BANKERS INSTITUTE OF RURAL DEVELOPMENT,
SECTOR-H, LDA COLONY, KANPUR ROAD, LUCKNOW-
226012.

NOTICE INVITING TENDERS (NIT) FOR TENDER FOR SUPPLY, INSTALLATION, TESTING, COMMISSIONING & MAINTENANCE OF VARIABLE REFRIGERANT VOLUME / VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEM & DISMANTLING OF OLD AIRCONDITION SYSTEM AT BIRD, LUCKNOW

NAME OF THE BIDDER: _____

ADDRESS: _____

_____

THE DIRECTOR,
BANKERS INSTITUTE OF RURAL DEVELOPMENT
SECTOR-H, LDA COLONY, KANPUR ROAD, LUCKNOW-226012.

BANKERS INSTITUTE OF RURAL DEVELOPMENT
DEPARTMENT OF PREMISES
BIRD, SECTOR – H, LDA COLONY,
KANPUR ROAD, LUCKNOW – 226 012.

Tender For

NOTICE INVITING TENDERS (NIT) FOR TENDER FOR SUPPLY, INSTALLATION, TESTING, COMMISSIONING & MAINTENANCE OF VARIABLE REFRIGERANT VOLUME / VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEM & DISMANTLING OF OLD AIRCONDITION SYSTEM AT BIRD, LUCKNOW

Only for Empaneled Contractors

Important Dates and Time

Sl. No.	Particulars of Activity	Date and Time
1	Issue of Tender and Commencement of Downloading Tender Document	01.02.2024
2	Date, Time and Place of Pre-Bid Meeting	12.02.2024 at 11:30 Hrs.
3	Last Date and Time for Submission of Tender	21.02.2024 up to 15:00 Hrs.
4	Date, Time and Place of Opening of Technical BID	21.02.2024 at 15:30 Hrs.
5	Opening of Financial BID	Will be communicated separately

[illegible] contains 142 pages

Table of Contents

Technical Bid

Bankers Institute of Rural Development
Sector – H, LDA colony,
Kanpur road, Lucknow – 226 012.

NOTICE INVITING TENDERS (NIT) FOR TENDER FOR SUPPLY, INSTALLATION, TESTING, COMMISSIONING & MAINTENANCE OF VARIABLE REFRIGERANT VOLUME / VARIABLE REFRIGERANT FLOW AIR CONDITIONING SYSTEM & DISMANTLING OF OLD AIRCONDITION SYSTEM AT BIRD, LUCKNOW

Name of the Tenderer: _____

Address: _____

Last Date and Time for Submission of Tender: 21.02.2024 up to 13.00 hrs.

(Section I to XI)

Notice Inviting Tender (NIT)

Ref. No. BIRD.LKO/NIT/1 954 /DPSF-Central AC /2023-24 Date:01/02/2024

Only For Empanelled Contractors

Dear Sir

NOTICE INVITING TENDERS (NIT) FOR

Tender for Supply, Installation, Testing, Commissioning & Maintenance of Variable Refrigerant Volume / Variable Refrigerant Flow Air Conditioning System & Dismantling Of Old Air conditioning System at BIRD, Lucknow.

1. Banker's Institute of Rural Development (BIRD) intends to invite tender for supply, installation, testing, commissioning, and maintenance of VRV/VRF air conditioning system & dismantling of old air conditioning system at bird, Lucknow. You are requested to submit your Bids in sealed envelope for the aforesaid work as per detailed specifications and other requirements as mentioned more specifically elsewhere in this tender document.

2. Sealed Bids in Three separate sealed Envelopes indicating clearly in three Envelopes indicating clearly 'Envelope No.1 – Technical Bid, 'Envelope No.2' – Financial Bid, and 'Envelope No.3'–Integrity Pact'. The envelopes should be addressed to The Director, BIRD, Sector-G, LDA Colony, Kanpur Road, Lucknow-226012, and super-scribed "Tender For Supply, Installation, Testing, Commissioning & Maintenance Of Variable Refrigerant Volume / Variable Refrigerant Flow Air Conditioning System & Dismantling Of Old Air conditioning System at BIRD, Lucknow". Tenderer may place Envelopes 1,2, &3 in a sixth big envelope.

The tender should be submitted not later than 21.02.2024 by 3.00 P.M.

3. This NIT (tender document) can be downloaded from our website at https://birdlucknow.rudsetti.org/tender-and-nit/ & www.rudsetti.org

4. Envelope No.3 shall contain Integrity Pact (IP) as per format given, duly signed and stamped by the bidder without notarization. Tenders submitted without IP will summarily be rejected and their subsequent envelope will not be opened. Envelope No.3 will be opened on 21.02.2024 after 15 no hrs. in presence of the bidders' representative, should they choose to be present.

3. Envelope no. 2 shall contain:

a. "Technical bid" of tender with every page signed and stamped.

b. Bar Chart indicating the program for the execution of the work (To be provided by the bidder after award of work.)

c. Separate Earnest Money Deposit (EMD) of Rs. 9.40 lakh/- (Rupees Nine Lakh Forty Thousand only) by way of a Bank Guarantee (BG)/ or NEFT/RTGS from any Nationalized Bank/ Scheduled Bank as per the format enclosed (Annexure-VI) along with this tender drawn in favour of Bankers Institute of Rural Development, payable at Lucknow or directly credited to BIRD's Current Account Number-923010044015830 maintained with Axis Bank, MG Marg, Lucknow-226001 (IFSC Code- UTIB0000553). The Tender without EMD shall be rejected out rightly. No interest shall be paid on the EMD.

e. Power of attorney authorizing the person to sign the tender.

f. Technical bids of only those bidders will be opened, whose Integrity Pact (IP) is found eligible. Technical bids be opened immediately after opening of IPs.

6. The Technical bids to be addressed by name to DIRECTOR, BANKERS INSTITUTE OF RURAL DEVELOPEMNT SECTOR -H, LDA COLONY, KANPUR ROAD, LUCKNOW – 226 012, INDIA. The Technical bids should not contain any condition whatsoever.

7. If the last date of receipt or opening of the tenders happens to be a holiday for BIRD, then the receipt and opening of the tenders shall be shifted to next working day without change of time and venue and no communication/ intimation shall be made in this regard.

8. Financial bids will be kept in envelope-II separately.

10. A pre-bid meeting will be held at DIRECTOR, BANKERS INSTITUTE OF RURAL DEVELOPEMNT SECTOR -H, LDA COLONY, KANPUR ROAD, LUCKNOW – 226 012, INDIA on 02.02.2024 at 11:30 hrs with the prospective bidders to clarify any issues pertaining to the tender. The bidders are expected to thoroughly read the tender document before being present for the pre-bid meeting, so as to understand all aspects of the work.

11. In case there are any queries or doubt the same should be informed in writing to BIRD in 3 days prior to the date of Pre-Bid meeting. In the absence of the same, issues, doubts or queries shall not be entertained subsequently.

12. Before filling up the tenders, the bidders may note the following:

a. The bids shall remain valid and open for acceptance for 3 months from the date of opening

of Envelopes. If the tenderer withdraws his tender before the expiry of the said period or makes any modifications in terms and condition of the tender which are not acceptable to BIRD, then BIRD without prejudice to any other right or remedy will be at liberty to forfeit the earnest money and cancel their tender and also their empanelment.

h. Time of Completion: Time is the essence of the contract. The Contractor shall be allowed to execute the work after working hours, in nights & on holidays, with the prior permission from BIRD authority. No extra payments will be made for the work being done during the odd hours. Date of commencement shall be either one week, from the date of issue work order to the contractor or day on which the contractor will take possession of site whichever is earlier. The work shall be completed within **6 months** from the date of commencement. The successful Contractor will have to give bar/activity chart of various activities of works to be done so that the work gets completed within the stipulated time. The chart shall be submitted before the time of commencement of work.

i. Liquidated damages for delay in completion of the works will be levied @ 0.25% of the value of the accepted tender for every week of delay or part thereof, subject to maximum of 5% of the value of the accepted tender.

j. The contractors should quote the rate in figures as well as in the words, and amount tendered by them. The rate for each item should be worked out and the requisite total amount shall be calculated accordingly. Rates quoted by the contractor in item rate tender in figures and words shall be accurately filled in so that there is no discrepancy in the rates, figures and words.

However, if a discrepancy is found in the rates in words and figures, then the rates quoted by the contractor in words shall be taken as correct. Where the rates quoted by the contractor in figures and in words tally but the amount is not worked out correctly the rates quoted by the contractor will be taken as correct and not the amount. The amount shall be subject to arithmetic check and correction if required.

k. The tender document must be filled in English and all the entries must be hand written or neatly typed. If any of the documents are missing or unsigned in financial/price bid, the tender shall be considered invalid.

l. BIRD reserves the right to accept or reject any /all tender/s in part or whole of any firm / firms without assigning any reasons for doing so.

g. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.

h. All taxes GST on material or on finished works etc., in respect of this contract shall be payable by contractor and BIRD will not entertain any claim whatsoever in this respect over the quoted price. All the taxes have to be invariably taken into the rate quoted.

i. The tenderer, apart from being a competent contractor must co-ordinate himself with all the agencies as and when required.

j. The tenderer should visit the site to ascertain the working conditions and local authority regulations / restrictions if any and other information required for the proper execution of the work.

k. The quantities of various items given in the schedule of quantities are approximate. The quantities of work may vary at time of allotment /execution of work. BIRD reserves the right to omit / delete any item(s) of work from the schedule at the time of allotment / before. Contractor will be paid for the actual work done at the site duly verified by the consultant and concerned official of the BIRD.

l. If the rate quoted by the contractor for any item / items are not workable or abnormally lower than the market rate, the bill and final payment of the contractor will be settled after the satisfactory execution of those item.

m. BIRD does not bind itself to accept the lowest or any tender at all.

BIRD also reserves to partly accept any tender or all tenders received without assigning any reason thereof.

n. Any discrepancies, omissions, ambiguities in the tender documents, if any, or any doubt as to their meaning should be reported in writing to DIRECTOR, BANKERS INSTITUTE OF RURAL DEVELOPEMNT SECTOR -H, LDA COLONY, KANPUR ROAD, LUCKNOW – 226 012, INDIA who will resolve the questions and if information sought is not clearly indicated or specified, BIRD will issue clarifications to all the tenderers which will become part of the Tender Document. BIRD will not be responsible if the discrepancies, omissions, ambiguities in the tender documents or any doubts as to their meaning are not brought to the notice of BIRD before three working days prior to the last date of submission of the tender.

o. The successful bidder shall execute an agreement on non-judicial stamp paper with BIRD in accordance with the standard format enclosed (Articles of Agreement) within 14 days

from date of issue of work order failing which the days bidder's EMD may stand forfeited.

SUPPORTING DOCUMENTS to be submitted along with the tender document

a. Bidder shall submit the list of makes of VRV /VRF system to be supplied along with OEM's certificates as per list of acceptable makes.

b. Authorization certificate from OEM for the last 1-year association

13. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required. Self –declaration in this regard should be submitted along with the tender.

14. Information and instructions for bidders will form part of NIT & to be submitted along with the tender document.

15. Pre Bid meeting shall be held in the Board Room to clear the doubt of intending tenderer, if any.

16. The department reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many tenders are received satisfying the laid down criterion.

17. **Care in submission of Tenders:**

i) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all-inclusive to accord with the all the provisions of the standard / General conditions / clauses of contract / bid document for the completion of works to the entire satisfaction of the Engineer.

ii) Tenderer will examine the various provisions of the central Goods and services tax Act, 2017 (CGST) / Integrated goods and services Tax Act, 2017(IGST) Union Territory Goods and services tax Act, 2017 (UTGST)/ respective states state goods and services tax act (SGST) also, as notified by central / state govt. & as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of Input Tax credit (ITC) likely to be availed by them is duly considered while quoting rates.

iii) The successful tenderer who is liable to be registered under CGST /IGST/UTGST/SGST act shall submit GSTIN along with other details required under CGST / IGST/UTGST/SGST act to IGRD immediately after the award of contract, without which no payment shall be released to the contractor. The contractor shall be responsible for deposition of applicable GST to the concerned authority.

v)Every tenderer / bidder is required to be registered compulsorily himself under CGST/SGST/UTGST/SGST Act or any other prevailing law of the land which requires registration in connection with the work.

vi) TDS under the provision GST law shall be deducted from the bills and / or payment of advances as and when made applicable under the Act. Provisions of GST Act, 2017 shall have the superseding effect over the all earlier taxes like VAT/WCT/Service Tax/ other like taxes etc., as contemplated in the Act. Accordingly, the terms VAT / WCT/Service Tax / etc., appearing anywhere in the bid document may be read as the applicable tax under the GST Act-2017.

Sd/-
Amit Kumar Lal
(Deputy General Manager)

Part –I
Technical Bid

Section- I

Form of Tender

The Director,
Bankers Institute of Rural Development,
Sector – II, LDA Colony, Kanpur Road,
LUCKNOW - 226012 (Uttar Pradesh).

Dear Sir,

We have carefully examined the technical specifications, designs and schedule of quantities relating to the works specified in the memorandum hereinafter set out and have visited and examined the installation site of the works specified in the said memorandum and have acquired the requisite information relating thereto as affecting the tender.

We hereby offer to execute the works specified in the said memorandum within the time specified in the said memorandum at the rates mentioned in the attached Schedule of Quantities and in accordance in all respects with specifications, designs and instructions in writing referred to in articles of agreement, general instructions to the tenderer and special conditions, conditions hereinbefore referred to, specifications, schedule of works, data sheet and schedule of quantities and with such materials as are provided for, by and in all other respects, in accordance with such conditions so far as they may be applicable.

MEMORANDUM

(a)	Description of Works	Notice Inviting Tenders (NIT) For Tender For Supply, Installation, Testing, Commissioning & Maintenance Of Variable Refrigerant Volume / Variable Refrigerant Flow Air-Conditioning System & Dismantling Of Old Air conditioning System at Bankers Institute of Rural Development Sector – II, LDA Colony, Kanpur Road, LUCKNOW - 226012
(b)	**Earnest Money Deposit (EMD)**	Earnest Money Deposit (EMD) of **Rs. 9.40 lakh/- (Rupees Nine Lakh Forty Thousand only)** by way of a Bank Guarantee (BG)/ or NEFT/RTGS from any Nationalized Bank/ Scheduled Bank as per the format enclosed (Annexure VI) along with this tender drawn in favour of Bankers Institute of Rural Development, payable at Lucknow or directly credited to BIRD's Current Account Number [illegible] maintained with Axis Bank, MG Marg, Lucknow-226001 (IFSC Code- UTIB[illegible]).
(c)	Time allowed for completion of work	6 Months from 10th day of letter of award.

1. We also agree that our tender will remain valid for acceptance by BIRD for 90 days from the date of opening of Techno-Financial bid of the tender and this period of validity can be extended for such period as may be mutually agreed between BIRD and us in writing. We also agree to keep the amount towards earnest money deposit valid during the entire period of validity of tender.

2. Should this tender be accepted, we hereby agree to abide by and fulfil all the Terms and Conditions of the Tender and in default thereof, to forfeit and pay to you or your successors, or assignees or nominees such sums of money as are stipulated in the conditions contained in the tender together with the written acceptance of the Contract.

3. We understand that you reserve the right to accept or reject any or all the tender either in full or in part without assigning any reason therefor.

4. The Tender is submitted in two parts in separate sealed envelopes, and Part I contains Integrity Pact. Part II contains all Techno-Financial Terms and Conditions' along with technical specifications/particulars in the BIRD's proforma.

Dated this_____day of _____

For and on behalf of M/s _____

_____

(Signature with seal)

Name _____
Designation _____
Place _____
Date _____

(Certified true copy of the Power of Attorney of the above signatory should be enclosed).

Witnesses

(1) Signature with
name, address and date _____
Signature

_____
_____

(2) Signature with
name, address and date _____
Signature

_____

Section-II

General Instructions to Tenderer and Special Conditions

Instructions to Tenderer

1.1. Tenderers are advised to submit the tender based strictly on the General Conditions of the Contract and Technical Specifications contained in the tender documents, and not to stipulate any deviations. If acceptance of the terms and conditions given in the tender documents has any price implications, the same should be considered and included in the quoted prices. Tender containing deviations from the terms and conditions may be rejected at the BIRD's discretion.

1.2. Tenderer shall submit full details of the patent, trademark, registered design, intellectual property rights, copyrights, industrial property rights held by them or used by them of any third party with regard to design or any part of the system.

1.3. **A pre-bid meeting of the intending tenderer will be held at 12.02.2024 at 11:30 hrs. to clarify any points / doubts raised by them in respect of the tender.** No separate communication will be sent for this meeting. All the intending tenderers are advised to study the tender document carefully and take present in the above meeting. All the points/conditions/specifications requiring clarifications shall be given in writing addressed to 'The Director, Bankers Institute of Rural Development, Sector – II, LDA Colony, Kanpur Road, Lucknow - 226012' by the intending tenderers 3 working days prior to the pre-bid meeting date through e-mail. These issues will be discussed and clarifications if any, will be published on BIRD website. Any such clarifications will form part of the tender. The tenderer is expected to get all the issues clarified during the above meeting and, should strictly desist from deviating from BIRD's tender conditions/specifications in their tender.

1.4. All information, correspondence letters the project shall be submitted and addressed to 'The Director, Bankers Institute of Rural Development, Sector – II, LDA Colony, Kanpur Road, LUCKNOW - 226012'.

2.0 Submission of Tender

2.1 It is three Envelopes indicating clearly 'Envelope No.1' – Technical Bid, 'Envelope No.2' – Price Bid, and 'Envelope No.3'—Integrity Pact'. The envelopes should be addressed to The Director, BIRD, Sector-II, LDA Colony, Kanpur Road, Lucknow-226012, and super-scribed "Tender for Supply, Installation, Testing, Commissioning & Maintenance Of Variable Refrigerant Volume / Variable Refrigerant Flow Air Conditioning System & Dismantling Of Old Air conditioning System At BIRD, Lucknow".

Tenderers / Bidders must enter into Integrity Pact (IP) with the BIRD on every stage of bidding. These covers shall be super scribed 'TENDER FOR Supply, Installation, Testing, Commissioning & Maintenance Of Variable Refrigerant Volume / Variable Refrigerant Flow Air Conditioning System & Dismantling Of Old Air conditioning System at Bankers Institute of Rural Development, Sector – II, LDA Colony, Kanpur Road, LUCKNOW - 226012 [Uttar Pradesh]' and addressed to 'The Director, Bankers Institute of Rural Development, Sector – II, LDA Colony, Kanpur Road, LUCKNOW - 226012'. Telegraphic, Faxed and E-mailed

tenders will not be accepted. The full name, postal address, e-mail address and tele/fax / telephone number of the tenderer shall be written on the bottom left corner of the sealed envelope. Insertions, postscripts, additions and alterations shall not be valid unless confirmed by the tenderer's signature. All copies of the tenders should be completed in all respects with all attachments/ enclosures/ annexures.

2.1 Tenderers are advised to use only the prescribed forms / formats (as given in the Tender Document) issued by BIRD which can be downloaded from our website. However, if they desire to submit additional information, they may do so on their own letter head / paper. Each page of the forms shall be signed and returned.

2.2 The tender duly sealed may be deposited in the 'Tender Box' kept in the Bankers Institute of Rural Development, 1st Floor DPSP section, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012., within the stipulated time and date. No tender will be received after 15:00 hours on 21.03.2024 under any circumstances whatsoever.

3.0 Technical specifications

3.1 Part-I This part shall contain the covering letter, un-priced tender consisting of complete technical specification including drawings and documents and Financial terms and conditions. Earnest Money shall be submitted with the original of part-I

3.2 Technical bid of the tender as submitted shall also contain the following:

(i) **Earnest Money Deposit (EMD) of Rs.9.40 lakh /- (Rupees Nine lakh Forty Thousand only) by way of a Bank Guarantee/NEFT/RTGS** from any Nationalised Bank / Scheduled Bank as per the format enclosed along with this tender.

(ii) Power of Attorney/authorization with the seal of the company/firm in the name of the person signing the tender documents.

(iii) Tenderer shall also indicate whether they have the capacity to Supply, install, testing and commission all the required systems **within the stipulated completion period as per tender document.**

(iv) List of deviations, if any, in Financial terms and conditions.

(v) List of deviations, if any, in technical specification.

(vi) Any other technical information the tenderer wishes to furnish.

4.0 Part II – Financial Bid

a) This part shall contain prices in **Indian Rupees (INR) only** as per format (Part II) both in figures and words. No other enclosure is permitted in Part II. Change in terms and conditions and technical deviations, if any, found in Part II of the tender will not be taken into account and will be treated as invalid. Tenders in which prices quoted in any other currency will not be considered. The rates quoted towards all-inclusive Annual Maintenance Contract (AMC) will also be in Indian Rupees (INR) only.

b) This contract is neither a fixed lump sum contract nor a piece work contract but an contract to carry out the work in respect of provision of the entire STC of VRV /VRF AC System to be paid for according to actual measured quantities at the rates/quantities provided in the schedule of rates in Financial bid.

c) The rates quoted shall be deemed to be for the finished work and shall be firm and binding without any escalation whatsoever till the system is handed over to BIRD.

5.0 Taxes and Other Charges

5.1 The prices quoted for supply of equipment shall be deemed to be inclusive of Goods & Services Tax (GST) or any other taxes/duties imposed by /State Government/ Local Bodies/ Central Government, charges for labour, transport, insurance charges for transit, shipment, packing, freight from the factory to the destination site, handling, clearing, installation, and commissioning charges, insurance charges for storage, supply, installation, testing and commissioning, CAR policy (1.25 times the Contract Value), workmen compensation and third party liability etc. commencing to date from issue of Work Order till the work should finally handed over to BIRD. If the bidder fails to include such taxes and duties in the tender, no claim thereof will be entertained by BIRD hereafter. As per Indian laws, income tax or other applicable statutory taxes/ levies at such kind will be deducted at source and a certificate for the same will be issued to the contractor.

5.2 The photocopies of the requisite documents, issued by the respective competent authority, showing proof of having paid the required amount duly authenticated shall be submitted to BIRD. For any adjustment required to be carried out due to changes in the rate of GST during the original currency of the contract period, the contractor shall furnish required documents / working of the revised duty amount and financial impact.
No claims shall be entertained for increase in GST by BIRD if the tax rate increases after the completion of the originally agreed delivery period.

However, any statutory variations in the rate of GST on AMC will be taken into account by BIRD on submission of documentary proof. The Vendors are also advised to include the current applicable rate of GST in the quoted AMC rate.

5.3 The tendered rates shall be firm and shall not be subject to any variations, toward account fluctuations in the market rate or any other source. Hence, no adjustment on the costs of materials and labour etc. shall be allowed on the basis of price variation clause governed by IEEMA (Indian Electrical and Electronic Manufacturers Association) or any other institution.

6.0 Opening of Tender

6.1 Part 1 of the tenders will be opened on 31.03.2014 at 15:30 hours in presence of tenderer who wish to be present.

7.0 Scope of Work

7.1 The scope of work shall include the following.

- The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of the Consultant and Employer. The Consultant with approval of Employer issue further drawings and / or written instructions, details directions and explanations which hereafter collectively referred to as "Consultant's Instructions" in regard to:

  a. The variation or modifications of the design quality or quantity of works or the addition or omission or substitution of any work.

  b. Any discrepancy in the drawings or between the schedule of quantities and / or drawings and / or specification.

  c. The removal from the site of any defective material Brought thereon by the contractor and the substitution of any other material thereof.

  d. The demolition removal and / or re-execution of any work executed by the contractor's.

  e. The dismissal from the work of any persons employed there upon.

  f. The opening up for inspection of any work covered up.

  g. The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the maintenance period (Defect Liability Period).

  The contractor shall forthwith comply with and duly execute any work comprised in such Employer's or his agent / Consultant's instructions, provided always that verbal instructions, directions and explanations given to the contractor's or his representative upon the works by the Employer's or his agent /Consultants shall, if involving a variation, be confirmed in writing to the contractor's within seven days. No works, for which rates are not specifically mentioned in the priced schedule of quantities, shall be taken up without written permission of the Employer or his agent / Consultants. The employer in consultation with the Consultants as provided in clause "variation" shall fix rates of items not mentioned in the priced schedule of quantities.

  Regarding all factory-made products for which ISI marked products are available, only products bearing ISI marking shall be used in the work.

7.2 Tenderer should indicate in his tender the complete description of the working of the system/sub system and their power requirements of each VRV/VRF AC system with all relevant brochure/literature etc. in addition to those called for in the Technical Specifications.

7.3 Tenderer shall carefully check the specifications and shall satisfy himself that the equipment offered is suitable as per the enclosed Technical Specifications and shall take full responsibility for the efficient operation of the equipment offered.

7.4 Tenderer shall supply all tools, plants, labour and consumables etc. as required for installation, testing and commissioning of the VRV/VRF AC systems.

7.5 Tenderer shall state clearly in his tender the standard tools, spare parts which he will supply free of cost (with warranty / guarantee, wherever applicable) when installing the VRV/VRF AC systems and handover same to BIRD after completion of the work.

7.6 All the works shall be done as per directions received from BIRD or its consultant.

8.0 Drawings and Documents

8.1 The successful tenderer shall submit, in duplicate, on receipt of acceptance of the tender, detailed working drawings and specifications showing the complete detailed of all work required. He will be held responsible for any discrepancies, errors, omissions and commissions in the drawing or particulars submitted by him even if these have been approved by BIRD. The drawings will be scrutinized by Consultant and returned to the tenderer within two weeks of receipt, duly approved or with observations. The contractor is to submit Operational Manuals and As-Built drawings after completion of work and before submission of final bill.

9.0 Packing and Dispatch

9.1 The equipment shall be properly and securely packed in boxes suitable for export (wherever applicable) and multiple handling and transportation by air / rail/ road under Indian conditions. All equipment/components etc. shall be delivered on Duty Delivery Paid (DDP) basis at Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, Lucknow – 226012.

10.0 Validity of Tender

10.1 The Tender along with the prices shall remain valid initially for a period of 90 days (3 months) from the date of opening of tender (Techno-Financial bids), which period may be further extended by mutual agreement in writing by the tenderer and the tenderer shall not cancel or withdraw the tender during this period.

11.0 Language

11.1 The Tender including all labels in drawings, documents, catalogues etc. shall be in English.

12.0 Earnest Money & Security Deposit

12.1 The Tender must be accompanied by Earnest Money Deposit (EMD) of **Rs. 9.40 lakh /- (Rupees Nine Lakh Forty Thousand only) by way of a Bank Guarantee (BG) or NEFT/RTGS** from any Nationalized Bank / Scheduled Bank as per the format enclosed along with this tender drawn in favour of Eastern Institute of Rural Development, payable at Lucknow or directly credited to BIRD's Current Account Number-922020044093690 maintained with Axis Bank, MG Marg, Lucknow-226001 (IFSC Code- UTIB0000933). EMD shall not bear any interest.

12.2 Tender not accompanied by EMD shall be rejected.

12.3 Should the Invitation to Tender be withdrawn or cancelled by the BIRD, which shall have the right to do so at any time, EMD will be returned.

- On award of contract, the successful tenderer shall furnish an amount equal to 10% (ten percent) of the contract value in the form of Bank Guarantee from any nationalized/scheduled Bank in the form prescribed by BIRD as per BIRD's proforma towards Security Deposit (see Annexure-VI) for the due fulfilment of the contract. On submission of the EMD already submitted will be released. This Bank Guarantee towards Security Deposit shall be kept valid (renewed as necessary) for the contract completion period up to the defect handing over of the VRV/VRF AC system installation and a further period of one year thereafter, i.e. one year for defect liability period and first year of AMC.

12.4 All compensation or other sums of money payable by the Contractor to BIRD under the terms of this Contract may be deducted from the security deposit, if the amounts so permit unless the contractor deposits such amounts in cash within ten days of issue of demand notice by BIRD.

13.0 Lowest Tender Not Necessarily to Be Accepted

13.1 BIRD is not bound to accept any or all tenders or to assign any reason for non-acceptance.

13.2 The tenderer whose tender is not accepted shall not be entitled to claim any costs, charges, damages and expenses of and incidental to or incurred by him through or in connection with his submission of tenders, even though BIRD may elect to modify/withdraw the tender.

14 **Tenderers shall visit the site:** Intending tenderer shall visit the site and make himself thoroughly acquainted with the local site condition, nature and requirements of the works, facilities of transport conditions, effective labor and materials, access and storage for materials and removal of rubbish. The tenderer shall include the cost of these items in the quoted rates like carriage, freight and other charges as also for any special difficulties and including police restriction for transport etc., for proper execution of work as indicated in the drawings. The successful tenderer will not be entitled to any claim of

compensation for difficulties faced or losses incurred on account of any site condition which existed before the commencement of the work or which in the opinion of the employer or his agent / Consultant might be deemed to have reasonably been inferred to be so existing before commencement of work.

