TENDER DOCUMENT

ESTABLISHMENT OF CT STIMULATOR FACILITY AND ASSOCIATED INFRASTRUCTURE FOR RIMS, IMPHAL

IFB No: HLL/CMO/HCD/CT/RIMS/MN/26-27, Dt. 14.10.2026

e- Tendering

Hi-Care DIVISION

HLL Lifecare Limited

(A Government of India Enterprise)

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PART I

INSTRUCTIONS TO THE BIDDERS (ITB)

Instructions to bidder are broad guidelines to be followed while formulating the bid and its submission to the Purchaser. It also describes the methodology for opening and evaluation of bids and consequent award of contract.

1. DEFINITIONS

In this Contract, the following words and expressions shall have the meanings as stated below:

a. **'Invitation for Bid'** shall mean and include the present document, and such other complements and agenda, which may subsequently be issued in this connection.

b. **'Bidder/Tenderer'** shall mean the person, firm or Corporation submitting a bid against this invitation for bid and shall also include his agents and representatives.

c. **'Purchaser/Owner'** shall mean HLL Lifecare Limited (HLL) or its units/Divisions thereof.

d. **'Engineer-In-Charge'**, shall mean the Engineer appointed by the purchaser/owner to supervise all activities of the project.

e. **'Supplier/Contractor'**, shall mean the successful bidder whose tender has been accepted by the purchaser/owner and to whom the order is placed by the purchaser/owner and shall include his heirs, legal representatives, successors etc.

f. **'Permanent Works'**, means and include all the work specified or set forth and required if any by the specification, drawings and other documents which form part of this contract or to be implied thereof or incidental thereof to be hereafter or required in such further explanatory instructions, drawings etc., as shall from time to time during the progress of the work be given by the HLL.

g. **'Project'**, shall mean entire work specified in the contract documents inclusive of extra items/extra quantities (if any) executed during the contract period.

h. **'Acceptance Letter'**, shall mean written consent by a letter of purchaser/owner to the bidder intimating him that his tender has been accepted.

i. **'Contract'**, shall mean the articles of Contract Agreement, the conditions of contract, schedule of quantities, specifications, drawings attached and duly signed by the purchaser/owner and the Contractor.

j. **'Date of Contract'**, shall mean the date on which the successful bidder has accepted the notification of award.

k. **‘Contract Period’**, shall mean the period (including rainy season) specified in the tender documents during which the contract shall be executed.

l. **‘Completion Certificate'**, shall mean the certificate issued by the purchaser/owner to the Contractor after successful completion of the project.

m. **'Extra Items'**, are those items, which are not appearing in the Schedule of Items but required to be executed during the project period.

2. SCOPE OF THE BID

HLL Lifecare Limited (HLL), a Government of India Enterprise, invites online bids from the eligible, competent and experienced Suppliers/Dealers/OEMs who are capable of executing the Specified work as per our tender conditions.

3. ELIGIBLE BIDDERS

3.1 A Bidder should have eligibility criteria as per 9.2-b of this section to submit bids against this tender.

3.2 A firm/bidder shall submit only one bid in the same bidding process. A Bidder (either as a firm or as an individual or as a partner of a firm) who submits or participates in more than one bid will cause all the proposals in which the Bidder has participated to be disqualified.

3.3 Joint ventures or Consortiums of two or more registered contactors are not permitted.

4. COST OF BIDDING

4.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and “the Purchaser", will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

4.2 Tender documents may be downloaded free of cost from the Government e-procurement portal (URL: https://etenders.gov.in/eprocure/app). However, tender document fees, as mentioned in the NIT, is required to be submitted along with the online bid.

5. SITE VISIT

5.1. The bidder is advised to visit and examine the Site of delivery/Work and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for delivery of item/construction of the Works. He shall examine the site condition and satisfy himself of the availability of materials at nearby places, difficulties which may arise during execution before submitting the bids. The costs of visiting the Site shall be at the bidder’s own expense.

5.2. The bidder and any of his personnel or agents will be granted permission by HLL to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the bidder, his personnel or agents will release and indemnify HLL and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

6. Getting information from web portal

6.1. All prospective bidders are expected to see all information regarding submission of bid for the Work published in the e tender website during the period from the date of publication of NIT for the Work and up to the last date and time for submission of bid. Non observance of information published in the website shall not be entertained as a reason for any claim or dispute regarding a tender at any stage.

6.2. All bids shall be submitted online on the Government e-procurement portal only in the relevant envelope(s)/ cover(s), as per the type of tender. No manual submission of bids shall be entertained for the tenders published through Government e-procurement portal under any circumstances.

6.3. The Government e-procurement portal shall not allow submission of bids online after the stipulated date & time. The bidder is advised to submit the bids well before the stipulated date & time to avoid any kind of network issues, traffic congestion, etc. In this regard, the department shall not be responsible for any kind of such issues faced by bidder.

7. Bidding Documents

7.1. Content of Bidding Documents

7.1.1. The bidding documents shall consist of the following unless otherwise specified

a. Notice Inviting Tender (NIT)
b. Instructions to Bidders
c. General and special Conditions of Contract
d. Technical Specifications
e. Form of Bid, Appendix to Bid
f. Bill of Quantities
g. Drawings if any

7.1.2. The Bidder is required to login to the e-procurement portal and download the listed documents from the website as mentioned in NIT. He shall save it in his system and undertake the necessary preparatory work off-line and upload the completed bid at his convenience before the closing date and time of submission.

7.1.3. The bidder is expected to examine carefully all instructions, Conditions of Contract, Contract Data, Forms, Terms, Technical Specifications, Bill of Quantities, Annexure and Drawings

in the Bid Document. Failure to comply with the requirements of Bid Document shall be at the Bidder's own risk.

7.2 Clarification of Bidding Documents

7.2.1. A prospective bidder requiring any clarification of the bidding documents shall contact the office of the Tender Inviting Authority on any working day between 10 AM and 5 PM.

7.2.2. In case the clarification sought necessitates modification of the bid documents, being unavoidable, the Tender Inviting Authority may affect the required modification and publish them in the website through corrigendum.

7.3 Amendment to bidding documents

7.3.1. Before the deadline for submission of bids, the Tender Inviting Authority may modify the bidding document by issuing addenda.

7.3.2. Any addendum thus issued shall be a part of the bidding documents which will be published in the e-tender website. The Tender Inviting Authority will not be responsible for the prospective bidders not viewing the website in time.

7.3.3. If the addendum thus published does involves major changes in the scope of work, the Tender Inviting Authority may at his own discretion, extend the deadline for submission of bids for a suitable period to enable prospective bidders to take reasonable time for bid preparation taking into account the addendum published.

8 Preparation of Bids

8.1 Language of the Bid

8.1.1. All documents relating to the bid shall be in the English language.

8.2. Documents Comprising the Bid

8.2.1. The online bid submitted by the bidder shall comprise the following:

i. The First Stage (Pre-Qualification or Technical Cover based on 2 cover tender system): Pre-Qualification or Technical proposal shall contain the scanned copies of the following documents which every bidder has to upload:

1. Copy of Valid GST registration, EPF Registration Certificate, IT PAN Card as per Clause 1.3. Sl No.1 of ITB
2. Work orders and the corresponding completion certificates in proof of experience as per Clause 1.3. Sl No. 2 of ITB
3. The Duly filled and Signed copy of financial statement as per Part III to be attached
4. Acceptance Form as per Part III of Forms and Declarations
5. Non- Black Listed Form Declaration as per the format in Part III

6. Power of Attorney, in case an authorized representative has signed the tender
7. Completion period as per the format in Part III
8. Requisition Form for e-Payment as per the format in Part III
9. No Deviation Certificate as per the format in Part III
10. The bidder should submit duly filled Superintendence, Supervision, Technical Staff and Employee Details certified by a Chartered Accountant
11. Part IV - List of approved make shall be duly signed with seal to be attached

ii. The Second Stage (Financial Cover or as per tender cover system):

The Bidder shall complete the Price bid as per format given for download along with this tender.

Note: The blank price bid should be downloaded and saved on bidder's computer without changing file-name otherwise price bid will not get uploaded. The bidder should fill in the details in the same file and upload the same back to the website.

Fixed price: Prices quoted by the Bidder shall be fixed during the bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable/ variable price quotation will be treated as non – responsive and rejected.

8.3. Bid Prices

8.3.1. The Bidder shall bid for the whole work as described in the Bill of Quantities.

8.3.2. For item rate tenders, the bidder shall fill in rates in figures and should not leave any cell blank. The line item total in words and the total amount shall be calculated by the system and shall be visible to the Bidder.

8.3.3. The rates quoted by the Bidder shall include cost of all materials and conveyance, labour charges; hire charges of plant and machinery, overheads and all incidental charges for execution of the contract. The rate quoted shall also include all statutory taxes as on the date of submission of the tender and such taxes shall be paid by the contractor.

8.3.4. GST or any other tax applicable shall be payable by the Contractor in respect of this contract and HLL will not entertain any claim whatsoever in respect of the same.

8.3.5. All taxes, royalty, Octroi and other levies payable by the contractor under the contract, or for any other cause as of the date 28 days prior to the deadline for submission of bids shall be included in the rates, prices and total of bid price. The bid prices shall also cater for any change in tax pattern during the tenure of work.

8.3.6. The rates and prices quoted by the bidder shall remain firm during the entire period of contract.

8.4. Currencies of Bid and Payment

8.4.1. The currency of bid and payment shall be quoted by the bidder entirely in Indian Rupees. All payments shall be made in Indian Rupees only.

8.5. Bid Validity

8.5.1. Bids shall remain valid for the period of **120** Days from the date of opening of the bid as specified in the NIT. A bid valid for a shorter period shall be rejected by HLL as non-responsive.

8.5.2. In exceptional circumstances, prior to expiry of the original bid validity period, the Tendering Authority may request the bidders to extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing or by e mail.

8.6. Bid Security (EMD)

8.6.1. The Bidder shall furnish, as part of his Bid, a Bid Security for an amount as detailed in the Notice Inviting Tender (NIT). For e-tenders, Bidders shall remit the Bid Security using the payment options given in e-tender under Government e-Procurement system only.

8.6.2 Each bid must be accompanied by EMD. Any Bid not accompanied by an acceptable Bid Security (EMD) shall be rejected as non-responsive.

8.7. Bid submission fee

8.7.1. For e-tenders, the mode of remittance of Bid submission fee (Tender Fee). For e-tenders, Bidders shall remit the Tender fee using the payment options as mentioned in the e-tender in Government eProcurement portal only.

8.7.2. Any bid not accompanied by the Tender Fee as notified, shall be rejected as nonresponsive.

8.7.3. Tender Fee remitted will not be refunded.

8.8 Alterations and additions

8.8.1. The bid shall contain no alterations or additions, except those to comply with instructions, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialed by the person or persons signing the bid.

8.8.2. The bidder shall not attach any conditions of his own to the Bid. The Bid price must be based on the tender documents. Any bidder who fails to comply with this clause will be disqualified.

9. Submission of Bids

The Bidder shall submit their bid online only through the Government e-Procurement portal (URL: https://etenders.gov.in/eprocure/app) as per the procedure laid down for e-submission as detailed in the web site. For e tenders, the bidders shall download the tender documents including the Bill of Quantity (BoQ) file from the portal. The Bidder shall fill up the documents and submit the same online using their Digital Signature Certificate. On successful submission of bids, a system generated receipt can be

downloaded by the bidder for future reference. Copies of all certificates and documents shall be uploaded while submitting the tender online.

9.1 The tender is invited in **2 Envelope system** from the registered and eligible firms at CPP Portal.

9.2 Pre-qualification Criteria for bidders: Following 2 envelopes shall be submitted online at CPP-portal by the bidder.

a) Envelope - I (Fee & Technical):

Tender fee (Non-refundable) as per the tender conditions shall be paid separately, thru RTGS/NEFT only transfer only in the following HLL A/c details:

Name of Bank :	HDFC Bank Limited
A/c number :	00630330000035
IFSC Code :	HDFC0000063
Branch name :	Commercial Branch, Vazhuthacaud, Thiruvananthapuram

Document of the above transactions completed successfully by the bidder, shall be uploaded separately while submitting the bids online.

Technical Bid should contain signed and scanned soft copy documents in proof of experience and duly filled and signed copy of documents specified in Part III.

Qualification Criteria for contractors / firms

The bidder should be fulfilling the following preconditions and must also upload/ submit documentary evidence in support of fulfillment of these conditions while submitting the bid.

