMS.

Sl.no	Parameters
1	Rectifier Voltage
2	Rectifier current
3	Output Voltage ø 1
4	Output Voltage ø2
5	Output Voltage ø3
6	Output Current ø1
7	Output current ø2
8	Output Current ø3
9	Output Active Power ø1
10	Output Active Power ø2
11	Output Active Power ø3
12	Output Frequency
13	Output Apparent Power ø1
14	Output Apparent Power ø2

15	Output Apparent Power ø3
16	Out total active power
17	Output total apparent power
18	Battery Voltage
19	Battery Current
20	Inverter overload
21	AC Low voltage Alarm

5.2.4.7. Energy Meter (LT Panel)

I. Monitoring Frequency, VLL (Line Voltage), Power Factor, Average Voltage, Average Current.
II. Monitoring & logging of voltage (V), current(I) & power factor on each incomer (I – R, I – Y, I – B, V – R, V – Y, V -B).
III. Monitoring & logging of KW (Kilo Watts) / KWH (Kilo Watts Hour) and total energy consumption.

Various parameters monitored by the MODBUS interface on the Proposed IBMS software are as follows: -

a. KWH	b. I-R	c. I-Y	d. I-B	e. V_R
f. V-Y	g. V-B	h. Frequency	i.VLL(Line Voltage)	j. Power Factor
k.Average	i.Average Voltage current			

5.2.4.8. Diesel Generator set

Various parameters monitored by the MODBUS interface on the Proposed IBMS software are as follows: -

- VLL - Line - Line Voltage
- Load Current
- Power Factor · Frequency
- Active Power
- Total Active Energy
- Apperant Power
- Appreant Energy
- R Phase Voltage
- Y Phase Voltage
- B Phase Voltage

5.2.4.9. Direct Digital Controllers (Equipment room)

The proposed Direct Digital Controllers shall be of distributed processing type, with the direct digital control algorithms operating by micro controllers. The number of controllers shall be as per the I/O requirements & geographical distribution of I/Os.

The controllers shall be connected to the various sensors, Switches and control panels by means of cables.

Example- Level switches for DG tanks and temperature and RH sensor for equipment area.

The equipment room will supervise individual sensors for proper performance as well as to give output to control various devices connected to it with minimum scan time of one second per input point.

5.2.5. Water Leakage Detection Systems

Water leak detection system shall be used in the critical areas to be protected, and shall have Tape sensors, detection module, alarms buzzer, condensation detectors, I/O modules as its major components. Water leak detection tape shall provide for the earliest detection of water for server farm area and PAC units.

The events shall be clearly reported on LCD/LED display which would also need to be integrated with BMS system.

5.2.5.1. Water Leak Detection System

Water leak detection cable shall be provisioned in all the water prone areas of Equipment room including the equipment room, Communication Room and the UPS Room.

The panels for water leak shall be located at the Security / BMS room.

Water leak detection System shall be designed to protect the air-conditioned premises and to alert the personnel about the leak in the AC systems. The system shall be capable of interfacing to Water leak detection sensors, condensation sensors & I/O modules.

The system shall also be designed to trip the AC when the sensor is activated. Events should be clearly reported on LCD/LED display with full English language description of the nature of the fault in the panel. Water Leak Detection systems shall be integrated with BMS.

The Water leak detection system shall comprise of Tape Sensors, Water Leak detection modules, Condensation detectors, I/O modules and sounders all connected to a Control Panel.

The Water Leak System will be designed for Server area, UPS and Battery Room only.

5.2.6. Fire Detection and Alarm System

General: In order to minimize fire damages to the equipment and furniture used inside Equipment room, the materials used should be made of non-combustible material or at least having minimal fire propagation or smoke generating properties. All the areas of the Equipment room shall have intelligent micro-processor based addressable fire detection system which shall be designed and installed as per NFPA 72 and IS: 2189.

All the detectors shall be connected to a Micro-Processor based intelligent Addressable Fire Alarm Panel, which indicates the exact address of the Detector on Fire. In case of Fire the alarm needs to be generated at the local site and simultaneously at Fire Brigade center.

5.2.6.1. Basis of Design

An Intelligent Fire Alarm System (IFAS) shall be provided to effect total control over the life safety services required in the Equipment room. The IFAS shall be of the digital, distributed processing, real time, and multitasking, multi-user and multi-location type.

The system shall be provided with Addressable and Analog fire alarm initiating, annunciating and control devices. The addressable and intelligent system shall be such that multi sensors detectors, thermal sensors, manual call points, etc., can be identified with point address.

5.2.6.2. Fire Alarm Control Panel (FACP)

The distributed Intelligent Fire Alarm Control Panel (FACP) shall function as fully stand-alone panel as well as providing a communication interface to the central station. FACP shall have its own microprocessor, software and memory and should be listed under UL. In the event of failure of the central or communication breakdown between the central station and the FACP, the FACP shall automatically operate on stand-alone mode without sacrificing any functions. The panel shall be capable of handling 120 devices per loop card.

The memory data for panel configuration and operation shall reside in non-volatile memory (EEPROM). Removal of the board shall not cause loss of memory. If such removal can cause loss of memory, then the card containing the memory shall have battery back-up for upto 24 hours on the board itself.

FACPs shall supervise detection circuits and shall generate an alarm in case of abnormal condition.

FACPs shall provide general-purpose inputs for monitoring such functions as low battery or AC power failure. FACPs shall provide tamper protection and commendable outputs, which can operate relays or logic level devices. Output commands shall take any of, but not limited to, maintained command, Momentary Command, Alarm Follow, or Alarm latch as required. Any relay in the FACP which is intended to be removable shall be supervised against removal.

5.2.6.3. Detectors & Addressable Devices:

i) General features common to all detectors:

a) Compatibility: All automatic fire detectors shall be inter-changeable without requiring different mounting bases or alterations in the signal panel.

b) Response Spectrum: Combustion gas detectors shall respond to both visible and invisible aerosols; size and colour of the aerosols shall not have a decisive influence on the response of the detector.

c) Sensitivity: On average 30 mgs of burned material per cu.m. (as measured in a 1 cu.m. chamber) shall release an alarm sensitivity which shall be adjustable according to the use of the space.

ii) Addressable Intelligent Detectors with advance microprocessor chip: Smoke detectors shall be intelligent and addressable devices and shall connect with two wires to one of the Fire Alarm Control Panel loops. The detectors shall use the combination of photoelectric (light-scattering) cum thermal detector principal. The detector should be ceiling mounted type and shall include a twist-lock base.

The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be activated remotely on command from the control panel.

The detectors shall provide address-setting means on the detector head using rotary decimal switches. Systems which use binary jumpers or DIP switches to set the detector address shall not be acceptable. The detectors shall also store an internal identifying code, which the control panel shall us to identify the type of detector. Detectors providing address setting through handheld programmers shall also be accepted.

The detectors shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel. Both LEDs may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED.