15 **Tenders:** The entire set of tender paper issued to the tenderer should be submitted and also signed on the last page together with initials on every page. Initial /signature will indicate the acceptance of the tender papers by the tenderer.

(Also see general rules and instructions for the guidance of Tenderers)

The schedule of quantities shall be filled in as follows:

i. The "Rate" column to be legibly filled in ink in both English figures and English words.

ii. Amount column to be filled in for each item and the amount for each sub head as detailed in the "Schedule/ Bill of Quantities".

iii. All corrections are to be initialed.

iv. In case of any errors / omissions in the quoted rates, the rates given in the tender marked "original" shall be taken as correct rates.

No modifications, writings or corrections can be made in the tender papers by the tenderer, but may at his option offer his comments or modifications in a separate sheet of paper attached to the original tender paper.

The Employer reserves the right to reject the lowest or any tender and also to discharge any or all of the tenders of each section or to split up and distribute any item of work to any specialist firm or firms, without assigning reasons.

The tenderers should note that the tender is strictly on the item rate basis and their attention is drawn to the fact that the rates for each and every item should be correct, workable and self-supporting. If called upon by the Employer / Consultants detailed analysis of any or all the rates shall be submitted. The Employer / Consultants shall not be bound to recognize the contractor's analysis. All corrections are to be initialed.

The works will be paid for as "measured work" on the basis of actual work done and not as "lumpsum" contract, unless otherwise specified. All items of work described in the schedule of quantities are to be deemed and paid as complete works in all respects and details including preparatory and finishing works involved, directly related to and reasonably detectable from the drawings, specifications and schedule of quantities and no further extra charges will be

allowed in this connection. In the case of lumpsum charges in the tender in respect of any items of work will be made for the actual work done on the basis of lumpsum charges as will be assessed to be payable by the Employer / Consultants.

The employer has power to add to, omit from any work as shown in drawings or described in specifications or include in schedule of quantities and intimate the same in writing but no addition, omission or variation shall be made by the contractor without authorization from the Employer. No variation shall vitiate the contract.

The tenderer shall note that his tender shall remain open for consideration for a period of three months from the date of opening of the tender.

17. **EMD/ RMD**

An initial part amount of Rs 9.40 Lakh towards Earnest Money Deposit (EMD) by way of a Bank Guarantee from Nationalized/Scheduled Bank or NEFT to be submitted along with "Technical Bid". The Tender without amount of EMD shall be rejected out rightly. No interest is payable on the EMD.

"Retention Money Deposit" (RMD) at the rate of 5% is recovered from each on-account bill till the total recovery amounts to the figure stipulated in the tender document at the time of invitation of tender.

This sum will be arrived at after adjusting the EMD. The EMD with RMD will constitute Security Deposit. While determining the RMD, the EMD already with the BIRD shall be taken into account, if the same is already kept with BIRD.

16 Right to Accept Part Tender

16.0 BIRD reserves the right to accept the tender either in whole or in part at the same prices quoted by the tenderer.

Evaluation of Tender

15.0 The tenders submitted shall be evaluated by an 'Evaluation Committee' of the Bank consisting of BIRD officials and / or external technical experts or any other committee as deemed fit by BIRD and its opinion/suggestion/recommendation shall not be questionable.

15.1 Selection Procedure: Only for empanelled Contractors

15.2 Financial bids

15.2.1 Financial bids of only those bidders who empanelled shall be evaluated whose will be declared technically qualified by BIRD.

15.2.2 The BIRD reserves the right to inspect the Bidders manufacturing/repairing facility, service centres, similar work / works carried out by the /contractor OEM etc. to satisfy itself regarding quality, finishes, workmanship, competence and service capabilities to take up the work. Necessary permissions for inspection of the above facility/ works carried should be arranged by the bidders.

15.2.3 The BIRD may call for any additional particulars/ clarifications on the bids submitted. The OEM/Contractor shall be required to submit the additional particulars/ clarifications within the specified date and time, failing which the OEM's/Contractors application shall be liable for rejection.

15.2.4 The Financial Bids of only those empanelled bidders shall be opened which the 'Evaluation Committee/Director' finds fit.

15.2.5 After completion of the work as security against due fulfillment of the terms and obligations the defects liability period (DLP) from the date of commissioning and handing over of the works and Comprehensive Annual Maintenance service contract for the entire life cycle of the equipment as specified in the tender; the successful tenderer shall renew the BG of 10% contract value initially valid for a period of 3 years. After 03 years, amount of Bank guarantee will be reduced by five percent (05%) of initial value every year for next 07 years

15.2.6 Final Evaluation:

Tenders will be evaluated based on capital cost of the system and CAMC charges for 5 years after DLP.

If the space in the proforma is insufficient for furnishing full details, the information shall be supplemented in separate sheet(s) of paper stating therein the part of the statement and serial number. Separate sheets shall be used for each part.

15.3 Applications containing false and / or inadequate information are liable for rejection. Applicants shall be disqualified at any stage at their risk and cost if they are found to have made untrue or false representation in the forms, statements and attachments submitted in proof of qualification and requirements.

15.4 Applications not received in the prescribed manner will be summarily rejected. The decision of BIRD in this regard shall be binding on all concerned.

16.0 Signing of Contract Agreement

16.1 The General instructions to the tenderer and special conditions, conditions hereinbefore referred to, Conditions of Contract and Technical Specifications, schedule of works enclosed with the tender documents and the subsequent correspondence exchanged between BIRD and the tenderer shall be the basis of the Purchase Order/Final contract to be entered into with the successful tenderer.

16.2 The tenderer shall go through the terms and conditions given in the general conditions of contract herewith and his offer shall be strictly in line with the terms specified therein. No deviation from the terms and conditions specified shall be acceptable. Each page of the tender documents should be signed and stamped for his/their having acquainted himself/themselves in the general conditions of contract, Technical specifications, etc.

16.3 The tender submitted on behalf of a firm shall be signed by all the partners of the firm or a partner who has the necessary authority on behalf of the firm to enter into the proposed contract. Otherwise the tender shall be rejected.

16.4 On receipt of intimation from BIRD of the acceptance of his/their tender, the successful tenderer shall be bound to implement the Contract and within 14 days thereof, the successful tenderer shall sign an agreement in accordance with the 'Articles of Agreement'. Notwithstanding the signing of the agreement, the written acceptance by BIRD of a tender in itself will constitute a binding contract between BIRD and the person so tendering, whether such agreement is or is not subsequently executed. The stamp duty charges will have to be borne by the contractor.

16.5 The contractor shall not assign the contract. He shall not sublet any portion of the contract except with the written consent of the BIRD. In case of breach of these conditions, BIRD may serve a notice in writing on the Contractor rescinding the contract whereupon the security deposit shall stand forfeited to BIRD, without prejudice to his other remedies against the Contractor.

17.0 Import and Export License

17.1 Import License, if required, will be obtained by the tenderer. All necessary documents/fees required to be submitted/paid to the relevant authorities, for obtaining the import license shall be the sole responsibility of the tenderer.

17.2 The tenderer shall obtain and maintain the necessary import license for importing machines into India from the competent authorities and shall pay all costs and fees connected therewith. Failure to obtain and maintain import license shall not be considered as Force Majeure. In case the tenderer fails to obtain or maintain the licenses, or if the licenses are withdrawn, the tenderer shall restore them within two months from the date of such cancellation/withdrawal. If the tenderer fails to restore the import license, BIRD shall have the right to cancel the contract in whole or in part and the tenderer shall forthwith return to BIRD all the amounts paid by BIRD to the tenderer in respect of the supplies and services cancelled, together with all damages suffered by BIRD. In this regard the decision of BIRD shall be final and binding and not subject to jurisdiction/arbitration.

18.0 Inspection of materials/work at site

18.1 Before dispatching of equipment to the site, the equipment may be inspected by the BIRD's engineers/ officials / consultants at the contractor's site and then approved for shipment. The contractor at his own expense offer to the inspectors all reasonable facilities as may be necessary for satisfying himself that the equipment

is being or have been manufactured/imported according to the specifications laid down in the tender. However, all cost towards inspector's travelling, lodging, boarding if any would be borne by BIRD.

18.2 BIRD's consultant / officials shall have free and full access at any time during execution of the contract to the contractor's works or site in case of the execution of work for the aforesaid purpose, and he may require the contractor to make arrangements for inspection of work or any part thereof or any material at his premises or at any other place specified by BIRD's consultant / officials and if the contractor has been permitted to employ the service of a sub-contractor, reserve to the BIRD's consultant / officials a similar right.

BIRD at its discretion may inspect the VRV/VRF AC work equipment at the contractor's site works, before dispatch of the same to the site at Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012. The above will, however, not in any way absolve the contractor of his responsibility for proper performance of the system/ components after erection and commissioning at the designated place.

18.3 The BIRD's officials shall have the power:

a) Before any equipment or part thereof are submitted for inspection to certify that they or any portion thereof are not in accordance with the contract owing to adoption of any unsatisfactory method of manufacture.

b) To reject any equipment or parts submitted as not being in accordance with the specifications;

c) To reject the whole of the equipment tendered for inspection, if after inspection of such portion thereof as he may in his discretion think fit, he is satisfied that the same is unsatisfactory; and

d) To mark the rejected equipment or parts with a rejection mark so that it may easily be identified if re-submitted.

18.4 Consequence of rejection:

If the equipment or a part thereof, being rejected by BIRD's consultant / officials, the contractor fails to make satisfactory supplies or rectify the faulty work/has executed within the stipulated period of delivery/completion period BIRD shall be at liberty to:

i) Allow the contractor to re-submit the equipment or parts in replacement of those rejected, within a time to be specified, the contractor bearing the cost of freight if any, on such replacement without being entitled to any extra payments on that account; or

ii) Purchase/execute or authorise the purchase/execution of quantity/work of the equipment or parts rejected or others of a similar description (when equipment or parts strictly complying with specifications are not, in the opinion of BIRD

which shall be final, readily available to the contractor at his risk and cost and without affecting the contractor's liability as regards supply under the contract; or

(ii) Cancel the contract and purchase/execute or authorise the purchase/execution of the equipment or others of a similar description (when equipment or parts exactly complying with specifications are not in the opinion of BIRD, which shall be final, readily available) at the risk and cost of the contractor. In the event of action being taken under such clause (ii) above or this clause, the provision of delivery clause applies as far as applicable.

18.5 **BIRD's decision as to rejection shall be final** – BIRD's decision as regards the rejection shall be final and binding on the contractor subject to contractor's appeal.

19.0 Completion Period

19.1 Time allowed for carrying out the work, as mentioned in the Memorandum, shall be strictly observed by the Contractor and it shall be reckoned from the 10th day after written order to commence the work is issued. The work throughout the stipulated period of the contract should proceed with all the due diligence and if the contractor fails to complete the work within the specified period, he shall be liable to pay liquidated damages as defined in "Appendix hereto before referred to" of the contract. The tenderer shall, before commencing the work, prepare a detailed work programme in the form of Bar Chart which shall be approved by BIRD. The tenderer shall indicate the time schedule as per the broad frame of work listed below.

19.2 The contractor shall submit a PERT Chart for completion of the work within the contractual completion period from the 10th day of Work Order. Such chart shall include all activities like the date of supply of material at site, time wise completion of work etc., and obtain the approval of the Consultant/BIRD.

19.3 BIRD will provide space within the compound of the building. However, the responsibility and safety of the materials stored will be with the contractor.

No accommodation will be provided for any worker by BIRD. The partitions/ enclosure for lockable storage to be erected by the vendor at his cost and shall be dismantled upon completion of works and disposed materials should be disposed outside the municipal limits at his risk and cost.

20.0 Insurance

20.1 The contractor shall take all insurances at his cost to cover all kinds of risks from the time the VRV/VRF AC system equipment leaves the manufacturer's works till handing over the VRV/VRF AC systems to BIRD, in the joint names of BIRD and the contractor (BIRD's name being first) and it shall cover the following risks.

- Contractor's All Risk Policy for 1.25 times of contract amount valid from the 10th day of commencement of the contract till actual hand over of the VRV/VRF AC systems to the BIRD.
- Workmen compensation policy for all the workmen of the contractor at site.

- Third party liability policy for a total of Rs.55 lakh and with a limit of Rs.5 lakh per accident.

Note:

These policies shall be remaining valid for all the time during the currency of the contract till the completion of the entire work. If these policies are not provided by the contractor, BIRD reserves the right to take the above insurance policies themselves and/ or remove the cost thereof from the bill of the contractor.

21.0 Warranty and All-Inclusive Maintenance Contract

21.1 The entire equipment shall be guaranteed to be free from defective workmanship or materials and any defects that may appear within 12 months from the date of issue of completion certificate for the work or commissioning of the system whichever is earlier, which in the opinion of the Employer have arisen from bad workmanship or materials, shall upon intimation by BIRD, be made good by the Contractor at his own cost within the time specified. During the said period of 12 months, the contractor (successful tenderer) shall make periodical inspection of the working of the VRV/VRF AC systems free of charge at least once a month or as per requirement, if required, and attend to the lubrication of the various parts and such other service that may be required to keep the VRV/VRF AC systems in good operative condition all the time.

The contractor shall be fully responsible for the warranty, in respect of proper design, quality and workmanship and warrant all components, accessories, spare parts etc. against any manufacturing defects during the warranty period. Warranty shall not become void for use or non-use of VRV/VRF AC systems or repaired by third party in case of urgency and non-availability of services from the tenderer at any point of time.The contractor should also comply with all applicable central, state or local laws, orders rules and regulations for installation and services provided thereafter.

The warranty period shall be 12 months from the date of handing over / commissioning of the VRV/VRF AC system of the contract i.e. date of virtualcompletion.

21.2 All-inclusive Annual Maintenance Contract (AMC)

The tenderer shall quote his rates in Indian Rupees (INR) per VRV/VRF AC system per annum for all-inclusive Comprehensive Maintenance Contract inclusive of custom duty for spares imported, transport, insurance, handling, GST etc. applicable after expiry of 12 months free warranty period. These rates shall remain firm for the first year of AMC & these charges will also be considered while evaluating tender as prescribed in the section "Evaluation of Tenders".

21.3 Scope of works during AMC

(A) The scope of work shall include the following:

The scope of work shall include the following.

- The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of

the Consultant and Employer. The Consultant with approval of Employer issue further drawings and / or written instructions, details directions and explanations which hereafter collectively referred to as "Consultant's Instructions" In regard to:

a. The variation or modification of the design quality or quantity of works or the addition or omission or substitution of any work.
b. Any discrepancy in the drawings or between the schedule of quantities and / or drawings and / or specification.
c. The removal from the site of any defective material Brought thereon by the contractor and the substitution of any other material thereof.
d. The demolition removal and / or re-execution of any work executed by the contractors.
e. The dismissal from the work of any persons employed there upon.
f. The opening up for inspection of any work covered up.
g. The rectification and making good of any defects under clauses hereinafter mentioned and those arising during the maintenance period (Defect Liability Period).

The contractor shall forthwith comply with and duly execute any work comprised in such Employer's or his agent / Consultant's instructions, provided always that verbal instructions, directions and explanations given to the contractor's or his representative upon the works by the Employer's or his agent /Consultants shall, if involving a variation, be confirmed in writing to the contractors within seven days. No works, for which rates are not specifically mentioned in the priced schedule of quantities, shall be taken up without written permission of the Employer or his agent / Consultants. The employer in consultation with the Consultants as provided in clause "variation" shall fix rates of items not mentioned in the priced schedule of quantities.

Regarding all factory-made products for which ISI marked products are available, only products bearing ISI marking shall be used in the work.

Tenderer should indicate in his tender the complete description of the working offthe system/sub systems and their power requirements of each VRV/VRF AC system with all relevantbrochures/literature etc, in addition to those called for in the Technical Specifications.

Tenderer shall carefully check the specifications and shall satisfy himself that the equipment offered is suitable as per the enclosed Technical Specifications and shall take full responsibility for the efficient operation of the equipment offered.

Tenderer shall supply all tools, plants, labour and consumables etc. as required for installation, testing and commissioning of the VRV/VRF AC systems.

Tenderer shall state clearly in his tender the standard tools, spare parts which he will supply free of cost (with warrantee / guarantee, wherever applicable) when installing the VRV/VRF AC systems and handover same to IIRD after completion of the work.

(B) Penalty for delay in service during warranty and AMC period

During the currency of the Annual Maintenance Service Contract, all care shall be taken so that the downtime of any VRV/VRF AC System is kept minimum.

They shall also ensure that the required spares etc. for proper maintenance are readily available with them for the complete life span of the VRV/VRF AC system.

The payment towards AMC charges will be made every quarter after satisfactorycompletion of the service.

22.0 Terms of Payment

The payment for the works to be executed under this contract shall be made as follows:

I- First Stage Payment

60% of the quoted rate per VRV/VRF AC system against submission of the following:

i) Manufacturer's Inspection and Test Certificates.
ii) Delivery of material at site and Consultant's Certificate that all components, parts, sub systems, consumables etc. for successful installation, commissioning and testing of the systems including maintenance have been received at site in good condition.
iii) Policies of insurance covering all the risks during transit, storage.

II- Second Stage Payment

20% of the quoted rate pro rata against installation.

III- Third Stage Payment

10 % on commissioning and submitting of licence from the Competent State Licensing / Inspecting Authority.

IV- Final Stage Payment

10% payment shall be released after expiry of 12 months of defect liability period or submission of Performance Bank Guarantee from a nationalised BIRD for an equivalent amount valid for 15 months.

Tenderer shall replace existing Central AC system under **buy-back arrangement** as the materials, allied equipment etc. piled up/ collected out of dismantling of existing Central AC system will be treated as scrap and the same will be disposed off by the tenderer at its own cost (all inclusive) whatsoever without any liability and on the rate acceptable to BIRD and the proceeds received / reported therefrom will be adjusted proportionately against payments due to the tenderer as per above terms.

Note :- Documentary proof of taxes paid is to be submitted for release of payment of (First Stage.)

Other Issues

23. The contractor shall furnish an undertaking as per the enclosed proforma (Annexure-V) that they will maintain the installed VRV/VRF system satisfactorily for a minimum period of 9 years from the date of expiry of the defect liability period at the rate quoted by him in this contract towards all-inclusive maintenance service contract subject to the terms, conditions, scope indicated under scope of service contract.

24. The Contractor shall carry out all the work strictly in accordance with drawing, details and instructions of BIRD's consultant / officers. If in the opinion of BIRD's Consultant / Officers, minimal changes have to be made to suit the site condition and with the prior approval in writing of the Employer, they desire the Contractor to carryout the same, the Contractor shall carry out the same without any extra charge.

25. The tenderer must obtain for himself on his own responsibility and at his own expense, all the information which may be necessary for the purpose of making a tender and for entering into a contract and must examine the drawings, inspect the site of the work, and acquaint himself with all local conditions, means of access to the work, nature of the work and all matters pertaining thereto. BIRD's decision in such cases shall be final and shall not be open to arbitration.

26. A Schedule of Probable Quantities in respect of such work and Specifications accompany these Special Conditions. The Schedule of Probable Quantities is liable to alteration by omissions, deductions or additions at the discretion of BIRD. Each tender should contain not only the rates but also the value of each item of work entered in a separate column and all the items should be totalled in order to show the aggregate value of the entire tender.

27. The rates quoted in the tender shall include all charges for scaffoldings, watching and lighting by night as well as day including Saturdays/Sundays and holidays, protection of all other erections, matters or things and the Contractor shall take down and remove any or all such centering, scaffolding etc. as occasion shall require or when ordered so to do, and fully reinstate and make good all matters and things disturbed during the execution of work and to the satisfaction of BIRD.

28. The contractor shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, whatever the cause of delays may be, including delays arising out of modifications to the work entrusted to him or in any sub-contract connected therewith or delays in awarding contracts for other trades of the project or in commencement or completion of such works. BIRD does not accept liability for any sum besides the tender amount, subject to such variations as are provided for herein.

29. The successful tenderer is bound to carry out all items of work necessary for completion of the job even though such items are not included in the quantities and rates. Schedule of instruction in respect of such additional items and their quantities will be issued in writing by BIRD.

30. A brief specification and design data accompany these special conditions. It is not to be accepted as final by any means. The tenderer is expected to explain in detail the various designs in VRV/VRF AC system mechanism offered, which would give a more

enhanced working and finish.

31. The successful tenderer must co-operate with the other contractors appointed by BIRD so that the work shall proceed smoothly with the least possible delay. He should make his own arrangement for storage and protection of all materials supplied by him.

32. The work has to be carried out at Builders Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW – 226012 and, therefore, in view of convenience and safety of staff /Officers, appropriate care has to be taken during execution of work.

33. The contractor must bear in mind that all the work shall be carried out strictly in accordance with the specifications made by the BIRD and also in compliance any other Acts/Rules/Regulations and no deviation on any account will be permitted.

I/We hereby declare that I/we have read and understood the above instructions for the guidance of the tenderers.

Witness ——————————— Signature of tenderer ———————————

Address ——————————— Address ———————————

Date ——————————— Date ———————————

Section- III

Safety Code

GENERAL SAFETY

Safety Codes:

i. Those engaged in welding works shall be provided with welder's protective eye shields and gloves.

ii. No paint containing lead products shall be used except in the form of paste or ready-made paint.

iii. No floor, roof or other part of the structure shall be so over loaded with debris or materials as to render it unsafe.

iv. There shall be maintained in a readily accessible place first aid appliances including adequate supply of sterilized dressings and cotton wool.

vi. The injured person shall be taken to a public hospital without loss of time.

vii. Suitable and strong scaffolds should be provided for workmen for all works that cannot safely be done from ground.

viii. No portable single ladder shall be over 8 meters in length. The width between the side rails shall not be less than 30cm (clear) and the distance between two adjacent rungs shall not be more than 30 cms. When a ladder is used, an extra man shall be engaged for holding the ladder.

ix. The excavated material shall not be placed within 1.5 meter of the edge of the trench of half of the depth of trench, whichever is more. All trenches and excavated shall be provided with necessary fencing and lighting.

x. Every opening in the floor of a building or in working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be one meter.

xi. Workers employed on mixing and handling material such as asphalt cement mortar or concrete and lime mortar shall be provided with protective foot wear and rubber hand- gloves.

xii. Use of hoisting machines and tackle including their attachments, anchorage and supports shall be in perfect working conditions.

xiii. Overcoats shall be supplied by the Contractor to the painters and adequate facilities shall be provided to enable the working painters to wash during the cessation of work.

xiv. Suitable facemask should be supplied for use by the workers when the paint is applied in the form of spray or surface having lead paint dry rubbed and scrapped.

Note: All standard safety norms shall be followed by the contractor and there will be zero tolerance towards any gap deviations from safety norms. Safety clearance has to be taken up from IIIRD before commencing any items of work.

FIRE SAFETY

i. Cutting / drilling machine and other electrically operated equipment used at site shall be plugged into currently rated electrical sockets.

ii. Only 5ft marked 3 pin plug and other appliances and equipment shall be used.

iii. Electrical power cables/wires used shall not have any joints and shall be properly rated.

iv. All electrical appliances i.e. welding, drilling, cutting machine etc. shall be safely and securely earthed to prevent leakage current while in operation.

v. Before commencing the welding work, fire section shall be informed and required precautions should be taken.

vi. Two buckets of water, sand and a fire cloth of suitable size shall be kept in an easily accessible area on the site.

vii. Fire extinguishers recommended by fire officers shall be kept on the site.

viii. Used paint drums shall be stored in specified store only after closing them properly.

ix. Personal protective equipment such as safety shoes, hand gloves, welder's mask, ear plug etc. depending upon the requirement of the work shall be provided by the contractor to the workmen to prevent occupational health hazards.

x. The safety belt shall be provided by the contractor and used by the workmen while working from height for more than 10' from Ground level.

xi. None of the passages in lobby and staircases or any entrance/exit shall be used for stacking / dumping any kind of materials/waste.

xii. Any debris/ waste generated from the work shall be collected on daily basis, removed from site and stored at the designated place in proper manner.

xiii. Battery operated emergency light/torches shall be provided by the contractor to the workmen while working beyond office hours.

Place:
Date:

SIGNATURE AND SEAL
OF THE CONTRACTOR

Section-IV
The Conditions Hereinafter Referred to

Interpretation Clause

1. In construing these Conditions, the Specifications, Schedule of Quantities and Contract Agreement, the following words shall have the meaning hereby assigned to them except where the subject or context otherwise required.

(a)	"BIRD"	Shall mean, Bankers Institute of Rural Development, Sitapur Road, LUCKNOW and shall include its assigns and successors.
(b)	Contractor/Bidder (in the case of a partnership)	"Contractor/Bidder" shall mean and _____ trading in the name and style of _____ and having a place of business at _____ and shall include the partners for the time being of the said firm and the legal representatives of a deceased partner.
	(in the case of individual)	"Contractor" shall mean M/s _____ trading in the name and style of _____ and shall include his heirs, successors and legal representatives.
	(in the case of Company)	"Contractor" shall mean _____ a company incorporated under _____ and having its registered office at _____ and shall include its successors and assigns.
(c)	"Site"	Shall mean the site of the contract works including any building and erections thereon and any other land (inclusively) as aforesaid allotted by the Employer for the Contractor's use.
(d)	"This Contract"	Shall mean the Articles of Agreement, the Special Conditions, the Conditions, the Appendix, the Schedule of Quantities and Specifications etc. attached hereto and duly signed.
(e)	"Notice in writing"	Or written notice shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address to have been received when in the ordinary course of post it would have been delivered.
(f)	"Act of Insolvency"	Shall mean any Act of Insolvency as defined by the Presidency Towns Insolvency Act or the Provincial Insolvency Act or any Act amending such original.
(g)	"Net Prices"	If in arriving at the contract amount, the Contractor shall have added to or deducted from the total of the items in the Tender any sum, either as a percentage or otherwise, then the net price of any item in the tender shall be the sum arrived at by adding to or deducting from the actual figure appearing in the Tender as the price of that item a similar percentage or proportion of statement of any Prime Cost items and provisional sums of money shall be deducted from the total amount of the tender. The expression "net rates" or "net prices" when used with reference

		to the contract or accounts shall be held to mean rates or prices so arrived at.
(h)	"The works"	Shall mean the Supply, Installation, Testing, and Commissioning of VRV /VRF Air conditioning system & dismantling of old central AC system at Bankers Institute of Rural Development, Sector – 10, LDA Colony, Kanpur Road, LUCKNOW – 226012 as provided herein.

Word importing persons include firms and corporations. Word importing the singular only also includes the plural and vice-versa where the context requires.

Contractor's Duties

2. Contractor's duties include the following.

a) Provide and pay for labour, materials and equipment, tools, construction equipment and machinery and other facilities and services necessary for the proper execution and completion of the specified works.

b) Secure and pay for required permits, statutory workman's compensation insurance, fees and licenses necessary for proper execution and completion of required work.

c) Give required notices.

d) Enforce strict discipline and good order among employees. Do not employ persons unskilled in assigned task.

Variations to be approved by Employer

3. The Contractor shall submit a statement of variations giving a quantity and rates duly supported by analysis of rates, vouchers etc. The rates on scrutiny and final acceptance by BIRD shall form a supplementary tender. BIRD shall not be liable for payment of such variations until these statements are sanctioned by it.

Drawings, Schedule of Quantities & Agreement

4. The Contract shall be executed in duplicate and the Contractor shall be entitled to one executed copy for his use. Before the issue of the final certificate to the Contractor, he shall forthwith return to BIRD all Drawings and Specifications.

Work Sequence

5. The successful Contractor shall include all costs in the tender to complete the works in the time schedule as given by him in the work schedule table. By submitting a tender, the Contractor agrees that they have reviewed the project specifications and drawings, toured the jobsite, and will complete all work in accordance with the overall time frame as per the approved schedule. The Contractor shall provide a detailed execution schedule, in accordance with the time frame approved as per the work task schedule, prior to award of the project.

Contractor's use of Estate

6. The site of the work is an occupied building. Contractor's use of Estate shall be subject to following:

- Confine operations at the site to areas permitted by law, ordinances, permits/Specification, and BIRD's specific instructions.
- Do not unreasonably encumber the site with materials or equipment. Staging area shall be located as directed by BIRD.
- Assume full responsibility for protection and safekeeping of tools and products stored on or off Estate.
- Move stored products which interfere with operations of building or the operations of other trades.

Contractor to provide everything necessary at his cost

7. The Contractor shall provide at his cost, everything necessary for the proper execution of the works according to the intent and meaning of the Drawings, Schedule of Quantities and Specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred therefrom, and if the Contractor finds any discrepancy in the Drawings or between the Drawings, Schedule of Quantities and Specifications, he shall immediately and in writing refer same to BIRD who shall decide which is to be followed. The Contractor shall provide all works under this specification in full accordance with Health and Safety Regulations.