SN	Eligibility Criteria	
1	Bidder should have a valid Certificate of the following:	
	a.	GST Registration
	b.	IT PAN Card
	c.	EPF Registration Certificate (if the firm has an exemption, a declaration of the same shall be submitted)
	d.	Certificate of incorporation /Memorandum of Article/ Partnership Deed etc.
	Note:	Copy of valid certificates for the above shall be submitted as proof.

SN	Eligibility Criteria	
2	The work shall be awarded to the responsive qualified bidder, who quotes the lowest amount for the tendered BoQs in total. The applicant should have successfully completed similar works during the last seven (7) years ending last day of the previous month to the one in which tender is invited shall be either of the following: Three similar completed works costing not less than 40% of the estimated cost put to tender or Rs.400 crore, whichever is less or Two similar completed works costing not less than 60% of the estimated cost put to tender or Rs. 600 crore, whichever is less or One similar completed work costing not less than 80% of the estimated cost put to tender or Rs. 800 crore, whichever is less. "Similar work" here encompass civil and electrical work necessary for the construction/renovation of buildings. The Duly filled and signed copy of the PERFORMANCE DECLARATION FORM as per the **item no. 1 of part IV** is to be attached. Copies of work orders and satisfactory work completion reports issued by the Client/Authority concerned shall be submitted in proof of the same.	
	Note:	For Govt. /Departmental works, Work orders and corresponding certificates issued by the Competent Authority (Exe. Engr., Supt. Engr., etc.) shall be submitted. Completion certificates for works issued by private parties shall be supported by TDS certificates.
3	The bidder shall have a minimum average annual turnover of not less than 50% of the estimated cost, calculated over the last three (3) financial years (FY 2022-23, FY 2023 24, FY 2024-25). The Duly filled and Signed copy of the FINANCIAL STATEMENT as per **item No.2 Part IV** is to be attached.	
	Note:	Enclose audited Balance sheets, Profit & Loss Statements, and IT return statements certified by a Chartered Accountant as proof of financial status.
4	The duly signed declaration form as per **item no-3 of part- IV is** to be attached.	
	Note:	Bidder quoting should not have a record of poor performance such as abandoning work, not properly completing the contract, termination, financial failures/ weaknesses, etc., in the last one year prior to the date of tender opening. In any case if it is observed, it will be considered a reason for rejection. HLL has the full right to assess the performance of the work by the bidder and the decision shall be binding upon the bidder.
5	The bidder should submit the duly notarized Power of Attorney, issued by the competent authority in favour of the signatory of the bid in the stamp paper of appropriate value as per the Stamp Act.	

SN	Eligibility Criteria
	Note: Power of Attorney should be provided along with the list of Directors/Partners.
6	Duly signed acceptance form along with the attested copy of tender document (**as per item no-4 of Part-IV)** to be attached
7	Duly signed completion period declaration as per **item no-5 of Part-IV** to be attached
8	Duly filled requisition form for E-payment along with clear and visible scan copy of cancelled cheque as per **item no-6 Part-IV** to be attached
9	Duly filled Superintendence, Supervision, Technical Staff and Employees Details as per **item no-7 of Part -IV** to be attached
10	Duly filled No Deviation Certificate as per **item no-8 of Part- IV** to be attached
11	The bidder should submit Site Visit Certificate issued from HLL failing which, the bid will be summarily rejected **(as per item no.9 of Part -IV).**
12	Duly signed copy of bid form (**as per item no. 10 of Part IV**) to be submitted.
13	Duly signed list of approved make **as per Part V** to be attached

Pre-bid queries: Pre-bid queries shall be communicated through hcdcmo@lifecarehll.com or through phone +91 75400 20076

b) Envelope – II (Financial Bid): The Financial e-Bid through CPP Portal.

All rates shall be quoted in the format provided and no other format is acceptable. If the price bid has been given as a standard format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the file, open it and complete the colored (Unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the file is found to be modified by the bidder, the bid will be rejected. **Bidder shall quote for all site's BoQs if any of the BoQs is not quoted then their bid will be treated as non-responsive**.

Note: -

1. HLL Lifecare Limited reserves the right to verify the credential submitted by the agency at any stage (before or after the award the work). If at any stage, any information / documents submitted by the applicant is found to be incorrect / false or have some discrepancy which disqualifies the firm then HLL shall take the following action:

   a) The agency shall be liable for debarment from tendering in HLL Lifecare Limited, apart from any other appropriate contractual /legal action.

2. On demand of the Tender Inviting Authority, this whole set of certificates and documents shall be send to the Tender Inviting Authority's office address (as given in the NIT) by registered post/Speed post of India Post in such a way that it shall be delivered to the Tender Inviting Authority before

the deadline mentioned. The Tender Inviting Authority reserves the right to reject any bid, for which the above details are not received before the deadline.

3. The Tender Inviting Authority shall not be responsible for any failure, malfunction or breakdown of the electronic system while downloading or uploading the documents by the Bidder during the e-procurement process.

10. Deadline for Submission of the Bids

10.1 Bid shall be received only online on or before the date and time as notified in NIT.

The Tender Inviting Authority, in exceptional circumstances and at its own discretion, may extend the last date for submission of bids, in which case all rights and obligations previously subject to the original date will then be subject to the new date of submission. The Bidder will not be able to submit his bid after expiry of the date and time of submission of bid (server time).

10.2 Modification, Resubmission and Withdrawal of Bids

10.2.1 Resubmission or modification of bid by the bidders for any number of times before the date and time of submission is allowed. Resubmission of bid shall require uploading of all documents including price bid afresh.

10.2.2 If the bidder fails to submit his modified bids within the pre-defined time of receipt, the system shall consider only the last bid submitted.

10.2.3 The Bidder can withdraw his/her bid before the date and time of receipt of the bid. The system shall not allow any withdrawal after the date and time of submission.

11. Bid Opening and Evaluation

11.1. Bid Opening

Bids shall be opened on the specified date & time, by the tender inviting authority or his authorized representative in the presence of bidders or their designated representatives who choose to attend.

11.1 Bid Opening Process

11.1.1. Opening of bids shall be carried out in the same order as it is occurring in invitation of bids or as in order of receipt of bids in the portal. The bidders & guest users can view the summary of opening of bids from any system. Bidders are not required to be present during the bid opening at the opening location if they so desire.

a) Envelope -I: Envelope-I Opening date shall be mentioned in NIT Document. (Envelop – I shall contain scanned copy of Tender Fees, Bid Security and scanned copy of Pre-qualification document) .

If any clarification is needed from bidder about the deficiency in his uploaded documents in Envelope- I and Envelope-II, he will be asked to provide it through CPP portal. The bidder shall upload the requisite clarification/documents within time specified by HLL Lifecare Limited, failing which tender will be liable for rejection.

c) Envelope -II: The financial bids of the contractors/firms found to be meeting the qualifying requirements shall be opened as per NIT Document. (Depending on evaluation of Envelop I, the date shall be intimated through CPP Portal)

11.1.2. In the event of the specified date of bid opening being declared a holiday for HLL, the bids will be opened at the same time on the next working day.

11.2. Confidentiality

11.2.1. Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award has been announced in favour of the successful bidder.

11.2.2. Any effort by a Bidder to influence the Purchaser during processing of bids, evaluation, bid comparison or award decisions shall be treated as Corrupt & Fraudulent Practices and may result in the rejection of the Bidders' bid.

11.3. Clarification of Bids

11.3.1. To assist in the examination, evaluation, and comparison of bids, the Tender Inviting Authority may ask the bidder for required clarification on the information submitted with the bid. The request for clarification and the response shall be in writing or by e-mail, but no change in the price or substance of the Bid shall be sought, offered, or permitted.

11.3.2. No Bidder shall contact the Tender Inviting Authority on any matter relating to the submitted bid from the time of the bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Tender Inviting Authority, he shall do so in writing.

11.4. Examination of Bids, and Determination of Responsiveness

11.4.1. During the bid opening, the Tender Inviting Authority will determine for each Bid whether it meets the required eligibility as specified in the NIT; is accompanied by the required bid security declaration form, bid submission fee and the required documents and certificates.

11.4.2. A substantially responsive bid is one which conforms to all the terms, conditions, and requirements of the bidding documents, without material deviation or reservation.

A material deviation or reservation is one: -

a. which affects in any substantial way the scope, quality, or performance of the Works;

b. which limits in any substantial way, inconsistent with the bidding documents, the Purchaser's rights or the Bidder's obligations under the Contract; or

c. whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

11.4.3. If a Bid is not substantially responsive, it may be rejected by the Tender Inviting Authority, and may not subsequently be made responsive by correction or withdrawal of the nonconforming material deviation or reservation.

11.4.4. Non submission of legible or required documents or evidences may render the bid non-responsive.

11.4.5. Bidder can witness the principal activities and view the documents/summary reports for that particular work by logging on to the portal with his DSC from anywhere.

11.4.6. Bidder who quotes lowest of all the BoQs in total, will be considered as L1 bidder.

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11.5. Negotiation on Bids

11.5.1. The Tender Inviting Authority reserves the right to negotiate with the lowest evaluated responsive bidder.

12. Award of Contract

12.1. The work shall be awarded to the qualified responsive bidder, who quotes the lowest amount for the tendered BOQ in total and the contract will be awarded for the total number of sites or a part as per the discretion of the Purchaser.

12. 2. In the eventuality of failure on the part of the lowest successful bidder to produce the original documents, or submit the security deposit, or acceptance of LOI/ Work order within the specified time limit, the Bidder shall be debarred in future from participating in Bids for three years and will be recommended for blacklisting by the competent authority. In such cases, the work shall be re-tendered.

12.3 The rates for the various items quoted by the Bidder shall be rounded to two decimal places. The decimal places in excess of two will be discarded during evaluation.

12.4 The Tender Inviting Authority reserves the right to accept or reject any Bid and to cancel the Bidding process and reject all Bids at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Tender Inviting Authority's action.

12.5 Notification of Award and Order Acceptance

12.5.1 The Bidder, whose Bid has been accepted, shall be notified of award by HLL prior to expiration of the Bid validity period by facsimile or e-mail confirmed by letter sent through post. This letter (hereinafter and in the Conditions of Contract called the

"Letter of Acceptance") will state the sum that the Purchaser will pay the Bidder in consideration of the execution, completion and remedying defects, if any of the Works by the Contractor as prescribed by the Contract.

12.5.2. The notification of award will constitute the formation of the Contract, subject only to the furnishing of a Security Deposit within 7 (Seven) days of issue of letter of acceptance.

12.5.3. Upon the furnishing by the successful Bidder of the Security Deposit, the Agreement Authority will promptly notify the other Bidders that their Bids have been unsuccessful.

12.5.4. Solicitor's fee, if any, to be paid to the Law Officers of Government for scrutinizing or drawing up of agreements - will be paid and the same recovered from the successful bidder.

13. Corrupt or Fraudulent Practices

13.1 The purchaser requires that the bidders, suppliers and contractors observe the highest standard of ethics during the procurement and execution of such contracts. In pursuit of this policy, the following are defined:

SN	Term	Meaning
(a)	Corrupt practice	The offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement process or in contract execution.
(b)	Fraudulent practice	A misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract.
(c)	Collusive practice	Means a scheme or arrangement between two or more bidders, with or without the knowledge of the purchaser, designed to establish bid prices at artificial, non-competitive levels.
(d)	Coercive practice	Means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract.

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

13.3 HLL reserves the right to club or split the items of works, change the qualifying criteria at their discretion and to reject or cancel the Invitation for bids without assigning any reason thereof.

Part II

GENERAL CONDITIONS OF CONTRACT

1. PRICE

1.1 The price quoted should be inclusive of all material cost, loading and unloading charges, all applicable taxes and other levies, labour charges, insurance, Installation and commissioning charges etc.
Price quoted should be firm without any escalation till the order is completely executed.

1.2 Abnormally Low Bid, may not be acceptable:

An Abnormally low bid is one in which the bid price, in combination with other elements of the bid, appears so low that it raises material concerns as to the capacity of the bid to perform the contract at the offered price. In such case HLL is having the right to seek written clarifications from the bidder, including detailed price analyses of its bid price in relation to scope, schedule, resources mobilization, Allocation of risks and responsibilities, and any other requirements of the bid document. After analyzing, if bidder has substantially failed to demonstrate its capacity to deliver the contract at offered price, the procuring entity may reject the bid/proposal.

Further, payment to abnormally increased in quantity/extra item from the bidder will not be acceptable.