The detector sensitivity shall be set through the Fire Alarm Control Panel and shall be adjustable in the field through the field programming of the system. Sensitivity may be automatically adjusted by the panel on a time-of-day basis.

Using software in the FACP, the detectors shall compensate for dust accumulation and other slow environmental changes which may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72 and IS-2189. The area covered by each smoke detector shall be as per NFPA-71 and IS-2189.

iii) Addressable Thermal Detectors: Thermal detectors shall be intelligent and addressable devices and shall connect with two wires to one of the Fire Alarm Control Panel loops. The detectors shall use an electronic detector to measure thermal conditions caused by a fire and shall, on command from the control panel, send data to the panel representing the analog level of such thermal measurements. The detectors shall be ceiling-mounted type and shall include a twist-lock base.

The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated remotely on command from the control pane.

The detectors shall provide address-setting means on the detector head using rotary decimal switches. Systems which use binary jumpers or DIP switches to set the address shall not be acceptable. Detectors providing address setting through handheld programmers shall also be accepted.

The detectors shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions. In certain applications, LEDs may be selected to be polled without flashing through system programming. Both LEDs may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. An output connection shall be provided in the base to connect an external remote alarm LED.

iv) Addressable Manual Stations: Addressable manual stations shall be provided to connect to the Fire Alarm Control Panel loops.

The manual stations shall on command from the Control Panel send data to the panel representing the state of the manual station. Press/break stations with resettable capability are also acceptable. Manual stations shall be constructed of high impact LEXAN sheet with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters.

Stations shall be suitable for surface mounting as shown on the plans, or semi-flush mounting, and shall be installed not less than 42 inches, nor more than 48 inches above the finished floor unless otherwise specified by applicable building codes.

v) Addressable Monitor Module: The monitor module shall provide address-setting and shall also store an internal identifying code which the Fire Alarm Control Panel shall use to identify the type of device. Modules using binary jumpers are not acceptable. An LED shall be provided which shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

vi) Response Indicator: In addition to built-in response indicator in each detector. Secondary response indicator of LED type shall be provided outside the rooms wherever asked for by the Architect/Interior Designer, for indication of fire through detector in the room. The design & Colour shall be as per Interior Designer approval.

vii) Control Module: The control module shall provide address-setting and shall also store an internal identifying code which the control panel shall use to identify the type of device. Modules which use binary jumpers are not acceptable. An LED shall be provided which shall flash under normal conditions, indicating that the control module is operational and is in regular communication with the control panel.

5.2.7. Very Early Smoke Detection & Alarm (VESDA)

The Very Early Smoke Detection & Alarm (VESDA) system for Equipment room, UPS and Power Room shall provide the highest sensitivity appropriate for detecting a complete range of smoke particles produced in incipient stage and real fires involving natural or synthetic materials. It shall comprise of an air sampling system, filter assembly, aspiration system, detector, and control system. The VESDA panels shall be located in the respective protection areas.

5.2.8. Clean agent Gas Based Suppression System Works

5.2.8.1. Purpose:

This specification is for procurement of a fire suppression System. It shall be used as a standard for equipment, installation, and acceptance testing.

a) General:

5.2.8.1.1. The 3M NOVEC 1230 Fire Suppression System shall include a detection and control system with provision for both pre-alarm and automatic agent release.

5.2.8.1.2. The detection and control system shall employ multi-criteria detectors. A single detector in one zone activated, shall cause an alarm signal to be generated. Another detector in the second zone activated, shall generate a pre-discharge signal, and start the pre-discharge condition.

5.2.8.1.3. The detectors shall be connected in two zones with Double Knock configuration (Cross Zoning) to ensure and prevent false dumping of the agent.

5.2.8.1.4. The suppression sub-system shall provide high-speed release of clean agent based on the concept of total flooding fire protection for enclosed areas. A uniform extinguishing concentration shall be seven (7) percent v/v concentration of clean agent at 70°F.

5.2.8.1.5. The system discharge time shall be 10 seconds or less, in accordance with NFPA Standard 2001.

5.2.8.1.6. Clean agent shall be stored in seamless storage containers complying with United States D.O.T. Specification. The Seamless Cylinder and the valves shall be approved by Chief Controller of Explosives, Nagpur, India. The Bidder shall be required to produce a NOC for the Chief Controller of Explosive Nagpur for the storage containers against the cylinder identification nos. punched on them. Welded cylinders will not be acceptable. The Cylinders shall be equipped with differential pressure valves & No replacement parts shall be necessary to recharge the clean agent containers.

5.2.8.1.7. Clean agent shall be discharged through the operation of an Electric (solenoid) operated device or pneumatically operated device, which releases the agent through a differential pressure valve. Systems that employ explosive or pyrotechnic devices shall not be permitted.

5.2.8.1.8. All system components shall be new and of current manufacture and shall be installed in accordance with local codes.

5.2.8.2. Extinguishing Systems:

5.2.8.2.1. The system shall be designed to provide a 7 percent volume concentration of extinguishing agent. The system shall be capable of meeting the performance parameters in the National Fire Protection Association Standard 2001. The extinguishing system shall include the following components:

- Agent storage container with cylinder valve.
- clean agentagent.
- Discharge nozzle(s).
- Electronic control head for master cylinder(s) and pressure operated control head for slave cylinder(s) as releasing devices.
- Mounting brackets.
- Discharge hoses.
- EL Check valve on manifold.
- Actuation hoses for slave cylinder(s)
- Master cylinder adapter kit for slave cylinder system.

5.2.8.2.2. The clean agent shall be filled in the cylinder at 25 / 42-bar pressure.

5.2.8.2.3. The clean agent discharge shall be activated by an output directly from the control panel, which will activate the electronic control head based releasing device. clean agent agent is stored in the container as a liquid, having a natural vapour pressure of 66.4 psia at 77° F. To aid release and distribution, the container shall be super pressurized to 360 psi (g) at 70° F with dry nitrogen. Cylinder valve bodies shall be brass. Any other material of construction shall not be acceptable.

5.2.8.2.4. The releasing device shall be easily removable from the cylinder without emptying the cylinder. While removed from cylinder, the releasing device shall be capable of being operated, with no replacement of parts required after this operation. The use of explosive devices to actuate agent discharge shall not be permitted. Upon discharge of the system, no parts shall require replacement other than gaskets, lubricants, and the clean agent agent. Systems requiring replacement of disks, squibs, or any other parts that add to the recharge cost will not be acceptable.

5.2.8.2.5. Systems containing component that have a dated life span and must be periodically replaced shall not be acceptable.

5.2.8.2.6. The releasing device shall also be capable of direct mechanical actuation, providing a means of discharge in the event of total electrical malfunction. The device shall be provided with a manual lever and a face plate with clear instruction of how to mechanically activate the system. In all cases, clean agent cylinders shall be fitted with a manual mechanical operating facility that requires two-action actuation to prevent accidental actuation.