No Disruption to Normal Routine Functions

8. This project is a major VRV/VRF AC system replacement work in an existing residential building. It is essential that the Contractor gives special attention and priority to all matters concerning safety, protection from dust and loose materials, reduction of noise levels, protection from water and air infiltration into building, and maintenance of neat and orderly conditions in and around work areas inside and outside of building. Packaging, scrap materials and demolition debris shall be promptly removed from the building and site on a daily basis.

9. If the contract includes works, which will be disruptive during normal business operations, or would be dangerous to building occupants, said works shall be performed during hours as BIRD dictates. Examples of such work include, without limitation, saw cutting of concrete, jack hammering, welding, metal cutting, pouring concrete, erecting steel or hoisting equipment over occupied portions of the building or performing tests requiring all VRV/VRF AC systems in a group. The Contractor shall perform such work during BIRD dictated hours and shall include all costs in its tender.

10. The Contractor shall keep noise levels within permissible limits. When it is [illegible] to produce noise above this level, the Contractor shall advise BIRD of

such needs and times will be scheduled as directed. The Contractor shall anticipate any excessive noise reducing procedures and include an allowance for it in the tender.

Protection of Work and Property

13. The Contractor shall install a suitable protective covering on all finished floors in areas where the works are being performed. No material handling equipment shall be permitted on or over finished floors unless said floors have been protected in a manner approved by BIED. Any damage to building finishes caused by the Contractor shall be refinished at no additional cost to BIED. The Contractor shall take photographs of any adjacent finishes that may be damaged during the works for a photographic record.

Authorities, Notices and Patents

14. The Contractor shall conform to the provisions of any Act of the Legislature relating to the works, and to the regulations and bye-laws of any authority, and of electric supply and other companies and/or authorities with whose systems, the installation is proposed to be connected and shall, before making any variations from the Drawings or Specifications that may be necessitated by so conforming, give to BIED, written notice, specifying the variation proposed to be made and the reason for making it and apply for instructions therein. In case the Contractor shall not receive such instructions within ten days, he shall proceed with the work conforming to the provisions, regulations or bye-laws, in question, and any variation so necessitated shall be dealt with under Clause No. 29 thereof.

The Contractor shall bring to the attention of BIED, all notices required by financial Acts, regulations or bye-laws to be given to any authority and pay to such authority, or to any public office, all fees that may be properly chargeable in respect of the works, and lodge the receipts with BIED.

The Contractor shall indemnify BIED against all claims in respect of rights, and shall defend all actions arising from claims, and shall himself pay all royalties, license fees, damages, cost and charges of all and every sort that may be legally incurred in respect thereof.

Setting out of work

15. The Contractor shall set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof. If at any time any error in this respect shall appear during the progress of the works within a period of one year from the completion of the works, the Contractor shall, if so required, at his own expense, rectify such error to the satisfaction of BIED.

Materials and workmanship to conform the descriptions

16. All materials and workmanship shall be for as procurable be of the respective kinds described in the Schedule of Quantities and/or Specifications to and in accordance

with BIRD's instructions, and the Contractor shall upon the request of BIRD furnish him with all invoices, accounts receipts and other vouchers to prove that the materials comply therewith. The Contractor shall at his own cost arrange for and/or carry out any test of any materials which BIRD may require.

Contractor's superintendence and representative on the works

17. The Contractor shall give all necessary personal superintendence during the execution of the works, and as long thereafter as the Employer may consider necessary until the expiration of the "Defect Liability Period" stated in the Appendix hereto. The Contractor shall also during the whole time the works are in progress, employ a competent representative who shall be constantly in attendance at the works while the men are at work. Any directions, explanations, instructions or notices given by the Employer to such representative shall be held to be given to the Contractor.

Dismissal of Workmen

18. The Contractor shall on the request of the Employer, immediately dismiss from the works, any person employed thereon by him who may, in the opinion of the Employer, be incompetent or misconduct himself and such person shall not be again employed on the works, without the permission of the Employer.

Access to Works

19. The Employer and their respective representatives shall at all reasonable times have free access to the works and/or the workshops, factories or other places where materials are lying or from which they are being obtained and the Contractor shall give every facility to the Employer and their representatives necessary for inspection and examination and test of the materials and workmanship. No person not authorized by the Employer except the representatives of public authorities shall be allowed on the works at any time.

Assignments and Sub-letting

20. The whole of the works included in the Contract shall be executed by the Contractor and the Contractor shall not directly or indirectly transfer, assign or under-let the Contract or any part share thereof or any interest therein without the prior written consent of the Employer, and no undertaking shall relieve the Contractor from the full and entire responsibility of the Contract or from active superintendence of the works during their progress.

21. No alteration, omissions or variation shall vitiate this Contract but in case the Employer thinks proper at any time during the progress of the works to make any alterations in or additions to or omissions from the works or any alteration in the kind or quality of the materials to be used therein and shall give notice thereof in writing under his hand to the Contractor, the Contractor shall alter, add to or omit [illegible], as the case may be, in accordance with such notice but the Contractor shall not do any work extra to or make any alterations or additions to or omissions from the works or any deviation from any of the provisions of the Contract, Stipulation,

Specifications or Contract Drawings without the previous consent in writing of the Employer and the value of such extras, alterations, additions or omissions shall in all cases be determined with the prior approval in writing of the Employer in accordance with the provisions of Clause 26 hereof, and the same shall be added to or deducted from the Contract Amount, as the case may be, accordingly.

Schedule of Quantities

22. The Schedule of Quantities, unless otherwise stated, shall be deemed to have been prepared in accordance with the Standard Method of Measurement.

Any error in description or in quantity or in omission of items from the Schedule of Quantities shall not vitiate this contract but shall be rectified and the value thereof as ascertained under Clause 26 hereof, shall be added to, or deducted from the Contract Amount (as the case may be) provided that no rectification of errors, if any, shall be allowed in the Contractor's Schedule of Rates.

Sufficiency of Schedule of Quantities

23. The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the prices stated in the Schedule of Quantities and/or the Schedule of Rates and Prices which rates and prices shall cover all his obligations under the Contract, and all matters and things necessary for the proper completion of the works.

Measurement/Inspection of Works

24. The Consultant may from time to time intimate to or inspect the Contractor and the Employer that he requires the works to be measured or inspected, and the Contractor shall forthwith attend or send a qualified Agent to assist the Consultant in taking such measurements and calculations and to furnish all particulars or to give all assistance required by any of them.

Should the Contractor not attend or neglect or omit to send such Agent, then the measurement taken by the consultant shall be taken to be correct measurements of the works. Such measurements shall be taken in accordance with the Mode of Measurement detailed in the Specifications.

The Contractor or his Agent may at the time of measurement take such notes and measurements as he may require.

All authorized extra works, omissions and all variations made with the prior approval in writing of the Employer shall be included in such measurements.

Prices for extra etc. ascertainment of

25. The Contractor may, when authorized by Employer, add to, omit from, or vary the works shown upon the drawings, or described in the Specification, or included in the Schedule of Quantities, but the Contractor shall make no addition, omission or variation without such authorization or direction.

A verbal authority or direction by the IIRD shall, if confirmed by him in writing within seven days, be deemed to have been given in writing.

No claim for any extra shall be allowed unless it shall have been executed under provisions of Clause 5 hereof with the concurrence of the Employer as herein mentioned. Any such extra is herein referred to as authorised extra and shall be made in accordance with the following provisions.

(a) (i) The net rates or prices in the original tender shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced therein.

(ii) Rates for all items, wherever possible, should be derived out of the rates given in the Priced Schedule of Quantities.

(b) The net prices of the original tender shall determine the value of the items omitted, provided if omissions vary the conditions under which any remaining items of works are carried out, the prices for the same shall be valued under sub-clause (c) hereof.

(c) Where the extra works are not of similar character and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items of works are carried out or if the amount of any omission or additions relative to the amount of the whole of the Contractworks or to any part thereof shall be such that in the opinion of IIRD thenet rate or price contained in the Priced Schedule of Quantities or tender or for any item of the works involves loss or expense beyond that reasonably contemplated by the Contractor or is by reason of such omission or addition rendered unreasonable or inapplicable, IIRD shall fix such other rate orprice as in the circumstances he shall think reasonable and proper.

(d) Where extra work cannot be properly measured or valued, the Contractor shall be allowed day work prices at the net rates in accordance with the localday work rates and wages for the district, provided that in either case vouchers specifying the daily time and materials employed, be delivered for certification to the engineer at or before the end of the week following that inwhich the work has been executed plus 15% towards establishment charges, contractor's overhead and profits.

The measurement and valuation in respect of the Contract shall be completed within the "period of final measurement" stated in the Appendix, or if not stated, then defined in Clause 24 hereof.

Unfixed materials when taken into account to be the property of theEmployer

25. Where in any Certificate (of which the Contractor has received payment) the Employer has included the value of any unfixed materials intended for and/or placed on or adjacent to the works, such materials shall become the property of the Employer and they shall not be removed except for use upon the works, without the written authority of IIRD.

The Contractor shall be liable for any loss of or damage to such materials.

Removal of improper work

27. BIRD/Consultant shall, during the progress of the works, have power to order in writing from time to time the removal from the works within such reasonable time or times, as may be specified in the order, of any materials which in the opinion of BIRD are not in accordance with the Specifications or the instructions of BIRD, the substitution of proper materials, and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the Drawings and Specifications or instruction, and the Contractor shall forthwith carry out such order at his own cost. In case of default on the part of the Contractor to carry out such order, BIRD shall have the power to employ and pay the other persons to carry out the same, and all expenses consequent thereon, or incidental thereto shall be borne by the Contractor, or maybe deducted by BIRD from any moneys due, or that may become due, to the Contractor.

Defects after virtual completion

28. Any defect, shrinkage, settlement or other faults which may appear within the "Defect Liability Period" stated in the Appendix hereto, if none stated, then within12 months after the virtual completion of the works, arising in the opinion of BIRD / Consultant from materials or workmanship not in accordance with thecontract, shall upon the directions in writing of BIRD, and within such reasonable time as shall be specified therein, be amended and made good by the Contractor, at his own cost and in case of default, BIRD may employ and pay other persons to amend and make good such defects, other faults, and all damages, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the Contractor and such damage, loss and expenses shall be recoverable from him by BIRD or may be deducted by BIRD from any moneys due or that may become due to the Contractor, or BIRD may in lieu of such amending and making good by the Contractor deduct from any money due to the Contractor a sum to be determined by BIRD equivalent to the cost of amending such work and in the event of the amount retained as Security Deposit being insufficient, recover the balance from the Contractor, together with any expenses BIRD may have incurred in connection therewith. Should any defective work have been done or material supplied by any Sub-Contractor employed on the works who has been nominated or approved by BIRD as provided in various clauses hereof, the Contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the Contractor and been subject to the provisions of this Clause and Clause aforesaid. The Contractor shall remain liable under the provision of this Clause, notwithstanding the signing of any certificate or the passing of any accounts, by BIRD.

Certificate of virtual completion and Defect Liability Period

29. The works shall not be considered as completed until Consultant / BIRD has certified in writing that they have been virtually completed. The Defect Liability Period shall commence from the date of such Certificate or obtaining of license whichever is later.

Nominated Sub-Contractor

30. All Specialists, Merchants, Tradesmen and others executing any work of supplying and fixing any goods, for which prime cost prices or provisional sums are included in the Schedule of Quantities and/or Specifications, who may be nominated or selected by BIRD are hereby declared to be Sub-Contractors employed by the Contractor and are herein referred to as nominated Sub-Contractors.

No nominated Sub-Contractors shall be employed on or in connection with the works against whom the Contractor shall make reasonable objection or (save where BIRD and Contractor shall otherwise agree) who will not enter into Contract providing,

Payment shall be made to the nominated Sub-Contractor within fourteen days provided that all nominated Sub-Contractor's accounts included in the previous Certificates have been duly discharged, in default whereof, BIRD may pay the same and deduct the amount thereof from any sums due to the Contractor. The exercise of this power shall not create privity of contract as between BIRD and Sub-Contractor.

Other persons employed by Employer

31. BIRD reserves the right to use the Estate and any portions of the site for the execution of any work not included in this Contract, which it may desire to have carried out by other persons, and the Contractor shall allow all reasonable facilities for the execution of such work but shall not be required to provide any plant or materials for the execution of such work. Such work shall be carried out in such manner as not to impede the progress of the works included in the Contract and the Contractor shall not be responsible for any damage or delay which may happen to or occasioned by such work.

Insurance in respect of damage to persons and property

32. The Contractor shall be responsible for all injury to persons, animals or things, and for all structural and decorative damage to property which may arise from the operation or neglect of himself or of any nominated Sub-Contractor or any employee or either, whether such injury or damage arises from carelessness, accident or any other cause whatever, in any way connected with the carrying out of this Contract. This liability under this clause shall be held to include inter alia, any damage to buildings, whether immediately adjacent or otherwise, and any damage to roads, streets, footpaths, bridges or ways as well as all damage caused to the buildings and other structures and works forming the subject matter of this Contract. The contractor shall also be responsible for any damage caused to the buildings and other structures and works forming the subject matter of this Contract by frost, rain, wind or other inclemency of weather. The Contractor shall indemnify and keep indemnified BIRD and hold him harmless in respect of all and any loss and expenses arising from any such injury or damage to persons or property as aforesaid and also against any claim made in respect of injury or damage, whether under any Statute or otherwise and also in respect of any award of compensation or damages consequent upon such claim.

33 **The contractor shall,at his own expense, effect and maintain till issue of the completion certificate under this contract, with an insurance company approved byBIRD, an All Risks Policy for insurance for an amount equal to 125% of the amount of the contract including earthquake risk/fire/perils in the joint names of BIRD and the contractor (the name of the former being placed first in the policy) against all risks as per the standard all risk policy for contractors and deposit such policy or policies with theemployer before commencing the works.** The Contractor shall reinstate alldamage of every sort mentioned in this Clause, so as to do delivery of the whole ofthe Contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of third parties. The Contractor shall also indemnify and keep indemnified BIRD against all claimswhich may be made against the Employer by any person/ member of the public orother third party in respect of anything which may arise in respect of the works or in consequence thereof and **shall at his own expense arrange to effect and maintain, until the completion of the Contract, with an Insurance company approved by the employer a policy of Insurance in the joint names of BIRD and the Contractor (the name of the former being placed first in the policy) against such risks and deposit such Policy or Policies with BIRD before commencement of the work.** The minimumlimit of coverage under the policy shall be as defined elsewhere under General instructions to the tenderer. The Contractor shall also similarly indemnify the Employer against all claims which may be made upon BIRD whether under the**Workmen Compensation Act** or any other statute in force during the currencyof this contract or at Common Law in respect of any employee of the Contractor orany Sub-Contractor and **shall at his own expenses effect and maintain, until the completion of the Contract, with an Insurance company approved by the employer a policy of Insurance in the joint names of BIRD and the Contractor (the name of the former being placed first in the policy) against such risks and deposit such Policy or Policies with BIRD from time to time during the currency of the Contract.** In default of the contractor ensuring as provided above, the employer may so ensure and may deduct the premiums paid from any money due or which may become due to the contractor.

The Contractor shall be responsible for any liability which may be excluded from the Insurance Policies above referred to and also for all other damages to any person, animal or property arising out of and incidental to the negligent or defective carrying out of this Contract, whatever may be the measure due to which the damage shall have been caused. He shall also indemnify and keep indemnified BIRD in respect of all and any costs, charges or expenses arising out of any claim or proceedings relating to the works and also in respect of any award of compensation or damages, arising therefrom. Without prejudice to other rights of BIRD against contractor in respect of such default, BIRD shall be entitled to deduct from any sums payable to the Contractor the amount of any damage, compensation, costs, charges and other expenses paid by the employer and which are payable by the contractor under this clause. The contractor shall upon realization by the insurer of any claim made against the insurer pursuant to a policy taken under this clause proceed with due diligence to rebuild or repair the works destroyed or damaged. In the event all the money received from the insurer in respect of such damage shall be paid to the contractor and the contractor shall not

be entitled to any further payments in respect of the expenditure incurred for rebuilding or repairing of the materials or goods destroyed or damaged.
The contractor, in case of re-building or reinstatement after damages shall be entitled to such extension of time for completion as BIRD may deem fit, but shall, however, not be entitled to reimbursement by BIRD of any shortfall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein.

Without prejudice to his liability under this clause, the contractor shall also cause all nominated sub-contractors to effect, for their respective portions of works similar policies of insurance in accordance with the provisions of this clause and shall produce or cause to produce to BIRD such policies. The contractor shall not permit a nominated sub-contractor to commence work at site unless said insurance policies are submitted. In the event of failure of the sub-contractor to take out such policy or policies of insurance before commencing the works at site, the contractor shall be responsible for any claim or damage attributable to the said sub-contractor.

Damages for Non-completion

34. For the purpose of reviewing/ monitoring the progress of work, three financial milestones, to be achieved on or before the stipulated time, have been defined below. In case, the contractor does not achieve a particular milestone, if any, mentioned below or rescheduled milestone(s) in terms of time extension clause 36hereof, the amount shown against that milestone shall be withheld to be adjustedagainst the liquidated damages levied at the time of completion of contract.Withholding of payments on failure to achieve a milestone shall be automatic and without any notice to the Contractor. No interest whatsoever shall be paid by BIRD on such withheld amount/s.

The application of liquidated damages (withholding of amount) shall not effect a change in the milestone or release the Contractor of his obligation to improve the progress of work.

If the Contractor fails to maintain the required progress of the works and fails to complete the works by the completion time stipulated in the Contractor within any extended time under time extension Clause 36 hereof and BIRD certifies in writing that in his opinion the same ought reasonably to have been completed, theContractor shall pay BIRD the sum named as "Liquidated Damages" for the period during which the said works shall so remain incomplete and BIRD may deduct such damages from any moneys due to the Contractor. The contractor hereby specifically agrees and authorizes BIRD to deduct such liquidated damages, if any, from any instalment of payment becoming due and payable to thecontractor in terms of this contract or from the retention money.

Delay and Extension of Time

35. If in the opinion of BIRD, the works be delayed (a) by force majeure or (b) by reason of any exceptionally inclement weather or (c) by reason of proceedings taken or threatened by or dispute with adjoining or neighboring owners or publicauthorities arising otherwise than through the Contractor's own default or (d) by the works or delays of other Contractors or Tradesmen engaged or nominated by BIRD and not provided for in the Schedule of Quantities, and/or Specification or

(e) by reason of BIRD's instructions as per Clause 7 hereof or (f) by reason of civil commotion, legal combination of workmen or strike or lock-out affecting any of the building trades or (g) in consequence of the Contractor not having received in due time, necessary instructions from BIRD for which he shall have specifically applied in writing or (h) from other causes which BIRD may certify beyond the control of Contractor or (i) in the event the value of the work exceeds the value of the Priced Schedule of Quantities owing to variation, BIRD may make a fair and reasonable extension of time for completion of the Contract works. In case of such strike or lock-out the Contractor shall nevertheless constantly use his endeavours to prevent delay and shall do all that may reasonably be required to the satisfaction of BIRD to proceed with work.

If the contractor needs an extension of time for completion of the work or if the completion of work gets delayed for any reason beyond the due date of completion stipulated in the contract, the contractor shall apply to the employer for extension of time in writing at least 15 days before the expiry of the scheduled time and while applying for extension of time, contractor shall furnish the reasons in detail and his justification along with documentary evidence (copy of relevant pages of hindrance register), if any, for delays. Only that period of extension of time as granted by BIRD (on receipt of the application from the contractor or even in absence of any such application or justification as to the reasonableness of the grounds for delay) will qualify for exemption of imposition of liquidated damages. For the balance period in excess of original stipulated period and an authorised extension of time granted by BIRD, the provision of liquidated damages as stated under clause 34 will become applicable.

Further, the contract shall remain in force even for the period beyond the due dated completion irrespective of whether the contractor has applied or not, for the grant of extension of time for completion unless the employer decides to terminate the contract. The delay for completion of work for any reason will not entail any right to the contractor to claim any revision of rates or any extra compensation for any reason.

Failure by Contractor to comply with Employer's instructions

36. If the Contractor after receipt of written notice from BIRD requiring compliance within ten days fails to comply with such further drawings and BIRD may employ and pay other persons to execute any such work whatsoever that may be necessary to give effect thereto, and all costs incurred in connection therewith shall be recoverable from the Contractor by BIRD as a debt or may be deducted by him from any moneys due to the Contractor.

Termination of Contract by the Employer

37. If the Contractor being an individual or a firm commits any "act of insolvency", or shall be adjudged an insolvent or being an Incorporated Company shall have an order for compulsory winding up made against it or pass an effective resolution forwinding up voluntarily or subject to the supervision of the Court and the Official Assignee or the Liquidator, in such acts of insolvency or winding up, as the case may be, shall be unable, within seven days after notice to him requiring him to do so, to show the reasonable satisfaction of BIRD that he is able to carry out andfulfil the Contract and to give security therefor, if so required by BIRD.

Or if the Contractor (whether an individual, firm or Incorporated Company) shall suffer execution or other process of Court attaching property to be issued against the Contractor,

Or shall suffer any payment under this Contract to be attached by or on behalf of any of the creditors of the Contractor,

Or shall assign or sublet this Contract without the consent in writing of BIRD first had and obtained,

Or shall charge or encumber this Contract or any payments due or which may become due to the Contractor hereunder:

Or if BIRD determine that the Contractor

(i) has abandoned the Contract, or

(ii) has failed to commence the works, or has without any lawful excuse under these Conditions suspended the progress of the works for 14 days after receiving from BIRD notice to proceed, or

(iii) has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or

(iv) has failed to remove materials from the site or to pull down, and replace work for seven days after receiving written notice that the said materials or work were condemned and rejected by BIRD under these Conditions or

(v) has neglected or failed persistently to observe and perform all or any of the acts, matters or things by the Contract to be observed and performed by the Contractor for seven days after written notice shall have been given to the Contractor requiring the Contractor to observe or perform the same.

Then and in any of the said cases, BIRD may notwithstanding any previous waiver, after giving seven day notice in writing to the Contractor, determine the Contract and liabilities of the Contractor; the whole of which shall continue in forcefully as if the Contract had not been so determined, and as if the works subsequently executed had been executed by or on behalf of the Contractor and further, BIRD by his agents or servants may enter upon and take possession of the works and all plant, tools, scaffoldings, machinery and materials being upon the Estate or the adjoining lands or roads, and use the same as his own property or employ the same by means of his own servants and workmen in carrying on and completing the works or by employing any other Contractor or other person or persons to complete the works, and the Contractor shall not in any way interrupt or do any act, matter or thing to prevent or hinder such other contractor or other person or persons employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or as soon thereafter as convenient, BIRD shall give a notice in writing to the Contractor to remove his surplus materials and plant, and should the Contractor fail to do so within a period of fourteen days after receipt thereof by him, the Employer may sell the same by public auction, and give credit to the Contractor for the net amount realised. BIRD shall thereafter ascertain and certify in writing under his hand what (if anything) shall be due or payable to, or by BIRD, for the value of the said plant and materials so taken possession of by BIRD and the expense or loss which BIRD shall have been put to in procuring the works to be completed, and the amount

if any, owing to the Contractor and the amount which shall be so certified shall thereupon be paid by HIRD to the Contractor or by the Contractor to HIRD, as the case may be, and the decision of the Employer shall be final and conclusive between the parties.

38. Certificates and Payments

All bills shall be prepared by the contractor in the form prescribed by the Employer / Consultants. Normally one interim bill shall be prepared each month subject to minimum value of Rs 75 lakhs per month for interim certificate as stated in these documents.
The bills in proper forms must be duly accompanied by detailed measurements in support of the quantities of work done and must show deductions for all previous payments, retention money, etc.

The Employer / Consultant shall issue a certificate after due scrutiny of the contractor's bill stating the amount due to the contractor from the Employer and the contractor shall be entitled to payment thereof, within the period of honoring certificates named in these documents.

The Employer will deduct retention money as described in clause 17 of these conditions. The refund of retention money will be made as specified in the said clause.

If the Employer has supplied any materials or goods to the contractor, the cost of any such materials or goods will be progressively deducted from the amount due to the contractor in accordance with the quantities consumed in the work.
All the interim payments shall be regarded as payments by way of advance against the final payment only and not as payments for work actually done and completed, and shall not preclude the requiring of bad, unsound, and imperfect or unskilled work to be removed and taken away and reconstructed, or re-erected or be considered as and admission of the due performance of the contract, or any part thereof in any respect or the accruing of any claim, nor shall, it conclude, determine or affect in any way the power of the Employer under these conditions or any of them as to the final settlement and adjustment of the accounts or otherwise or in any other way vary or affect the contract. The final bill shall be submitted by the contractor to the consultant within one week of the date fixed for completion of the work or of the date of certificate of completion furnished by the Consultant. The payment of final bill shall be made by the employer within 45 days from the date of receipt of certified bill from Consultant. All interim bills shall be supported with necessary valid insurance covers, test certificates, measurement sheets of work done duly certified by the consultant and accepted by the contractor, any other documents as required by the consultant employer.

- Final Payment
  The final bill shall be accompanied by a certificate of completion from the Employer / Consultants, and other relevant documents such as .....build drawings etc. Payments of final bill shall be made after deduction of Retention Money as specified in clause 17 of these conditions, which shall be refunded after the completion of the Defects Liability Period after receiving the Employer's/Consultant's certificate that the contractor has rectified all defects to the satisfaction of the Employer / Consultants. The acceptance of the payment of the final bill by the contractor would indicate that he has no further claim in respect of the work executed.

39. Matters to be finally determined by BIRD

The decision, opinion, direction, Certificate (except for payment), with respect to all or any of the matter under Clauses 2,9,10,13,23,24,25,29,37,39,40,41 hereof (which matters are herein referred to as the excepted matters) shall be final and conclusive and binding on the parties hereto and shall be without appeal. Any other decision,opinion, direction, Certificate or valuation of BIRD or any refusal of BIRDto give any of the same shall be subject to the right of arbitration and review underClause 39 hereof in the same way in all respects (including the provision as to opening the reference) as if it were a decision of BIRD.

40. Settlement of dispute by Arbitration

I) The bids and any contract resulting therefrom shall be governed by and construed according to Indian laws.

II) All disputes and differences of any kind whatsoever arising out of or in connection with this offer or in the discharge of any obligation arising under this offer (whether during the course of execution of the order or after completion and whether before or after termination abandonment or breach of the agreement) shall be resolved amicably.

III) In case of failure to resolve the disputes and differences amicably within 30 days of notice by either party, then such unsettled dispute or difference shall be referred to arbitration by sole arbitrator mutually agreed in accordance with the Arbitration and Conciliation Act, 1996. If no agreement is arrived at, within 30 days from the date of notice as to who shall be the sole arbitrator, then the sole arbitrator shall be appointed as here in after provided.

IV) In case of dispute not resolved as mentioned above, BIRD shall send to the contractor / bidder a list of 3 names of persons who shall be presently unconnected with BIRD or contractor / bidder. Contractor shall on receipt of the names as foresaid select any one of the persons so named to be appointed as sole arbitrator and communicate to BIRD within 30 days of receipt of the names. BIRD shall there upon without delay appoint the said person as sole arbitrator. If bidder fails to select a person as sole arbitrator within 30 days of receipt of the panel and inform BIRD accordingly, then BIRD shall be entitled to appoint one of the persons of the panel from the panel as sole arbitrator and communicate his name to the bidder. If the persons appointed is unable or unwilling to act or refuses his appointment or vacates his offfice in any reason whatsoever, another person shall be appointed by BIRD from the above lists of persons. The provisions of the Indian Arbitration and Conciliation Act, 1996, shall govern the

VI) The venue of the arbitration shall be Lucknow, under the exclusive jurisdiction of courts at Lucknow only.

VII) The language of Arbitration shall be English. The award shall be final and binding to both parties.

VIII) The fees, if any of the arbitration shall initially be paid in equal proportion by each of the parties. The cost of the reference and of the award including the fees, if any, of the arbitrator, shall be directed to be finally borne and paid by such party as or parties to the dispute in such a manner or proportion as may be directed by the arbitrator as the case may be in the award. VIII) Work under the tender document / agreement shall be continued by the contractor, during the arbitration proceedings, unless otherwise directed in writing by BIRD, unless the matter is such that the work cannot possibly be continued until the decision of the arbitrator is obtained. Save as those which are otherwise explicitly provided in the agreement, no payment due, or payable by BIRD, to the contractor shall be withheld on account of ongoing arbitration proceeding, if any, unless it is the subject matter or of the subject matters thereof.