2. TAXES/DUTIES/LEVIES

The contractor shall be entirely responsible for all applicable taxes including GST, duties, license fees etc. incurred until successful completion of contract.

3. ESCALATION

The rates quoted by the Contractor in the contract documents shall be final and shall not be subjected to any change due to the increase in labour wages or inflation in the cost of materials or any other price variations due to any reason during the stipulated time period of the contract or during the extended time period of completion.

Rates quoted should be inclusive of all cost of materials, Tools/ Equipment labor charges, conveyance to site, handling charges, loading and unloading charges, hiring charges, clearing of debris, statutory payments etc.

4. COMPLETION TIME

Time is the essence of the contract. Delay in work/delivery/non delivery/incompletion of the Specified Item/work will cause loss and/or damage to Client/Purchaser.

Time of completion allowed is **90 Days** from the date of Letter of Intent/Work Order or Site Clearance (whichever is later) and is irrespective of the no. of sites awarded to the party.

5. PAYMENT TERMS

The contractor can submit two running account bills during the work period and payment made as below:

a) 80% of the GST bill value will be paid on each running account bill submitted by the contractor recommended by State in charge (P&S, HLL) and approved by Project Engineer (P&S, HLL)/ Deputy General Manager (BD, HLL).

b) Balance 20% of running account bill will be paid along with the final bill only after submission of Work Completion certificate issued by State in charge (P&S, HLL) and approved by Project Engineer (P&S, HLL)/ Deputy General Manager (BD, HLL).

Retention: 5% amount of the Bill will be retained as retention money and will be released only after the Defect liability period of 12 months without any interest.

Tax Deduction: All statutory deductions like GST, Income Tax, Works Contract Tax, E.S.I., P.F. or any other government-imposed liabilities shall be borne by the Contractor (as applicable at the time of execution of job) and shall be deducted from each bill submitted by the Contractor.

The running account bills/Final bill are to be submitted detailing the work description, quantity and rate as per the Work Order. Payment will be made against actual measurements recorded and certified jointly by State in charge (P&S, HLL) and the Contractor's representative. For supply of capital items, duly certified delivery challan/supporting documents such as Warranty Certificates etc. shall be enclosed along with bill and shall be submitted to following Address:

HLL Lifecare Limited,
HLL Bhavan, #26/4,
Tambaram-Velachery Main Road,
Pallikaranai, Chennai – 600 100,
Tamilnadu, India.

The payment will be disbursed by HLL Project Division in Chennai only against the actual work executed at site. GST No. 33AAACH5598K1Z8.

Payments to the vendor shall be contingent upon the availability of funds disbursed by the client. Consequently, the timing of disbursement may be subject to change based on fund availability. The competent authority will notify the vendor promptly of any anticipated delays in payment.

6. PERFORMANCE SECURITY

6.1 On receipt of notification of award, simultaneously with the execution of the contract, successful bidder shall furnish a Performance Security in the form of a Demand Draft from a nationalized bank drawn in favor of HLL Lifecare Limited, payable at Chennai or a Bank Guarantee from a nationalized bank, for an amount equal to **5%** of the total contract value as Performance Security for his faithful execution of contract. The Performance Security should

be valid until successful completion of the contract and acceptance of the Equipment/works by the purchaser/owner and will be released after acceptance of the Equipment/works by the purchaser/owner. In case of a delay in the works the validity of Performance Security shall be extended.

6.2 Within 7 days of the receipt of notification of award from the purchaser/owner; the successful Bidder shall furnish the Performance Security in the form of a Demand Draft or Bank Guarantee in the Performance Security form to be sent along with the Notification of Award.

6.3 Failure of the successful Bidder to accept the notification of award or submission of security deposit within the timeframe shall constitute sufficient grounds for the annulment of the award, in which even the purchaser/owner may make the award to the next lowest evaluated bidder or call for new bids.

6.4 Forfeiture of Security Deposit:

If the successful bidder/Contractor fails to supply the ordered material at the rate finalized or execute the work and / or supplies only part quantity / partially execute the work or fails to comply with the terms and conditions of the purchase order / work order the security deposit furnished will be forfeited / Bank Guarantee encashed.

7. EARNEST MONEY

7.1 Each bid must be accompanied by Bid Security Declaration Form.

7.2 The Bid Security Declaration Form is required to protect the purchaser/owner against risk of Bidder's conduct

8. INDEMNIFICATION CLAUSE

The Bidder shall indemnify and hold harmless the Owner/Purchaser from and against the below mentioned:

i. All claims, demands, action, proceedings, losses, damages, liabilities, cost, charges, expenses or obligations that are occasioned or may occasion to HLL as a result of our non-payment of any statutory dues levied/ leviable on the Contractor or the Contractor committing breach of any the rules, regulations, orders, directives, instructions that may be issued by any authority under various Labor Laws, PF, ESI Acts and all other applicable Laws/Acts/Rules or any other Statue or Laws for the time being in force

ii. Any damages, loss or expenses due to or resulting from any negligence or breach of duty on our part or on the part of Sub-Contractor/s, if any, servants or agents of the Bidder.

iii. Claims, if any, of the employee or the Contractor and its Sub Contractor/s, under the Workmen's Compensation Act, 1923 and Employer's Liability Act 1938 or Various Labor Laws or any other Laws rules and regulations in force for the time being in India and any acts replacing and/or amending 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.

iv. Any non - compliance or improper compliance of statues, rules and regulations which are applicable to HLL and also to the Contractor and to the employees , in respect of (a) Employees' Provident Fund and Miscellaneous Provision Act, 1952, (b) Employees State Insurance Act, 1948, © Contract Labor (R&A) Act, 1970 (d) Minimum Wages Act, 1948 (e) Payment of Wages Act,1936 (f) Bonus Act, 1965 (g) Workmen's Compensation Act, 1923 and / or any other laws which may become applicable in respect of the Contract/ Agreement between HLL and the Bidder.

v. Any Act or omission by us or our Sub-contractor/s, if any, our /their servants or agents which may involve any loss, damages, liability, civil or criminal action.

vi. To protect against all claims for damage caused due to non-obtaining of insurance policy during the project period.

9. FORCE MAJEURE

a. Neither the Contractor nor the Purchaser/Owner shall be considered in default in the performance of their obligations as per the Contract so long as such performance is prevented or delayed because of strikes, war, hostilities, revolution, civil commotion, epidemics, accidents, fire, cyclone, flood or because of any law and order proclamation, regulation or ordinance of Government or subdivision thereof or because of any act of God. The proof of existence of force majeure shall be provided by the party claiming it to the satisfaction of the other.

b. The Contractor shall advise Purchaser/Owner initially by a Fax, followed by post, the beginning and end of any of the above causes of delay, failing which Purchaser/Owner shall not be liable to consider delays due to the above reasons. Notice as stated above should be given even in case where only the Contractor's bids are under the consideration of the Purchaser/Owner and no acceptance of the same has been given and detailed order issued.

c. In the event of definite delay even if arising out of reasons due to force majeure, Purchaser/Owner shall have the right at their discretion to cancel the Order or part of the Order without any liability on their part to make any payment to the Contractor while reserving the right to claim refund of and any payment if advanced or paid to Contractor.

10. DELAY IN WORK EXECUTION DUE TO REASONS BEYOND CONTRACTOR'S CONTROL

a. Force majeure: If the execution of work is delayed due to force majeure, then Purchaser/Owner as per the affected period may extend the time period.

b. In case work is delayed due to non-availability of stores supplied by Owner or any decision by Owner holding the progress of work, the contractor then upon any such happening causing delay shall immediately but not later than 10 days, give notice thereof in writing to the Owner, but nevertheless use constantly his best effort to prevent or make good delay. The Owner may in his discretion grant such extension of time as may appear reasonable to him and the same shall

be communicated to the contractor in writing and shall be final and binding on him and the contractor shall be bound to complete the work within such extended time.

11. LIQUIDATED DAMAGES FOR DELAYS

In case the Contractor fails to achieve the approved milestones and/or complete the work within the stipulated completion period, Liquidated Damages shall be levied at the rate of 0.5% of the total Contract value per week or part thereof, subject to a maximum of 7.5% of the total Contract value, unless the delay is solely attributable to HLL Lifecare Limited and duly certified as such. Grant of extension of time, if any, shall not be treated as a matter of right and shall be considered only at the sole discretion of HLL Lifecare Limited, without prejudice to the levy of Liquidated Damages, where applicable.

12. Termination / Cancellation for Non-Performance

HLL Lifecare Limited reserves the absolute right to terminate the Contract, either wholly or partly, without prejudice to any other remedies available under the Contract, if the Contractor fails to commence the work as per agreed timelines, shows unsatisfactory progress, repeatedly fails to achieve approved milestones (where repeated failure shall mean failure to achieve two or more consecutive milestones or three milestones in total, notwithstanding any extension granted), abandons the work or otherwise demonstrates inability to complete the work.

Upon such termination, HLL Lifecare Limited shall be entitled to get the balance work executed at the risk and cost of the Contractor, and any excess expenditure incurred shall be recoverable from the Contractor, including adjustment against the Performance Security, Retention Amount or any other dues payable to the Contractor under this or any other contract.

13. REALIZATION OF LOSS ON ACCOUNT OF TERMINATION

In the event of termination of the contract by the Client/PMC for any reason attributable to the Contractor's default, the Contractor shall be liable to pay an amount equal to 30% of the cost of the remaining works at the agreed rates as liquidated damages.

This amount shall be recovered from the Contractor towards the risk and cost incurred by the Client/PMC due to the termination. The Contractor shall remit this liquidated damages amount within three (3) months of the date of termination.

The Client/PMC shall have the right to recover the liquidated damages from the following sources:

1. Earnest Money Deposit (EMD) / Security Deposit
2. Running Account Bills / Retention Money
3. Any other dues payable to the Contractor by the Client/PMC
4. Bank Guarantee / Performance Guarantee
5. By filing civil suit against the Contractor

This clause shall not preclude the Client/PMC from recovering any actual losses incurred due to the Contractor's default, which may exceed the liquidated damages amount. Such actual losses shall be assessed after the completion of the remaining works through another contractor.

14. SCOPE OF SERVICES, SUPPLIES AND MATERIALS:

i) The scope will include all services, supplies etc. for the satisfactory execution of the Contract except in so far as any of those are expressly excluded.

15. CONTRACTORS SUPERINTENDENCE, SUPERVISION, TECHNICAL STAFF & EMPLOYEES

15.1 The contractor shall provide all necessary superintendence during execution of the work and all along thereafter as may be necessary for proper fulfilling of the obligations under the contract. As per tendered amount (worked out on the basis of quoted rate of individual items) and before commencement of the work, intimate in writing to the Engineer-in-Charge, the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. Minimum requirement of such technical representative(s) and their qualifications and experience shall not be lower than specified in Forms and Declaration in Part III. Even of the contractor (or partner(s) in case of firm/ company) is himself / herself an Engineers, it is necessary on the part of the contractor to Employ principal technical representative / technical representative (s) as per stipulation in **item no. 9 Part III**.

The Engineer-in-Charge shall within 3 days of receipt of such communication intimate in writing his approval or otherwise of such a representative(s) to the contractor. Any such approval may at any time be withdrawn and in case of such withdrawal, the contractor shall appoint another such representative(s) according to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from Engineer-in charge and shall be available at site before start of work.

All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s) The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any construction activity is in progress and also present himself/themselves, as required, to the Engineer-in-Charge and/or his designated representative to take instructions. Instructions given to the principal technical representative or other technical representative(s) shall be deemed to have the same force as if these have been given to the contractor. The principal technical representative and other technical representative(s) shall be actually available at site fully during all stages of execution of work, during recording/checking/test checking of measurements of works and whenever so required by the Engineer-in-Charge and shall also note down instructions conveyed by the Engineer-in-Charge or his designated representative(s) in the site order book and shall affix his/their signature in token of noting down the instructions and in token of acceptance of measurements/checked measurements/ test checked measurements. The representative(s) shall not look after any other work. Substitutes, duly approved by

Engineer-in-Charge of the work in similar manner as aforesaid shall be provided in event of absence of any of the representative(s) by more than two days.