5.2.8.2.7. clean agent storage cylinders shall be provided with a safety rupture disc. An increase in internal pressure due to high temperature shall rupture the safety disc and allow the contents to vent before the rupture pressure of the container is reached. The contents shall not be vented through the discharge piping and nozzles. clean agent containers shall be equipped with a pressure gauge to display internal pressure. The gauge shall be an integral part of the container and shall be Colour-coded for fast referencing of pressure reading.

5.2.8.2.8. Discharge nozzles shall be used to disperse the 3M NOVEC 1230. The nozzles shall be brass with female threads and available in ½" through 2" sizes. Each size shall come in two styles: 180o and 360o dispersion patterns.

5.2.8.2.9. The clean agent gas and accessories supplied must be accompanied by certificate from 3 M company.

5.2.8.3. System Components

5.2.8.3.1. Major components of the clean agent system such as the cylinders, valves, and releasing devices, nozzles and accessories shall be supplied by one single manufacturer under the same brand name.

5.2.8.3.2. Release of clean agent agent shall be accomplished by an electrical output from the control panel to electronic control head releasing devices and shall be in accordance with the requirements set forth in the current edition of the National Fire Protection Association Standard 2001.

5.2.8.4. System Consideration and Requirements

5.2.8.4.1. System Drawings: The Supplier shall specifically prepare plans which are to an indicated scale with lettering no smaller than one-eighth inch and easily reproducible. These plans shall show the quantity, location, and marking of all system components. Included shall be a description and routing of all piping.Computer flow calculations using the manufacturers approved software shall detail pressure changes, flow rates, pipe and nozzle sizes. Care should be taken to locate all agent storage containers as close to the protected area as possible to ensure complete liquid discharge of the suppression agent within 10 seconds. System electrical schematics and diagrams shall be provided, including a description of all interlock functions.

5.2.8.5. Codes & Standards

a) NFPA 2001 standards on clean agent fire extinguishing system.
b) SMPV Rules 1981, CCE Nagpur (for storage of cylinders)
c) clean agent manufacturer recommendation.
d) Tariff Advisory committee rules.

5.2.9. Rodent repellent system

The rodent repellent system shall have master console and accessories that include satellites / transducers. The consoles shall be installed in the control room and the satellites would be installed in the main problem areas (like the main server hall and the utility areas in the necessary areas above raised floor, below and above false ceiling etc.) supply, Installation, Testing and Commissioning of ultrasonic rodent repellent system with a peak frequency response of above 20 KHZ consisting all the items with all necessary accessories including connections etc. as required. Ultrasonic Variable Frequency sound wave-based system is proposed at equipment room. The sensors are required to be placed at all the strategic locations inside the equipment room.

5.2.10. Technical Specifications for CCTV Surveillance System

5.2.10.1. System Requirement

5.2.10.1.1. The CCTV System shall be IP based system. The CCTV system shall be configured in such a manner that on a single user workstation, information from both the equipment room site shall be available.

1) System Objectives
a) To enable the important areas of the premises to be remotely monitored.
b) To enable sensitive areas to be scanned from pre-selected position.
c) To enable automatic recording by Digital Multiplex Recorder on hard disk and to play back the recorded events on selected monitors.

2) Camera

a) Each aisle of the server racks, a camera should be installed. Bidder needs to work out the total camera.

b) Each side of the outer wall of the equipment building camera needs to installed.

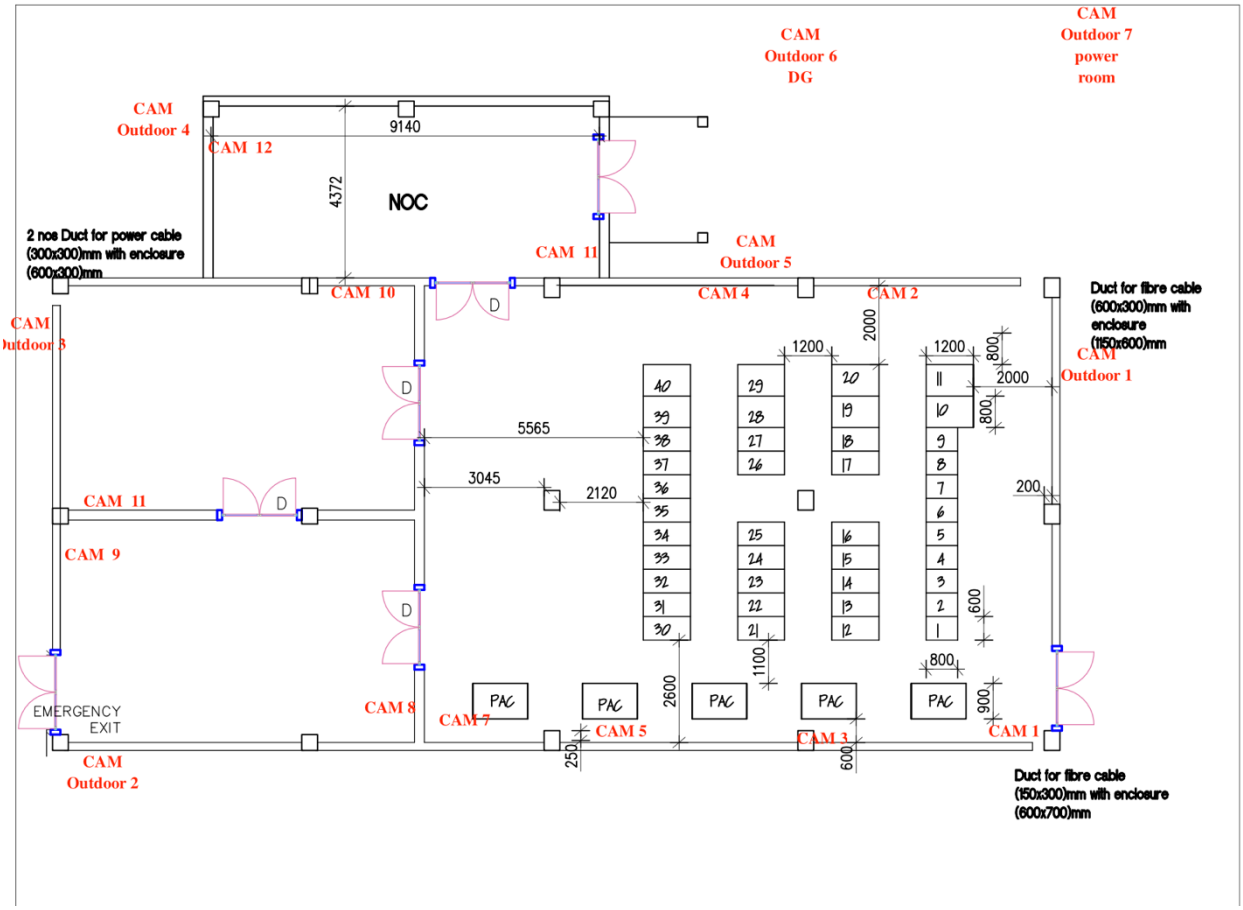
c) Outdoor camera needs to be installed at the DG shed and the existing power room.

d) Cameras must be PTZ 360 degrees.

e) Connection to the cameras can be on Fibre or PoE, the necessary hardware, software and accessories like switches cables and power adapters needs to be provided.

f) Storage should be for 90 days.

g) 4 no's of 85" LED TV needs to be supplied



5.3. TECHINICAL SPECIFICATION FOR NETWORK & PASSIVE

5.3.1. Equipment room Cabling System Infrastructure

The bidder should carry out overhead cabling for the equipment rooms per TIER III standard in floors. The schematic drawing is provided for reference and the bidder should provide details drawings and layout plan of the cabling system.