Right of technical scrutiny of final bill

41. The BIRD/Consultant shall have a right to cause a technical examination of the works and the final bill of the Contractor including all supporting vouchers, abstracts etc. to be made at the time of payment of the final bill. If as a result of this examination or otherwise, any sum is found to have been overpaid or over-certified it shall be lawful for BIRD to recover the sum.

Employer entitled to recover compensation paid to workmen

42. If, for any reason, BIRD is obliged, by virtue of the provision of the Workmen's Compensation Act, 1923, or any statutory modifications or re-enactment thereof to pay compensation to a workman employed by the Contractor in execution of the works, BIRD shall be entitled to recover from the Contractor the amount of compensation so paid, and without prejudice to rights of BIRD under the said Act, BIRD shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by BIRD to the Contractor under this Contract or otherwise. BIRD shall not be bound to contest any claim made against it under the said Act, except on the written request of the Contractor and upon his giving to BIRD full security to the satisfaction of BIRD for all costs for which BIRD might become liable in consequence of contesting such claim.

Abandonment of Works

43. If at any time after acceptance of the tender, BIRD shall, for any reason whatsoever, not require the whole or any part of the works to be carried out, BIRD shall give notice in writing to the Contractor who shall have no claim to any payment of compensation or otherwise whatsoever on account of any profit or advantage which he might have derived from the execution of the whole works.

Return of surplus materials

44. Notwithstanding anything contained to the contrary in any or all the Clauses of this Contract, where any material for the execution of the Contract is procured with the assistance of BIRD by purchases made under orders or permits or licenses issued by Government, the Contractor shall hold the said materials economically and solely for the purpose of this Contract and not dispose of them without the prior written permission of BIRD and return it to the BIRD, if required by BIRD, at the price to be determined by BIRD having due regard to the condition of the materials, the price to be determined not to exceed the purchase price thereof inclusive of GST and other such levies paid by the Contractor in respect thereof. In the event of breach of the aforesaid condition, the Contractor shall, in addition to being liable to action for contravention of the terms of

licensing permits and/or criminal breach of trust, be liable to BIRD for all moneys, advantages or profits resulting, or which in the usual courses would have resulted to him, by reason of such breach.

Right of Employer to terminate Contract in the event of death of Contractor, if individual

45. Without prejudice to any of the rights or remedies under this Contract, being an individual, if the Contractor dies, BIRD shall have the option of terminating the Contract without incurring any liability for such termination.

Accident Reports

46. In the event of accidents of any kind, the Contractor shall furnish the Client with copies of all accident reports. The reports shall be sent without delay and at the same time that they are forwarded to any other parties.

Marginal Notes

47. The notes in the box and in the catch lines hereto and in the annexures hereto are meant only for convenience of reference and shall not in any way be taken into account in the interpretation of these presents and the annexures hereto.

Progress of Work

48. Upon award, the Contractor shall reconfirm, in writing, the starting and completion schedule including equipment delivery dates based upon the information submitted on its tender form.

49. The Contractor shall submit, in writing, monthly reports showing current equipment delivery dates and anticipated completion dates for individual units.

A BARCHART/WORK SCHEDULE shall be submitted by the Contractor before the start of the work, for BIRD's approval and the same shall be adhered to for completion of work. Any deviation from the schedule without any genuine reason shall attract penalties as specified elsewhere in this tender document.

VARIATION / DEVIATION

50. The tender rates shall be fixed and applicable for any increase or decrease in the tendered quantities. The Employer / Consultant can increase or decrease any quantities to any extend or even delete particular item as per the site requirements and the contractor shall not be paid anything extra on this account. Nothing extra will be paid by BIED on account of omission / deletion of items or decrease in the quantity of items. BIED shall not entertain any claim whatsoever from the contractor on this account.

51. The price of all additional items / non-tendered items will be worked out on the basis of rates quoted for similar items in the contract wherever existing. If similar items are not available, the rates for such items will be derived as per standard method of rate analysis based on prevalent fair price of labor, material and other components as required with 15% towards contractor's profit and overheads plus applicable Service Tax.

SUBSTITUTION

52. Substitution is generally not allowed; in case of exception, it will be permitted after the approval of the Employer / Consultants in writing for any such substitution well in advance. Materials designated in this specification shall be prefer first and in case of non- availability these mentioned in BOQ the substitution by "Equal" or "Other approved" etc. needs approval of the Employer / Consultant in writing.

CLEARING SITE ON COMPLETION

53. On completion of the works the contractor shall clear away and remove from the site all constructional plant, surplus materials, rubbish and temporary works of every kind and leave the whole of the site and the works clean and in a workmanlike condition to the satisfaction of the Employer/Consultants.

CONCEALED WORK

54. The contractor shall give due notice to the Employer/Consultants whenever any work is to be buried in the earth, concrete or in the bodies of walls or otherwise becoming inaccessible later on, in order that the work may be inspected and correct dimensions taken before such burial, in default whereof the same shall, at the opinion of the Employer/ Consultant be either opened up for measurement at the contractor's expenses or no payment may be made for such materials. Should any dispute or differences arise after the execution of any work as to measurements etc., or other matters which cannot be conveniently tested or checked, the notes of the Employer / Consultants shall be accepted as correct and binding on the contractor.

Section-V

Appendix Hereinbefore Referred To

1.	Defect Liability Period	12 months from the date of Virtual Completion Certificate referred to in Clause 28 of the section **'Conditions Hereinafter Referred To'**.
2.	Date of Commencement	10th day from the date of letter of award of work.
3.	Date of Completion	Date of virtual completion certificate issued by the consultant /BSRD
4.	Liquidated damages at the rate of	0.25 % per week of delay subject to a maximum of 5% of the contract value of the incomplete / delayed VRV/VRF AC systems as per the specified milestones referred to in Clause 34 of the section **'Conditions Hereinafter Referred To'**.
5.	Period for honoring certificates	One month for interim bills and 45 days for final bill.

Employer: **Contractor:**

Section-VI

Annexure-I

ARTICLES OF AGREEMENT

ARTICLES OF AGREEMENT made on this ..... day of ..... (Month) .... Between the Bankers Institute of Rural Development (BIRD) (hereinafter called "the Employer") and having its Office at Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012 of the one part and M/s (hereinafter called "the Tenderer" or "the Contractor") and having its registered office at..... of the other part.

WHEREAS the Employer is desirous of getting executed the work of "Supply, Installation, Testing, and Commissioning of VRV/VRF Air Conditioning system & dismantling of old Central AC System at Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012" and has caused the techno-Financial bids showing and describing the work to be done under the direction of the Employer.

AND WHEREAS the said Techno-Financial has been signed by or on behalf of the parties hereto.

AND WHEREAS the Tenderer has agreed to execute upon and subject to the conditions set forth in the Techno-Financial bids and Conditions of Contract (all of which are collectively hereinafter referred to as "the said Conditions") the work shown upon the said technical specifications, and included in the techno-Financial Bid at the respective rates thereinset forth amounting the sum as (herein) arrived or such other sum as shall become payable there under (hereinafter referred to as "the said contract amount").

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration hereinafter mentioned, the Tenderer will upon and subject to the conditions aforesaid, carry out and complete the works shown in the contract, described by or referred to in the Schedule of Quantities and to the said conditions.

2. The Employer shall pay the Tenderer the said contract amount or such sum as shall become payable at the times and in the manner specified in the said conditions.

3. The said Conditions and Appendix thereto and the documents attached hereto shall be read and construed as forming part of this Agreement and the parties hereto shall be respectively abide by, submit themselves to the said conditions and the correspondence and perform the agreement on their part respectively in the said conditions and the documents contained herein. This Agreement and documents mentioned herein shall form the basis of this contract.

4. This contract is on Item rate contract for carrying out the work of "Supply, Installation, Testing, and Commissioning of VRV/VRF Air Conditioning system & dismantling of old Central AC System at Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012" and to be paid for according to actual measured quantities at the rates contained in the Schedule of Rates and probable quantities or as provided in the said conditions.

5. The Tenderer shall afford every reasonable facility for the works of all the other Contractors, who are engaged by the Employer and shall make good any damage done by them or their people to any of the Employer's property etc. after the completion of such works.

6. The Employer reserves to itself the right of altering the nature of work by adding to or omitting any items of work or having portions of the same carried out by engaging any other contractor / agency at its sole discretion without prejudice to this contract. The contractor shall not have any right to claim loss of profit / loss of opportunity to work from the Employer.

7. The tenderer shall have to submit the "no other claims certificate" along with the final bill and on or the final bill is settled by the Employer, the tenderer will not have any rights/ claim for either any under related or over-related work.

8. Time shall be considered as the essence of this contract, and the Tenderer hereby agrees to complete the entire work as prescribed in the tender.

9. All disputes arising out of or in any way connected with this agreement shall be deemed to have arisen at Lucknow and only the sole Arbitrator as appointed by both the parties upon mutual consent in Lucknow shall have the jurisdiction to determine the same.

10. That all parts of this contract have been read and fully understood by the tenderer.

IN WITNESS WHEREOF the Employer has set its hands to these presents through its duly authorized officials and the Tenderer has caused its common seal to be affixed hereunto and the said two duplicates/ has caused these presents and the said two duplicates here of to be executed on its behalf, the day and year first herein above written.

Signature Clause

SIGNED AND DELIVERED by the
Bankers Institute of Rural
Development by the hand of Shri

(Name & Designation)

In the presence of:

Witness #1

Signature:

Name:

Address:

Witness #2

Signature:

Name:

Address:

SIGNED AND DELIVERED by the Bidder

(Name, Signature & Designation)

Witness #1

Signature:

Name:

Address

Witness #2

Signature:

Name:

Address

Annexure-II

INDEMNITY BOND

Know all men by these presents that I, Shri ..... of M/s ..... do hereby execute Indemnity Bond in favour of BIRD, having their Office at Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW – 226012 and M/s ....., having their registered office at..... on this ..... day of .....

WHEREAS BIRD has appointed M/s ..... as the Contractor for their proposed work relating to "Supply, Installation, Testing, and Commissioning of VRV/VRF Air Conditioning system & dismantling of old Central AC System at Bankers Institute of Rural Development, 1st floor DPSP section, Sector – H, LDA Colony, Kanpur Road, LUCKNOW – 226012".

THIS DEED WITNESSETH AS FOLLOWS:

I/We, on behalf of M/s ..... hereby do indemnify (s keep BIRD and its Employees harmless against and from

1. any third party claims, civil or criminal complaints, liabilities, site mishaps and other accidents or disputes and/or damages occurring or arising out of any mishaps at the site due to faulty work, for our negligence, faulty construction and/or for violating any law, rules and regulations in force, for the time being while executing/executed works by s/we,

2. any damages, loss or expenses due to or resulting from negligence or breach of duty on the part of me/us or any of our sub-contractor/s if any, servants or agents.

3. any claim by an employee of mine/ours or of sub-contractor/s, if any, under the Workmen Compensation Act, 1923 and Employers Liability Act, 1938 or any other law, rules and regulations in force for the time being and any Acts replacing and/or amend the same or any of the same as may be in force at the time and under any law in respect of injuries to persons or property arising out of and in the course of the execution of the contract work and/or arising out of and in the course of employment of any workmen/employee.

4. Any act or omission of mine/ours of sub-contractor/s if any, our/their servants or agents which may involve any loss, damage, liability, civil or criminal action.

IN WITNESS WHEREOF M/s ..... has set their hands on this ..... day of .....

SIGNED AND DELIVERED BY THE AFORESAID M/s ..... through their authorized representative (Shri .....)

Signature

IN THE PRESENCE OF WITNESSES

1. Name & Signature:
2. Name & Signature:

Annexure-III

Pre- Contract Integrity Pact

Bankers Institute of Rural Development (BIRD),

Sector-H, LDA Colony, Kanpur Road Lucknow

PRE CONTRACT INTEGRITY PACT

(To be submitted on Rs. 500 Stamp Paper only on first page and remaining documents on normal A4 size paper duly signed by the bidder) and submitted in envelope duly superscribed as Integrity Pact.

Between

Bankers Institute of Rural Development (BIRD) hereinafter referred to as "The Principal"

And

.....hereinafter referred to as "The Bidder"

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s for ..... The Principal values full compliance with all relevant laws of the land, rules, regulations and economic use of resources and of fairness /transparency in its relations with its Bidder(s).

In order to achieve these goals, the Principal will appoint Independent External Monitors (IEMs) who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

(1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

a. No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

b. The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will, in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

c. The Principal will exclude from the process all known prejudiced persons.

(2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)

(1) The Bidder(s) commit themselves to take all measures necessary to prevent corruption. The Bidder(s) commit themselves to observe the following principles during participation in the tender process and during the contract execution:

a. The Bidder(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

b. The Bidder(s) will not enter with other Bidders into any unlicensed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

c. The Bidder(s)will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

d. The Bidder(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly the Bidder(s)of Indian Nationality shall furnish the name and address of the foreign principals, if any.

e. The Bidder(s) will, when presenting their bid, disclose any and all payments made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

f. Bidder(s) who have signed the Integrity Pact shall not approach the Courts while representing the matter to IEMs and shall wait for their decision in the matter.

g. The Bidder(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future contracts

If the Bidder(s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form which put their reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s) from the tender process.

Section 4 – Compensation for Damages

(1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/Bid Security. (2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the Contract value or the amount equivalent to Performance Bank Guarantee.

Section 5 – Previous transgression

(1) The Bidder declares that no previous transgressions occurred in the last three years with any other Company in any country conforming to the anti-corruption approach or with any Public Sector Enterprise in India that could justify his exclusion from the tender process.

(2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process.

Section 6 – Equal treatment of all Bidders

(1)In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor.

(2)The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

(3)The Principal will disqualify from the tender process all bidders who do not sign the Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidder(s)

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or an representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Section 8 – Independent External Monitor

(1)The Principal appoints competent and credible Independent External Monitor for this Pact after approval by the Central Vigilance Commission. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement. The Independent External Monitor appointed for BIED is :

Dr. Sanjay Kumar Panda, IAS (Retd.)
516, Ward No. 3, Sideshwar Sahi,
City, Cuttack District
Odisha – 753 008

(2) The Monitor is not subject to instructions by the representatives of the parties and performs his/her functions neutrally and independently. The Monitor would have access to all Contract documents, whenever required. It will be obligatory for him / her to treat the information and documents of the Bidders as confidential. He / she reports to the Director, BIED.

(3) The Bidder(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his/her request and demonstration of a valid interest, unrestricted and unconditional access to their project documentation. The same is applicable to Subcontractors.

(4) The monitor is under contractual obligation to treat the information and documents of the Bidder(s) Sub with confidentiality. The Monitor has also signed declarations on 'Non- disclosure of Confidential Information and of 'Absence of Conflict of Interest'. In case of any conflict of interest arising at a later date, the IEM shall inform Director, BIED and recuse himself/herself from that case.

(5) The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project, provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

(e) As soon as the Monitor notices, or believes to notice, a violation of this agreement, he/she will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

(f) The monitor will submit a written report to the Director, IRBD within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposal for correcting problematic situations.

(g) If the Monitor has reported to the Director, IRBD, a substantiated suspicion of an offence under the relevant IPC/PC Act, and the Director, IRBD has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.

(g) The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contract on 12 months after the last payment under the contract, and for all other Bidders 6 months after the contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings. If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by the Director, IRBD.

Section 10 – Other provisions

(a) This agreement is subject to Indian Law, Place of performance and jurisdiction is the Head Office of the Principal, i.e. Lucknow.

(b) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

(c) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

(d) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(e) Issues like Warranty/Guarantee etc. shall be outside the purview of IEMs.

(f) In the event of any contradiction between the Integrity Pact and its Annexure, if any, the Clause in the Integrity Pact will prevail.

(For & On behalf of the Principal)
(Office Seal)

(For & on behalf of the Bidder)
(Office Seal)

Place_____

Date _____

Witness 1:
(Name &Address)

Witness 2:
(Name &Address)

Section VII

GENERAL DESCRIPTION OF WORKS

1. Design Basis for BIRD, BANKERS INSTITUTE OF RURAL DEVELOPMNT SECTOR -H, LDA COLONY KANPUR ROAD, LUCKNOW – 226 012, INDIA.

Basis of design for heat load estimation:

Geographical details

Location:	Lucknow
Latitude:	26.51° N
Longitude:	80.57° E
Altitude:	123 mts

Ambient temperature Condition: As per IS 7896:2001(Re affirmed 2017) Outside

Summer		
Dry bulb temperature:	107.24°F	42.0°C
Wet bulb temperature:	74.48°F	24.2°C
Monsoon		
Dry bulb temperature:	91.94°F	33.3°C
Wet bulb temperature:	83.12°F	28.8°C
Winter		
Dry bulb temperature:	42.80°F	7.3°C
Wet bulb temperature:	41.36°F	6.8°C

Inside

Dry bulb temperature:	77.0 ± 3.6°F	24 ± 2°C
Humidity		50 ± 10%

Other Parameters

Occupancy:	As Given
Lighting Load:	1.1 W/sq. ft.
Equipment Load: (Electrical Load)	@35% of Equipment Load given.
	(ISHRAE HVAC DATA BOOK 2017) (From) Table 1.27, 1.28 & 1.29)

Thermal Transmittance Value (U value)

Walls	0.15 Btu/Hr Sq/Ft°F
Partition	0.33 Btu/Hr Sq/Ft°F
Roof	0.30 Btu/Hr Sq/Ft°F
Window	

SHGC	0.56
U value	1.13 Btu/Hr SqFt°F
ACH	1 nos.

(SHRAE HVAC DATA BOOK 2017) (Table: I.53)
ACH – Air Changes per Hour.

Heat Load Calculation Sheet:

Air conditioning System at BIRD Lucknow at present:

Chilled Water system is installed at BIRD Lucknow with Hot Water Generator for Heating in winters.

Following are the System details.

(a) Voltas Chiller : 05126DX - 3 Working + 1 Stand By. (Reciprocating Compressor).

Capacity: 126 Tr
Refrigerant: R 22
Hot Water Generator: - 400 kW
(Runs in winter only).

(b) AHU

(i) 14,000 CFM, Qty: 4

(ii) 10,000 CFM, Qty:4

(iii) 8,000 CFM, Qty:1

(iv) 5,000 CFM, Qty:1

(v) 3,000 CFM, Qty:9

(vi) 2,500 CFM, Qty: 1

(c) FCU

(i) 1.5 Tr : 160 Qty.

(ii) 2.0 Tr : 84 Qty.

Technical Specifications

Supply, Installation, Testing, and Commissioning VRV/VRF AC system and Dismantling of old Central AC System at Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012

Bankers Institute of Rural Development, 1st floor DPSP section, Sector – H, LDA Colony, Kanpur Road, LUCKNOW is presently provided with a non- Passenger VRV/VRF AC systems in each of the Main building & Academic Block. BIRD desires to replace the VRV/VRF AC systems with State-of-the-Art technology VRV/VRF AC systems.

TECHNICAL SPECIFICATION OF AIR CONDITIONG SYSTEM

1. VARIABLE REFRIGERANT FLOW / VOLUME SYSTEM

SCOPE

Variable refrigerant flow (VRF) is an air-condition system configuration where there is one outdoor condensing unit and multiple indoor units. The term variable refrigerant flow refers to the ability of the system to control the amount of refrigerant flowing to the multiple evaporators (indoor units), enabling the use of many evaporators of differing capacities and configurations connected to a single condensing unit. The arrangement provides an individualized comfort control, and simultaneous heating and cooling in different zones.

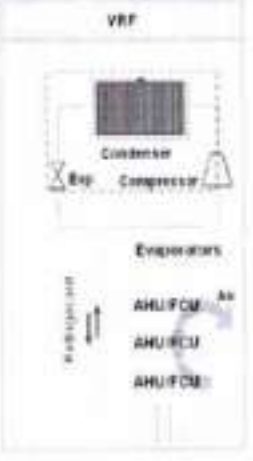
Currently widely applied in large buildings especially in Japan and Europe, these systems are just starting to be introduced in the U.S. The VRF technology/system was developed and designed by Daikin Industries, Japan who named and protected the term variable refrigerant volume (VRV) system so other manufacturers use the term VRF "variable refrigerant flow". In essence both are same.

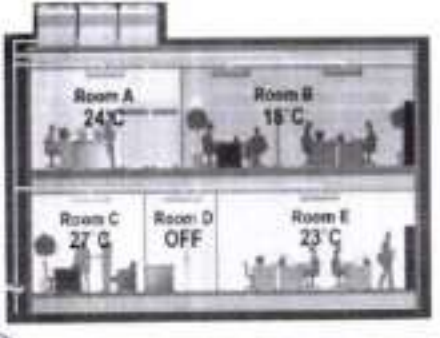
With a higher efficiency and increased controllability, the VRF system can help achieve a sustainable design. Unfortunately, the design of VRF systems is more complicated and requires additional work compared to designing a conventional direct expansion (DX) system.

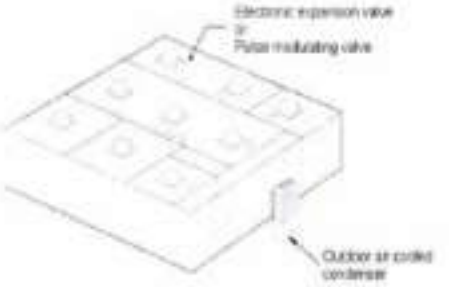
VRF systems are similar to the multi-split systems which connect one outdoor section to several evaporators. However, multi-split systems turn OFF or ON completely in response to one master controller, whereas VRF systems continually adjust the flow of refrigerant to each indoor evaporator. The control is achieved by continually varying the flow of refrigerant through a pulse modulating valve (PMV) whose opening is determined by the microprocessor receiving information from the thermistor sensors in each indoor unit. The indoor units are linked by a control wire to the outdoor unit which responds to the demand from the indoor units by varying its compressor speed to match the total cooling and/or heating requirements.

VRF systems promise a more energy-efficient strategy (estimates range from 11% to 17% less energy compared to conventional units) at a somewhat higher cost.

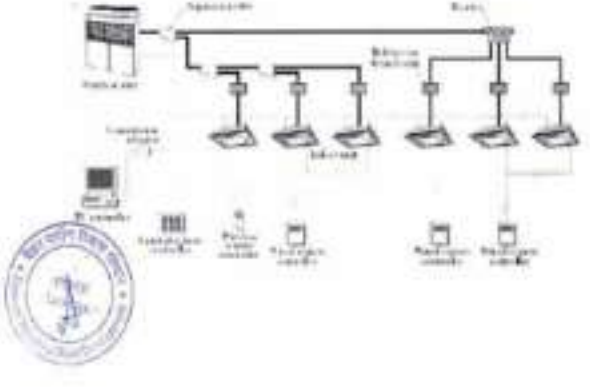
The scope of this section comprises the supply, erection testing and commissioning of Variable Refrigerant Volume System conforming to these specifications and in accordance with the requirements of Drawing and Schedule of Quantities.

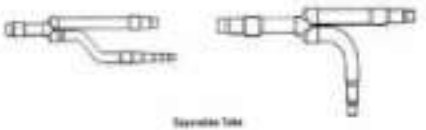






VRF System with Multiple Indoor Evaporator Units

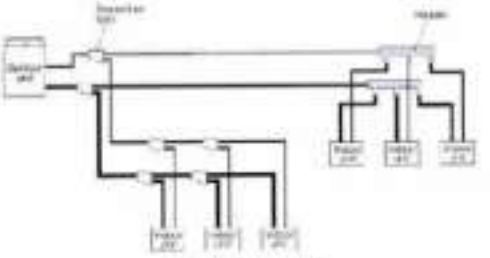




Separation Tube

Header Liquid Pipe

Header Gas Pipe



Cooling Type VRF System

TYPE

Units shall be air cooled, variable refrigerant Flow / volume air conditioner consisting of outdoor unit and multiple indoor units. Each indoor units having capability to cool independently for the requirement of the rooms.

It shall be possible to connect more than one indoor units on one refrigerant circuit. The indoor units on any circuit can be of different type and also controlled individually. Indoor

units can be duct able, hi wall, cassette type, AHU, etc

Compressor installed in outdoor unit shall be equipped with at least all inverter compressor. The system shall be capable of changing the rotating speed of inverter compressor by inverter controller to follow variations in cooling / heating load.

Outdoor unit shall be suitable for mix match connection of all type of indoor units.
The refrigerant piping between indoor units and outdoor unit shall be possible to extend up to 200m with maximum 90m level difference **without any oil traps.**
Both indoor units and outdoor unit shall be factory assembled, tested and filled with first charge of refrigerant before delivering at site.

OUTDOOR UNIT

The outdoor unit shall be factory assembled, weather proof casing, constructed from heavy gauge mild steel panels and coated with baked enamel finish. The unit should be completely factory wired, tested with all necessary controls.

- All outdoor units shall have one two scroll rotary compressors and in case unit has two compressors than the unit should be able to operate even in case one of compressor is out of order **(if one inverter compressor malfunctions, other continues to provide emergency operation smoothly till repair is effected)**.
- It should also be provided with duty cycling for multiple inverter compressor switching starting sequence for better stability and prolonging equipment life.
- The outdoor unit shall be modular in design and should be allowed for side by side installation.
- The unit shall be provided with its own microprocessor control panel.
- The outdoor units should have anti corrosion paint free galbarium base plate for easy mounting of unit.
- The machine must have a **sub cool feature** to use unit surface more effectively thru proper circuit bridge so that it prevents the flashing of refrigerant from long piping due to this effect thereby achieving energy savings.
- Unit should have **Oil Return Mechanism with inbuilt oil Sensor** in Compressor.
- Unit should have crankcase oil heaters.
- The noise level shall not be more than 60 dB(A), measured horizontally 1m away from the unit and 1.5m above ground level.

- The outdoor units shall be supplied and installed complete with the following safety devices:
  - High pressure switch (manual reset)
  - Low pressure sensors
  - Suction and discharge temperature sensors
  - Fan motor overload protector
  - Over current relay
  - Inverter overload protector
  - PCB Board Fuse
  - Crankcase heater
  - Fusible plug
  - Short recycling guard timer.
  - Oil temperature sensor

The outdoor unit should be fitted with low noise, aero spiral design fan with aerofitting grille for spiral discharge airflow to reduce pressure loss and should be fitted with DC fan motor for better efficiency.
The condensing unit shall be designed to operate safely when connected to multiple fan coil units.
The Outdoor machines shall be preferably compact machines for purpose of space saving and smaller foot print shall be preferred.

COMPRESSOR

The compressor shall be highly efficient scroll rotary type and capable of inverter control. The inverter compressor shall change the speed in accordance to the variation in cooling load requirement.

- All outdoor units shall have multiple steps of capacity control to meet load fluctuation and indoor unit individual control. All parts of compressor shall be sufficiently lubricated studs. Forced lubrication may also be employed.
- Oil heater shall be provided in the compressor casing.
- **The Inverter compressor shall preferably be Reluctance DC inverter compressor for higher efficiency and improved reliability .**

HEAT EXCHANGER

The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminium fins to form a cross fin coil.

- The aluminium fins shall be covered by anti-corrosion resin film.
- The unit should be with e-pass heat exchanger to optimize the path of heat exchanger and for better efficiency of condenser.

- The unit shall be provided with necessary number of direct driven low noise level propeller type fans arranged for vertical discharge. Each fan shall have a safety guard.

REFRIGERANT CIRCUIT

The refrigerant circuit shall include liquid & gas shut-off valves and a solenoid valves at condenser end.
The equipment must have inbuilt refrigerant stabilization control for proper refrigerant distribution.
All necessary safety devices shall be provided to ensure the safety operation of the system.

SAFETY DEVICES

All necessary safety devices shall be provided to ensure safe operation of the system.
Following safety devices shall be part of outdoor unit; high-pressure switch, fuse, fan drive overload protector, fusible plug, over load relay, overload protection for inverter.

OIL RECOVERY SYSTEM

Unit shall be equipped with an oil recovery system to ensure stable operation with long refrigeration piping lengths.

The system must be provided with oil balancing circuit to avoid poor lubrication.

REMOTE MONITORING SYSTEM (CENTRAL CONTROL SYSTEM)

The VRF systems in the public areas shall be compatible with remote monitoring services of a BMS system via a centralized controller. The centralized controller itself shall be able to monitor, operate and control indoor and outdoor unit parameters and allow similar control via the BMS.
Remote monitoring system shall be able to perform following functions :

ON/OFF Function
Temperature Set Function
Fan Speed Control
Schedule
Fault Detection

INDOOR UNIT

This section deals with supply, installation, testing, commissioning of various type of indoor units confirming to general specification and suitable for the duty selected. The type, capacity and size of indoor units shall be as specified in detailed Bill Of Quantities.