If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representative(s) is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non-refundable) shall be effected from the contractor as specified in "Table 1" and the decision of the Engineer-in-Charge as recorded in the site order book and measurement recorded checked/test checked in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable technical Principal technical representative and/or other technical representative(s) and if such appointed persons are not effectively present or are absent by more than two days without duly approved substitute or do not discharge their responsibilities satisfactorily, the Engineer-in-Charge shall have full powers to suspend the execution of the work until such date as suitable other technical representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of the technical representative(s) (in the form of copy of Form-16 or CPF deduction issued to the Engineers employed by him) along with every on account bill/ final bill and shall produce evidence if at any time so required by the Engineer-in-Charge.

Table: 1

Requirement of Technical Representative(s) and recovery Rate

SN	Minimum Qualification of Technical Representative	Discipline	Designation	Minimum Experience	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 13.1
1	Graduate Engineer/ Diploma Engineer	Civil	Site Engineer	2 (or) 5	1 No / Each Site	15,000/- per month
2	Graduate Engineer/ Diploma Engineer	Electrical	Site Engineer	2 (or) 5	1 No / Each Site	15,000/- per month

15.2 The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work.

- The contractor shall provide and employ skilled, semiskilled and unskilled labour as is necessary for proper and timely execution of the work.

- The Engineer-in-Charge shall be at liberty to object to and require the contractor to remove from the works any person who in his opinion misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable. Such person shall not be employed again at works site without the written

permission of the Engineer-in Charge and the persons so removed shall be replaced within 2 days by competent substitutes.

15.3 In the eventuality of failure of the required manpower on the sites as per the tender document, Bidder shall be debarred in future from participating in Bids for three years and will be recommended for blacklisting by the competent. In such cases, it will be considered as violation of the contract. HLL has the right to cancel the order and the work shall be re-tendered.

16. MATERIALS TO BE PROVIDED BY CONTRACTOR

The contractor shall, at his own expense, provide all materials, required for the works other than those which are stipulated to be supplied by the HLL

The contractor shall, at his own expense and without delay, supply to the Engineer-in- Charge samples of materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The contractor shall, if requested by the Engineer-in-Charge furnish proof, to the satisfaction of the Engineer-in-Charge that the materials so comply. The Engineer-in-Charge shall within thirty days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval, fresh samples complying with the specifications laid down in the contract. When materials are required to be tested in accordance with specifications, approval of the Engineer-in-Charge shall be issued after the test results are received / Batch report received.

The Contractor shall at his risk and cost submit the samples of materials to be tested or analyzed and shall not make use of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the Engineer-in-Charge. The Contractor shall not be eligible for any claim or compensation either arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials.

The contractor shall, at his risk and cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge may require for collecting, and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the Engineer-in-Charge and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. The Engineer-in- Charge or his authorized representative shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility and every assistance in obtaining the right to such access.

The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-in-Charge shall be at liberty to employ at the expense of the contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may

happen or arise to such materials. The Engineer-in-Charge shall also have full powers to require other proper materials to be substituted thereof and in case of default, the Engineer-in-Charge may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor.

17. FORECLOSURE OF CONTRACT DUE TO ABANDONMENT OR REDUCTION IN SCOPE OF WORK

If at any time after acceptance of the tender, Engineer-in-charge shall decide to abandon or reduce the scope of the works for any reason whatsoever and hence not require the whole or any part of the works to be carried out, the Engineer-in-Charge shall give notice in writing to that effect to the contractor and the contractor shall act accordingly in the matter. The contractor 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 works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.

18. ACTION IN CASE WORK NOT DONE AS PER SPECIFICATIONS

All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer-ln-charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Quality Assurance Unit of the HLL or any organization engaged by the HLL for Quality Assurance and of the Chief Technical Examiner's Office, and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for that purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

If it shall appear to the Engineer-in-charge or his authorized subordinates in charge of the work or to the Chief Engineer in charge of Quality Assurance or his subordinate officers or the officers of the organization engaged by the HLL for Quality Assurance or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve months (six months in the case of work costing Rs. 10 Lac and below except road work) of the completion of the work from the Engineer-in-Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer-in- Charge in his demand aforesaid, then the contractor shall be liable to

pay compensation at the same rate as per **GCC 12** of the contract (for non-completion of the work in time) for this default.

In such case the Engineer-in-Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the authority specified in Special Conditions of Contract may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and/or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the Engineer-in-Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.

18. SPECIAL INSTRUCTIONS

a. The bidder shall visit the site before quoting for the work and also take their own assessments before quoting of bids.

b. The work should be carried out without causing any inconvenience to the public and shall ensure that no damages are caused to the existing site premises.

c. During the execution of work, the contractor or authorized representative should be present at site.

d. All Materials, Equipment's/ Tools required for the work should be arranged by the contractor and brought to site for the timely completion of the work.

e. The materials used shall be as per specification and of good quality.

f. The Contractor has to arrange necessary insurance coverage for the machine, workmen etc. deployed by him. He shall arrange all safety measures to protect his workmen and also the properties of HLL/Hospital. The work site safety of all employees, their ESI, PF etc. will have to be borne by the contractor.

g. The Purchaser/Owner should be immediately informed for any discrepancy in specifications and instructions in the execution of job before actual execution of particular item having discrepancy.

h. Any item found to be having been executed with poor workmanship then the Contractor shall have to rectify the work as specified by Purchaser/Owner. No extra charge will be admissible in such case. If CONTRACTORS fail to do so, the Purchaser/Owner reserved the right to rectify the work through some other agency at the expenses of Contractor.

i. The schedule of activities as submitted by the Contractor shall have to be strictly adhered to. Regular progress reports shall have to be submitted by the Contractor giving all details for monitoring of the schedule.

j. The Contractor shall have to co-operate with the agencies executing other works in the same area.

k. While executing the work, the Contractor shall ensure safety and security of the property of the Purchaser/Owner so as to avoid theft etc.

l. The Quantity shown in the schedule is an approximate estimated quantity and subject to vary as per each site conditions. No rate revision will be entertained if the quantity increases/decreases due to the site condition while executing the work.

m. During the execution of work, the contractor or authorized representative/s at least one person having technical qualification should be present at site.

n. Final payment shall be paid only after clearing the site as per direction of Engineer-in-charge/ Officer in charge.

o. Rates and amount Quoted by contractor shall be firm and fixed for entire contract period as well as extended period for completion of the works. No escalation shall be applicable on this contract.

p. The contractor should post a senior experienced person for the execution of the work and also provide necessary supervisory staff for smooth execution of work.

q. Temporary fences, shelters, watchman, danger signals and such other precautions, necessary to protect the public and properties of public as included in the rate quoted by the contractor.

r. The contractor should submit all documents such as material test certificates, batch reports, guarantee card, Warranty card of Items/ Components supplied by him.

s. The contractor should prepare all the completion drawings required for getting approval and sanction, and will be responsible for obtaining statutory clearance from the Government/ Electrical inspectorate/ appropriate bodies for commissioning the system as per prevailing rules.

t. All the necessary field tests like cube test, workability test, etc. shall be carried out by the contractor on his expense from time to time and all the records should be maintained at site.

u. Shop drawings, detailed working drawings should be prepared by the contractor and should obtain approval from the site in-charge before the commencement of work.

v. The contractor shall responsible for vetting of structural drawings with competent authority before the commencement of work (if required).

w. The quantity shown in this work order is only tentative and may increase or decrease to any extend as per the drawing and site condition.

x. Handing Over of the Project: Contractor will hand over the project to Owner /Client after successful completion of each component of the project in all respect and complete satisfaction of Engineer-In-charge. The partial handing over of building components shall not be considered.

Contractor shall also provide necessary Completion Certificate/NOC from all local Government/ Statuary Authorities including Fire, Forest, Electrical, Environment, Lift, DG Set, required before handing over the project to the client.

y. The work will be commenced by the Contractor only after the approval of drawings from the concerned local authorities including fire fighting's department or any other department as per statuary requirement.

z. No payment shall be provided /recommended against the supply of materials, if the supply & fixing is included in a single specification.

aa. The Contractor shall be solely responsible to follow the general clauses of the contract including labour regulations, registration of contractor, obtaining labour license from labour department, safety precautions, etc. and all other statutory provisions related to labour/works as per the prevailing General Clauses of Contract amended from time to time. The Contractor shall stick to the schedule of all activities and carry out it with mutually agreed time frame.

bb. The contractor shall make his own arrangements for obtaining electric connection and water Connection/ arrangement (if required) and make necessary payments directly to the department concerned. No dispute in this regard shall be entertained.

cc. The Project work will be carried out in the manner complying in all respects with the requirements of relevant bye laws of the local body under the jurisdiction of which the work is to be executed or as directed by the Engineer in-charge and nothing extra will be paid on this account.

dd. The contractor shall comply with proper and legal orders and directions of the local or public authority or municipality and abide by their rule and regulations and pay all fees and charges which he may be liable.

ee. The contractor shall give a performance test of the entire installation (s) as per standing specification before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.

ff. Samples of various materials required for testing shall be provided free of charges by the contractor. Testing charges, if any, unless otherwise provided shall be borne by the Contractor. All other expenditure required to be incurred for taking the samples, conveyance, packing etc. shall be borne by the contractor himself.

gg. The work shall be carried out in accordance with the Architectural drawings and structural drawings, to be issued from time to time, by the Engineer-in-Charge.

hh. Before commencement of any item of work the contractor shall correlate all the relevant architectural and structural drawings, nomenclature of items and specifications etc. issued for the work and satisfy himself that the information available there from is complete and unambiguous. The figure and written dimension of the drawings shall be superseding the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-in-charge before execution of the work.

ii. The contractor alone shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and/ or incomplete information and no claim whatsoever shall be entertained on this account.

jj. The Contractor shall render all help and assistance in documenting the total sequence of this project by way of photography, slides, audio-video recording etc. nothing extra shall be payable to the agency on this account.

kk. No payment will be made to the contractor for damage caused by rains, or other natural calamities during the execution of the works and no such claim on this account will be entertained.

ll. The contractor shall bear all incidental charges for cartage, storage and safe custody of materials issued by HLL

mm. Any expenditure incurred on preliminary site work, e.g. temporary access roads, temporary labour huts, staff quarters and site office; storage accommodation and water storage tanks.

nn. Contractor should ensure the cash flow before quoting the tender. It is not possible to stop the works due to delay in part payment/ payment of any other project from the Client / HLL.

oo. Special conditions for Cement: The contractor shall procure 53 grade Ordinary Portland Cement (conforming to IS:8112), Portland Pozzolona cement (confirming to IS:1489: Part –I) as required in the work, from reputed manufacturers as mentioned in the list of approved make in tender. The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacture(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufactures, given by the tenderer, fully or partially. The cement brought to the site for execution of work shall be in bags bearing manufacturer's name & ISI marking. Weight of cementing each bag shall be 50 kg. Samples of cement arranged by the contactor shall be taken by the Engineer- in-Charge and got tested in accordance with provisions of relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected and it shall be removed from the site by the contractor at his own cost within 7 days of written order from the Engineer-in-Charge to do so.

SAFETY CODES

1. Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable footholds and hand-hold shall be provided on the ladder and the ladder shall be given an inclination not steeper than ¼ to 1(¼ horizontal and 1 vertical).

2. Scaffolding of staging more than 3.6 m (12ft.) above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached or bolted, braced and otherwise secured at least 90 cm. (3ft.) high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

3. Working platforms, gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 3.6 m (12ft.) above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in (2) above.

4. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of person or materials by providing suitable fencing or railing whose minimum height shall be 90 cm. (3ft.).

5. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9m. (30ft.) in length while the width between side rails in rung ladder shall in no case be less than 29 cm. (11½") for ladder up to and including 3 m. (10 ft.) in length. For longer ladders, this width should be increased at least ¼" for each additional 30 cm. (1 foot) of length. Uniform step spacing of not more than 30 cm shall be kept. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit;

action or proceedings to any such person or which may, with the consent of the contractor, be paid to compensate any claim by any such person

6. (a) Excavation and Trenching - All trenches 1.2 m. (4ft.) or more in depth, shall at all times be supplied with at least one ladder for each 30 m. (100 ft.) in length or fraction thereof, Ladder shall extend from bottom of the trench to at least 90 cm. (3ft.) above the surface of the ground. The side of the trenches which are 1.5 m. (5ft.) or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides collapsing. The excavated materials shall not be placed within 1.5 m. (5ft.) of the edges of the trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances, undermining or undercutting shall be done.