The Jakar Equipment room has two entrance ducts to rooms separated at least 16 meters on both the floors of the Equipment room. The indoor tray for the ducts needs to be built with for network cables (fibre and power cables) separated as per TIER III standards.

The Jakar Equipment room will house 40 racks. There are 22 existing racks that will be migrated to the new equipment room by BT. The overhead raceways for Fibre, Category 6E cables should conform to the TIA 942. Each of the 40 racks, 42U 19" should be equipped with a 24 ports fibre FODP and copper patch panel for category 6E cables.
The rack should be 42U 19" Rack (600mmx1200mm) and should be fully perforated rack for maximum air flow.

All the cables and patch cables, for copper and fiber, to be used inside the equipment room areas shall be LSZH rated to minimize fire hazards and reduce carbon footprint. PVC cable jackets are not acceptable. The fiber cabling pre-terminated trunk cables are to be used between HAD, MDA and equipment racks to reduce the fiber cable mess inside the racks. Factory fitted pre-terminated cables reduce installation time, reduces losses due to poor termination at site, and enhances better air-flow and power management within the equipment room. Pre-terminated cabling shall be 100% factory tested and shall be equipped with plug-n-play type interfaces.

Using pre-terminated cabling enhances the modularity, scalability, and reusability factor of all the fiber components within the EQUIPMENT ROOM, which otherwise is very difficult to manage.

All components to be used shall be 2023 ROHS compliant.

The copper and fiber system within the equipment room must be having intelligence to detect any connection, disconnection, and shall be able to generate some logs, events and alerts based on these activities. The managed system shall be able to give real-time view of the entire cabling system installed within the Equipment room. Each panel for this managed system, both for copper and fiber shall have web browsing facility to remotely login and view the status of each port both on front as well as rear.
The managed system software shall be able to monitor and control the system live from the server as well as from remote locations. Panel port enabled with LED's, shall be capable of giving multiple port status updates, Multiple user profiles shall be supported by the system to have more flexibility of usage and work orders shall be remotely created and managed through the system.

The managed cabling software must be of open platform and shall have an open API so that it can easily be integrated with any third-party software's like BACNet equipment room, NMS, etc.

The cabling work should be complying to the TIA – 942 standard and the basic elements of the TIER III equipment room cabling system structure as per TIA-942 standard that needs to be considered are as follows:

- Horizontal cabling

- Backbone cabling.
- Cross-connect in the entrance room or main distribution area.
- Main cross-connect (MC) in the main distribution area.
- Horizontal cross-connect (HC) in the telecommunications room, horizontal distribution area or main distribution area.
- Zone outlet or consolidation point in the zone distribution area.
- Outlet in the equipment distribution area.

5.3.2. Main distribution area

The main distribution area (MDA) is the central space where the point of distribution for the structured cabling system in the equipment room is located. The equipment room shall have at least one main distribution area on each floor and a separate MDA for cage services in each floor. The main distribution area should be lcoated near the entrance of the cable ducts. located to avoid exceeding maximum distance restrictions for the applications to be supported, including maximum cable lengths for access provider circuits served out of the entrance room.

5.3.3. Servers Racks

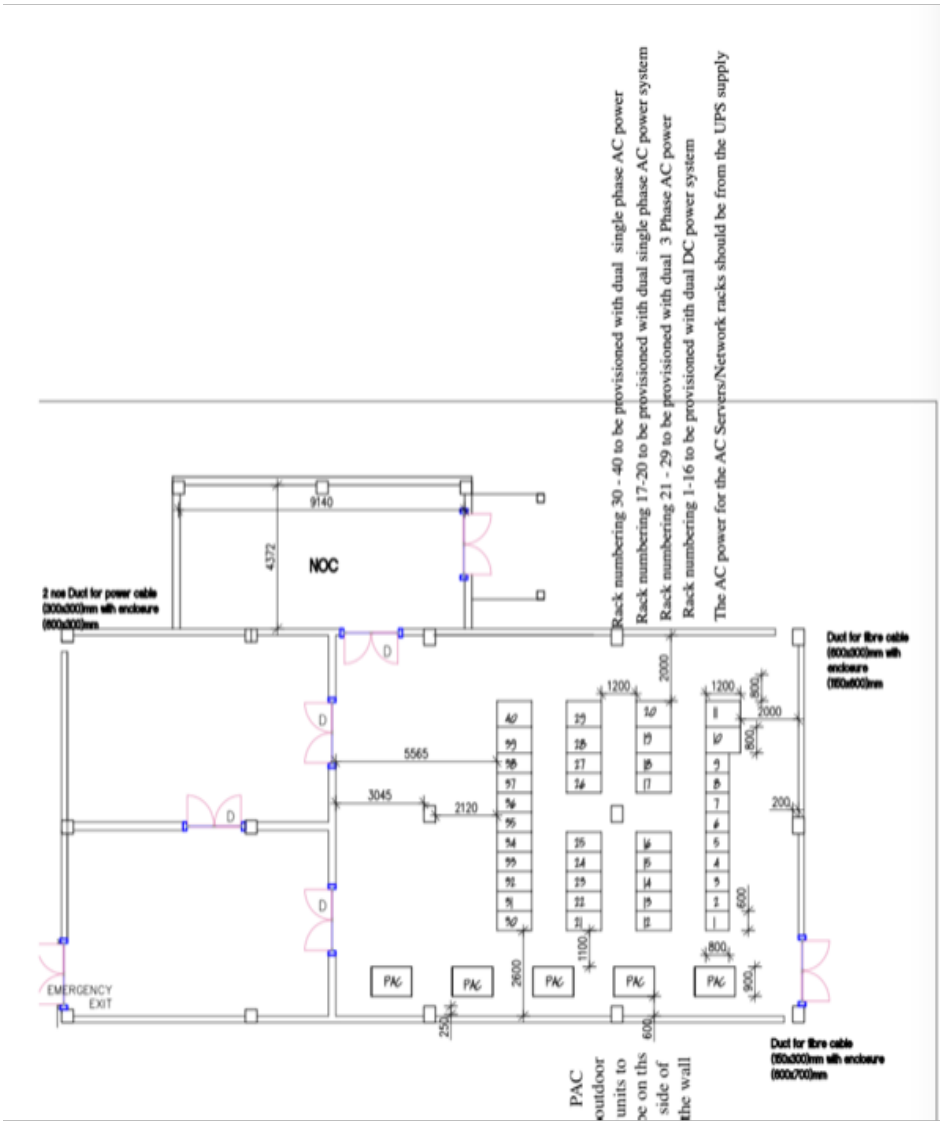
The Server Racks 19" 42U that and the MDA should be of the following minimum standards and all proposed Server racks and accessories should confirm to TIER III and TIA 942.