Round Flow Cassette Type with Occupancy Sensor/Bi Wall Type with Occupancy Sensor (OEM Design Approved)

A. General

a) Unit shall be manufactured by OEM.
b) Unit shall be factory assembled, wired, piped and run tested.
c) Unit shall be designed to be installed for indoor application.
d) Unit shall be attached to an installation plate/bracket that secures unit to the wall.
e) Unit shall be capable to be installed with heat pump VRF system.

B. Product Capacity

C. Casing/Panel

a) Unit case shall be manufactured using white Acrylonitrile Butadiene Styrene (ABS) resin and has a white finish or as AS OEM designed verified.

D. Cabinet Assembly:

a) Unit shall have one supply air outlet and one return air inlet.
b) Unit shall be equipped with factory installed temperature thermistors for:
   a. Return air
   b. Refrigerant entering coil
   c. Refrigerant leaving coil
c) Unit shall have a factory assembled, piped and wired electronic expansion valve (EEV) for refrigerant control.
d) Unit shall have a built-in control panel to communicate with other indoor units and to the outdoor unit.
e) Unit shall have the following functions as standard:
a. Self-diagnostic function
   b. Auto addressing
   c. Auto restart function
   d. Auto operation function
   e. Child lock function
   f. Dual thermistor control
   g. Sleep mode
   h. Filter life and power consumption display (with wired controller)

i. Smart Load Control

j. Refrigerant leakage detection(With accessory)

k. Thermo on/off range setting

l. 1 point external input

m. Group control

n. Comfort cooling

o. Timer (on/off, weekly)

E. Fan Assembly

a) The unit shall have a single, direct driven, cross-flow fan made of high strength SAN (Styrene Acrylonitrile resin).

b) The fan impeller shall be statically and dynamically balanced.

c) The fan motor is Brush Less Direct control (BLDC) with permanently lubricated and sealed ball bearings.

d) The fan motor shall include thermal, overcurrent and low RPM protection.

e) The fan motor assembly shall be mounted on vibration attenuating rubber grommets.

f) The fan speed shall be controlled using microprocessor based direct digitally controlled algorithm.

g) In cooling mode, the indoor unit's fan shall have the following settings: Super Low, Low, Med, High or AS OEM designed verified.

h) In heating mode, the indoor unit's fan shall have the following settings: Low, Med, High or AS OEM designed verified.

i) Unit shall have factory installed motorized louver to provide flow of air in up and down direction for uniform airflow.

F. Filter Assembly

a) The return air inlet shall have a factory supplied removable, washable filter with antifungal treatment.

b) The filter access shall be from the front of the unit.

G.Coil Assembly

a) Unit shall have a factory built coil comprised of aluminum fins mechanically bonded on copper tubing.

b) The copper tubing shall have inner grooves for high efficiency heat exchanger.

c) Unit shall have a minimum 2 row coil, 19-23 fins per inch or AS OEM designed verified.

d) Unit shall have a factory supplied condensate drain pan insulated with PE foam

below the coil.

e) Unit shall be designed for gravity drain.
f) Unit shall have a factory insulated drain hose to handle condensate.
g) Unit shall have provision of 45° flare refrigerant pipe connections.
h) The coil shall be factory pressure tested at 4.6MPa.
i) All refrigerant piping from outdoor unit to indoor unit shall be field insulated.

H.Microprocessor Control:

a) The unit shall have a factory installed microprocessor controller capable of performing functions necessary to operate the system.
b) The unit shall be able to communicate with other indoor units and the outdoor unit using a field supplied minimum of 18 AWG, 2 core, stranded and shielded communication cable.
c) The unit controls shall operate the indoor unit using one of the three operating modes:
a. Heating
b. Cooling
c. Dry (Dehumidification)
d. Fan only

I. Electrical:

a) The unit electrical power shall be 220 - 240 /1/ 50 (V/Ph/Hz)
b) The unit shall be capable of operating within voltage limits of +/- 10% of the rated voltage.

J. Controls:

a) Unit shall use controls provided by the manufacturer to perform all functions necessary to operate the system effectively and efficiently and communicate with the outdoor unit over an RS485 daisy chain or AS OEM designed verified.

DOUBLE SKIN AIR HANDLING UNITS

1. SCOPE

The Scope of this section comprises the supply, erection, testing and commissioning of air handling units conforming to these Specifications and in accordance with requirements of Appendix.

2. TYPE

The Air Handling Units shall be of Draw through / Blow through type having filter section, cooling coil section suitable for refrigerant / chilled water cooling coil and fan sections with centrifugal fan as per schedule of quantities and arrangement shown on the drawings.

The Air Handling Units shall be of Draw through type having various sections such as filter section, cooling coil section suitable for refrigerant / chilled water-cooling coil and fan sections with centrifugal fan as per schedule of quantities and arrangement shown on the drawings.

3. CAPACITY

The air moving and coil capacities (Air Conditioning Load) shall be as known in Appendix, schedule of quantities and on drawings.

4. CASING

The housing/ casing of the air handling unit shall be of double skin construction. The housing shall be so made that it can be delivered at site in total/ semi knock down conditions depending upon the conditions. The framework shall be of extruded aluminium hollow sections fitted with pre-formed insulated sections. All the members shall be assembled thru mechanical joints to make a sturdy and strong framework for various sections.

Double skin panels (each not exceeding 750mm width) shall be made of 24G (0.63mm) pre-plasticised coated Galvanised sheet steel and 0.6mm galvanised sheet inside with 40 ± 5 mm thick PUF insulation of 38 Kg/Cu.M in the form of slabs in between for normal AHU's and for OT AHU's insulation thickness shall be 43mm.

The panels shall be bolted from inside on to the framework with soft rubber gasket in between to make the joints airtight. Suitable doors with powder coated hinges and latches shall be provided for access to various panels for maintenance.

Mechanical Strength: D1, Thermal Bridging: TB2, Thermal Transmittance: T2,Air leakage:L1 and Filter by pass: F9 or Higher Characteristics. The said mechanical performance should be meet by each AHU as mentioned below.

The Fan and the motor arrangement shall be mounted on to the extruded aluminium framework. The entire housing i.e. The Air Handling Unit shall be mounted on GI fiber channel framework.

Drain pan shall be constructed of 16 gauge Aluminium sheet in two layers having 25 mm thick 38 Kg/Cu.M. nitrile foam insulation sandwiched in-between(or Special CI AHU's construction material shall be as specified in schedule of quantities). The K-value shall not be more than 0.014 Kcal/hr-sq.mtr-°C/M at 10°C mean temperature. The pan shall have necessary slope to facilitate for fast removal of condensate. The coil shall be mounted on the rollers in order to facilitate easy removal of the coil from the drain pan for cleaning. Outlet shall be provided on both the sides of drain pan.

5. MOTOR AND DRIVE

Fan motors shall be 415 ± 10% volts 50 cycles 3 phase squirrel cage, totally enclosed fan cooled with IP-55 rotation. Motor shall be especially designed for quite operation and motor speed shall not exceed 1440 RPM. Drive to fan shall be provided through belt drive arrangement. Belts shall be of oil-resistant type. Adjustable sheaves shall be provided.

6. FAN

The fan shall be forward curved double inlet double width type complete with motor and drive package. The wheel and housing shall be fabricated from heavy gauge galvanised steel. The fan impeller shall be mounted on a solid shaft supported in housing with angle iron frame and pillow block heavy duty ball bearings. The fan shall be selected for a speed not exceeding 1000 RPM.

The impeller and fan shaft shall be statically and dynamically balanced. The fan outlet velocity shall not be more than 1800 FPM. The fan housing with motor shall be mounted on a channel base mounted inside the air handling housing on anti vibration springs mounts. The fan outlet shall be connected with casing with the help of fire retardant canvas.

7. COOLING/HEATING COILS

refrigerant / Chilled/ hot water coils shall have 12.5mm (1/2") to 15mm (5/8") dia. tubes minimum 0.5 mm thick with aluminium fins firmly bonded to copper tubes assembled in a zinc coated steel frame. Face and surface areas shall be such as to ensure rated capacity from each unit and such that the air velocity across each coil shall not exceed 150 meters per minute. The coil shall be pitched in the unit casing for proper drainage. Each coil shall be factory tested at 21 Kg./Sq.cm air pressure under water. Tube shall be hydraulically mechanically expanded for minimum thermal contact resistance with fins. Fins spacing shall be 11 to 13 fins per inch (4 to 5 fins per centimeter).

8. FILTERS

Each unit shall be provided with a factory assembled filter section containing washable synthetic type air filters having anodized aluminium frame. The media shall be supported with HDP mesh on one side and aluminium mesh on other side. Filters media velocity shall not exceed 350 Feet per Minute. Filters shall fit so as to prevent by-pass. Holding frames shall be provided for installing a number of filter cells in banks. These cells shall be held within the frames by quick acting spring clips that snap over the cell handles. The efficiency of filters shall not be less than 98% down to 10-micron size.
Fine filters and HEPA filters as per schedule of quantities

9. FILTER ASSEMBLY

The housing shall be made from extruded aluminium sections. All joints shall be sealed airtight and shall be made free of all burrs and sharp edges.

The filter loading mechanism shall be sliding type or front loading type. The locking mechanism shall be a spring loaded, toggle type mechanism with a bolt and thrust assembly which shall thrust the filter evenly against the sealing flange of the housing when it is installed.

10. ISOLATORS

Vibration isolators shall be provided with all air handling units. The fan and motor framework shall be isolated from the AHU framework by means of spring type vibration isolators. The AHU shall be mounted on RAG nos. 200x200x200 P.C.C. blocks suitable for weight of the AHU. The framework of the AHU and the P.C.C. blocks shall be isolated by means of neoprene mats of size 150mmx150mm in two layers with 3kg G.S.S. sheet sandwiched in between.

11. FRESH AIR INTAKES

Exhaust/Fresh air louvers of 80 mm thick high performance (55% free area) drainable fixed louver type Aluminium frame and blades. Mullions to be sliding interlock type with integral internal drain. Jamb and mullion drains to be open on front face in order to direct water away from inside of louver. Blades to be one piece extrusions with gutters design to catch and direct water to jamb and mullion drains. Fasteners to be of aluminum. Louvers to have framed 13 mm mesh removable mill finish aluminum bird screens.

Blending cooled fresh air louvers constructed out of extruded aluminium complete with bird screens, filters and damper shall be provided in the clear openings in masonry walls of the air handling unit rooms with at least one external wall.

Louvers, filters, damper, and fresh air duct shall be provided for various air handling units as called for in the schedule of quantities. Fresh air dampers shall be of the interlocking opposed blade louver type. Blades shall be made of not less than 16 gauge aluminium sheet, edges covered with felt to provide air-tight closure, and shall be rattle-free.

Dampers shall be equipped with brass / nylon bushes and ball bearings. Filters shall be similar to those earlier specified for air handling units. All hardware shall be corrosion resistant brass or Stainless steel.

12. PAINTING

Shop coats of paint that have become marred during shipment or erection shall be cleaned off with mineral spirits, wire brushed and spot primed over the affected areas, then coated with enamel paint to match the finish over the adjoining shop-painted surfaces.

13. NOISE CONTROL

Air Handling Units shall be selected for the lowest operating noise level of the equipment. Fan performance rating, power consumption, and sound power data with operating points clearly indicated shall be submitted with the tenders and verified at the time of testing and commissioning of the installation. The sound level within the AHU room shall be less than 75 dB.

14. CONNECTIONS

Piping installation requirements are specified in other section. The Drawings indicate the general arrangement of piping, valves, fittings, and specialties. The following are specific connection requirements:

Arrange piping installations adjacent to units to allow unit servicing and maintenance.
Connect piping to air-handling units with flanges enabling easy removal of the coil.
Connect condensate drain pans using 40 mm (1-1/2 inch) minimum, insulated G.I. pipe and extend to nearest floor drain. Construct deep trap (depth as per detail) at connection to drain pan and install cleanouts at changes in direction.

Duct installations and connections are specified in other sections, make final duct connections with flexible connections.

Electrical Connections: The following requirements apply:

Electrical power wiring is specified in section Electrical.
Temperature control wiring and interlock wiring is specified in Section "Electrical Control

Grounding: Connect unit components to ground in accordance with the National Electrical Code.

15. ADJUSTING, CLEANING, AND PROTECTING

Adjust damper linkages for proper damper operation.
Clean unit cabinet interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheel, fan cabinet, and coils entering air face.

16. COMMISSIONING

Final Checks Before Start-Up: Perform the following operations and checks before start-up:

Remove shipping, blocking and bracing.
Verify unit is secure on mounting and supporting devices and that, connections for piping, ductwork and electrical are complete. Verify proper thermal overload protection is installed in motors, starters, and disconnects.
Perform cleaning and adjusting specified in this Section.
Disconnect fan drive from motor and verify proper motor rotation direction and verify fan wheel free rotation and smooth bearing operations. Reconnect fan drive system and align belts.
Lubricate bearings, pulleys, belts, and other moving parts with factory recommended lubricants.
Set outside-air / supply air dampers to minimum outside-air setting.
Comb coil fins for parallel orientation.
Install temporary throw away filters for initial run and finally install clean filters.
Verify manual and automatic volume control, and fire dampers in connected ductwork system are in the full-open position.
Disable automatic temperature control operators.

Starting procedures for central-station air-handling units:
Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicate RPM.
Replace fan and motor pulleys as required to achieve design conditions.
Measure and record motor electrical values for voltage and amperage.
Shut unit down and reconnect automatic temperature control operators.

17. TESTING

Cooling/heating capacity of various fan coil units shall be computed from the measurements of air flow and dry and wet bulb temperatures of air entering and leaving the coil. Flow measurements shall be by a calibrated rotating vane anemometer and temperature measurements by accurately calibrated mercury-in-glass thermometers.

Computed ratings shall conform to the specified capacities and quoted ratings. Power consumption shall be computed from measurements of incoming voltage and input current, whereas, noise level at various locations within the conditioned spaces shall be measured by a sound pressure level meter.

DUCT INSULATION & DUCT LINING

1. SCOPE

The scope of this section comprises the supply and application of insulation conforming to these Specifications.

2. **MATERIAL**

Material shall be either of the following as specified in schedule of quantities

I Aluminium foil faced glasswool, resin bonded fibreglass
II Chemically cross linked Polyethylene foam / Closed cell Elastomeric Nitrile Rubber

I Aluminium foil faced glasswool, resin bonded fibreglass

Insulation material shall be Aluminium foil faced glasswool, resin bonded fibreglass or other approved equal. The Thermal conductivity of the insulation material shall not exceed 0.034 K. cal per hr-sq.metre -degree Celsius or 0.27 Btu/hr-sq.ft-degree F/inch at 32 degree C (90 degree F) mean temperature, and density shall not be less than 24 Kg/cubic metre. Thickness of the insulation shall be as specified for the individual application. Samples of insulation material shall be submitted for approval.

METHOD OF DUCT INSULATION

Duct insulation shall be applied as follows:

1. Clean the outside surface of duct properly with wire brush render it free from all foreign matter and grease.
2. Apply rubber based adhesive CPRX compound at 1.7 to 1.8 Sq.Mtr. per Kg.
3. Fix rigid fibre glass slabs of required thickness (as called for in schedule of quantities) with Aluminium foiled facing at positions, Butt the joints well together. Seal all the joints with 75mm wide aluminium tape.
4. Secure the insulation by 25mm PVC strap wound over GI corners at 500 mm centre to centre. The contractor shall take due care during and after installation not to damage the Aluminium foiled facing. All damages even of minor nature shall have to be repaired by aluminium tape.

5. Apply wire netting for finishing the duct insulation surface.

DUCTS EXPOSED TO ATMOSPHERE

Ducts exposed to atmosphere shall be insulated as under:

1. Clean surface and apply thick coat of hot bitumen 85/25.
2. Fix 50mm thick Extruded polystyrene or equivalent normal density insulation. The density should not be less than 16 Kg/Cum.
3. Wrap 500-gauge polythene backed hessian secured with 18 SWG G.I. wire and the joints sealed with adhesive.
4. Fix 24 gauge X 12mm hexagonal G.I. mesh / chicken wire mesh tightly over hessian.
5. Apply total 12mm thick sand cement plaster in 4:1 ratio in two layers each of 6mm thick.
6. Fix tar felt type 3 grade I, I.S. 1322 with joints overlapped and sealed with bitumen.
7. Fix 24 S.W.G. x 20mm hexagonal G.I. mesh wire netting with 22 SWG G.I. lacing wire.
8. Apply bituminous paint over the surface.

II Chemically cross linked Polyethylene foam / Closed cell Elastomeric Nitrile Rubber

Chemically cross linked Polyethylene foam / Closed cell Elastomeric Nitrile Rubber, having a uniform density not less than 40 Kg/cu. m. and with a 'K' value in the range of 0.035 watt/ meter Kelvin to 0.039 watt/ meter Kelvin for temperature ranging from 0 degree C to 40 degree C respectively. Material shall have temperature range of -40 degree C to +105 degree C for pipe insulation & -10 degree C to +60 degree C for duct insulation. The insulation shall have fire performance such that it passes minimum Class 1 as per BS476 Part 7 for surface spread of flame authenticated by certificates from CBRI. Water Permeability of the insulation material shall not be less than 0.15ng/Pasm measured as per DIN52615. All joints shall be sealed properly with adhesive, which shall provide similar vapour barrier as the original insulating material.

DUCT INSULATION APPLICATION

Duct Insulation shall be applied as called for in tender schedule as follows:

1. Apply CPHX compound of Shalimar Tar Products over the surface after cleaning the ducts.
2. Measurement of surface dimensions shall be taken properly to cut insulation sheets to size with sufficient allowance in dimension.
3. Material shall be fitted under compression & no stretching of material shall be permitted. A thin film of adhesive, as specified, shall be applied on the back of the insulating material sheet & then on the metal surface. When adhesive is tack dry, insulating material

sheet shall be placed in position & pressed firmly to achieve a good bond. All longitudinal & transverse joints shall be sealed properly.

4. Apply PVC packing strips at regular intervals of 450mm over GI corners.

DUCT LINING

1 MATERIAL

Material for acoustic lining shall be resin bounded fibre glass or other approved equal. The thermal conductivity shall not exceed 0.034 Kcal per hr. Sq.mtr. degree C/meter at 30 degree C mean temperature difference and density shall not be less than 32 Kg./CuM.

Acoustical lining of duct wherever specified shall be applied as under:

2. METHOD OF APPLICATION

1. Fix G.I. channel / angle frame work 25mm wide x depth equal to thickness of insulation at 600mm centre, screwed to the sheet metal by means of brass metal screws.
2. Supply and Fix Fibre glass Crown 200 or other approved equivalent material in the frame work with joints well butted together.
3. Cover insulation with fibre glass tissue paper.
4. Finally cover the insulation with 28 SWG perforated aluminium sheet having 20% perforation with joints overlapped and screwed to the frame by means of brass metal screws, to produce an even surface.

AIR DISTRIBUTION
SHEET METAL WORK AND INSULATION:

1. GENERAL

This section comprises of supply, fabrication, installation and testing of all sheet metal ducts and supply, installation, testing and balancing of grilles, registers and diffusers, in accordance with these specifications and the general arrangements shown on the drawings.

2. DUCT MATERIAL

All ducts shall be fabricated from galvanized steel sheets of the following thickness:

Round Ducts	20 Gauge	1.00mm thickness
Rectangular ducts upto 750mm	24 Gauge	0.63mm thickness
Rectangular ducts greater than 750 mm and upto 1500mm	22 Gauge	0.80mm thickness
Rectangular ducts greater than 1500mm and upto 2250mm	20 Gauge	1.00mm thickness
Rectangular ducts greater than 2250mm	18 Gauge	1.25mm thickness

3. DUCT FABRICATION

All Galvanized ducts shall be factory fabricated from lock form grade galvanized sheet steel zinc coated conforming with IS. 277, coating grade 120 or aluminium sheets conforming to ISS:737-1955 (wherever aluminium ducts are specified) and installed in a workman like manner, generally conforming to IS:655-1963 (Revised) – Round exposed ducts shall be circ formed for achieving perfect circle configuration.

Ducts shall be straight and smooth on the inside with neatly finished joints. All joints shall be made airtight by applying sealant during the assembly of the ductwork. Sealing of the seams shall be accomplished by using approved sealant. Transverse joints shall be made using sponge rubber sulphur-free foam rubber gasketing (3mm thick and 20mm wide) All exposed ducts within conditioned spaces shall have only slip joints and no flanged joints. The internal ends of slip joints shall be made in the direction of Air flow.

Changes in dimensions and shape of ducts shall be gradual. Curved elbows, unless otherwise approved, shall have a center line radius equal to one and half times the width of the duct. Air turns shall be installed in all abrupt elbows and shall consist of curved metal blades or vanes, arranged to permit the air to make the turns without appreciable turbulence.

All ducts shall be rigid and shall be adequately supported and braced where required with standing seams, bracing to be as per IS:655-1963 iron or angles of ample size to keep the ducts true to shape and to prevent buckling, vibration or breathing.
All sheet metal connections, partitions and plenums required to confine the flow of air to and through the filters and fans, shall be constructed out of 18 gauge galvanized steel sheet, thoroughly stiffened with 25mm x 25mm x 3mm angle iron braces and fitted with all necessary doors, to give access to all parts of the apparatus. Doors shall not be less than 45cm x 45cm in size.

Volume control dampers wherever indicated on the drawings shall be installed as a minimum. The final duct design may call for additional volume control dampers based on final duct configuration.

4. DUCT INSTALLATION

All ducts shall be installed generally as per the drawings and in strict accordance with approved shop drawings prepared by the Contractor.

The contractor shall provide and neatly erect all sheet metal work as may be required to carry out the intent of these specifications and drawings. This work shall meet with the approval of the BIRD
install as parts and details.

All necessary allowances and provisions shall be made by the contractor for beams, pipes, or other obstructions in the buildings, whether or not the same are shown on the drawings. Where it becomes necessary to avoid beams or other structural work, plumbing or other pipes, and/or conduits, the ducts shall be transformed, divided or curved to one side, the required area being maintained as approved or directed by the BIRD.

If a duct cannot be run as shown on the drawing, the contractor shall install the duct between the required points by any path available, subject to the approval of the BIRD.

All duct work shall be independently supported from building elements or as required by the BIRD. All horizontal ducts shall be rigidly and securely supported, in an approved manner, within hangers formed of MS rods and angle iron under ducts not greater than 2 meter centers. All vertical duct work shall be supported by structural members at each floor.

Ducting on top of the ceiling shall be supported from the slab above, or from beams, after obtaining approval of the BIRD. In no case shall a duct be supported from the ceiling hangers or be permitted to rest on a hung ceiling.

All metal work in dead or closed down spaces shall be erected in time to occasion no delay to other contractors in the building.

All ducts shall be totally free from vibration under all conditions of operations. Whenever duct work is connected to fans, that may cause vibrations in the duct, ducts shall be provided with two flexible connections located close to the unit in mutually perpendicular directions. Flexible connection shall be constructed of fire resistant flexible double canvas sleeves at least 10 cm long, secured properly and bolted at both ends. Sleeve shall be made smooth and the connecting duct work rigidly held by independent supports on both ends. The flexible connection shall be suitable for pressures at the point of installation.

The two mating flanges of the ducts being joined with each other shall be made air tight by providing 3mm thick 20mm wide Sulphur-free foam rubber gasket on mating flanges.

5. DAMPERS

All dampers shall be of Galvanised iron construction with louver dampers of robust construction and tightly fitted. The design, method of handling, and control shall be suitable for the location and service required.

Dampers shall be provided with suitable links, levers and quadrants as required for their proper operation; control or setting devices shall be made robust, easily operable and accessible through suitable access doors in the ducts. Every dampers shall have an indicating device clearly showing the damper position at all times.

Dampers shall be placed in ducts and at every branch of supply air duct connections, whether or not indicated on the drawings, for the proper volume control and balancing of the system.

All the dampers at grille collars shall be of extruded aluminium construction with louver dampers of robust construction and tightly fitted

6. FIRE DAMPERS

The ducts shall be provided with approved fire damper of at least 1 1/2 hours fire rating as shown on the drawing.
Fire damper blades shall be single piece folded type high strength galvanised steel construction. In normal position these blades shall remain parallel to air stream providing maximum air passage and preventing passing air currents from creating noise or clutter.

The blades shall be held in position through a non spring return motor. Access doors are required at all damper locations and wherever indicated on the drawings. All access doors to be fabricated of the same material as the duct work and shall have a minimum of two hinges. Hinges shall be zinc plated, pins shall be of brass. Minimum dimension of the door shall be 300 x 300mm where duct sizes permit.

In case of fire, the signal from the smoke detector / thermister shall be utilised to close the fire damper as well as the AHU.

Fire damper sleeves and access doors shall be provided within the ducts in accordance with the manufacturer's recommendations.
Rates being quoted for shall include fire dampers wiring etc. as required.

7. SUPPLY AIR REGISTERS

Supply air registers shall be of approved make and of aluminium construction with individually adjustable bars. Supply air registers shall be double deflection type, with removable key-operated volume control dampers. The outer frame should be made out of 20-G and louvers of 24-G

All registers shall be selected in consultation with the Engineer-in-charge. Different spaces shall require horizontal or vertical face bars, and different width of margin frames.

All registers shall have a soft, continuous rubber gasket between the periphery of the register and the surface on which it has to be mounted. The effective area of the registers shall not be less than 80 percent.

Registers shall be adjustable pattern as such grill bar shall be pivotable to provide pattern with 0 to 360 degree horizontal arc and upto 30 degree deflection up or down.

Bars shall hold deflection settings under all conditions of velocity and pressure.

Bars longer than 45 cm shall be reinforced by a set back vertical member.

Registers shall be given a rust inhibiting prime coat and factory applied powder coated finish of approved colour.

8. SUPPLY AIR DIFFUSERS

Diffusers shall be of approved make and of Aluminium construction, square / rectangular in shape with flush fixed pattern or adjustable flow pattern. Diffusers for different spaces shall be selected in consultation with the HRD.

All supply air diffusers shall be equipped with removable key-operated volume control dampers. Anti-smudge ring may be required in specific applications. The outer shell and diffusing assembly shall be made out of 18 and 24G respectively.

9. OUTSIDE AIR LOUVERS

Exhaust/Fresh air louvers of 80 mm thick high performance (55% free area) drainable fixed louver type powder coated Aluminium frame and blades. Mullions to be sliding interlock type with integral internal drain. Jamb and mullion drains to be open on front face in order to direct water away from inside of louver. Blades to be one piece extrusions with gutters design to catch and direct water to jamb and mullion drains. Fasteners to be aluminium. Louvers to have framed 13 mm mesh removable mill finish aluminium bird screens.

10.TESTING AND BALANCING

After completion of the installation of the complete air distribution system, all ducts shall be tested for air leaks. Before painting the interiors, air distribution system shall be allowed to run continuously for 48 hours for driving away any dust or foreign material lodged within ducts during installation.

The entire air distribution system shall be balanced using approved anemometer. Air quantities at the fan discharge and at various outlets shall be identical to, or less than 5 percent in excess of, those specified and quoted. Leakage in each air distribution system shall be within 3 percent so that supply air volume at each fan shall be identical to, or no greater than 3 percent in excess of, the total air quantity measured at all supply outlets served by the fan. Branch duct adjustments shall be made by volume or splitter dampers. Dampers shall be permanently marked after air balance is complete so that these can be restored to their correct position if disturbed at any time. Complete air balance report shall be submitted to the Engineer-in-charge for scrutiny and approval, and six copies of the approved report shall be provided with completion documents.

REFRIGERANT PIPING

All refrigerant piping for the air conditioning system shall be constructed from soft seamless pipes upto 19.1mm and hard drawn copper refrigerant pipes for above 19.1mm with copper fittings and silver-soldered joints. The refrigerant piping arrangements shall be in accordance with good practice within the air conditioning industry, and are to include charging connections, suction line insulation and all other items normally forming part of proper refrigerant circuits.

All joints in copper piping shall be swear joints using low temperature brazing and or silver solder. Before jointing any copper pipe or fittings, its interiors shall be thoroughly cleaned by passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt etc. while constructing the joints. Subsequently, it shall be thoroughly blown out using nitrogen.

The contractor shall perform Nitrogen gas test and vacuum test on refrigerant piping. Start and stop timing & pressure maintained shall be checked and the readings recorded shall be counter signed by consultant / BIRD or its authorized representative

After the refrigerant piping installation has been completed, the refrigerant piping system shall be pressure tested using nitrogen at pressure of 20Kg per sq cm and 10 Kg per sq cm (lowside).