(b) Safety Measures for digging bore holes: -

i. If the bore well is successful, it should be safely capped to avoid caving and collapse of the bore well. The failed and the abandoned ones should be completely refilled to avoid caving and collapse;
ii. During drilling, sign boards should be erected near the site with the address of the drilling contractor and the Engineer in-charge of the work;
iii. Suitable fencing should be erected around the well during the drilling and after the installation of the rig on the point of drilling, flags shall be put 50m all-round the point of drilling to avoid entry of people;
iv. After drilling the bore well, a cement platform (0.50m x 0.50m x 1.20m) 0.60m above ground level and 0.60m below ground level should be constructed around the well casing;
v. After the completion of the bore well, the contractor should cap the bore well properly by welding steel plate, cover the bore well with the drilled wet soil and fix thorny shrubs over the soil. This should be done even while repairing the pump;
vi. After the bore well is drilled the entire site should be brought to the ground level.

7. Demolition - Before any demolition work is commenced and also during the progress of the work,

i. All roads and open areas adjacent to the work site shall either be closed or suitably protected.
ii. No electric cable or apparatus which is liable to be a source of danger or a cable or apparatus used by the operator shall remain electrically charged.
iii. All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.

8. All necessary personal safety equipment as considered adequate by the Engineer-in-Charge should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the contractor should take adequate steps to ensure proper use of equipment by those concerned. The following safety equipment shall invariably be provided.
    i. Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.
    ii. Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes, shall be provided with protective goggles.
    iii. Those engaged in welding works shall be provided with welder's protective eye shields.
    iv. Stone breaker shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
    v. When workers are employed in sewers and manholes, which are in active use, the contractors shall ensure that the manhole covers are opened and ventilated at least for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public. In addition, the contractor shall ensure that the following safety measure are adhered to: -
        (a) Entry for workers into the line shall not be allowed except under supervision of the JE or any other higher officer.
        (b) At least 5 to 6 manholes upstream and downstream should be kept open for at least 2 to 3 hours before any man is allowed to enter into the manhole for working inside.
        (c) Before entry, presence of Toxic gases should be tested by inserting wet lead acetate paper which changes colour in the presence of such gases and gives indication of their presence.
        (d) Presence of Oxygen should be verified by lowering a detector lamp into the manhole. In case, no Oxygen is found inside the sewer line, workers should be sent only with Oxygen kit.
        (e) Safety belt with rope should be provided to the workers. While working inside the manholes, such rope should be handled by two men standing outside to enable him to be pulled out during emergency.
        (f) The area should be barricaded or cordoned off by suitable means to avoid mishaps of any kind. Proper warning signs should be displayed for the safety of the public whenever cleaning works are undertaken during night or day.

(g) No smoking or open flames shall be allowed near the blocked manhole being cleaned.

(h) The debris obtained on account of cleaning of blocked manholes and sewer lines should be immediately removed to avoid accidents on account of slippery nature of the debris.

(i) Workers should not be allowed to work inside the manhole continuously. He should be given rest intermittently. The Engineer-in- Charge may decide the time up to which a worker may be allowed to work continuously inside the manhole.

(j) Gas masks with Oxygen Cylinder should be kept at site for use in emergency.

(k) Air-blowers should be used for flow of fresh air through the manholes. Whenever called for, portable air blowers are recommended for ventilating the manholes. The Motors for these shall be vapour proof and of totally enclosed type. Non sparking gas engines also could be used but they should be placed at least 2 meters away from the opening and on the leeward side protected from wind so that they will not be a source of friction on any inflammable gas that might be present.

(l) The workers engaged for cleaning the manholes/sewers should be properly trained before allowing to work in the manhole.

(m) The workers shall be provided with Gumboots or non-sparking shoes bump helmets and gloves non sparking tools safety lights and gas masks and portable air blowers (when necessary). They must be supplied with barrier cream for anointing the limbs before working inside the sewer lines.

(n) Workmen descending a manhole shall try each ladder stop or rung carefully before putting his full weight on it to guard against insecure fastening due to corrosion of the rung fixed to manhole well.

(o) If a man has received a physical injury, he should be brought out of the sewer immediately and adequate medical aid should be provided to him.

(p) The extent to which these precautions are to be taken depend on individual situation but the decision of the Engineer-in-Charge regarding the steps to be taken in this regard in an individual case will be final.

vi. The Contractor shall not employ men and women below the age of 18 years on the work of painting with products containing lead in any form. Wherever men above the age of 18 are employed on the work of lead painting, the following precaution should be taken: -

(q) No paint containing lead or lead products shall be used except in the form of paste or readymade paint.
(r) Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint is dry rubbed and scrapped.
(s) Overalls shall be supplied by the contractors to the workmen and adequate facilities shall be provided to enable the working painters to wash during and on the cessation of work.

9. The Contractor shall not employ women and men below the age of 18 on the work of painting with product containing lead in any form, wherever men above the age of 18are employed on the work of lead painting, the following principles must be observed for such use:
   i. White lead, sulphate of lead or product containing these pigment, shall not be used in painting operation except in the form of pastes or paint ready for use.
   ii. Measures shall be taken, wherever required in order to prevent danger arising from the application of a paint in the form of spray.
   iii. Measures shall be taken, wherever practicable, to prevent danger arising out of from dust caused by dry rubbing down and scraping.
   iv. Adequate facilities shall be provided to enable working painters to wash during and on cessation of work.
   v. Overall shall be worn by working painters during the whole of working period.
   vi. Suitable arrangement shall be made to prevent clothing put off during working hours being spoiled by painting materials.
   vii. Cases of lead poisoning and suspected lead poisoning shall be notified and shall be subsequently verified by medical man.
   viii. HLL may require, when necessary medical examination of workers.
   ix. Instructions with regard to special hygienic precautions to be taken in the painting trade shall be distributed to working painters.
10. When the work is done near any place where there is risk of drowning, all necessary equipment's should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision, should be made for prompt first aid treatment of all injuries likely to be obtained during the course of the work.
11. Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions: -
   i. These shall be of good mechanical construction, sound materials and adequate strength and free from patent defects and shall be kept repaired and in good working order.

ii. Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from patent defects.

iii. Every crane driver or hoisting appliance operator, shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding winch or give signals to operator.

iv. In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

v. In case of departmental machines, the safe working load shall be notified by the Electrical Engineer-in-Charge. As regards contractor's machines the contractors shall notify the safe working load of the machine to the Engineer-in-Charge whenever he brings any machinery to site of work and get it verified by the Electrical Engineer concerned.

12. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided. The worker should not wear any rings, watches and carry keys or other materials which are good conductors of electricity.
13. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.
14. These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at work spot. The person responsible for compliance of the safety code shall be named therein by the contractor.
15. To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangements made by the contractor shall be open to inspection by the Labour Officer or Engineer-in-Charge of the department or their representatives.

16. Notwithstanding the above clauses from (1) to (15), there is nothing in these to exempt the contractor from the operations of any other Act or Rule in force in the Republic of India.

19. ENTIRETY OF THE AGREEMENT

All of the terms agreed to between the Supplier/Contractor and Purchaser/owner will be included in the Purchase/work Order/Contract and no their communication, proposal or understanding, written, oral or implied, will be considered to be included in the Purchase/work Order/Contract or form part of the Contract between the Supplier/Contractor and Purchaser/owner unless specifically agreed to in that behalf in writing between Supplier/Contractor and Purchaser/owner.

20. CORRESPONDENCE

All correspondence relating to this Order including Invoice shall be in English, to:

Deputy Vice President (P&S)
Hi-Care Division,
HLL Lifecare Limited,
HLL Bhavan, #26/4, Tambaram-Velachery Main Road,
Pallikaranai, Chennai – 600 100,
Tamilnadu, India.
Phn: 044-29813732/34
E-mail: hcdcmo@lifecarehll.com

21. SETTLEMENT OF DISPUTES

Arbitration shall not be a means of settlement of any dispute or claim arising out of the contract relating to the work. Any disputes or difference arising between the parties with respect to the performance of any part of this agreement or anything connected therewith, etc shall as far as possible be mutually settled by the process of dialog and negotiation.

The Courts at Madras alone shall have jurisdiction in respect of settlement of any matter arising out or in connection with the contract.

PART III

SPECIFIC CONDITIONS OF CONTRACT (SCC)

1. **Execution Timeline and Monitoring**

i. The successful bidder shall submit a detailed Work Programme / Execution Schedule within **seven (7) days** from the date of issue of the Purchase Order / Letter of Award. The programme shall indicate activity wise milestones and timelines for commencement and completion of various sections of the work. The programme shall be subject to approval by the Engineer-in-Charge, HLL Lifecare Limited.

ii. The approved Work Programme shall form an integral part of the Contract and shall be binding on the Contractor. HLL Lifecare Limited shall have the right to monitor the progress of work at site and through periodic review meetings. Any deviation or slippage from the approved timelines shall be promptly communicated by the Contractor in writing, along with reasons for the delay and a proposed corrective action plan.

iii. Any request for revision of the Work Programme shall be made by the Contractor in writing within fourteen (14) days of the occurrence of the event causing delay, failing which the request shall not be considered or accepted. Further, any request found to be unnecessary or unjustified shall be liable to be rejected by HLL Lifecare Limited. The Work Programme may be amended, as necessary, by mutual agreement between HLL Lifecare Limited and the Contractor, subject to the overall completion period stipulated in the Contract documents. With every rescheduling of milestones, or if at any time the actual progress of the work falls behind the approved programme by more than ten percent (10%) of the stipulated contract completion period, the Contractor shall submit a revised Work Programme. The revised programme shall be accompanied by all required designs/ drawings/ documents which shall be prepared and made available by the Contractor concurrently and without causing any delay to the execution of the work.

iv. In the event of non-submission of the Work Programme by the Contractor within the stipulated time, the programme approved by the Engineer-in-Charge shall be deemed final and binding on the Contractor. Approval of the Work Programme by the Engineer-in-Charge shall not relieve the Contractor of any obligations or responsibilities under the Contract.

2. **Disqualification**

Contractors or vendors who have exhibited poor performance, repeated delays, quality failures or contractual non-compliance in previous works executed for HLL Lifecare Limited may be disqualified or debarred from participating in future tenders of HLL Lifecare Limited for a period as decided by the Competent Authority and the decision in this regard shall be final and binding on the Contractor.

3. **Performance Based Completion Certificate**

Completion Certificate shall be issued only after verification and confirmation of actual execution of the work in accordance with the approved scope, timelines and quality requirements. HLL Lifecare Limited reserves the right to record performance remarks in the Completion Certificate, which may be taken into consideration during evaluation of the Contractor in future tenders.

4. **No Claim Clause for Enforcement Actions**

Any action taken by the Company under the Contract, including Liquidated Damages, termination, risk and cost execution or debarment, shall not give the Contractor any right to claim compensation or damages

Part IV

FORMS AND DECLARATIONS

1. PERFORMANCE DECLARATION FORM

(In company letterhead with sign & seal)

Details of all works of similar class completed during the during the last seven (7) years ending last day of the previous month

SN	Name of work with brief description	Work order number with date	Work order amount (Excl. GST)	Gross amount of work completed (Excl. GST)	Actual Date of completion
1					
2					
3					

Note: Copies of Work orders and Completion certificates issued by the Client/Authority concerned shall be submitted as proof of the same. Completion certificates for works issued by private parties shall be supported by TDS certificates.

Signature and seal of the bidder

2. FINANCIAL STATEMENT

Name & Address of bidder:

Financial Year	**Annual Turnover (In Rs.)**
2022-2023	
2023-2024	
2024-2025	
Total annual turnover for the 3 financial years	
Average annual turnover for the 3 financial years	

Note: Enclose audited balance sheets, profit & loss statement and IT return for the above period duly certified by a Chartered Accountant as proof.

We hereby declare that the above Turnover figures are based on the audited financial statements of the firm.

Signature and stamp of Chartered Accountant
UDIN:

Signature and stamp of the bidder

3. DECLARATION FORM

(In company letterhead with sign & seal)

We hereby declare and confirm that:

1. We don't not have any relation with the person authorized to evaluate commercially or involve in finalizing the tender.

2. If at any time, information furnished by us is proved to be false or incorrect, we are liable for any action as deemed fit to HLL Lifecare Limited.

3. We have never been blacklisted/banned /de-registered/de-barred by any of the Government authorities for preceding years from the date of issue of this tender document

4. We will abide by all the terms & conditions of the tender document.

5. We certify that we are offering more than 50% items from India for the supplies required under this e-Tender and hence falls under the category of 'Class 1 local supplier' as defined in Public Procurement (Preference to Make in India), Order 2017 as amended from time to time.