Mounting dimensions: W=19", H=42U, D=360mm
External dimensions: W=600, H=2055, D=600 [mm, +/-2]
Net/gross weight: 85 / 91 [kg]
Materials: - RACK mounting rails: cold-rolled steel SPCC 2mm - bolted
- horizontal mounting rails: cold-rolled steel SPCC 1,5mm - bolted
- frame: cold-rolled steel SPCC 1,2mm RAL 9004 - welded
- front door: 5mm toughened glass / SPCC 1,2mm RAL 9004 - hinged
- side cold-rolled steel SPCC 1,2mm RAL 9004 - removablepanel:
- rear door: cold-rolled steel SPCC 1,2mm RAL 9004 - hinged
Static load: 1000 kg (with leveling feet)
Use: inside, IP20
Notes: - adjustable distance between front and rear RACK rails
- ventilation holes in the front door, top and bottom panel
- possible mounting of a fan unit in the top panels - RAWP (max. 2 pcs.)
- cable ducts in the top and bottom panel
- 4 casters without locks and 4 leveling feet included
- possible assembly of a 100mm high plinth - RAC166M
- Doors Open to 180°- Allows Easy Access To Cabinet, Without Removing The Door
PDU Bracket With Power strip and Cable Management- Provides Another Option For Zero U Power strip And/or Cable Management Routing
- lockable front door (2 keys in set)
- lockable rear door (2 keys in set)
- side - lock assembly possible - RAZB16panel
- ready-to-assemble
Declarations, warranty: RoHS, 12 months from the date of purchase

5.3.4. Power Strips

Each Rack should be supplied with 2 power strips catering to max load of 4KW each on power strip. The intelligent power strip should have the minimum of the following specifications.

1. Rack Power Distribution Unit (PDU) should be hot-swappable output power modules
2. Reconfigurable input power modules, allowing immediate onsite configuration of rack power to suit IT equipment need.
3. PDU supports efficient equipment room management using remote monitoring and control to the receptacle level, as well as monitoring of environmental input options, such as rack temperature and humidity.
4. Modular communications card allows a variety of monitoring options.



5.4. GENERAL TECHNICAL SPECIFICATION FOR DEG & AVR

5.4.1. Standby Diesel Engine Generator

BT presently has 2 generators of Cummins Make of 600KVA and 335KVA, 3 Phase and the existing 600KVA DG needs to be used. Bidder may opt for any of three options

1. Bidder to propose a DG of 600KVA of same make and capacity to make N+1 conforming to TIER III standard.
2. Bidders can propose 2x 600KVA DG as an option confirming TIER III standard.
3. Bidders may propose different DG of 600kVA but all the specifications must be the same with the existing 600 KVA DG to work in synchronization conforming to TIER III standard.

5.4.2. AVR

Similar to DG, BT has an existing AVR of VINITEC Make that needs to be migrated to the new equipment room. The Bidder may opt from the 2 options:

1. Bidder to propose second AVR of the same capacity of 500KVA to make N+1 conforming TIER III standard. For that, bidders need to consider the migration plan.
2. The bidder may propose 2 X 500KVA AVR as an option conforming TIER III standard.

5.5. TECHNICAL SPECIFICATION FOR UNINTERRUPTIBLE POWER SYSTEM

5.5.1. General Description

The supply of Online double conversion Uninterruptible Power System(s) in Dual Bus Configuration rated at 240kVA, with independent Lead Acid SMF batteries /Lithium ion batteries housed in one or more external racks/cubicles and providing a minimum autonomy of 2 hours at full load. The UPS must have provision of including an in-built isolation transformer as an option and external isolation transformer of same capacity of UPS (240KVA). The UPS and Isolation Transformer shall be redundant, meaning that two separate UPS & Isolation Transformer with (1+1) configuration in parallel shall be supplied which will provide independent supply to the server racks.

In addition, need to supply a UPS of 20KVA for the pow supply to the required NOC and IBMS system. Bidders need to ensure all cabling and monitoring systems have to be installed. A Isolation transformer of 20KVA is required for 20KVA UPS. The Utility Panel supply to be fed to Emergency lighting, Power point supply to monitoring screen and to computer points and power point testing point in server room.

The present specifications contain minimum requirements. All offers must be completed strictly in accordance therewith, either by confirming data or by filling in the spaces provided, where requirements are not met.

Any deviations or exceptions to the minimum requirements must be stated explicitly in the offer.

5.5.1.1. Design Specifications

The Uninterruptible Power System (UPS) will include the following operational components:

- Full IGBT Rectifier/battery charger
- IGBT Inverter
- Maintenance bypass switch
- Static switch
- Batteries.

5.5.1.2. IGBT Rectifier/Battery charger

The IGBT Rectifier/Battery charger will have an input isolating switch and a PWM digital vector control system (DSP based) which, in addition to normal functions (AC/equipment room conversion), will automatically correct the input power factor to a value > 0.99 and limit the harmonic rejection to the mains at a THDI value < 3% at full output load, and a THDi value < 5% for any other condition.

For the battery charger function, this converter will include built-in fuses and a control circuit for the voltage and battery recharging current. The ripple current to the batteries will be less than 0.05 C10. A microprocessor control function will perform the following operations:

- Test the battery by automatically performing a partial battery discharge at weekly
- intervals or at intervals defined by the user.
- Adjust battery float voltage as a function of ambient temperature.
- Calculate the remaining battery autonomy time during discharge.
- Automatically compensate battery shutdown voltage as function of time for prolonged discharge.

5.5.1.3. IGBT Inverter

The IGBT inverter shall have a PWM digital vector control system (DSP based), capable of converting equipment room voltage from the IGBT rectifier or battery into AC voltage. A rated output filter will create an output voltage pure sinusoidal waveform.
The control circuit, in addition to normal functions, shall automatically adjust nominal output power in accordance with ambient temperature.

Inverter should be able to deliver full Active Power at Unity power factor (KVA=KW) and UPS should support the full Power factor range (Lagging & leading) of load without any consideration in power rating.

5.5.1.4. Static bypass switch

The static bypass switch shall feature a separate power input and will consist of the following:

· Static switches (SCR type), which can support overloads and short circuits downstream of the UPS
· A bypass and maintenance bypass input isolating switch with auxiliary indicator contact
· An output load switch.

5.5.1.5. Batteries

Lithium Ion and Maintenance free Lead Acid batteries will feature an enclosure made of self-extinguishing material. The batteries will be housed in one or more racks/ cubicles and will be protected by fuses located on each pole and via a dedicated isolator. Battery should provide power autonomy for 1 hour of equipment room full load condition. The methodology used for sizing the batteries should be submitted in detail.