Pressure shall be maintained in the system for 48 hours. The system shall then be evacuated to minimum vacuum if 700mm hg and held for 24 hours.
The air-conditioning system supplier shall be design sizes and erect proper interconnections of the complete refrigerant circuit.
The thickness of copper piping shall not be less than mentioned below:

PIPE DIA		Thickness (MM)	TEMPER GRADE
MM	Inches		
6.35	1/4"	0.80	Annealed soft
9.53	3/8"	0.80	
12.7	1/2"	0.80	
15.88	5/8"	0.99	
19.05	3/4"	0.80	Half Hard
22.22	7/8"	0.80	
25.4	1"	0.99	
28.58	1 1/8"	1.1	
31.75	1 1/4"	1.1	
34.93	1 3/8"	1.21	
38.1	1 1/2"	1.21	
41.28	1 5/8"	1.44	
44.45	1 3/4"	1.5	
47.63	1 7/8"	1.9	
50.8	2"	2	
53.98	2 1/8"	2.1	

The suction line pipe size and the liquid line pipe size shall be selected according to the manufacturers specified outside diameter. All refrigerant pipes shall be properly supported and anchored to the building structure using steel hangers, anchors, brackets and supports which shall be fixed to the building structure by means of inserts or expansion shields of adequate size and number to support the load imposed thereon.

The refrigerant piping should be laid in such a way that it should not distort the interior of the room, wherever the refrigerant pipe has to be laid across the room, it should be laid in a concealed manner by making appropriate boring arrangement matching with the interior of the room. All associated minor Civil Engineering works (like chasing on wall, ceiling & re-plastering & repainting etc.) related with the above items are included in the scope of work. The above scope does not included false ceiling wherever required.

PIPE INSULATION

a. **Refrigerant Pipe Insulation**

The whole of the liquid and suction refrigerant lines including all fittings, valves and strainer bodies, etc. shall be insulated with 19mm thick elastomeric nitrile rubber as specified in BOQ.

Drain Pipe Insulation:

Drain pipes carrying condensate water shall be insulated with 9 mm thick elastomeric nitrile rubber insulation.

For proper drainage of condensate, U Trap shall be provided in the drain piping (wherever required). All pipe supports shall be of pre fabricated & pre painted slotted angle supports, properly installed with clamps etc.

The condensate drain pipe arrangement for disposal of condensate water be made in such a way that there should not be any leakages of condensate water inside rooms as well in the route of drain water pipe line & water should be discharged at the location jointly decided with BIRD of work. All associated civil engineering works as per requirement at site to above connection like making chase in the wall & restoring arrangement of drain –pipe shall be made in such a way that it should not affect the aesthetic of the building as well as is maintenance friendly & easily accessible.

c. Copper pipes exposed to sunlight hall be covered in G. I. Cables trays and in such case insulation shall be covered with Ultra Violet protection coatings for long life of Copper Tube insulation. Cable tray shall be suitably fastened to roof/terrace with fasteners.

i) The contractor shall submit computer generated reports of the VRV system for a duration of one hour indicating pressures, temperatures, voltage, power consumed, etc.

ii) Cable glands shall be compression type, heavy-duty chromium plated.

ii) All cable termination to have lugs/ thimbles.

ELECTRICAL INSTALLATION

I.SCOPE

The scope of this section comprises of the fabrication, supply, erection, testing and commissioning of ELECTRICAL CONTROL PANELS, wiring and earthing for all components of the Air Conditioning system.

II.GENERAL

Work shall be carried out in accordance with the Specifications, local rules, Indian Electricity Act 1910 as amended up to date and rules issued there under, regulations of the Local Fire Insurance Association and Indian Standard code of practice No.IS:732-1963 (revised) including Indian Electricity Rules 1956 and MES Specifications.

III.WIRING SYSTEM

All power wiring shall be carried out with 650/1100 Volts grade PVC insulated aluminium conductor armoured cable/copper conductor wires in M.S. Conduits. Sized for starting current and continuous running current carrying capacity and by applying proper de-rating factor. Termination of conductors shall be by means of crimping. No joints shall be permitted.

IV.CONTROL PANELS

1. M.V. PANELS

All the M.V. panels shall be suitable for operation on 3 phase, 415 Volts, 50 Cycles, neutral grounded at transformer and short circuit level not less than 35 MVA at 415 Volts.

The M.V. panels shall comply with the latest edition of relevant Indian Standards and Indian Electricity rules and regulations.

2. **CONSTRUCTION FEATURES**

The M.V. Panels shall be metal enclosed sheet steel cubicle, indoor, dead front and floor mounting type. The M.V. panels shall be totally enclosed, completely dust and vermin proof. Neoprene Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. M.V. panels shall be preferably arranged in multi-tier formation. The enclosure protection shall be IP 54 as per IS:2147.

All doors and covers shall be fully gasketed with Neoprene strips and shall be lockable. M.S. sheet steel used in the construction of distribution boards and M.V. panels shall be 16SWG/sheets for all load bearing members.

M.S. sheet steel shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet metal shall be seam welded, all welding slag grounded off and welding pits wiped with plumber metal.

All panels and covers shall be properly fitted and square with the frame, and holes in the panel correctly positioned.

Fixing screws shall enter in into holes tapped into an adequate thickness of metal or provided with hank nuts. Self threading screws shall not be used in the construction of panels. A base channel of 75 mm x 5 mm thick shall be provided at the bottom. A minimum of 200 mm between the floor of M.V. panels bottom most unit shall be provided.

The M.V. panel shall be of adequate size with a provision of 20% spare space to accommodate possible future additional switch gear.

Knockout holes of appropriate size and number shall be provided in the M.V. panels in conformity with the location of incoming and outgoing cables/Bus Ducts. The height of operating handle, push buttons etc., shall be restricted between 300 mm and 2000 mm from finished floor level.

M.V. panels shall be provided with removable sheet steel gland plates at top to drill holes for cable entry at site.

The panels shall be capable of withstanding the specified fault level. The panels shall have adequate natural cooling such that the rated continuous current flow through the components does not cause temperature rise beyond permissible limits.

The panels shall be equipped with thermostatically controlled space heaters, plug socket suitable for 230 Volts single phase 50 Cycles power supply.

Defeat interlocks shall be provided for isolating devices as specified keeping safety in mind. Mechanical and Electrical inter locking shall be provided as specified.

In case of draw-out modules, withdrawal shall be possible without disconnecting wires or cables. Draw-out modules shall be used for ACBs.

The power and control circuits shall have self aligning and self isolating contacts. The fixed and moving contacts shall be easily approachable for maintenance/replacement.

In case plug and socket arrangement is used for control connection, the design should ensure that only a particular plug can be inserted in the specific socket.

Withdraw-able modules shall have 3 positions i.e. service-test-isolated. In test position the power supply shall be disconnected but the control supply shall remain connected.

The draw out module shall have a latch arrangement before full draw-out position to prevent accidental fall of the module during removal. With the draw-out module removed, the live parts exposed in the panel, shall either be finger proof or shall be shrouded to prevent contact.

3. CIRCUIT COMPARTMENTS

Each circuit breaker and switch fuse units and MCCB's shall be housed in separate compartments and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly interlocked with the breaker/switch fuse unit/MCCB in "ON" position. Safety interlocks shall be provided for air circuit breakers to prevent the breaker from being drawn out when the breaker is in "ON" position. The door shall not form an integral part of the draw out portion of the ACB. All instruments and indicating lamps shall not be mounted on the ACB compartment door. Sheet steel barriers shall be provided between the tiers in a vertical section.

4. INSTRUMENT ACCOMMODATION

Separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contactors and control fuses etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, bus bars and connections.
Individual feeder ammeters, selector switches indicating lamps shall be provided on the door of the feeder.

5. BUS BARS AND BUS BAR CONNECTIONS

The Bus Bar and inter-connection shall be of electrolytic copper and of rectangular cross sections suitable for continuous full load current for phase bus bars and half rated current for neutral bus bar without exceeding specified temperatures and shall be extensible on either side. The current density of copper bus bars shall be not more than 1.5 Amps per sq.mm area.

The bus bars and inter connections shall be insulated with heat resistant sleeves and colour coded. The bus bars shall be supported on unbreakable, non-hygroscopic insulated supports at regular intervals, to withstand the force arising from short circuit in the system. All bus bars shall be provided in a separate chamber and properly ventilated. All bus bar connections in M.V. panel shall be done by bolting.

All bus bar connections in M.V. panels shall be done by drilling holes and connecting by brass bolt and nuts. Additional cross section of bus bars shall be provided in M.V. panels to cover up the holes drilled in the bus bars. Automatically operated safety shutters to screen the live cluster when the breaker is withdrawn from cubicle be provided. All connections between the bus bars and switches and between switches and cable end terminals shall be through solid copper strips of proper size to carry full rated current and insulated with fiberglass sleeves.

6. TERMINALS

The outgoing terminals of the breaker and neutral link shall be Brought out to a terminal block suitably located at the rear side of the panel. The current transformer for instruments, meters and for protection shall be mounted on the Bus Bars with proper supports. Separate cable compartments shall be provided for incoming and outgoing cables.

7. WIREWAYS

A horizontal wire way with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections. Instrument and control wiring shall be done by using 600/1100 volts grade PVC insulated copper conductor wires of minimum size 1.5 sq.mm cross sectional area.
Internal wiring for connection to remote control equipment shall be run up to terminal strip of Elmex type of suitable size.
Every control wire shall be numbered ferruled with interlocking type. The Ferrules shall be made of non Hygroscopic-insulating material. All wires used shall have crimped type lugs on either end for termination. All terminals shall have marking for terminal identification. The terminals shall be pinching type not more than 2 wires shall be terminated in a terminal. At least 20% spare terminals in each terminal block shall be provided.

8. CABLE COMPARTMENTS

In the M.V. Panels for easy termination of all incoming and outgoing cables entering from bottom or top, adequate proper supports shall be provided in cable compartments to support cables. All incoming and outgoing switch terminals shall be Brought out to terminal blocks in the cable compartment.

9. AIR CIRCUIT BREAKERS

The circuit breakers shall be sheet metal enclosed flush front, draw out type and shall be provided with a trip free manual remove operating mechanism with mechanical "ON" - "OFF" indications. Shut trip and time lag fuses suitable for 220 VAC shall be provided. The Circuit breakers shall be for continuous rating. Also shall be suitable for 35 MVA fault level at 415 Volts. Short time rating for circuit breaker should be equivalent to 35 MVA for 1 second and 415 Volts. The moving parts of 3 or 4 pole circuit breaker shall have common operating mechanism, primary and secondary isolating devices, auxiliary switches, mechanical position indicators, all mounted on a rigid sturdy steel frame work. Primary and secondary disconnecting devices shall be self-aligning type of fully isolating.

Circuit breaker shall be designed to close and trip without opening the circuit breaker compartment door. The operating handle and the mechanical trip push button shall be at the front of the breakers panel and integral with the breaker. The ACB's shall be withdrawal type and not fixed type.

The ACB operating spring shall be chargeable with charging motor as well as manually. Once the spring is charged it should be able to close the breaker and also trip without requiring to be charged. Every Trip-Close-Trip operation with one charge of spring shall be possible. The ACB's shall be operable both from the cubicle as well as from remote position. Anti pumping devices shall be used both for electrical and mechanical to prevent the breaker from reworking.

Local-remote selector switch with key interlock and auxiliary contacts to operate locally and remote position shall be provided.

The breaker shall be provided with remote push button as well as local push buttons for operating breakers.

Suitable contacts for "Auto-Trip" annunciation and indication shall be provided.

10. CRADLE

The cradle shall be so designed and constructed as to permit the smooth withdrawal and insertion of the breaker into it. The movement shall be free from jerks, easy to operate and shall be on steel balls/rollers and not on flat surfaces.

There shall be 4 distinct and separate positions of the circuit breaker on the cradle.

Service: Both main and secondary isolating contacts in service.

Test: Main isolating contacts separate & secondary isolating contacts in service.
Isolated: Both main and secondary isolating contacts isolated.
Maintenance: Circuit Breaker fully outside the panels ready for maintenance.

There shall be provision for locking the breaker in any or all of the first three positions.

11. PROTECTIVE DEVICES

C.T operated overload and short circuit tripping mechanism with earth fault protection through relays shall be provided for all circuit breakers.

Suitable over voltage tripping mechanism for voltage in excess of 110% of the rated voltage (415V) shall be provided in the incoming breaker.
Suitable under voltage tripping mechanism for voltage in less than 90% of the rated voltage(415) shall be provided in the incoming breaker.

The direct acting releases shall be fitted with test strip for periodical checking of trip operations. Provision shall be made for fitting micro-switches on over current releases, shut and under voltage releases for external remote indication of tripping on faults.

There shall be not less than 4 N/O and 4 N/C auxiliary contacts rated 5 amp on each breaker. The auxiliary contact blocks shall be so located as to be accessible from the front. The auxiliary contacts in the trip circuits shall close before the main contacts have closed. All other contacts shall close simultaneously with the main contacts. The auxiliary contacts in the trip circuits shall open after the main contacts open.

All current carrying parts shall be silver plated and suitable arcing contacts with proper arc chutes shall be provided to protect the main contacts. The heat generated in the contacts due to tripping under fault conditions shall be very normal.

12. SWITCH FUSE UNITS

The fuse switch units shall be 3-pole double break type suitable for load break duty quick make and break action. Separate neutral link shall be provided with hinged doors duly interlocked with operating mechanism so as to prevent opening of the door when the switch is in "ON" position and also prevent closing of the switch when the door is not properly secured. All contacts shall be silver plated and all live parts shall be shrouded. The incoming and outgoing terminals of switch shall be adequately sized to receive proper size of aluminium conductor wires/cables. High rupturing capacity (HRC) fuse links shall be provided with switch fuse units and shall be in accordance with IS:2208-1962 and having rupturing capacity of not less than 35 MVA at 415 volts. HRC fuse links shall be provided with visible indicators to show that they have operated, switch fuse units shall be IS make or approved equal. The switch fuse units shall be manufactured in accordance with IS:4047-1967 as amended to date.

13. MOULDED CASE CIRCUIT BREAKERS (MCCB's)

MCCB shall be panel-mounted type. All the live parts of MCCB shall be enclosed in a moulded case and all contacts shall be silver-plated.

MCCB shall be trip-free with quick make and quick break operating mechanism.

MCCB shall be provided with magnetic short circuit protection in the out-going feeders. They shall be provided with thermal overload protection in all the three phases. If required, time delayed overload protection against overloads for feeders other than motor protection feeders may be provided.

The protection devices of outgoing MCCB feeders shall be properly co-ordinated for tripping settings.

The fault level withstand capacity of the MCCB shall match that of the switchgear. Backup protective fuses shall not be used with MCCB for fault level compensation.

The operating handle of the MCCB shall be interlocked with the module door such that the door cannot be opened with the MCCB "ON".

The breaker handle shall indicate the operated position of the MCCB. When tripped on fault, the breaker handle shall occupy an intermediate position.

The terminals of the MCCB shall be able to accept the size of Aluminium conductor of the cables used.

14. FUSES

Fuses shall be high rupturing capacity (HRC) fuse links and shall be in accordance with IS:2208-1962 and having rupturing capacity of not less than 35 MVA at 415 volts.

The back up fuse rating for each motor equipment shall be so chosen that the fuse does not operate on starting of motors equipment. HRC fuses shall be IS or approved equal.

15. METERS

All meters and relays shall be housed in a separate compartment and accessible from front only. Lockable doors shall be provided for the metering and relay compartment. The main breaker shall be provided with "ON" and "OFF" indicating lamps. The details of meters, fuses, relays and indicating lamps are as described in each switchboard. Wiring for meters and relays shall be colour coded and labelled with approved plastic heads for easy identification.

16. **CURRENT TRANSFORMERS**

Where ammeters are called for CT's shall be provided for current measuring more than 100 amps. Each phase shall be provided with separate current transformer of accuracy Class 1 and suitable V.A. burden for operation of associated metering. Current transformers shall be in accordance with IS:2705-1964 as amended upto date. C.T. shall be cast resin insulated type.

17. **INDICATNG AND METERING EQUIPMENT**

All meters and indicating instruments shall be in accordance with relevant Indian Standard. The meters shall be flush mounted and drawout type. Indicating lamps shall be neon type and of low burden. Indicating lamps shall be backed up with HRC fuses and toggle switch.

18. **MOULDED FUSE FITTINGS**

Moulded fuse fittings shall be manufactured in accordance with IS:1300 and BS 771. The HRC fuse fittings body shall be made of High grade Phenolic moulding. The fuse fittings shall be non-inflammable and non-hydroscopic, with hand glass surface block finish. Viewing aperture shall be provided in the fuse fittings for easy identification of blown off fuse.

19. **TIME DELAY RELAYS**

Time delay relays for delayed starting of heavy motors i.e. chiller motor shall be provided the time delay relays shall be adjustable type with time delay adjustment from 0-100 seconds. Time delay relays shall have one set of auxiliary contacts for indicating lamp connections.

20. **TOGGLE SWITCH**

Toggle Switch when called for shall be in conformity with IS 2854-1968 revised to date and shall be of 5 Amps rating.

21. **CONTACTORS**

Contactors shall be magnetically operated air break type suitable for the system voltage of 415 volts 3 phase 50 cycles. Main contactor shall have 3 poles and minimum of 2 nos. NO and 2 nos. NC contacts for interlocking purposes.

Short time rating of the contactors shall be properly co-ordinated with the operating time

of ACB/MCCBs such that type '2' co-ordination is achieved. Wherever required Auxiliary contactors shall be used to multiply the contacts without bimetal relay for the purpose of interlocking and indication/annunciation.

22. SPACE HEATERS

A space heater rated for 240V, 50 Hz and controlled through a double pole miniature circuit breaker shall be provided for each cubicles. This shall be thermostatically controlled.

23. EARTHING

Copper earth bars of 25 mm x 3 mm shall be provided for M.V. panel and main distribution boards for the full length of the distribution boards and connected to the frame work of the distribution boards. Provision shall be made for connection from this earth bar to the main earthing bar on both sides of distribution board. Proper earthing terminals shall be provided in the final distribution board.

Draw-out modules of M.V. Panels shall be provided with scraping earth system for effective earthing.

24. LABELS

Engraved PVC labels shall be provided on all incoming an outgoing feeders switches Circuit diagram showing the arrangements of the Circuit inside the panel shall be screwed bolted riveted on inside of the panel door and covered with transparent laminated plastic sheet.

The bus bar chamber as well as feeder cubical shall have inter-panel fire resistant barriers. Door hinges shall be concealed types.

Each instrument and equipment shall be provided with permanently fixed nameplate on the front and also rear of the panel door. The size of the nameplate shall be 25 x 75mm. Letters shall be engraved on the plate. Nameplate shall be of black perspex with white engraving and of minimum 3mm thick.

All the M.V. panels shall be subject to tests specified in relevant Indian Standard and test certificate shall be furnished.

The following capacity contactors and O/L relays shall be provided for different motors.

Type of Contactor Current overload Relay

	Relay	Starter	Capacity	Range
1.	5 HP motor	DOL	16 Amps	6-12 Amps
2.	7.5 HP motor	Star Delta	16 Amps	6-12 Amps
3.	10 HP motor	Star Delta	32 Amps	6-12 Amps
4.	15 HP motor	Star Delta	32 Amps	10-16 Amp
5.	20 HP motor	Star Delta	63 Amps	16-22 Amp
6.	25 HP motor	Star Delta	63 Amps	16-22 Amp
7.	30 HP motor	Star Delta	63 Amps	20-32 Amp
8.	40 HP motor	Star Delta	70 Amps	28-42 Amp
9.	50 HP motor	Star Delta	70 Amps	28-42 Amp
10.	60 HP motor	Star Delta	70 Amps	30-45 Amp
11.	75 HP motor	Star Delta	110 Amps	45-70 Amp
12.	100 HP motor	Star Delta	200 Amps	60-100 Amp

Single-phase preventers shall be provided for all 3-phase motors. Single-phase preventer shall be in conformity with relevant ISI standards. Single-phase preventers shall act when the supply voltage drops down to 90% of the rated voltage or failure of one or more phases. Single-phase preventer shall be voltage operated and have approved make.

Control panel shall contain starters and safety fuses for compressor, chilled water pump motors, cooling tower motor etc. It shall also house the Air circuit breaker for main incoming supply, voltmeter with selector switch for measuring the current drawn by each motor and indicating lights for incoming phases as well as status indication of each equipment.

All control panels shall be provided with detailed control circuit diagram indicating the terminal numbers and colour coding of the wires used in the panels. This diagram shall be pasted on the inner side of the cover and protected with PVC transparent lamination.

ON-OFF switches for each motor/equipment should not be provided on the cover of the control panel, but at the same time interlocking shall be provided between switch and the door in such a way that the door of the panel cannot be opened when the supply is ON.

WIRING OF EQUIPMENT

1. **CABLES:**

PVC insulated aluminium conductor Armoured cables shall be used for connecting motors.

2. **CABLE GLANDS:**

Heavy duty compression type cable gland alongwith the cable lugs shall be used for termination of cables. The cable glands shall be of cadmium plates brass. For all power cables, crimped type copper cable lugs shall be provided.

3. **CABLE TRAYS:**

The cable trays shall be channel type made out of M.S. sheets (slotted) having a minimum thickness of 2mm duly painted. (Cable trays exposed to atmosphere shall be hot dip galvanised/ GI Perforated painted). The Clamps used shall be Aluminium with G.I/Cadmium plated nut-bolts. The size of these trays shall be selected considering the number of cables and leaving minimum 20% spare area. The arrangement of cables in these trays shall be in Single Tier Formation.

Sharp bending of the cables shall be avoided. The radius for bending PVC insulated cable and sheath armoured cable shall not be less than 10D where "D" overall diameter of the cable. Wherever cable rises from concrete trenches, these shall be taken in G.I. pipes of suitable size. The Bidder shall make sure that the 40% area of pipe shall be free after the cable is laid.

4. **WIRE SIZES**

Final connection to the equipment shall be through flexible wiring enclosed in galvanized flexible conduit rigidly clamped at both ends. An isolator shall be provided near each motor/equipment wherever the motor/equipment is separated from the supply panel through a partition barrier or through ceiling construction. P.V.C. insulated single strand hard drawn copper conductor wires shall be used inside the control panel for connecting different components and all the wires inside the control panel shall be neatly dressed and plastic beads shall be provided at both the ends for easy identification.

5. **EARTHING**

Main power upto the Electrical panels in Plant rooms along with earthing shall be provided by other agency. Each panel shall be earthed to building main earthing. All the motor etc. shall be double earthed to the panel. All three phase motor/equipments shall be earthed with two independent earth conductors as per the requirement of Indian Electricity Rules and Regulation - 1956.

6. **DRAWINGS**

Shop drawing for control panel and wiring of equipment showing the route of control cables shall be got approved by the BHEL before starting the fabrication of panel and starting the work. On completion two sets of completion "As installed" drawings incorporating all details like conduit routes, number of wires in conduit, location of panels,

switches, junction/pull boxes and cable route etc. shall be furnished by the Bidder.

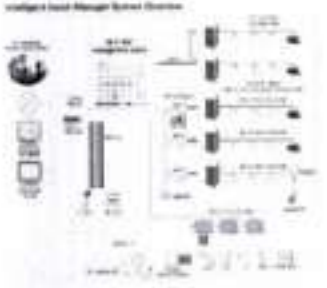
7. **TESTING**

Before commissioning of the equipment the entire Electrical Installation shall be tested in accordance with code of Practice IS:732-1963 (Revised) and test report furnished by a qualified and authorised person. The entire electrical installation shall be got approved by Electrical Inspector and certificate from Electrical Inspector shall be submitted. All tests shall be carried out in presence of engineer-incharge.

8. **PAINTING**

All sheet steelwork shall undergo a process of degreasing, pickling in acid, cold rinsing, phosphatising passivating and then sprayed with a high corrosion resistant primer. It shall then be baked in an oven. The finishing treatment shall be by application of synthetic enamel paint of approved shade.

CENTRAL CONTROLER:



- Central Controller capable of communicate to VRF Indoor units via RS 485 communication protocol along with password to prevent unauthorized access.

- 10.4 Inch TFT LCD Touch Screen have capability of controlling & monitoring up to 512 indoor units individually, in groups.

- It is capable to monitor, operate via PC Web Access (interface through web NABARDbrser along with password to prevent unauthorized access) NABARDbrser, Remote Access (control, monitor from anywhere).

- It is compatible with Air Conditioner, Hydro Kit, and Ventilation & also can be connectable to upper level controllers.

Central Controller has the following multiple functions like:

1. Individual control (On, Off / Operation mode / Fan speed / Temp control, Swing / Air flow control).

2. Lock Function (Entire system / Temp / Mode /Fan / Clear).

3. Two set point / Auto Changeover: automatically switched the indoor unit into the correct mode to optimize space comfort.

4. Temperature Set Point Range limit: Prevents the set point from being set to extremes that can result in overcooling or overheating of the space.

5. Emergency Stop: function is to stop all connected equipments when an emergency stop situation occurs.

6. Energy save mode: When using this function, operation mode changes from cooling to fan or heating to off mode.

7. Energy Management: Power consumption of individual / group equipment (Daily, Weekly, and Monthly) 4 month energy history period (with optional accessory Power Distributor Indicator).

8. Scheduling: condition the space only when necessary.
Schedule program (200 events) Weekly, Monthly, Exception day.

9. Report Information: Error history (maximum 5000 storage, maximum 1 year checkable period). One can view each error report with display date / device name / error code / error Occurred / detail error information.

Maximum of 80 Outdoor units can be connected to Central Controller or As Per OEM make.

Central Controller has the following multiple functions like:

10. Individual control (On, Off / Operation mode / Fan speed / Temp control, Swing / Air flow control).

11. Lock Function (Entire system / Temp / Mode /Fan / Clear).

12. Two set point / Auto Changeover: automatically switched the indoor unit into the correct mode to optimize space comfort.

13. Temperature Set Point Range limit: Prevents the set point from being set to extremes that can result in overcooling or overheating of the space.

14. Emergency Stop: function is to stop all connected equipments when an emergency stop situation occurs.

15. Energy save mode: When using this function, operation mode changes from cooling to fan or heating to off mode.

16. Energy Management: Power consumption of individual / group equipment (Daily, Weekly, and Monthly) 4 month energy history period (with optional accessory Power Distributor Indicator).

17. Scheduling: condition the space only when necessary.
Schedule program (200 events) Weekly, Monthly, Exception day.

18. Report Information: Error history (maximum 5000 storage, maximum 1 year checkable period). One can view each error report with display date / device name / error code / error Occurred / detail error information.

Controller Installation should include all wiring and accessories as OEM Manufacturer directions and recommendations for the proper reliable functioning of controller.

Section- VIII -LIST OF ABBREVIATIONS

Followings List of Abbreviations shall have been used in preparing the Tender Specifications, Bill of Quantities & Drawings.