6. We hereby confirm that we have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India or on sub-contracting to contractors from such countries; I hereby certify that we (bidder) is not from such a country or it from such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries, unless such contractor is registered with the Competent Authority. We hereby certify that we (bidder) fulfil all requirements in this regard and is eligible to be considered. Accordingly, we declare that our company is not from those countries sharing borders with India and not restricted UNDER RULE 144 (XI) OF GFR 2017.

7. We confirm having read and understood all the instructions, forms, terms and conditions and other requirements of the above tender (both expressed and implied) in full and that we agree to abide by all without any deviation.

SIGNATURE OF THE BIDDER WITH SEAL

4. ACCEPTANCE FORM

(In company letterhead with sign & seal)

From

To

Deputy Vice President (P&S),
Hi-Care Division,
HLL Lifecare Limited,
HLL Bhavan, #26/4, Tambaram-Velachery Main Road,
Pallikaranai, Chennai – 600 100,
Tamilnadu, India.
Phn: 044-29813732/34
E-mail: hcdcmo@lifecarehll.com

Name of Work:

Dear Sir,

I / We, hereby offer to design / fabricate / supply/install/testing/validate/commission as detailed in schedule hereto or such portion thereof as you may specify in the acceptance of Bid at the price given in the price bid and agree to hold this offer open for **120 days** from the date of bid opening prescribed by the Purchaser. I/We have understood the terms and conditions mentioned in the invitation for bid and Conditions of Contract furnished by you and have thoroughly examined the specifications quoted in the bid document hereto and are fully aware of the nature of the scope of work required and my/our offer is to comply strictly in accordance with the requirement and the terms and conditions mentioned above.

We are hereby attesting all the pages of the tender document & submitting the same in proof of our acceptance of the terms of the tender.

Yours faithfully,

SIGNATURE OF THE BIDDER WITH SEAL

5. COMPLETION PERIOD

(In company letterhead with sign & seal)

_____(Name of the Work) as per schedule of Work provided by HLL Engineer-in-charge and each site shall be completed within a period of _____**Days** from the date of Letter of Intent/Work Order or Site Clearance (whichever is later), irrespective to the no. of sites awarded.

SIGNATURE OF THE BIDDER WITH SEAL

6. REQUISITION FORM FOR E-PAYMENT

Certified that I am having a Savings / Current Account in <Name of Bank> ---------- ---------- at <Name of Branch>---------- with <IFSC Code> _____

The Account Number is: _____

I wish to receive all payments in this account through NEFT and RTGS systems, as the case may be, for all payments relating to this work.

Name of Bidder

Place: _____

Date: _____

(Attach Scanned copy of Cancelled cheque of above bank)

7. SUPERINTENDENCE, SUPERVISION, TECHNICAL STAFF & EMPLOYEES DETAILS

(In the company letter with sign & seal)

Tender Reference No:

Name of the Bidder:

SN	Minimum Qualification of Technical Representative	Discipline	Minimum Experience (in Years	No. of Employees Required
1	Graduate Engineer or Diploma Engineer	Civil	2 or 5 Respectively	1
2	Graduate Engineer or Diploma Engineer	Electrical	2 or 5 Respectively	1

Assistant Engineers retired from Government service that are holding Diploma will be treated par with Graduate Engineers.

Diploma holder with minimum 10-year relevant experience with a deputed construction company can be treated at par with graduate Engineers for the purpose of such deployment subject to the condition.

Note: I/ We hereby declared that we will provide the employees as per mentioned in the tender document. In failing which, I / we understand that we will be Debarred from future Works as per the GCC 15.3

SIGNATURE OF THE BIDDER WITH SEAL

8. NO DEVIATION CERTIFICATE

(In the company letter with sign & seal)

To

_____

_____

_____

_____

Subject: No Deviation Certificate for _____(Name of the Work)

Tender Ref. No:

Dear Sir,

With reference to above this is to confirm that as per Tender conditions we have visited site before submission of our Offer and noted the job content and site condition etc. We also confirm that we have not changed/modified the above tender document and in case of observance of the same at any stage it shall be treated as null and void.

We hereby also confirm that we have not taken any deviation from Tender Clause together with other reference as enumerated in the above referred Notice Inviting Tender and we hereby convey our unconditional acceptance to all terms & conditions as stipulated in the Tender Document.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null and void.

Yours faithfully,

Date:

(Signature, name and designation
of the Authorized signatory)

Name and seal of Bidder

Note:
In case of Association, the Associate Bidder shall also submit the Form

9. FORMAT OF SITE VISIT CERTIFICATE

TO WHOM SO EVER IT MAY CONCERN

Ref. No:

This is to certify that _____, having its office at _____ has conducted a site visit at the project locations:

The visit was carried out on _____in connection with the following e-tender:

- Name of Work:
- Tender ID:

This certificate is issued upon request of the bidder

Bharath Ebenezer B
Manager (BD)
HLL Lifecare Limited

10. BID FORM

Date_____

To
HLL Lifecare Limited
……

Ref. Tender Document No. _____dated _____

We, the undersigned have examined the above mentioned tender document, including its amendment/corrigendum (if any), the receipt of which is hereby confirmed.

If our BID is accepted, we undertake to perform the work, in accordance with this tender document.

We further confirm that, if our BID is accepted, we shall provide you with a performance security of required amount in an acceptable form in terms of GCC clause for due performance of the contract.

We agree to keep our BID valid for acceptance as required in the GIT clause or for subsequently extended period, if any, agreed to by us. We also accordingly confirm to abide by this BID up to the aforesaid period and this BID may be accepted any time before the expiry of the aforesaid period.

We further confirm that, until a formal contract is executed, this tender read with your written acceptance thereof within the aforesaid period shall constitute a binding contract between us.

We further understand that you are not bound to accept the lowest or any BID you may receive against your above-referred tender enquiry.

We confirm that we do not stand deregistered/banned/blacklisted by any Govt. Authorities.

We confirm that we fully agree to the terms and conditions specified in above mentioned tender document, including amendment/ corrigendum if any

(Signature with date)
(Name and designation)
Duly authorised to sign BID for and on behalf of

PART V

LIST OF APPROVED MAKES FOR CIVIL AND ELECTRICAL WORK

To be submitted in the letter pad of the firm indicating full name and address, telephone & fax numbers etc.)

TECHNICAL SPECIFICATIONS

1. All the measurements shall be as per the latest edition of B.I.S.
2. The Technical specifications, code of practice etc. shall be referred in accordance with CPWD Specifications and work shall be executed accordingly for all works.
3. Items which are not covered under CPWD Specification shall be carried out as per relevant Indian Standard Specifications of BIS/ NBC/ IRC/ BS/ ASTM/ DIN as directed by the Engineer-in-charge.
4. The detailed specifications for electrical works shall be in accordance with CPWD – General Specifications for Electrical Works Part I (Internal) 2013.

TECHNICAL SPECIFICATION & CONDITIONS – CIVIL WORKS

1. **EARTH WORK**: As per relevant CPWD specifications.

A. Irrespective of the stipulations in the relevant CPWD Specifications or elsewhere in the Contract, the excavated earth shall be disposed of by the contractor at his own cost to the place as directed by Engineer – in-charge and/or permitted by the local authority after obtaining written permission of the Engineer – in-charge and no payment will be made by the HLL for disposal of this excavated earth.

B. The Contractor shall, at his own expense and without extra charges, make provision for all shoring, pumping, dredging or bailing out water, encountered from any sources such as rain, floods, springs, subsoil water table being high or due to any other cause whatsoever.

C. Filling in plinth shall be consolidated with water and compacted with pneumatic rammers, to achieve 90% relative density on testing. One test is to be carried out for 1000 sq.ms. of compacted area.

2. PLAIN CEMENT CONCRETE AND REINFORCED CEMENT CONCRETE WORK:

A. STONE AGGREGATE:

i. Stone aggregate used in the work shall be of hard broken stone to be obtained from approved source and shall conform to relevant provision in the Latest CPWD Specifications for works.

B. SAND

i. Sand to be used for the work shall be of as specified in CPWD Specifications 2019. Sand shall be obtained from the source to be got approved by the Engineer in charge and washed if required, with appropriate equipment to bring down the chemical, inorganic and organic impurities within the permissible limits as per the direction of the Engineer in charge. The same shall consist of hard siliceous materials. Note: Where only one variety of sand is available the sand will be sieved for use in finishing work as directed by the Engineer – in – charge in order to obtain smooth surface and nothing extra will be paid on this account.

ii. Nothing extra shall be paid for screening or washing the sand as prescribed above.

C. CEMENT

i. The contractor shall procure 43/ 53 grade ordinary Portland cement [grade as per design/ decision of Engineer-in-charge] conforming to IS 8112/Portland Pozzolana Cement conforming to IS:1489 (Part-I) as required in the work, from approved manufacturers of cement having a production capacity not less than one million tonnes per annum as approved by the Engineer –in -charge. The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacturer(s) which the tenderer proposes to use in the work. No changein the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer, fully or partially. The supply of cement shall be taken in 50 kg bags bearing manufacturer's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-charge and got tested in accordance with provisions of relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not conform to the BIS codes, the same shall stand rejected, and it shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer in-charge to do so.The cement shall be brought at site in bulk supply of approximately 50 tonnes

or as decided by the Engineer-in-charge. The cement godown of the capacity to store a minimum of 2000 bags of cement shall be constructed by the contractor at site of work for which no extra payment shall be made.

D. CENTERING SHUTTERING AND SCAFFOLDING:

i. All Scaffolding centering for RCC shall be with properly designed system and brought to site well in advance so that the progress of the work is not hampered for non-availability of the same.
ii. All shuttering for RCC work except soffits of slab shall be in water proof shuttering Ply. Shuttering for slab and soffits shall be in water proof shuttering ply or in good quality mild steel plates free of dents, bends or warping and rusting as approved by the Engineer in charge.
iii. Contractor should deploy complete one set of shuttering materials for minimum one complete floor and the shuttering material for beam bottom shall be minimum for two complete floors.

E. **REINFORCEMENT:**

i. TMT reinforcement steel shall be used shall be as per design and conforming to IS: 1786 pertaining to Fe 500D OR Fe 550D grade of steel.
ii. TMT steel bars manufactured by main producers, as per list of makes, shall be allowed in the work. Contractor shall produce manufacturer Test Report for each dia and each lot Tests. Nothing extra will be paid for "straightening of bars" received from market in coils or with bends. All incidental charges of any kind whatsoever including cartage, storage, safe custody of materials, cutting and wastage etc. shall be borne by the contractor.
iii. The actual average sectional weight for dia up to 10 mm shall be arrived at from one meter long samples (minimum 3 from each dia) taken from each lot of steel. The discretion of the Engineer – in – charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will constitute the single lot for this purpose.
iv. The weight of each lot of a particular diameter of 10mm and below shall be reckoned as the weight as per actual issue multiplied by a factor equal to the standard sectional weight of the particular diameter divided by the average sectional weight of the particular dia in a particular lot worked out as per above para. Adjustment for the steel shall be effected on the basis of the weight as modified above for quantity payable.

v. Measurement of all diameters of steel be on linear basis and will be converted into weight on the basis of standard sectional weight coefficients given in relevant CPWD specifications mentioned in schedule 'F' of General Conditions of Contract.

vi. Measurement of reinforcement shall be as per procedure described in the relevant CPWD specifications mentioned in schedule 'F' of General Conditions of Contract

F. CONCRETE MIX DESIGN

The mix design shall be for MODERATE exposure and GOOD degree of quality control, unless otherwise specified.

3. BRICK WORK

A. BRICK WORK

a. Bricks used in the work shall be obtained from kilns to be got approved from the Engineer in charge and shall be best quality well burnt ground moulded bricks as available in the vicinity. They shall have a compressive strength of not less than 75 Kgs/sq.cm and an absorption percentage of not more than 15 (Fifteen) % of its dry weight when immersed in water for 24 hours. In all other respects they shall conform to the provision in Latest CPWD Specifications for works.

b. Both the face of wall of thickness more than 23cm shall be kept in the proper plane. Walls of half brick thickness or less shall be measured separately and paid in sqm.

c. Bricks wall beyond half brick thickness shall be measured in multiple of half brick (i.e. more than 115mm or equivalent) which shall be deemed to be inclusive of mortar joints. In all other respects they shall conform to the provision in relevant specifications of the work.

d. For mortar, use of PP Cement shall be preferred.