Batteries will have an operating life of 5 years and, in the event of total failure of the mains power source, will guarantee the supply of nominal UPS output power for a minimum autonomy of 1 hour.

The IGBT inverter will be synchronised with the bypass line so that the load can be transferred from the inverter (conditioned line) to the bypass supply (direct line) and vice versa without any break in the supply to the load. In all operating modes, the battery charger will provide the power necessary to keep the battery fully charged.

5.5.1.6. Digital interactive

In this operating mode, under normal service conditions, the load will always be supplied from the direct line through the bypass static switch. The quality of the direct line will be monitored constantly using algorithms operated in real time by the DSP control system.

If the direct line is outside the permitted tolerances, the load will be automatically transferred to the conditioned line (inverter) without interruption.

In the absence of power supply to the direct and conditioned lines, the battery will supply power to the loads through the inverter. During this phase, power will be drawn from the battery and the battery charge will be reduced. Visible and audible signals will alert the user to this operating state. The remaining autonomy time will be calculated by a diagnostic algorithm.

When the quality and reliability of the direct line return within permitted limits, the UPS will automatically start supplying the load from the direct line.

5.5.1.7. Maintenance bypass switch

The UPS will be equipped with a bypass switch capable of transferring the load to the bypass supply without interruption so as to enable the UPS to be switched off and isolated for maintenance operations. The supply to the load will be maintained.

5.5.1.8. Service hot line

The Supplier will indicate the service center nearest to the place of installation of the equipment supplied under the contract. The service center indicated must be able to provide routine maintenance services and must be able to respond to urgent calls as and when required by BT.

5.5.1.9. UNINTERRUPTIBLE POWER SYSTEM TECHNICAL DATA

Parameter	**Unit of measure**	**Specification data**	**Supplier's data**
Input characteristics			
Nominal voltage	(V)	415 V three-phase + N	
Tolerance on voltage	(%)	250 V 460V	
Nominal frequency	Hz	50	
Tolerance on frequency	%	± 10	

Input power factor @ nominal voltage		> 0.99	
Total harmonic distortion (THDi) @ full load	%	< 3	
Total harmonic distortion (THDi) in all other conditions	%	< 5	
Walk in /Soft start	(Sec)	10 (1 to 90 Selectable)	
Rectifier Hold OFF (Sec)	(Sec)	10 (1 to 180 Selectable)	

5.6. TECHNICAL SPECIFICATION FOR DC SMPS

120 kW DCPS System for Server Room with VRLA Battery(lithium ion batteries to be also quoted) minimum of 5 hours back up , battery auxiliaries including Battery Cables. Suppliers will make the final choice on the type of batteries based on the technical specification and cost.

DCDB: The output from the SMPS feed to DCDB and from DCDB it will be fed to Individual IT racks. Bidder need to propose Proper MCB rating and cable size and also should provide drawing of DCDB.

5.7. TECHNICAL SPECIFICATION FOR HEAT VENTILATION AIR CONDITIONING (HVAC) SYSTEM

5.7.1. Design Description

The Bidder should submit a complete layout diagram and methodology that are used to calculate the numbers of Precision AC for installing (N+1) configuration PAC along with all accessories & Tonnage that is required for an Equipment room. The PAC unit to be supplied should be of 3phase 50Hz. Similar methodology and calculation should be submitted for comfort cooling in the NOC room.

The refrigerant to be used should be R407C/R410a is a zero-ozone depletion gas used for refrigerants. It has no chlorine content, no ozone depletion potential, and only a modest direct global warming potential unlike the other gases.

The Bidder needs to consider the following design parameters to improve temperature control and air flow distribution in the Equipment room as per TIER III Standards.
Bidders can quote for the following brands are Delta, Schneider, Vertiv & equivalent. And also ACOS for PAC is required for individual PACs.

5.7.1.1.1. Precision AC unit will be placed perpendicular to hot aisles, so they draw hot air down the hot aisles. This is based on the ASHRAE (American Society of heating and refrigeration and Air-conditioning) guidelines.

5.7.1.1.2. The sum of IT equipment airflow with CRAC airflow is matched, to limit recirculation over top of racks and cool air to all servers.

5.7.1.1.3. Designed for Uniform Static air pressure, using 450 MM raised floors, perforated tiles in front of each rack, and no perforated tiles next to AC

5.7.1.1.4. Eliminate the mixing of hot and cold air.

5.7.1.1.5. The mixing of hot and cold air is a sign of inefficiency and cooling costs that can be reduced. The following techniques are to be considered to eliminate the mixing of hot and cold air:

- Employ hot aisles and cold aisles. ◦ Eliminate gaps in rows.
- Use longer rows.
- The system shall be rated for continuous operation of 24 hours a day.
- Cooling units of higher cubic meter per hour (CMH) and higher static pressure are to be provided to cover the depth of the room.
- The refrigerant R407C/R410a shall be non-inflammable, non-toxic and non-explosiveand have the pressure andtemperature characteristics suitable for this operation.
- All refrigerant pipe shall be of copper possessing sufficient strength and size suitable for service and shall be provided with thermal insulation of suitable material.

5.7.2. Comfort Air conditioning for other utility areas

Comfort Air conditioning shall be proposed for all the auxiliary and utility areas for NOC room. The comfort AC units will be provided with automatic temperature controls. The AC must have both heating and cooling features as this AC will be required in the NOC monitoring room. Make: Blue star, Daikin, Toshiba or equivalent. Wall mounted compact size high Performance Split type Cooling Unit for Power & Battery Rooms with high air quality to match equipment sensible load application. Each unit shall facilitate installation in Small Areas, shall feature robust design to run 24x7, Auto-Restart function, Monitoring with Unit-to-Unit Communication and Ease of service. Units having two parts; Indoor section & outdoor section. The Indoor unit shall comprise of Metallic Body construction, Evaporator Coil with Hydrophilic Coating, Backward Curve fan with EC motor, HDPE Washable Filters, Expansion Valve, R407C/R410a Refrigerant, Corded Remote, Microprocessor Controller, Filter, Suction and Discharge piping, Internal power and Control wiring, HP/LP Cut-outs, Power and Control contactors, RS485 card for monitoring, and Other Electrical & safety accessories. Outdoor cabinet consists of a Compressor, Fan with single phase motor and Condenser coilTeam Mode feature for unit control, synchronizing the Multiple No. of units to work as a single system for all above units. Fault Failure changeover, Cascading Effect, Sequencing of above Units.

5.7.3. Electrical work cabling & Earthing

From BPC substation till the equipment cable should be as per the equipment ratings. The outdoor cable should be UG cable and DC cable must be single core Cu/ 2Core Cu.

The earthing for DC, Body earthing, Neutral Earthing must be done separately as per TIER III standard. The earthing value should be less than 5ohm and installation, number of pits are to be done confirming TIER III standard.