AABC : AMERICAN AIR BALANCING COUNCIL
ACH : AIR CHANGE PER HOUR
AC : AIR CONDITIONING
ACMV: AIR CONDUCTING AND MECHANICAL VENTILATION
AHU : AIR HANDLING UNIT
ANSI : AMERICAN NATIONAL STANDARD INSTITUTE
ARI : AMERICAN REFRIGERATION INSTITUTE
ASHRAE: AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIRCONDITIONING ENGINEER
ASME: AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTA : ASSOCIATION OF SHORT - CIRCUIT TESTING AUTHORITIES
ASTM: AMERICAN SOCIETY OF TESTING AND MATERIALS
ATG : AIR TRANSFER GRILLE
AWS : AMERICAN WELDING SOCIETY
BAS : BUILDING AUTOMATION SYSTEM
BIS : BUREAU OF INDIAN STANDARD
BMS : BUILDING MANAGEMENT SYSTEM
BTU : BRITISH THERMAL UNIT
CDW : CONDENSER WATER
CFM : CUBIC FEET PER MINUTE
CHW : CHILLED WATER
CMS : CENTRAL MONITORING SYSTEM
CRCA : COLD ROLLED COLD ANNEALED
CSA : CANADIAN STANDARD ASSOCIATION
CT : COOLING TOWER
CTI : COOLING TOWER INSTITUTE
DB : DISTRIBUTION BOARD
DDC : DIRECT DIGITAL CONTROLLER
DOL : DIRECT ON LINE
DFA : DELHI FIRE AUTHORITY
DIA : DIAMETER
DIDW: DOUBLE INLET DOUBLE WIDTH
DX : DIRECT EXPANSION
EA : EXHAUST AIR
EEPROM: ELECTRICAL ERASABLE PROGRAM
ELCB : EARTH LEKAGE CIRCUIT BREAKER
ETL : ELETRICAL TESTING LABORATORIES
EPA : ENVIRONMENTAL PROTECTION ACT
FCU : FAN COIL UNIT
FA : FLOOR ABOVE
FB : FLOOR BLOW

FCC	:	FIRE COMMAND CENTRE
FD	:	FIRE DAMPER
FFL	:	FINISHED FLOOR LEVEL
FPM	:	FEET PER MINUTE
FPS	:	FOOT PER SECOND
FRP	:	FIBERGLASS REINFORCED PLASTIC
GI	:	GALVANISED IRON
GPM	:	GALLON PER MINUTE
GSS	:	GALVANIZED STEEL SHEET
H/L	:	HIGH LEVEL
HDG	:	HOT DIP GALVANIZED
HDPE	:	HIGH DENSITY POLY ETHANE
HFC	:	HYDRO FLURO CARBON
HP	:	HORSE POWER
HVAC	:	HEATING VENTILATION & AIR CONDITIONING
IAQ	:	INDOOR AIR QUALITY
IEC	:	INTERNATIONAL ELECTROCHEMICAL COMMISSION
IKW	:	INDICATED KILO WATT
IPD	:	INITIAL PRESSURE DROP
ISO	:	INTERNATIONAL STANDARD ORGANIZATION
KW	:	KILO WATT
L	:	LITRE
LCD	:	LIQUID CRYSTAL DISPLAY
L/L	:	LOW LEVEL
L/S	:	LITRE PER SECOND
LSZH	:	LOW SMOKE ZERO HALOGEN
LT	:	LOW TENSION
M	:	METER
MAX	:	MAXIMUM
MCB	:	MINIATURE CIRCUIT BREAKER
MCC	:	MOTOR CONTROL CENTRE
MFD	:	MOTORIZED FIRE DAMPER
MIN	:	MINIMUM
MM	:	MILLIMETER
NBC	:	NATIONAL BUILDING CODE
NC	:	NOISE CRITERIA
NEC	:	NATIONAL ELECTRIC CODE
NFPA	:	NATIONAL FIRE PROTECTION ASSOCIATION
NPLV	:	NET PART LOAD VALUE
NIST	:	NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY
NEMA	:	NATIONAL ELECTRICAL MANUFACTURERS ASSOCCIATION
NPSH	:	NET POSITIVE SUCTION HEAD
NTS	:	NOT TO SCALE
OA	:	OUTDOOR AIR

PHE : PUBLIC HEALTH ENGINEERING
PLC : PROGRAMMABLE LOGIC CONTROLLER
P.C. : PERSONAL COMPUTER
PSIG : POUNDS PER SQUARE INCH GAUGE
PUF : POLYURETHANE FOAM
RA : RETURN AIR
RAD : RETURN AIR DUCT
RCC : REINFORCED CEMENT CONCRETE
RH : RELATIVE HUMIDITY
RPM : REVOLUTIONS PER MINUTE
SA : SUPPLY AIR
SAD : SUPPLY AIR DUCT
SMACNA: SHEET METAL & AIR CONDITIONING CONTRACTORS NATIONAL ASSOCCIATION INC
STD : STANDARD
T/A : TO ABOVE
TAB : TESTING, ADJUSTING AND BALANCING
T/B : TO BELOW
TCC : TERMINAL CONTROL CENTRE
TFA : TREATED FRESH AIR
TOA : TREATED OUTDOOR AIR
TP : THREE PHASE
TR : TONS OF REFRIGERATION
TVOC: TOTAL VOLATILE ORGANIC COMPOUNDS
VAV : VARIABLE AIR VOLUME
VFD : VARIABLE FREQUENCY DRIVES
VIP : VIBRATION ISOLATING PAD
VSPS : VARIABLE SPEED PUMPING SYSTEM
XLPE : CROSS -LINKED POLYETHYLENE
SISW : SINGLE INLET SINGLE WIDTH
UL : UNDERWRITERS LABORATORIES INC.
WG : WATER GAUGE

Section- IX -LIST OF BUREAU OFINDIAN STANDARD CODES

I.S. 3615 – Glossary of Terms Used in Refrigeration & Air Conditioning.
I.S. 325 – Three phase Induction Motors
I.S. 1822 – Motor Starters of voltage Not Exceeding 1000 volts
I.S. 3624 – Bourdon Tube Pressure and Vacuum Gauges
I.S. 2372 – Timber for cooling towers
I.S. 7403 – Code of practice for selection of standard worm and helical gear boxes
I.S. 1620 – Horizontal centrifugal pumps for clear, cold, fresh water
I.S. 996 – Single phase small A.C. and Universal motors
I.S. 1239 – Mild steel tubes, tubulars and other wrought steel fittings
I.S. 3589 – Electrically welded steel pipes for water, gas and sewage.
I.S. 6392 – Steel pipe flanges
I.S. 778 – Gun metal gate, globe and check valves for general purpose
I.S. 2952 – Recommendation for methods of measurement of fluid flow by means of orifice plates and nozzles
I.S. 277 – Galvanised steel sheets
I.S. 737 – Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes.
I.S. 655 – Metal air ducts
I.S. 732 – Code of practice for electrical wiring and fittings for buildings
I.S. 2516 – A.C circuit breakers
I.S. 900 – Code of practice for installation and maintenance of induction motors
I.S. 1248 – Direct acting electrical indicating instruments
I.S. 2516 – A.C. circuit breakers for voltages not exceeding 1000 volts
I.S. 4047 –Heavy duty air break switches and composite units of air break switches and fuses for voltage not exceeding 1000 volts.
I.S. 2208 – HRC cartridge fuse links upto 650 volts
I.S. 1554 – PVC insulated (heavy duty) electric cables for working voltage upto and (PART I) including 1100 volts.
I.S. 8183 – Specification for bonded glass wool/ mineral wool
I.S. 4671 – Specification for expanded polystyrene for thermal insulation purposes
I.S. 11561 – Code of practice for testing of cooling towers.
I.S. 7898 – Data for outside design conditions for air conditioning for summer months.
I.S. 8148 – Packages air conditioners
I.S. 2370 – Sectional cold rooms (walk-in type)
I.S. 5111 – Testing of refrigerant compressors
I.S. 10594 – Thermostatic Expansion Valve
IS 12615 – Energy efficient induction motors
Energy Conservation Building Code 2007
National Building Code of India 2016

SECTION- X

LIST OF APPROVED MAKE – BIRD , LUCKNOW		
1	VRV/VRF MANUFACTURER/Split AC	DAIKIN/TRANE/MITSUBISHI ELECTRIC/ CARRIER/SAMSUNG/Toshiba/Hitachi/ LG/Voltas/Bluestar/or equivalent as approved by BIRD.
2	VRV OUTDOOR STAND	ASPEN/(BIG FOOT) /HIRA WALRAVEN/ PHP ROOF TOOP SUPPORT Or equivalent as approved by BIRD.
3	COPPER PIPE	TOTALINE/ MANDEV/RAJCO equivalent as approved by BIRD.
4	CLOSED/OPEN CELL ELASTOMERIC NITRILE RUBBER INSULATION	ARMACELL/ KFLEX/ A FLEX equivalent as approved by BIRD.
5	PVC DRAIN PIPE	POLYPACK/ FINOLEX/ SUPREME equivalent as approved by BIRD.
6	ELECTRICAL PANEL	EAP/ADLEC/ADVANCE/TRICOLITE or CPERI Certified Panel Manufacturer equivalent as approved by BIRD.
7	MOTOR	ABB/CROMPTON/HINDUSTAN equivalent as approved by BIRD.
8	STARTER	ABB/SCHNEIDER/SIEMENS equivalent as approved by BIRD.
9	MCB/MCCB	SCHNEIDER/L&T/SIEMENS/ L&T equivalent as approved by BIRD.
10	PVC INSULATED XLPE ALUMINIUM/ COPPER CONDUCTOR	GLOSTER/HAVELLS/FINOLEX/SKYTONE/POLYCAB equivalent as approved by BIRD.
11	PVC INSULATED COPPER CONDUCTOR FLEXIBLE WIRES	FINOLEX/BATRA HENLEY/ DIATRON/SKYTONE/DELTON equivalent as approved by BIRD.
12	PVC/MS CONDUIT (ISI APPROVED)	BEC/AKG/NIC equivalent as approved by BIRD.
13	VFD	FUJI / DANFOSS /ABB / equivalent as approved by BIRD.
14	INDUSTRIAL SOCKETS / SPLASH PROOF	CLIPSAL/SCHNEIDER equivalent as approved by BIRD.

15	GI SHEET METAL DUCT	JINDAL/SAIL/TATA equivalent as approved by BIRD.
16	GRILLS/DIFFUSER	PINE AIR/ SYSYTEM AIR/ AIRMASTER/ BRIGHT FLOW / AIR FLOW equivalent as approved by BIRD.
17	HESSIAN (FIRE TREATED)	NAVAIR/ PYROGUARD/AIR FLOW equivalent as approved by BIRD.
18	ALUMINIUM TAPE	JOHNSON/BIRLA 3M equivalent as approved by BIRD.
19	VIBRATION ISOLATOR	RESISTOFLEX/DUNLOP equivalent as approved by BIRD.
20	INSULATION -XLPE	SUPREME/ K-FLEX/ TROCELLEN equivalent as approved by BIRD.
21	THERMAL INSULATION CLASS O	SUPREME/ K-FLEX/ TROCELLEN equivalent as approved by BIRD.
22	EPS (THERMOCOL) INSULATION	TOSHIBA/SIH equivalent as approved by BIRD.
23	V BELT	DUNLOP/ FENNER equivalent as approved by BIRD.
24	MINERAL WOOL INSULATION	LLOYD INSULATION / UP TWIGA/ KIMMCO equivalent as approved by BIRD.
25	CLOSED CELL FIRE RETARDANT XLPE (FOR DUCT INSULATION)	ARMACELL/ AEROFLUX/ TROCELLEN/ A FLEX equivalent as approved by BIRD.
26	TARFELT/CTRX COMPOUND	SHALIMAR TAR PRODUCT/ASIAN equivalent as approved by BIRD.
27	DASH FASTNERS	FISHER/HILTI equivalent as approved by BIRD.
28	AHU	VTS/FLAKTWOOD/SYSTEMAIR equivalent as approved by BIRD.
29	Pre fabricated Duct	Zeco/ Techno/ Rolastar/ Technofab equivalent as approval by BIRD.
30	Cable Tray	Pilco/ Slocut/ MEM/ BEC/ Steelkraft/ Legrand equivalent as approved by BIRD.

NOTE: Make of any other equipment not mentioned above shall be got approved from the Consultant before execution. Any other equivalent make in place of the above makes can be provided if the same meets the standards and is acceptable to the Consultant.

Section-XI
ADDITIONAL TERMS AND CONDITIONS

Supply and Installation of VRV package type Air Conditioning System

1. General

1.1 The contractor must get acquainted with the proposed site for the work and study specifications, conditions and drawings carefully. The work shall be executed in close coordination with the progress of building work.

1.2 (A) the Work, as indicated in the schedule of work with specification attached herewith including any modification/addition /alteration ordered subsequently, shall be carried out as per specification indicated below and in the following order of preference.

i Indian Electricity rules 2005 amended up to date

ii Relevant BIS standards as modified up to date.

iii CPWD general specification for electrical works.

1.3 (b) In case of any conflict the schedule of work, additional terms and conditions, standards specifications and clauses of agreement shall prevail in the proceeding order.

1.4 (c) All equipment's shall be delivered with (i) Manufacturer's test certificate (ii) manufacturer's technical catalogues, instructions (O&M manuals).

1.5(d) Scaffolding & any other T & P required for execution of shall be arranged by the tenderer.

1.6 (e) For items/Equipment's requiring inspection at manufacturer's works , the contractor will intimate the date of testing of equipments at the manufacturer's works before dispatch. The successful Tenderer shall give sufficient advance notice regarding the dates proposed for such tests to the department's representative to facilitate his presence during testing. The engineer in charge at his discretion may witness such testing. Equipment will be inspected at the Manufacturer/Authorized Dealer premises before dispatch to the site by the contractor . The department also reserves the right to inspect the fabrication/ assembly job at factory and successful tenderer has to make the arrangement for the same.

2. Scope of Work

The following shall be deemed to be included within the scope of work.

i) All minor building work i/c support necessary for installation of equipment, making of opening in walls/ floors either RCC or brick masonry and restoring them in original condition and finish.

ii) Responsibility to ensure safety of materials against pilferage and damage till the installation are handed over to the department.

3. Work to be arranged by the department

The department shall be responsible for the following works only and these are excluded from the responsibility of the contractor.

i) Free power and water for testing and commissioning of equipments.

ii) Site for installation.

4. Inspection before dispatch

a) All routine tests shall be conducted before dispatch of equipments. No equipments shall be dispatched from the contractor's premises without such tests being conducted and tests result recorded, these test certificates shall be given along with the supply of equipments. An OEM certificate of "no defect" is to be provided along with dispatched equipment or material to the site.

b) Prior to dispatch, all equipment's shall be adequately protected for the whole period transit, storage and erection against corrosion and accidental damages etc from the effect of vermin, rain, and humid climate.

5. Insurance

The contractor shall include storage cum erection including third party insurance right from the storage to commissioning of various equipments. All insurance which the contractor is required to enter into under the contract shall be effected with any authorized general insurance company and the contractor shall produce the policies of insurance.

6. Remedy to failure to Insure

If the contractor fails to effect and keep in force the insurance referred to in the preceding sub-clause the department may effect and keep in force any such insurance and pay such premiums as may be necessary for that purpose and from time to time deduct the amount, so paid by the department, from any money due or which may become due to successful tenderer or recovery the same as debt from the successful tenderer bill.

7. Supply of material

i. Supply of material shall be phased in such a manner that erection work is not hampered for want of material.

ii. All tools and tackles required for unloading of equipment and erection at site shall be the responsibility of contractor.

iii. The acceptance makes of various equipments/components/accessories have been indicated. Other than those the materials to be used in the site of works shall be ISI marked , where material bearing ISI marked , are not available , material conforming to ISI shall be used with prior approval of the BHEL.

iv. Suitable and open storage accommodation shall provided by the department free of cost to the agency. However, temporary structure if any required by the contractor for safe and lockable storage of material shall be allowed at his own cost.

v. The department will not be liable for any damage, losses and compensation payable at law in respect of or in consequence of any accident or injury to any

vi. Schedule of procurement of materials/equipments shall be submitted by successful tenderer within 15 days from the date of award of work. procurement of material shall be as per the approval of BIRD.

8. Quality of material and workmanship

All parts of the equipment shall be of such design, size and material so as to function satisfactorily under all related conditions of operation .All components of the equipment's shall have adequate factor of safety. The work of fabrication and assembly shall conform to sound engineering practice and on the basis of "Fail Safe Design". The mechanical parts are subject to wear and tear shall be easily replaceable type, the construction of the equipment's shall be such as to facilitate easy operation inspection, maintenance and repairs. All connections and contacts shall be designed to minimize the risk of accidental short circuit caused animals, birds and vermin etc. All identical items and their component parts should be completely, interchangeable including spare parts.

9. Inspection and Testing at site

The installation shall be subject to necessary inspection during every stage, by the BIRD or his authorized representative .The successful tenderer shall provide all facility and assistance for the purpose.

The completed installation shall be inspected and tested by the BIRD in the manner as will be laid down by him, in consultation with the contractors.

All instruments and facility necessary for the tests shall be provided by the contractor

10. Completeness of tenderer.

All fittings, equipment's, accessories, hardware's, foundation bolts, Terminals lugs For electric connections, cable glands and items which are necessary for efficient assembly, shall be deemed to have been included in the scope of work, the installation shall be completed in all details even where such details have not been mentioned in these specifications.

11. Guarantee

All equipment's shall be guaranteed for at least a period of 12 months from the date acceptance and taking over of the installation by the department against unsatisfactorily, performance and/or breakdown due to defective design, material, manufacture, workmanship or installation. The equipment or components or part thereof so found defective during the guarantee period shall be repaired or replaced free of cost to the satisfaction of BIRD. In case it is felt by the department that undue delay is being caused by the risk and cost of the contractor. The decision of BIRD in this regard shall be final.

12. Completion plan and data

a) The contractor shall give three copies of completion plans and data as per details below within one month after actual completion failing which an amount @ of 2.5% of value of work subject to maximum of Rs. 1000/- shall be deducted from any amount due to the contractor.

b) General layout of the site showing the routes of cables, location of feeder pillars.

c) Schedule of lengths, type & size of cables in different circuits/service mains and pole numbers on each circuit and

d) Position of all cable joints, if any

b. The contractor shall submit completion certificates as within one month after actual date of completion failing which an amount @ 2.5% of tendered cost subject to maximum of Rs. 10000/- shall be the responsibility of agency and deduction from any amount due to the contractor.

Security/Safety of installation shall be the responsibility of agency.

Section-XII

Check List: Financial Conditions

Supply, Installation, Testing, and Commissioning of VRV/VRF AC System and Dismantling of old Central AC System at BIRD, Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW – 226012.

APPENDIX

ABSTRACT TO GENERAL CONDITIONS OF CONTRACT		
1	Earnest money Deposit (EMD)	An initial part amount of Rs 9.40 lakh (Rupees Nine lakh Forty Thousand only) towards Earnest Money Deposit (EMD)by way of Bank Guarantee from Nationalized Bank/Scheduled Bank to be submitted along with the "Techno-Financial Bid".
2	Date of Commencement	Date of commencement shall be either 10 days from the date of issue of work order.
3	Period of Completion	4 months from the date of commencement.
4	Defect Liability Period	12 months from the date of virtual completion.
5	Agreed Liquidated Damages	0.25% of the value of the accepted tender for every week of delay or part thereof, subject to maximum of 5% of the value of the accepted tender.
6	Period of Final Measurement	30 days
7	Value of Work for the issue of Interim Certificate	Minimum Rs 75.00 Lakhs per month.
8	Retention money from each interim bill	5% of all the RA Bills
9	Total retention money including Earnest Money and initial security deposit	As per Clause 17, General Condition.
10	Consultant's certificate of Payment	15 days after submission of interim bills by the contractor.
11	Period of honoring payment certificate	30 days from date of Consultant's certificate of payment for the interim bills and its acceptance to employer.
12	Delayed Payments	No interest will be paid on this account.

Part II should not contain any terms and conditions but only priced bill of quantity.Terms and conditions, if any, incorporated in Part II, will not be valid or considered.

Place :
Date : Signature of Contractor _____

Name & Designation _____ Seal of the Contractor / firm _____

Section-XIII

DECLARATION

I/We have inspected the site of works and have made me/we fully acquainted with the local conditions in and around the sites of works.

I/We here by declare that I/We have gone through the conditions laid down or any other terms and condition written with elsewhere in the Notice Inviting Tender, Conditions of Contract, Technical Specifications and understood the same and on the basis of the same I/We quoted our rates in the Schedule of Quantities attached with the tender documents.

I/We shall also uniformly maintain such progress as may be directed by the Employer/Consultant to ensure completion of same within the target date as mentioned in the tender document. the site of works and have made me/we fully acquainted with the local conditions in and around the sites of works.

Witness _____

Signature of Tenderer

Address: _____

_____

_____

Date: _____

Annexure-IV

Proforma for Details of Principal Bidder / Other Bidders

Sl. No.	Particulars	Bidder
1	Name of the Bidder	
2	Address	
3.	Contact Person	
4	Email	
5	Telephone No.& Mobile No.	
6	Fax No.	

Signature of the Tenderer: ----------

Date: ----------

Annexure-V

(Proforma of undertaking for maintenance confirmation by the Tenderer on Company's Letterhead)

Date:

The Director,
RBSD,
Sector – H, LDA Colony, Kanpur
Road, LUCKNOW - 226012.

Dear Sir,

Supply, Installation, Testing, Commissioning and Maintenance of VRV/VRF Air Conditioning system at Bankers Institute of Rural Development, 1st floor DPSP section, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012

We hereby undertake to maintain the VRV/VRF AC systems installed by us in your Bankers Institute of Rural Development, Sector – H, LDA Colony, Kanpur Road, LUCKNOW, satisfactorily for a period of not less than 5 years after expiry of the defect liability/warranty period at the rate quoted by us towards all-inclusive maintenance contract, subject only to the price revision clause specified in the tender.

In the unlikely event of M/s_____the original equipment manufacturer (OEM), failing to provide support in terms of spares etc. due to technological obsolescence or for any reason, we shall continue to provide all-inclusive service to your satisfaction, by arranging required spares etc. ourselves, within the rates quoted by us for the all-inclusive maintenance contract for the period accepted as above.

Yours faithfully,

For_____

Authorised Signatory

Annexure-VI

Proforma of Bank Guarantee (In lieu of EMD amount)

(To be Stamped as a Security Bond - To be submitted on Non judicial stamp paper of appropriate value purchased in the name of the issuing Bank)

No. _____ Date _____

The Director,
BIRD
Sector – H, LDA Colony, Kanpur
Road, LUCKNOW - 226012.

Dear Sir

Supply, Installation, Testing, Commissioning and Maintenance of VRV/VRF Air Conditioning system at Bankers Institute of Rural Development, 1st floor DPSP section, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012

WHEREAS

You have taken part in the bidding of tender for Supply, Installation, Testing, Commissioning and Maintenance of VRV/VRF Air Conditioning system at Bankers Institute of Rural Development, 1st floor DPSP section, Sector – H, LDA Colony, Kanpur Road, LUCKNOW - 226012

i. ---------- in our constituents M/s. a ----
_____ having Its Registered Office at _____
hereinafter referred to as "the Contractor" which expression shall include its successors and assigns planners for the time being and from time to time) on the terms and conditions mentioned in the tender.

2. One of the terms of the tender is that to take part in the tender the contractor had to deposit an EMD amount of Rs._____ mentioned in the tender document for which the Bank Guarantee is format attached.

3. The Contractors have requested the Employer and the Employer has agreed to take EMD amount as Bank Guarantee submitted by the Contractors only up to a sum of Rs. –
_____ (Rupees_____ only)) in the form of a Bank Guarantee

4. The Contractors, who are our constituents, have since requested us to furnish the said Guarantee to the Employer in respect of the said sum of Rs. ---------- (Rupees ---
---------- only)

NOW, THEREFORE, THIS LETTER OF GUARANTEE WITNESSETH THAT:-

In consideration of the Bankers Institute of Rural Development having agreed to take the Bank Guarantee in lieu of Earnest Money Deposit in terms of the said tender of Rs -- (Rupees --- only) and also to accept this Guarantee in lieu of the EMD of sums of Rs. -------- (Rupees ------------------------------------- --only).

We, the .... hereby unconditionally and irrevocably guarantee unto the Bankers Institute of Rural Development (hereinafter referred to as "the BIRD", which expression shall include its successors and assigns) that in the event of the BIRD coming to the conclusion that the Contractor have not performed their obligations under the said tender or have committed a breach thereof in particular failed to rectify the defect in the construction/workmanship brought to their notice in terms of the said Agreement which conclusion shall be final and binding on us, WE shall on demand and without demur pay to the BIRD the sum of Rs.--------------------------- (Rupees ---------------------------------- only) or any lower amount that may be demanded by the BIRD and our this guarantee shall be treated as equal to the Earnest Money Deposit kept with the BIRD for the due performance of the aforesaid obligations of the Contractors under the said Agreement.

2. We, the .... also agree and confirm that the sum not exceeding Rs 9.40 Lakh (Rupees Nine Lakh Forty Thousand only) as indicated in the written demand issued by the BIRD shall be final and binding on us and we shall not ask for any further proof or evidence and we shall not question the same either inside or outside in any Court, Tribunal or Arbitration, etc.; and that we will make the payment pursuant to the demand notice issued by BIRD without reference to the Contractors and notwithstanding any dispute or difference that may exist or arise between the BIRD and the Contractors or any other person, and that this guarantee shall be a continuing guarantee and shall not be revoked by us without prior consent in writing of the BIRD;

3. We hereby further agree that:

a. any neglect or forbearance, act or omission on the part of the BIRD in enforcement of the conditions of the contract or granting of any time or the showing of any indulgence by the BIRD to the Contractors in respect of the completion of the building or any other matter in connection therewith or any variation in the terms of the said contract made by mutual agreement between the BIRD and the Contractors or any other act or deed on the part of the BIRD, which, but for this Clause, may have the effect of discharging the guarantor under the Law of Suretyship, shall not discharge us in any way and our obligation under this guarantee shall be discharged only by payment in full of the sums guaranteed hereunder;

b. it shall not be necessary for the BIRD to exhaust its remedies against the Contractors before invoking this guarantee and the guarantee herein contained shall been forcable notwithstanding that any other security, which the BIRD may have obtained or may obtain from the Contractors, is outstanding and unrealised.

c. our liability under this guarantee shall not be affected by any infirmity or irregularity on the part of the Contractors in entering into the said contract or by the dissolution or change in the constitution or name of the Contractors;

d. our liability under this guarantee shall not exceed the sum of Rs. ..... (Rupees ..... only) mentioned above

4. This guarantee shall remain in force up to provided that if so desired by the BIRD, this guarantee shall be renewed by us for a further period as may be indicated by the BIRD on the same terms and conditions as contained herein, but at the cost of the Contractors, failing which the amount guaranteed hereunder shall become payable to the BIRD on demand.

5. Our liability under this guarantee will terminate on the aforesaid date, unless renewed as provide hereinabove, or on the day when the Contractors comply with the obligations under the said Agreement, in particular that relating to the rectification of defects in the construction or workmanship during the period of defects liability as provided in the with Agreement (as to which a certification in writing by the BIRD alone shall be conclusive proof), whichever date is earlier. Unless a claim or suit or action is filed against us within 6 months from the date aforesaid or the extended period of this guarantee, all the rights of the BIRD against us under this guarantee shall stand forfeited and we shall be released and discharged from all our obligation and liabilities hereunder.

Yours faithfully,

N.B. This guarantee will require stamp duty as applicable in the State, where it is executed and shall be signed by the official whose signature and authority shall be certified.

SIGNED AND DELIVERED
(For & on behalf of the above-named Bank)

For & on behalf of
(Bank's Name & Seal)

Branch Manager
(Bank's Seal)

Bank Address .....

TENDER SCHEDULE

Part – I Financial Bid

TENDER SCHEDULE
Financial Bid

Supply, Installation, Testing, Commissioning & Maintenance Of Variable Refrigerant Volume / Variable Refrigerant Flow Air Conditioning System & Dismantling Of Old Air conditioning System

CLIENT:
THE DIRECTOR,
BANKERS INSTITUTE OF RURAL DEVELOPMENT (BIRD)
SECTOR – H, LDA COLONY, KANPUR ROAD, LUCKNOW – 226 012.

Bill of Quantities – Office Area

	GENERAL NOTES:
i	The rate for each item of work included in the Schedule of Quantities shall, unless expressly stated otherwise, include cost of
a	All materials, fixing materials, accessories, appliances tools, plants, equipment, freeport, labour and consumable required to prepare for and to the full and entire execution, testing, balancing, commissioning and completion of work called for in the form and as per Specifications and Drawings
b	Wastage on materials and labour
c	Loading, transporting, unloading, handling/double handling, hoisting to all levels, setting, fixing and fixing in position, protecting, disposal of debris and all other labour necessary in and for the full and entire execution and for the job in accordance with the contract documents, good practice and energy/ee principles
d.	Liabilities, obligations and risks arising out of Conditions of Contract.
e	The unit rate for all equipment or materials in Indian Rupees shall include cost of equipment and materials including all taxes and duties and also including forwarding, freight, insurance and transport into Contractor's store at site, storage, installation, testing, balancing, commissioning and other works required.
f	The contractor shall perform Nitrogen test and vacuum test on refrigerant piping. Start and stop testing & pressure control test shall be checked and the readings recorded shall be counter signed by consultant / client's representative.
g	The contractor shall submit complete generated reports of the VRF system for a duration of one hour indicating parameters, temperatures, voltage, power consumed, etc
h	Cable glands shall be compression type, heavy-duty chromium plated
i	All cable termination to have 'tags' /ferrules
k	INSTRUCTION / MAINTENANCE MANUAL
	The Contractor shall prepare and produce instruction, operation and maintenance manuals in English for the use, operation and the maintenance of the supplied equipment and installations and submit to the Client / Consult ant in (3) copies at the time of handing over. The manual shall generally consist of the following:
i	Description of the project.
ii	Operating instructions.
iii	Maintenance instructions including procedures for preventive maintenance.
iv	Schematic & control wiring diagrams.
vii	Commissioning Certificate.
7	MAINTENANCE OF PLANT AND TRAINING OF PERSONNEL
	The Contractor shall arrange to provide, at no extra cost, necessary personnel and materials to carry out all routine maintenance of the AC equipment as required regularly.