B. Solid/Hollow Block Work

a. Precast CC blocks shall be procured from approved manufactures or manufactured at site. Nothing extra shall be payable on account of adding any admixture for making pre- cast blocks or for steam curing.

b. The Solid CC blocks shall have nominal size of 400mm x 200mm x 200mm for 200mm thick masonry wall& Hollow blocks of nominal size 400mm x 200mm x 100mm for 100mm thick masonry walland shall confirm to IS 2185.

c. The samples of CC blocks (each sample consisting of 6 specimens) shall be chosen randomly from the lot and tested for various parameters specified below. One samples shall be tested for every 100 cum or part thereof.

d. Following parameters shall be tested.

i. Compressive strength.
ii. Water absorption
iii. Density
iv. Dimensional Tolerances
v. The material shall meet following parameters :
vi. Compressive strength shall be no less than 5.0 N/sq. mm.
vii. Water absorption shall not be more than 5%.
viii. Density shall be not less than 1500 kg/cum.
ix. Dimensional tolerance in the size shall be not more than + 5mm for length and + 3mm for height and width.

e. Top course of all plinth, parapets, steps and top of walls below floor and roofs shall be laid with solid blocks, properly radiated and keyed into position to form cut (meru) corner. Where blocks cannot be cut to meru corners, cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) equal to thickness of the coarse shall be provided in lieu of cut blocks. No additional payment shall be made on this account.
f. Nothing extra shall be payable on account of chasing the CC block masonry work for embedding pipes, electrical boards/ boxes etc. and also filling the chases with cement mortar 1:4 (1 Cement : 4 Coarse sand). The chasing shall however be carried out using machine cutters so as not to disturb the joints in the masonry and without any cracks being developed in the masonry.
g. All other specifications for 100 mm thick and 200mm thick hollow/solid block work shall be as described for full brick and half brick masonry work respectively.
h. For unsupported lengths of 100 mm thick walls exceeding 3.5 m, 100 x 200 mm wide R.C. mullions shall be provided at 3.5 m centre, tied to the lintels at door height. Similarly, continuous R.C. beam of size 100 x 150 mm shall be provided at door height for 100 mm thick wall. Such RC mullion/ bands shall be measured and paid separately.

4. **CEMENT PLASTER: -** The use of PP Cement shall be preferred.

The joints in the brick work, concrete blocks, shall be raked to a depth of 15 mm while the masonry is green. Concrete surfaces to receive plaster shall be suitably roughened. All walls shall be washed with water and kept damp for 10 hours before plastering. The plaster unless specified otherwise shall be average of 12 mm thick on walls. The finished texture shall be as approved by the HLL. The mix for plaster unless otherwise specified, shall be one-part cement and four parts sand, to walls. All plaster work shall be kept continuously wet for seven days.

5. **STEEL GRILL WORK**:

a. All steel grills shall be according to the detailed drawings and obtained from approved suppliers. These shall conform to Latest CPWD Specifications for works.

b. In case of grills an approved quality priming coat of zinc chromate shall be applied over and above a shop coat of primer. Nothing extra shall be payable for providing shop coat primer, but the zinc chromate primer, if additionally required, will be paid for separately.

6. PAINTING

a. MATERIAL

This paint shall be brought to the site of work by the contractor in its original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The materials shall be kept in the joint custody of the contractor and the Engineer-in- Charge. The empty containers shall not be removed from the site of work till the relevant item of work has been completed and permission obtained from the Engineer-in-Charge

b. SCAFFOLDING

Scaffolding as required for the proper execution of the work shall be erected. If work can be done safely with the ladder or jhoola these will be permitted in place of scaffolding.

c. PREPARATION OF SURFACE

The surface shall be thoroughly cleaned off all mortar dropping, dirt dust, algae, fungus or moth, grease and other foreign matter of brushing and washing, pitting in plaster shall make good, surface imperfections such as cracks, holes etc. should be repaired using white cement. The prepared surface shall have received the approval of the Engineer in charge after inspection before painting is commenced.

d. APPLICATION

Before pouring into smaller containers for use, the paint shall be stirred thoroughly in its container, when applying also the paint shall be continuously stirred in the smaller containers so that its consistency is kept uniform. The lids of paint drums shall be kept tightly closed when not in use as by exposure to atmosphere the paint may thicken and also be kept safe from dust. Paint shall be applied with a brush on the cleaned and smooth surface. Horizontal strokes shall be given, First and vertical strokes shall be applied immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush marks.

e. BRUSHES & CONTAINERS

After work, the brushes shall be completely cleaned of Paint and linseed oil by rinsing with turpentine. A brush in which Paint has dried up is ruined and shall on no account be used for painting work. The containers when not in use, shall be kept closed and free from air so that Paint does not thicken and also shall be kept safe from dust. When the Paint has been used, the containers shall be washed with turpentine and wiped dry with soft clean cloth, so that they are clean, and can be used again.

7. ALUMINIUM WORK \UPVC

a. The scope of the work is the fabrication, supply and erection at site of all types of Aluminium/ UPVC glazed doors, windows and ventilators in accordance with the drawings and specifications.

b. The supply and erection will include all parts such as but not restricted to frames, tracks, guides, mullions, styles, rails, couplers, transoms, rails, plates glazing bars, glass, hinges, arrangement, spring catches, cord and pulley arrangements, spring catches, cord and pulley arrangements door closers floor springs etc., required for the whole work whether the parts/ items are individually and specifically referred to in the schedules/ specifications/drawings or not provided that the supply and installation of such parts can be inferred there from and are necessary to make the work complete, unless separate provision is made in the bills of quantities for supply to such parts/items.

c. The doors, windows, ventilators, will be fabricated to suit the finished clear openings in the building/structure which the tenderer will himself measure.

d. Materials:-

i. The members will be made out of aluminum alloy corresponding to IS:733 and will consist of extruded sections and of other shapes, and to sized gauges as shown in the drawings/ described in accordance with the relevant IS codes. The members shall be chosen to provide strength/ stability and maximum resistance to wear and tear.

ii. UPVC members shall be made of PVC material conforming to IS: 10151.

iii. The Sections will be as per approved makes, extruded sections. As indicated in the drawings the tenderer should specifically mention which sections he is using.

iv. The weight of sections and the corresponding catalogue numbers are mentioned. The weight of sections and the corresponding catalogue numbers are mentioned. The IS specifications are to be strictly adhered.

v. The extruder using recycled materials may be preferred.

vi. The alloy of extruded aluminum should be BS or IS old HE9, Alcon 50 SWP. to this effect test certificate has to be provided for the extruder.

a. Finishing

i. The extruded aluminum section has to be mechanically finished to remove all scratches; extrusion marks etc and subsequently thoroughly cleared in all alkali baths prior to anodizing.

ii. The polyester powder coating, as required, as per item of work, shall be of desired shade with minimum average thickness to 50 microns or other shades as required and to this effect the tenderer must have to produce test certificate from authorized institutions Bureau of Indian Standard.

iii. The polyester powder coated material should be properly wrapped in gummed tape before fabrication to avoid scratches during fabricated and erection shall be kept protected till handing over.

b. Fabrication:

- Before commencing the fabrication the contractor shall submit to the Engineer – in - charge for their approval detailed shop drawings, based on the Architectural drawings and corresponding specification showing junctions, fittings, accessories such as hinges flush bolts, locks, latches, latching arrangements, peg stays, rotor arms, anodize pivots gaskets rubber packing door felts, mastic, sealant etc., including fixing and sealing arrangements. Type and method of scaffolding he intends to use, Fabrication is to be taken up only after approval by the Engineer – in- charge and in accordance with the approved drawings. Sections for fabrication of door/ window/ventilators etc shall be as per architectural drawings or as approved by the Engineer – in - charge.

ii. A sample of finished door / windows/ ventilator railing etc. shall be fabricated as per the shop drawings approved by the Engineer – in - charge for final approval before under taking mass production/ fabrication,

iii. The doors, window, ventilators and partitions shall be as per thickness given in the approved shop drawings, Polyester Powder coating shall be as specified in the item specifications.

iv. All materials shall conform to relevant IS. Codes and in the absence of IS code, they should correspond to the best engineering practice; decision of the Engineer – in

- charge shall be final and binding on the contractor.

v. Fabrication shall be done true to the drawing/ sample approved and in correspondence to the finished openings at the site. All joints shall be mitered at the corners, true right angles,

and joints to be finished neatly to hairlines, with concealed fasteners, wherever possible joints shall be made in concealed locations. vii. Site installation shall be with concealed screws, self-tapping or other approved fasteners or may be by welding, due precautions shall be taken to avoid any distortion/ discoloration /damage to the finished items.

vi. Wood work faces /parts coming in contact with masonry shall before shifting to the site be given a heavy coat of alkali resistance bitumen paint. Steel items coming in contact with other incompatible materials shall be given a thick coat of zinc chromate primer.

c. Glazing:

Glazing shall be done with flawless sheet glass of best approved quality without waviness, distortion, coloration / discoloration, of specified thickness in sizes as shown in the drawings, fixed as required with special glazing clips, putty, neoprene/PVC gaskets. All glass shall be cleaned thoroughly before they are fixed in position. Unless otherwise specified the minimum thickness shall be 5 mm thick.

8. FALSE CEILING

i. False ceiling items in general are carried out as per the description of the item in the Bill of quantities and also as per the manufacturer's specifications / as directed by the Engineer – in – Charge.

ii. Location of particular type of false ceiling shall be as per relevant drawing, in its absence written approval of the Engineer – in - charge shall be obtained.

iii. The false ceiling tiles from manufacturers using recycled materials shall be preferred.

9. FLOORING:

i. The flooring in the building shall be as per the approved floor finish drawings and laid in such a way that limits in floor levels would not exceed the limits provided in the latest CPWD specifications or manufactures specifications.

ii. Wherever Vitrified Tile flooring is done, it shall be with multy grade/range 1st Quality tiles.

iii. Slope in floors shall be provided as per architectural drawings, else the levels at any place when checked over a distance of one meters in any direction should not show variation in floor level more than 3 mm.

iv. Rate for the items of flooring is inclusive of provision of sunken flooring and finishing edges of the same in bath kitchen, toilets, cutting holes for traps/ pipes etc., and nothing extra shall be paid on this account unless otherwise specified.

v. Protective layer to be provided of any type of flooring and nothing extra shall be paid on this account.10.

10. STAINLESS STEEL RAILINGS

i. The scope of the work includes preparation of the shop drawings (based on the architectural drawings), fabrication, supply, installation and protection of the stainless steel railing till completion and handing over of the work.

ii. The stainless steel work shall be got executed through specialized fabricator having experience of similar works. The Contractor shall submit the credentials of the fabricator for the approval of the Engineer-in-Charge.

iii. The Contractor shall submit shop drawings, for approval of the Engineer-in-Charge, for fabricating stainless steel railing with detailing of M.S. stiffener frame work backing along with the fixing details of the M.S. frame work to the R.C.C columns. The details of the joints in the stainless steel railing including location, etc. shall also be shown in the shop drawings.

iv. The Contractor shall procure and submit to the Engineer-in-Charge, samples of various materials for the railing work, for approval. After approval of samples, the Contractor shall prepare a mock up for approval of Engineer-in-Charge/ HITES. The material shall be procured and the mass work taken up only after the approval of the mock up by the Engineer-in-Charge/ HITES. The mock-up shall be dismantled and removed by the contractor as per the directions of the Engineer-in-Charge. Nothing extra shall be payable on this account.

v. The stainless steel shall be of grade 316 with brushed steel satin finish and procured from the approved manufacturer. It shall be without any dents, waviness, scratches, stains etc.

vi. The required joints in the railing provided as per the architectural drawings, shall be welded in a workmanlike manner including grinding, polishing, buffing etc. all complete and compacted. The temporary clamps provided and fixed to hold the stainless steel railing, in position shall be removed after the concrete has set properly. The junction of the flooring and the cladding shall be neatly filled with weather silicone sealant of approved colour and shade. Nothing extra shall be payable on this account.

vii. One test (three specimens) for each lot shall be conducted for the stainless steel pipe in the approved laboratory. Therefore, the material shall preferably be procured in one lot from one manufacturer.

viii. The finished surface shall be free of any defects like dents, waviness, scratches, stains etc. and shall have uniform brushed stbe rejected and redone by the Contractor at his own cost. The finished surface shall therefore be protected using protective tape which shall be removed at

the time of completion of the work. The surface shall then be suitably cleaned using nonabrasive approved cleaner for the material. Nothing extra shall be payable on this account.

ix. The item includes the cost of all inputs of labour, materials (including stainless steel pipes, welding, brazing, concrete, protective film, weather silicone sealant etc including cost of providing and fixing M.S. frames), T & P other incidental charges, wastages etc. The items also included providing and fixing stainless steel anchor fasteners for fixing railing.

x. The railing shall be fixed in position using stainless steel pipes, stainless steel posts of required diameters and thickness as shown on drawing and polished to satin finish including cutting, welding, grinding, bending to required profile and shape, hoisting, butting, polishing etc.

xi. The item includes the cost of all inputs of labour, materials, T&P, other incidental charges, wastage etc. The entire work shall be carried out to the satisfaction of Engineer-In-Charge.