5.8. Technical Specification for Green Power for Bumthang Equipment building.

5.8.1. Power Systems Overview

The bidder should provide Electrical power system confirming to a TIER III and the BT Green Equipment room should confirm to TIER III with Power Usage Effectiveness (PUE) of **1.2 but no higher than 1.41** of Equipment room infrastructure Efficiency (EQUIPMENT ROOM).

The total power available to the Jakar Equipment room from Bhutan Power Corporation (BPC) substation which is approximately 75 meters from the Jakar Equipment room is 400KVA.

The power supply to the racks should be laid under the rack and any crossing with the network cables should be at 90o as per TIA-942. The power supply cable from UPS to the rack shall be of industrial grade socket with self-locking system.

On each Server rack, there will two nos of intelligent PDU installed and power supply to each PDU from 2 UPS and each UPS will be (1+1) mode.
The DC power and AC power should be laid in a different tray and the crossing of the cables should confirm to TIER III design.

The following needs to be incorporated in addition to the TIER III Equipment room power requirement.

- Multiple power delivery paths,
- Failures of any device in either paths will not cause power disruption,
- Redundant power paths to allow maintenance to be performed without shutting the loads,
- One power system to be offline for maintenance or repair, while the second system supplies protected power to the load.
- All devices with similar function must have physical separation so failure in one path does not affect the secondary path
- The switchover for power supply should be all automatic. · All cables should be copper conductors.
- Lighting systems for equipment room need to provide a comfortable visual working environment for the staff, whilst at the same time balancing energy and cost efficiencies.
- The bidder should provide detail Emergency lighting and exit illumination to the emergency door.
- All power and lighting cables should be properly labelled.
- The detail drawing, circuit layout and installation diagram of the Electrical system of Equipment room including the lighting system for NOC monitoring room, power and equipment room with lighting point should be submitted with the methodology and calculation deriving the requirements.
- Lighting point should be of make: Phillips, Havells, Samsung & equivalent.

6. SECTION VII: ANNEXURES (Technical)

6.1. Annexure 1: Technical Bill of Materials (as per specs required) & Schedule of Rates

Sl.No	Component Name	Item Description, make, model no	Quantity	UoM	Rate	Amount
1	**Diesel Generator & AVR**					
a	Diesel Generator	600kVA **Cummins Make**,	1	Lot		
b	DG	600KVA DG of **other make** as options	2 nos			
c	AMF Panel	As per DG rating. Must have ACB & tie breaker, Cu busbar. Inbuilt run at' It lent LT Distribution panel	2	Nos		
d	AVR	500kVA	1	Lot		
2	**HVAC**					
a.	Precision AC	Cooling for Server Room with Low Side Works. 10-14Tr based on load for equipment room, power and battery room. **Make: Delta, Schneider,Vertiv, or equivalent**	Bidder need determine exact requirement of PAC for Equipment room, power an Battery room. Need to share the workings			
b.	Comfort AC for NOC room	6.5 kW X 2 nos,. (NoC Room) **Make: Bluestar, Daikin, Toshiba, equivalent**.	Bidder need to provide drawings with quantity requirement after site visit			
3	**UPS**					
a	240 KVA UPS & Battery	240KVA UPS &VRLA Battery, (lithium ion batteries to be also quoted) battery auxiliaries including battery cable Breakup cost for each component has to be provided. **Make: Delta, Vertiv, Schneider or equivalent**.	1	lot		
b	240KVA Isolator transformer	240KVA for UPS **Make:, Delta, Vertiv, Schneider or equivalent**	2	Nos		

c	20KVA UPS for utility	20KVA UPS & VRLA Battery, (lithium ion batteries to be also quoted) battery auxiliaries including battery cable Breakup cost for each component has to be provided. **Make: Delta, Vertiv, Schneider or equivalent**.				
d	20KVA Isolator transformer	20KVA for UPS **Make:, Delta, Vertiv, Schneider or equivalent**	1	lot		
4	**Isolator**	1000A 4Pole, ACB, Connection Before AVR	2	Nos		
5	**Cabling, lighting and earthing**					
a.	Electrical work cabling	Cabling from BPC transformer till racks **Make:Polycah.KLl/Havclls.'Avocab/RR cable**	Bidder need to visit site to determine the forexact measurement	1	lot	
b	Lighting	Lighting and power point connection, Lighting Panel in NOC room, Power room and server room. **Make: Philps, Legrand, Havells, Samsung or equivalent**.	Bidder need to visit site to determine the forexact measurement and must provide detail drawing	1	lot	
c	Earthing	Saparate earthing for AC/DC/body earthing as per TIER III standard. Earth Value should be less that 5 Ohm	1 lot	lot		
6	**SMPS**					
a.	SMPS& Battery	130KW SMPS & VRLA Battery, Bidder need to quote for 130KW SMPS and VLRA and Lithium ion batteries including battery cable separately **Make: Vertiv, Schneider, Delta or equivalent**.	1	lot		
7	**Electrical Drawings**	Bidder need to propose with drawing upon site visit	1	lot		
8	**Safety Signages (Glow LED type)**					

8	**Fire Extinguisher**	Bidder need to visit site to determine the dimension measurement and must provide detail drawing				
9	**First Aid Kit**					
10	**Harmonic filter**					
a	Power Factor Correction Meter	As per TIER III standard Make:. **L&T/Equivalent**	2	Nos		
13	**LT Panels**					
a	Main LT Distribution Panels	**CPRI Approved Shivam Electricals /Equivalent Panels with switchgear of Schneider/ L&T/ ABB/ Equivalent**	2	2 Nos		
b	Utility Panels	Bidder need to propose in details of Panel in SLD diagram	2	Nos		
c	ACDB & DCDB	Bidders need to propose quantities with drawing upon site visit. Must indicate MCB rating and output from DB				
d	EQUIPMENT BUILDING DB	Bidders need to propose with drawing upon site visit. Make: Legrand, Havells, Anchor or equivalent.				
17	**IBMS**					
a	Hardware	**Honeywell/Siemens/Equilvalent**				
b	Software for Monitoring IBMS					
c	Rodent Control	**Honeywell/Siemens/Equivalent**	As per TIER III standards			
d	Intelligent Smoke and Fire Detection System	**Honeywell/Siemens/Equilvalent**	As per TIER III standards			
f.	Heat Detectors	**Honeywell/Siemens/Equilvalent**	As per TIER III standards			
g	Fire Suppression System	**Honeywell/Siemens/Equilvalent**	As per TIER III standards			
h	Water Leak Detection System	**Honeywell/Siemens/Equivalent**	As per TIER III standards			