Sl.No	Description of Items	Qty	unit	Rate(INR)	Amount (INR)
5	Supply, Installation, Testing and Commissioning of modular type outdoor units equipped with highly efficient scroll/rotary compressors (**all inverter compressors**), special heat exchanger (anti-corrosion fin factory coated),Y branch as required, outdoor unit support, auto check function for the connection wires, auto addressing setting, and capacity as mentioned below. Outer casing of the Out Door Unit should be factory coated with rust prevention coating. Compressor as specifications mentioned in the tender. VRV/VRF system shall be suitable for working on **50°C ambient temperature**. The ODU shall be complete with Micro-processor control panel, sub cooler, accumulator, isolating valves (service valves) and all the necessary accessories for proper functioning of the units.				
a	The compressor will include lubricating oil & Refrigerant R-410 A, including top up if required.				
b	**The prices should include VRV/VRF AC system, shifting and positioning of units at Site.**				
c	The scope shall include electrical isolators suitable for outdoor application on suitable stand next to each outdoor unit.				
d	The COP of system should be more than 3.1 at 100% Load & IEER not less than 6.5 (100% combination ration) at 35°C DBT ambient temperature & at 27°C DBT/19°C WBT inside temperature (AHRI testing Condition should be followed for 100% Load COP test result). Units should be Heat pump model.				
e	ODU installation is done as per Manufacturer recommendation with all installation requirements i.e foundation, Vibration Isolation etc as recommended by Manufacturer. ODU installation is included in ODU price.				
f	The Contractor/OEM will arrange the inspection and COP and Ambient Testing of units at NABL certified Laboratory without any extra cost to the Consultant.				
5.1	ODU Capacities (HP) are as under:				
i	12	6	Nos.		
ii	14	3	Nos.		
iii	16	1	Nos.		
iii	18	1	Nos.		
iv	20	1	Nos.		
v	24	3	Nos.		
vi	[illegible]	1	Nos.		

vii	37	1	Nos.			
viii	38	1	Nos.			
ix	47	1	Nos.			
x	50	4	Nos.			
2.1	Supply, installation, testing and commissioning of factory built/site assembled Eurovent Certified/UL Certified with equivalent leakage class Air handling units in Double skin type (Casing shall be of Non-Extruder construction with 48 +/- 5 mm panels with thermal break construction consisting of GI casing of thickness 0.6 mm outside layer and 0.8 mm inside layer with 275 GSM or equivalent zinc coating and polyurethane foam (PUF) insulation having density of 42 kg/m3.) complete with Backward curved centrifugal blade Plug type direct driven fan of Aerofoil design blade along with VFD suitable for static pressure as detailed below, CH cooling coil with aluminium finned copper tubes. Filter section should be having MERV13 or higher, UV lamps UL certified, IE3 motor suitable for 415 +/-10% volts, 50 Hz, 3 phase AC supply, drain connections with stainless steel drain pan and necessary vibration isolation arrangement to avoid any vibration etc. complete as per specifications and drawings. AHU Construction should meet Mechanical performance of AHU casing as tested in Eurovent accredited laboratory as per EN1886 and meet the following characteristics: Mechanical Strength D1, Thermal Bridging TB2, Thermal Transmittance T2, Air leakage L1 and Filter by pass F9 or Higher Characteristics. The said mechanical performance should be meet by each AHU as mentioned below. The External Static pressure should be 25-30 mm and should be verified as per actual site conditions. RKA plenum should be part of AHU. The direction of AHU to be approved by Consultant. VFD should be capable to control the speed of the fan and compatible with BMS integration for fan speed control. ESP as defined or as approved. All accessory should be considered for the proper functioning. Cooling coils (Coil Tr.) should be 6/8 row as mentioned below or approved. The VFD shall be suitable for at least 1 PID (Temp.). The scope shall include the Starter Panel, controller, field devices and wiring. Starter Panel should be built in AHU. VFD should be at least IP-55, suitable for input Voltage of 380 Vac to 480 Vac -15% to +10% with inputs Frequency of 50Hz +/- 5%. Overload shall be 120% for 60 Sec & VFD shall be rated at 500kgC. Pressure and Humidity sensor should be included. By Pass Provision should be provided in Starter Panel with Star Delta Combination as required or Design by OEM. VFD should be with weather proof enclosure. Fire Dampers could be integrated with AHU Panel and Fire Panel for application in Fire Case.					

i	3500 (4 Row Coil)	1	Nos.		
ii	8000 (4 Row Coil)	11	Nos.		
iii	5000 (6 Row Coil)	1	Nos.		
iv	8000 (6 Row Coil)	1	Nos.		
v	12000 (6 Row Coil)	4	Nos.		
vi	14000 (6 Row Coil)	4	Nos.		
2.1.1	Dismantling of OLD AHU from AHU Room and scrapping as required.				
i	2500	1	Nos.		
ii	3000	11	Nos.		
iii	5000	1	Nos.		
iv	8000	1	Nos.		
v	12000	4	Nos.		
vi	14000	4	Nos.		
2.1.2	Supply, Installation, Testing and commissioning of AHU kit (Expansion kit) , Control kit & Control remote in AHU room as required to connect the indoor unit complete etc. is required.	27	Nos.		
2.1.3	Supply, Installation, Testing, Balancing & Commissioning of G.I.S rectangular/round ducting including plenum as required as per IS 655 - 2006 complete with gaskets, elbows, splitters, vanes, support & adjustable dampers, etc. as per approved drawings (Factory Fabricated)The price shall include necessary scaffolding required for working at required height.				
	Hot dipped Galvanised with 120GSM Zinc coating				
i	Thickness 0.80mm Sheet	300	Sq.m		
ii	Thickness 0.63mm Sheet	300	Sq.m		
2.1.4	Supplying, Fixing, testing and commissioning of Fire dampers in supply air duct/ main branch and return air path as and where required of required size c/c control wiring, the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally	10	sq.m		

	required. The damper shall also be closed in the event of fire signal complete as required and as per CPWD specifications.				
2.1.5	Supply and fixing of 25 mm thickness duly laminated aluminium foil of mat finish closed cell Nitrile rubber (Class O) insulation on the circle duct after applying suitable adhesive for Nitrile Rubber. The joint shall be sealed with 50 mm wide and 3 mm thick self adhesive nitrile rubber tape insulation complete as per specification and as required.	600	Sq.m		
2.1.6	Supply and fixing of acoustic lining of supply air duct and plenum with 25 mm thick Supply and Application of Acoustic Insulation with Engineered Nitrile Rubber open cell foam with Density 140 - 180 kg/m3 passing Class 1 Fire Performance test as per BS 476 Part 7, Air Erosion test for 10,000 fpm air velocity as per ASTM C 1071-05 and with built in antimicrobial protection. The material should pass Fungi Resistance Test as per DIN EN ISO 846 Method A and Bacterial Resistance Test as per DIN EN ISO 846 Method C, to be applied using manufacturer's recommended Rubber based Adhesive in a blend of solvents.	100	Sq.m		
2.1.7	Supply and fixing of Flexible connection Duct.	50	Sq.m		
3.1	Supply, installation, testing and commissioning of following minimum capacity VRV/VRF High Wall Indoor/Cassette equipped with washable synthetic media pre filter, fan selection with suitable static fan/dynamically balanced blower/multi speed motor, coil selection with DX coil, Electronic Expansion valve/outer cabinet, drain pan, drain pump, insulation, pipe connection etc. suitable for operation on 230 V ± 10%, 50 Hz, single phase AC supply, complete as required. The unit shall have automatic feature shut down provision in case of fire on receiving the signal from BMS System. The Cooling capacity of Indoor Unit will be at Air Inlet condition of at 27°C DB/19°C WB inside temperature and other specification as mentioned in drawing/specification. The IDU unit should be with wireless remote.				
3.2	IDU Capacities are as under				
3.2.1	High Wall				
1	1.0 TR	16	Nos.		

2.3	"Supplying, installation, testing and commissioning of Split AC machine (Inverter type, Cooling and Heating system) of minimum BEE 3 (Three) star rating, having", copper condenser with rotary/scroll type compressor, LCD remote control, complete with (IDU & ODU) and 3 mtrs long insulated copper tubes with outdoor unit wall mounting bracket, 20 mm dia. PVC drain pipe c/w connection etc. as required for SITC.				
2.3.1	High Wall				
i	1.5 Ton	46	Nos.		
2.4	ODU (1): Combination of below Capacities demanding from Office Area and Shifting to Hostel Area and Refilling of Gas and Installation to Hostel Area as under:				
2.3.1	High Wall				
i	1.5 Ton	25	Nos.		
3.1.	Supply, installation, testing and commissioning including vacuumisation and Nitrogen testing of the following nominal sizes soft/hard drawn copper refrigerant piping for VRV/VRF system for Refrigerant R 410 complete with fittings with suitable adjustable ring type hanger supports, jointing/brazing including accessories, insulated with XPLE Class O tubular insulation/ anti-Class I closed cell elastomeric or its rubber rubber sleeves of specified thickness as given below for suction and Liquid lines, all accessories as per specification etc as required/approved by consultant. The cost should also include the time/s to be made for piping and sealing the pipe ends to air tight joints.				
i	9.5 mm OD (Soft Drawn) with tube thickness 1.1 mm with 19 mm thick insulation	1,000	RM		
ii	12.7 mm (OD)(Soft Drawn) with tube thickness 1.2 mm with 19 mm thick insulation	1,000	RM		
iii	15 mm (OD)(Hard Drawn) with tube thickness 1.2 mm with 19 mm thick insulation	1,000	RM		
iv	28.58 mm (OD)(Hard Drawn) with tube thickness 1.2 mm with 19 mm thick insulation	1,000	RM		
v	34.9 mm (OD)(Hard Drawn) with tube thickness 1.2 mm with 19 mm thick insulation	700	RM		
vi	41.27 mm (OD)(Hard Drawn) with tube thickness 1.2 mm with 19 mm thick insulation	700	RM		
3.2	Supply, installation, Testing and commissioning of refrigerant piping Y joints set as required to connect the ind oor units complete etc as required.	50	Nos.		
4	Supply, installation, Testing and commissioning of PVC (minimum 15kg/sqcm pressure rated) drain water piping complete with fittings(elbows,tee, reducers,sockets,u trap etc.) supports, jointing,built in insulation with XLPE class O tubular insulation and any other item required to make the system				

	completion. Nominal diameters of pipe in mm's as indicated below:				
i	25 mm dia pipe, insulation thickness -9 mm	1,000	RMt		
ii	32 mm dia pipe, insulation thickness -9 mm	500	RMt		
iii	48 mm dia pipe, insulation thickness -9 mm	300	RMt		
5	Supplying and installing following size of perforated painted with powder coating M.S. cable trays with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling/Electrical/wall with M.S. suspenders including bolts & nuts, painting suspenders etc. as required				
i	300 mm width X 50 mm depth X 1.6 mm thickness	4,400	Mtr		
6	The plant supports shall consist of a galvanised steel frame supported by adjustable leg and foot assemblies. The frame dimensions should be designed to take the weight with minimal deflection, and should be manufactured from hot dip galvanised carbon steel: BS EN 10219-1, to a welding standard: BS EN ISO 15614. The galvanising standard to be BS EN ISO 1461 with salt mist testing to BS EN 60068-2-52. The feet shall be 150mm square made from Nylon 6.6(NB1) 30% glass fibre filled. Bound using a ratio of high quality moisture curing polyurethane pre polymer to BS 7188 and BS 5696-3. The leg assembly is fixed at minimum 300 mm. Load bearing strength should be not less than 300/600 kg/stand. Third party certification should be provided for load bearing strength				
i	Minimum Dimension (L * W*H) 1600 mm * 360 mm*250 mm)	4	Nos.		
ii	Minimum Dimension (L * W) 3200 mm * 355 mm* 250 mm	17	Nos.		
iii	Minimum Dimension (L * W) 2400 mm * 600 mm*250 mm	8	Nos.		
7	**Electrical distribution Panel**				
	Supplying, installation, testing & commissioning of cubical type wall/ floor mounted Distribution Panel suitable for **Outdoor application** for 415V, 3 Phase, 4 Wire 50 Hz AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2mm thick for frame work and covers, 3 mm thick for gland plates /& cleaning & finishing complete with 7 tank process for powder coating in approved shade, having Suitable Amp capacity extensible type Copper bus bars of high conductivity, SMC bus bar supports, with short circuit withstand capacity of **50kA** , with entire panel shall have a common earth bus of suitable size at the rear with 2 Nos earth stud, panel connections from main bus bar to switch gears with				

	required size of Copper bus bars and control wiring with 1.5 sq.mm. PVC insulated FRLS copper conductor Single Core cable, cable alleys, cable gland plates, providing & fixing following switch gears:-				
	Each MCCB shall be with the following				
i	Extended Rotary Operating Handle, Phase Spreader links and Phase barriers				
ii	1 Set - Digital Ammeter with in built ASS, metering C.T.s "Cast Resin" type, 15VA, and accuracy class 1of 800/5A for measuring current in each phase				
iii	1 Set - Digital Voltmeter with in built 9SS, with 2Amp. Back up MCB				
iv	1 Set - 3 Nos. Phase indication LED lamps with 2Amp back up MCB, Breaker 'ON/OFF' indicating light with 1A MCB, test terminal block set, circuits as per standard practice, auxiliary contacts for positive interlocking of the breakers as required. - 1 Set				
v	3 No. Suitable energy meter				
vi	Each Panel will have Junction box with holes punched for connecting the existing panel through Cable				
A	**Electrical distribution Panel**				
	Supplying, installation, testing & commissioning of cubical type wall / floor mounted Distribution Panel suitable for **out door application** for 415V, 3 Phase, 4Wire 50 Hz AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2mm thick for frame work and covers, 1 mm thick for gland plates (1 coating & finishing completely with 7 tank process for powder coating in approved shade, having Suitable 2amp capacity extensible type Copper bus bars of high conductivity, SMC bus bar supports, with short circuit withstand capacity of **25kA for 1 sec.** with entire panel shall have a common earth bus of suitable size at the rear with 2 Nos earth stud, solid connections from main bus bar to switch gears with required size of Copper bus bars and control wiring with 1.5 sq.mm. PVC insulated FRLS copper conductor Single Core cable, cable alleys, cable gland plates, providing & fixing following switch gears:-				
	Each MCCB shall be with the following				
	Extended Rotary Operating Handle, Phase Spreader links and Phase barriers				

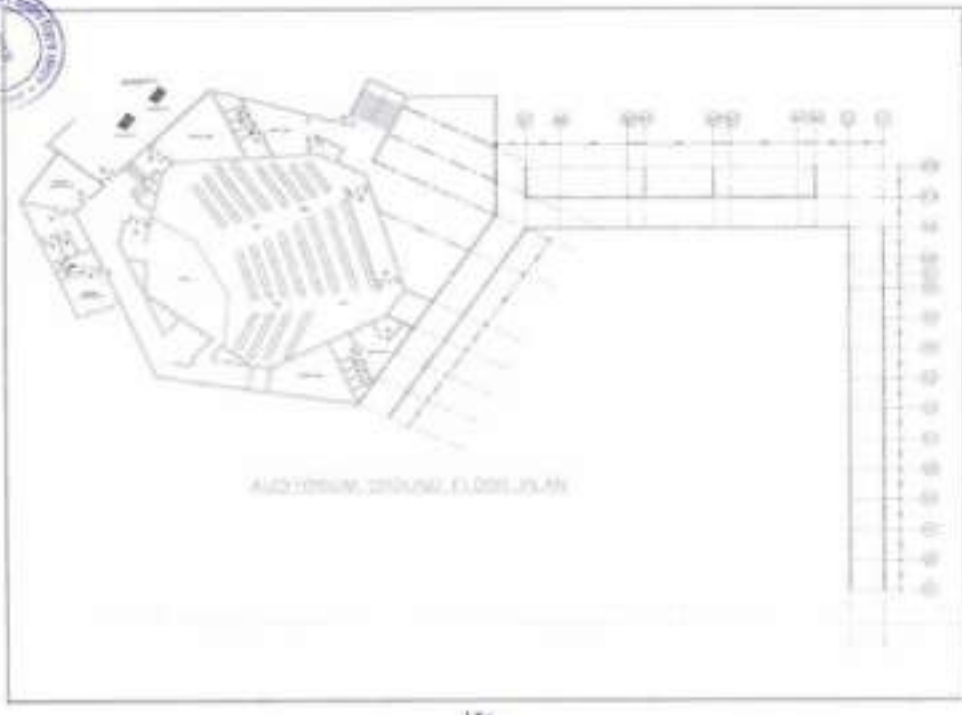
i	1 Set - Digital Ammeter with in built ASS, metering C.T.s "CAST RESIN" type, 15VA, and accuracy class 0.5 [illegible] for measuring current in each phase				
ii	1 Set - Digital Voltmeter with in built VSS, with 2Amp Back up MCB				
iii	1 Set - 3 Nos. Phase indication LED lamps with 2Amp back up MCB, Breaker "ON/OFF" indicating light with 2A MCB, test terminal block set, circuits as per standard practice, auxiliary contacts for positive interlocking of the breakers as required - 1 Set				
7.1	**Panel A**				
i	**Incomer**				
a	1 No. - 400 Amps Four Pole, 36 KA (ICU=ICS) for 1 sec. MCCB with Thermal Magnetic release with O/C, S/C & E/F protection release.				
ii	**Bus Bar:**				
	TPN Copper extensible type main bus bars of minimum of **500 A** capacity (As per capacity of corresponding incoming / Bus coupler(s) , and auxiliary bus bars of suitable capacity with heat shrunk coloured sleeves and [illegible] SMC bus bars supports at required intervals complete for cross section, size supports & their spacing etc. for withstanding fault level of 35kA for 1 Sec.				
iii	**Outgoings**				
	Supplying and fixing following outgoing complete connections, inter connections etc. as required.				
a)	1 Nos. - 80Amp, 10KA, TPN EL+ MCB				
b)	4 Nos. - 40 Amp, 10KA, TPN EL+MCB				
c)	4 Nos. - 16 Amp, 10KA, SPN EL+MCB	8	Set		
d)	4 Nos. - 10 Amp, 10KA, SPN EL+MCB				
e)	4 Nos. - 20 Amp, 10KA, SPN EL+MCB				
f)	1 Nos. - 10 Amp, 10KA, SPN EL+MCB				
7.2	**Panel B**				
i	**Incomer**				
A	1 No. - 400 Amps Four Pole, 36 KA (ICU=ICS) for 1 sec. MCCB with Thermal Magnetic release with O/C, S/C & E/F protection release.				
	Bus Bar:				

	TPN Copper insulated type main bus bars of minimum of 800 A capacity (As per capacity of corresponding incoming / Bus couplers) , and auxiliary bus bars of suitable capacity with heat shrink coloured sleeves and (ii) SWE bus bars couplers as required intervals complete for cross section, bus couplers & their spacing etc. for withstanding fault level of 50kA for 1 sec.				
i)	**Outgoings**				
	Supplying and fixing following outgoing complete connection, inter connection etc. as required.				
a)	2 Nos. - 80Amp, 30KA, TPN (L+ MCB				
b)	2 Nos. - 63 Amp, 10KA, TPN (L+MCB	4	Set		
c)	3 Nos. – 40 Amp, 10KA, TPN (L+MCB				
d)	1 Nos. – 32 Amp, 10KA, TPN (L+MCB				
f)	1 No. - 16 Amp, 10KA, SPN (L+MCB				
g)	1 No. - 10 Amp, 10KA, SPN (L+MCB				
h)	4 Nos. - 10 Amp, 10KA, SPN (L+MCB				
i)	4 Nos. - 63 Amp, 10KA, SPN (L+MCB				
8	Supply & installation of interconnecting control & transmission Copper wiring ZC x 1.5sqmm as communication cable required in PVC conduit.	8,400	RM		
9	Supply of following 1100 PVC insulated copper conductor armoured 660/1100 volts complete with cable tray clamps, saddles, thimble cable gland etc. including effective proper connection to the equipment as required.				
i	4C X 6 mm2	50	RM		
ii	4CX 10 mm2	50	RM		
iii	4CX 16 mm2	100	RM		
iv	4CX 25 mm2	100	RM		
v	3C X 4 sq.mm (Black, Green & Any Phase Color)	100	RM		
vi	3C X 2.5 sq.mm (Black, Green & Any Phase Color)	8,400	RM		
vii	2C X 6 mm2	50	RM		
viii	2C X 10 mm2	50	RM		
ix	2C X 16 mm2	100	RM		

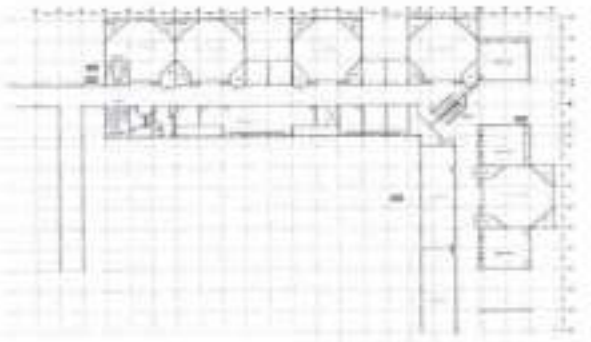
x	3C X 25 mm2	100	RM		
xi	4C X 50 mm2	1000	RM		
xii	4C X 70 mm2	1000	RM		
xiii	3C X 50 mm2	1000	RM		
xiv	3C X 70 mm2	1000	RM		
11	**EARTHING & MISCELLANEOUS ITEM**				
11.1	Earthing complete with galvanised steel earth plate electrode 600×600mm× 6mm thick, buried directly in ground (earth pit not less than 2.25 metres deep below ground level) with top edge of the plate not less than 1.5 metres below normal ground level, connected to galvanised earth lead wire but using galvanised iron strip 32×6mm as earthing lead	10	Set		
12	**Dismantling and buying back (-)**				
1.1	Dismantling and **buying back** including VRV/HW AC system (lifting & transportation) of following items including legal disposal of the debris.				
i	Chiller 4 x 425TR	1	Set		
ii	Pump & Misc.	1	Set		
iii	Cooling tower/ Misc	1	Set		
iv	Piping (All Central AC plant and its vicinity)	1	Set		
v	Electrical panel	1	Set		
vi	Starter panel	1	Set		
vii	Cable	1	Set		
viii	Hot water Generator	1	Set		
ix	Open type exp tank	1	Set		
x	Old AHUs	27	Nos.		
	BUY BACK : The amount will be in negative, to be deducted from the Grand total. The contractor will give credit.				
	GRAND TOTAL A (Minus Buy Back) **In Words**				
	GRAND TOTAL A (Minus Buy Back)				

	in Numbers				
B	AMC (B)				
	Annual Comprehensive routine operation including 3 operator per Shift & 2 shifts per day) and preventive maintenance comprising of VRF unit in all accessories, consumable like oil, gas, PCB's & other item to keep the system in perfect running condition as required for the following periods after defect liability period of 1 year after successfully commissioning and handing over				
i	1st Year after expiry of 1 year warranty period	7%	of		
ii	2nd Year after expiry of 1 year warranty period	7%	of		
iii	3rd Year after expiry of 1 year warranty period	7%	of		
iv	4th Year after expiry of 1 year warranty period	7%	of		
v	5th Year after expiry of 1 year warranty period	7%	of		
	Note: The cost of min 3 operator per Shift & for 2 shifts per day for defect liability period shall be part of equipment.				
	GRAND TOTAL B				
	GRAND TOTAL (A +B) in Words				
	GRAND TOTAL (A +B) in Numbers				

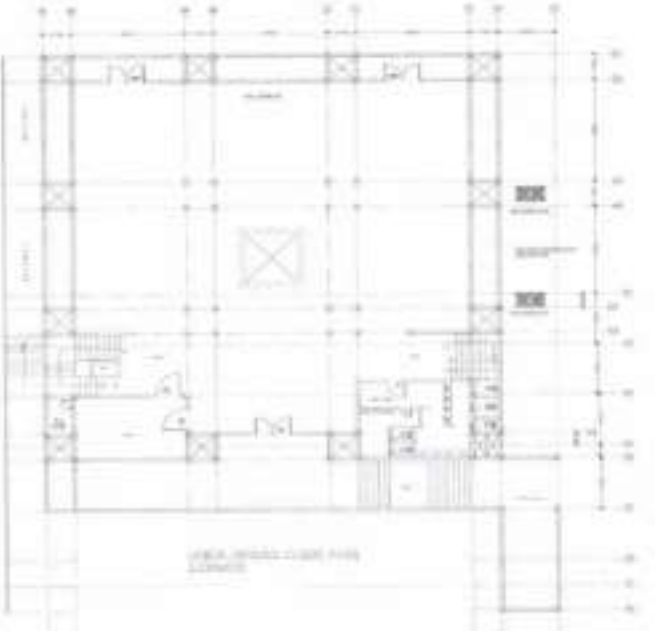
Tender Drawings -

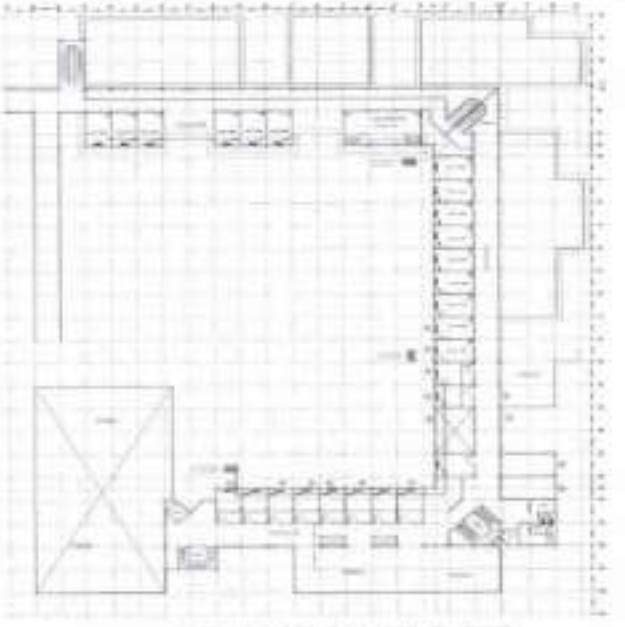


FIRST FLOOR PLAN

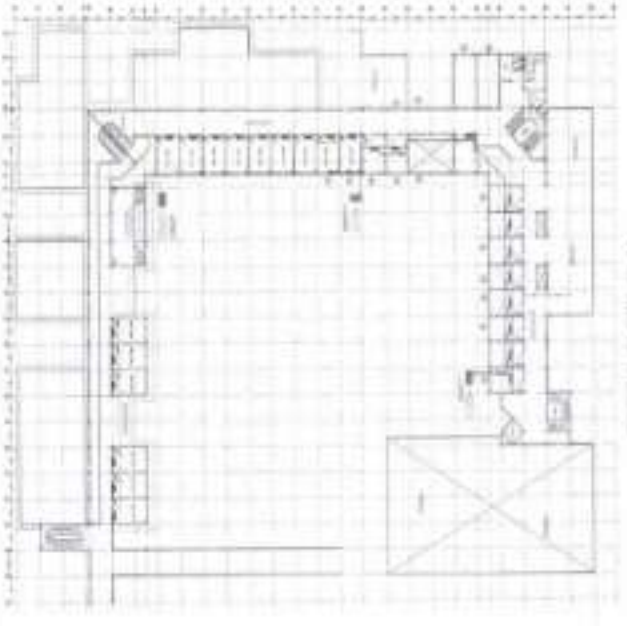


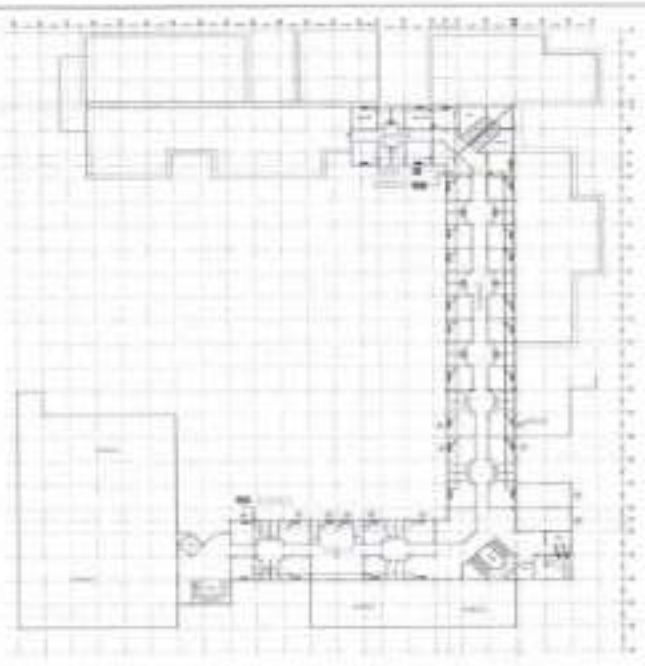
GROUND FLOOR PLAN





SECOND FLOOR PLAN (SOUTH SIDE)
SECOND FLOOR PLAN





THIRD FLOOR PLAN/SOUTH THIRD FLOOR PLAN