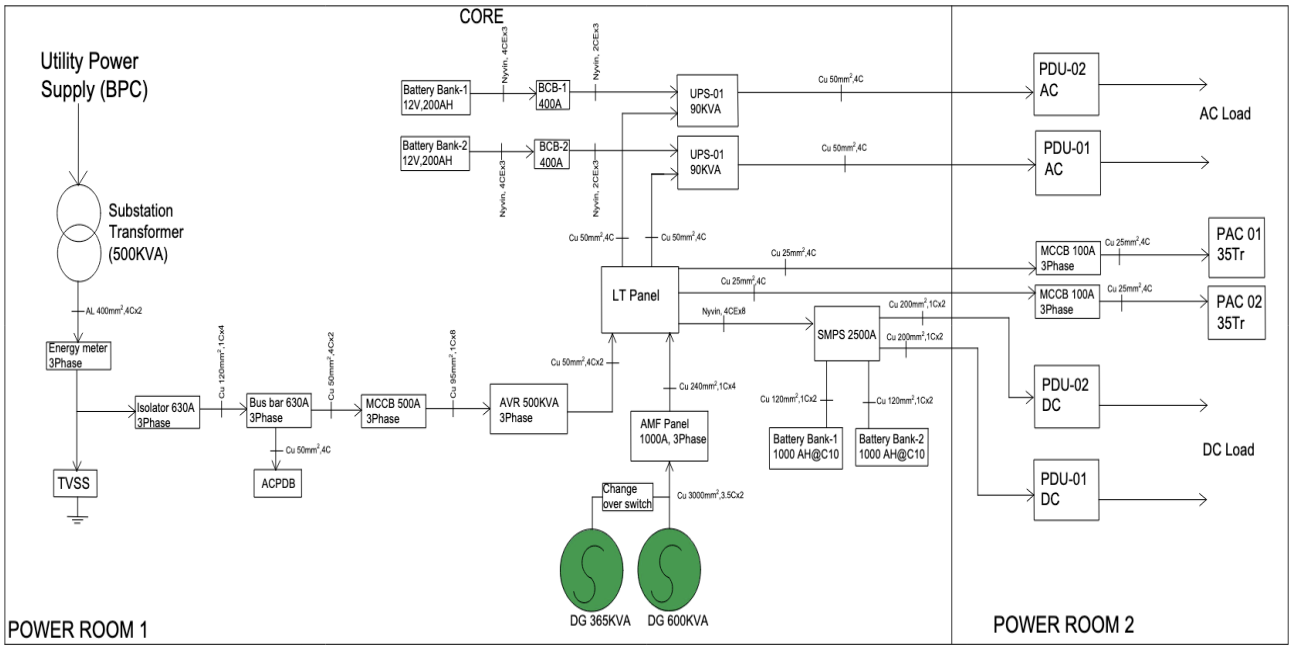
i	CCTV Systemincluding accessories	**Make; Sony. Panasonic, Honeywell, Bosch, Axis Communications**				
1	Passive /Active IT Network	Cisco(POE switches)/CommScope/TE equivalent	Bidder to refer to RFP.			
18	**Civil, Interior and Furnishing Work**					
a	Fire rated doors	(P/Fixing M.S."C" Channel for fire door fixing shall be included) **Make: Shaktimet / Godrej / Promat**	6			
b	False ceiling	For detail, refer specification. **MAKE - Armstrong / USG / CELOTEX/Equivalent for equipment room and battery room**	1			
c	False flooring	Floor panel should be finished with 2mm thick antistatic high-pressure laminate with 1.2mm thick PVC trim edge all-round. The under-structure system shall consist pedestal assembly and stringer system. Perforated **floor grills made out of steel section should be provided at necessary locations.** Floor should be capable of supporting a concentrated load of 400 Kg with minimum deflection. Panel shall withstand UDL of minimum 1000 kg. Raised Floor Height 600MM WITH SIESMIC SUPPORT for equipment room	1			
d	Tile flooring	600x600 mm vitrified polished and anti-skid tiles for Power and Battery rooms	1			
e	Skiting	For equipment room skiting should be finished with 2mm thick antistatic of 150mm height & For power and batter room tiles skiting of 150mm height	1			
f.	Supply of Tile pullers		2			
g	Insulation	CLASS O Armaflex Thick Nitrile Thermal Insulation with Aluminum Foil under false floor and joints for equipment room and ceiling for equipment room	1			
h	Partition wall	Siporex/AAC 2 hours fire rated full height wall between rectifier and battery room & between equipment room, rectifier & power rooms	1			

i	Painting	Water based emulsion of approved band and shades Conforming to green seal -11 VOC requirements for all internal walls	1			
j	**Furnitures**					
	Work station with accessories		6			
	Small Size steel cupboard for storage	Best quality steel cupboard with three shelves with lockers **(Make: Karma Steel, Godrej and equivalent)**	2			
	Chairs		6			
	Steel shoe racks for 10 pairs capacity		1			
	White board	900x 1200mm for NoC room	1			
k	Self-illuminated signage	Marking emergency fire exits and other signage	1			
l	Vacuum cleaner with necessary accessories		1			
m	Cuts/chipping /openings	In walls for service routing, cable tray, copper piping etc complete	1			
n	Ladder	Multi-purpose 12 steps aluminum folder ladder "A" Ladder Height 5.9'	1			
o	Ms structural supports	For cross supporting all racks & equipment to maintain the position of the items during earthquake.	1			

6.2. Annexure 2: Product/Unit Installation Charges

All relevant Service cost should be segregated and submitted in detail

6.3. Annexure 3: SLD for the Existing Power Network Diagram


CORE
Utility Power Supply (BPC)
Substation Transformer (500KVA)
AL 400mm²,4Cx2
Energy meter 3Phase
TVSS
Isolator 630A 3Phase
Cu 120mm²,1Cx4
Bus bar 630A 3Phase
Cu 50mm²,4C
ACPDB
Cu 50mm²,4Cx2
MCCB 500A 3Phase
Cu 95mm²,1Cx8
AVR 500KVA 3Phase
Cu 50mm²,4Cx2
Battery Bank-1 12V,200AH
Nyvin, 4CEx3
BCB-1 400A
Nyvin, 2CEx3
Battery Bank-2 12V,200AH
Nyvin, 4CEx3
BCB-2 400A
Nyvin, 2CEx3
UPS-01 90KVA
UPS-01 90KVA
Cu 50mm²,4C
Cu 50mm²,4C
Cu 50mm²,4C
Cu 50mm²,4C
LT Panel
Cu 25mm²,4C
Cu 25mm²,4C
Nyvin, 4CEx8
Cu 240mm²,1Cx4
AMF Panel 1000A, 3Phase
Change over switch
Cu 3000mm²,3.5Cx2
DG 365KVA
DG 600KVA
SMPS 2500A
Cu 200mm²,1Cx2
Cu 200mm²,1Cx2
Cu 120mm²,1Cx2
Cu 120mm²,1Cx2
Battery Bank-1 1000 AH@C10
Battery Bank-2 1000 AH@C10
PDU-02 AC
PDU-01 AC
AC Load
MCCB 100A 3Phase
Cu 25mm²,4C
PAC 01 35Tr
MCCB 100A 3Phase
Cu 25mm²,4C
PAC 02 35Tr
PDU-02 DC
PDU-01 DC
DC Load
POWER ROOM 1
POWER ROOM 2

6.4. Annexure 4: SLD for the Proposed Power Infrastructure