11. GLASS:

i. All glass and glazing material shall be verified and coordinate with the applicable Performance requirement.

ii. All glass shall be cut to require size and ready for glazing. All glass shall be accurate sizes with clear undamaged edges and surfaces which are not disfigured. Any panel which does not fit any section of the curtain wall and shop front will be rejected and a replacement made at the Contractor's expense.

iii. Glass shall conform to the quality, thickness and dimensional requirement specified in Bill of Quantities/ CPWD Specification.

iv. Heat strengthened glass shall not deviate in surface flatness by more than 0.23 mm with in 260mm of leading or trailing edge, or 0.076 mm in centre. Direction of ripple shall be consistent and is acceptable to Engineer-in-charge. Distortion of glass shall be controlled as much as possible during heat strengthening. Sag distortion shall be unidirectional and surface compression shall be in the range of 320-450 Kg/cm². All glass shall be delivered to site with the manufacturer's label of identification attached.

v. The glass glazed panel/ structural glazing frames for the structural glazing system shall be designed to withstand lateral imposed loads and comply with requirement of local building codes.

vi. Glass shall be free from defect or impurities detrimental to its performance. Defects such as bubbles, waves, spots scratches, spalls, discoloration, visibly imperfect coating, chipping, and bubbles delaminating of opacifier film shall be limited in accordance with the Manufacturer's

/ trade guidelines. The glass is to be produced in such a way that the rollers will be parallel to what will be the horizontal position of the glass. Glass should be consistent in colour.

vii. Double glazed units shall be procured only from approved manufacturer. Quality control tests shall be performed for mixing, curing, adhesion and dew point. The unit shall be guaranteed against condensation and dirt between the panes, failure of seal and damage to internal coating.

viii. All glass breakage caused by the Contractor or his sub-contractor because of negligence or caused by the installation of faulty work by him shall be replaced by the Contractor at his own expense without delay to the project completion.

12. WATER PROOFING TREATMENT:

All the items for water proofing treatment with cement based water proofing treatment for roof slab and sunken portion in schedule of quantities shall be guaranteed for TEN YEARS the case of cement based treatment by the contractor as per Performa prescribed. The water proofing treatment work should be got done through specialized agency approved by EIC.

13. WATER PROOFING TREATMENT FOR ROOF /SUNKEN FLOORS OF W.C`S ETC.

i. Water proofing treatment for roof/ sunken floor has to carried out as per the respective Bill of Quantities/ CPWD Specification.

ii. The finished surface after water proofing treatment shall have required slope.

iii. While treatment of sunken floors is done it shall be ensured that the 'S' or 'P' traps as the case may be have been fixed/ eased and rounded off properly the work shall be carried out as per relevant CPWD specifications.

iv. GURANTEE: The above water proofing, treatment shall be guaranteed for TEN YEARS against any leakage etc. the contractor shall have to execute a bond, 10 % of cost of items executed for water proofing shall be retained for 10 years as security (Refer GCC provisions).

14. ANTIBACTERIAL PAINT

i. The Antibacterial Paint shall be able to provide anti-Microbial Protection:

ii. The scope of work includes providing & applying approved makes anti-Microbial Paint on wall surfaces as per manufacturer's specifications complete in all respect & as directed by Engineer-in-charge. Following are the desired characteristic of the paint:

iii. Protection: The product hygiene coatings to start the biocidal action as soon as the microorganism land on the surface, and prevents the growth of mould, bacteria and yeasts for at least 5 years.

iv. Lily Cycle Savings: The unparalleled durability of hygiene coatings should help to extend the maintenance cycle and to minimize all related material, labour and shut down costs.

v. Chemical Persistence: The hygiene coatings should be highly resistant to abrasives, detergents and weak acids and alkalis used in cleaning

15. CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPES

CPVC pipes & fittings used in hot & cold potable water distribution system shall conform to requirement of IS 15778. The material from which the pipe is produced shall consist of chlorinated polyvinyl chlorides. The polymer from which the pipe compounds are to be manufactured shall have chlorine content not less than 66.5%. The internal and external surfaces of the pipe shall be smooth, clean and free from grooving and other defects. The pipes shall not have any detrimental effect on the composition of the water flowing through it.

LIST OF APPROVED MAKES (CIVIL WORKS)

SN	Material	Approved Make/Manufacturers
1	Plywood /Block board /Ply board	Duro/ Greenply/ Century/ Kitply/ National/ Archiply/ Merino/equivalent
2	Pre-laminated particle board / Veneered particle board	Novapan /Century /Green Ply /AK Plywood/ Merino/equivalent
3	PVC door/shutter	Rajshri/ Plasopan/ Synkapolywood/ Polyline Sintex/ Polyex/equivalent
4	Clear Glass / Clear Float Glass / Toughened Glass/ Mirror/ Structural Glazing	Modiguard/ Saint Gobian (SG)/ TATA Continental/ Asahi India Safety Glass Ltd/equivalent
5	Glass Wool / Insulation Boards	Rockwool/ UP Twiga/ Lioyd Insulation/ equivalent
6	Aluminum building hardware	IPSA/ Everite/ EBCO/ ECIE/ Hardwyn Traders/equivalent
7	Aluminium Sections	Jindal/ Hindalco/ Indal/equivalent
8	UPVC Doors & Windows & Partitions	Fenesta/ Lingel/ CASSA/ Evolution/ Kommerling/ NCL Wintec/ Duroplast/AparnaVenster/equivalent
9	UPVC Toilet Doors	AMD Overseas/ Fenesta/ Lingel/ CASSA/ Evolution/ Kommerling/ NCL Wintec/ Duroplast/AparnaVenster/equivalent
10	Locks/Latches	Godrej/ Harrison/ Hettichplaza/ yale/ link/equivalent
11	Door Hardware	Dorma/ Kich/ Classic/ Haffle/ Ozone/ Geze/equivalent
12	Hydraulic Door Closer/Floor Spring	Godrej/ Hardwyn/ Dorma/ Everite/equivalent
13	Adhesive for tiles	Cico / Pidilite / ArdexEndura / Sikka / Fosroc / BASF/ MYK Laticrete

SN	Material	Approved Make/Manufacturers
14	Adhesive for Wood Work	Fevicol/ Pidilite/ ArelditeCico/ Vamicol/ Dunlop/equivalent
15	Fastener	Fisher/ Hilti/ Canon/ Bosch/equivalent
16	Fire Sealant	Hilti/ Promat/ Birla/ 3M/equivalent
17	Silicon sealants /Weather Sealant / Structural Glazing Sealant/ Additives	Asian paints/ Foscroc/ Pidilite/ GE- Silicon/ Pidilite/ CICO/ Sikka/ MYK Arment
18	Cement	ACC/ Coromandel / Ultra tech/ JK Cement/ Ambuja/ India Cement/ Ramco/ Dalmia/ Malabar Cement/ Birla/ Chettinad/ Cement Corporation of India/ Bharati/equivalent
19	Concrete Additive	Sikka/ CICO/ Pidilite/ Fosroc/ Fairmate/ MC Bauchemie / BASF/ MYK Arment
20	Concrete Admixture	Fosroc/ Pidilite/ MYK Arment
21	AAC blocks	Xtralite from Ultratech/ Aerocon from HIL/ Siporex India Limited/equivalent
22	Damp proof material	Impermo/ Duraseal/ ACCO-proof/
23	Gypsum Board / Gypsum False Ceiling/ Gypsum Partitions	India Gypsum/ SaintGobain/ Lafarge/ Boral Gypsum/ Armstrong/equivalent
24	Calcium Silicate Boards & Tiles False Ceiling	India Gypsum/ Aerolite/ RAMCO (Hilux)/ Saint Gobain (Gyproc)/equivalent
25	Metal false Ceiling	Armstrong/ Hunter-Douglas/ USG/ Unimet/ equivalent
26	Mineral fibre false Ceiling	Armstrong/ Decosonic/ USG/ AMF/ Saint Gobain (Gyproc)/equivalent
27	Ceramic Tiles	Kajaria/ Somany / H & R Johnson/ Orient - Bell NITCO/ RAK/equivalent
28	Vitrified Tiles (Double/ Fully Charged)/ Gem Free	Kajaria/ Somany / H & R Johnson/ Orient- Bell/ NITCO /RAK/equivalent
29	Epoxy Flooring	CIPY/ FOSROC/ ArdexEndura/ Dr. Beck/ Flamaflor/ BASF/ MYK Arment
30	PVC Flooring	LG Floors / Gerflor / Premier Vinyl flooring / Armstrong/equivalent
31	Cement Concrete Paver Tiles/ Drain cover/ Kerb Stone	K.K/ HPL/ TUFFTECH/ NITCO/ Modern/ Dalal Tiles/ CICO/ Bharat Concrete Products/ Ashokaa/ Uni Stone Products (India) Pvt. Ltd/ Hindustan Tiles/equivalent
32	Antistatic Floor Coating	INARCO/ PVC WONDER FLOOR/ ARMSTRON/ MYK Arment
33	Water proofing compound	Dr.Fix/ FOSROC/ SIKA/ CICO/ Pidilite/ Impermo by Snowcem/ MYK Arment

SN	Material	Approved Make/Manufacturers
34	Water proofing Materials (Bitumenistic)	BASF/ Fosroc/ Sikka/ CICO/ Pidilite/ STP/ ArdexEndura/ MYK Arment
35	White Cement	Birla White/ JK White/equivalent
36	Wall putty	JK Wall Putty/ Birla Putty / Nippon/equivalent
37	Synthetic Enamel Paint	Asian (Premium Apcolite Gloss)/ Berger (LuxolHigloss)/ Nerolax/ ICI (Dulux Gloss)/ Nerolac / Jotun/equivalent
38	Oil Bound Distemper	Nerolac/ Berger (BisonAcrylic)/ Asianpaints/
39	Dry Distemper	Berger (Castle)/equivalent
40	Emulsion Paint	Nerolac/ Berger/ Asian paints/ ICI/ Jotun/equivalent
41	Steel/ wood primer	Nerolac/ Berger/ Asian paints/ ICI / Jotun/equivalent
42	Texture Paint	Spectrum/ Unilite Heritage/ Asian/ Berger/ Jotun/ equivalent
43	Epoxy Paint	ICI Dulux/ Nerolac/ Cico/ Sikka/ BASF/ Berger/ Pidilite/ MYK Arment
44	OT: Anti -Fungal Paint	ArdexEndura/ Sikka by Liquid Plastic/ Viesmann/ SSK/ TRILUX/ MYK Arment
45	Water proofing cement paint	Snowcem/ Asian/equivalent
46	Pre –coated galvanized steel Profile sheet & accessories	TATA Bluescope/ DynaRoof/ ESSAR Steel/ JINDAL/ Llyod Insulations India Ltd / S.R Metals/equivalent
47	Steel section windows, Pressed Steel door frame	San HarvicSteelman Industries/ AGEW/ BHAWANI-STEEL/equivalent
48	Structural Steel Sections/ Rolled Sections & Tubeless Sections	SAIL, TATA (TISCO), RINL, Jindal/ RANA/ Capital/ Kamdhanu/ Prithivi/ Prakashsurya/ Appolo&Hitech/equivalent
49	Reinforcement Steel	SAIL/ TATA(TISCO)/ RINL/ JSW/ JINDAL/equivalent
50	Pre-coated Galvanized Steel Sheet	Tata BlueScope / Llyod Insulations India Ltd / S.R.Metals/equivalent
51	Polycarbonate Sheets	Galina/ GE Plastic / Skyarch/ Polytechno/ Tuflite/equivalent
52	PUF/ Sandwich Panels	Llyod Insulations India Ltd / Jindal / T K E S P Ltd Isocab Sandwich Panels/equivalent
53	Vitreous china sanitary ware	Jaquar/ Kohler/ Cera/Hindware/ Parryware / Kerovit/equivalent
54	Plastic WC cover	Hindustan Saitary ware, Commander, DIPLOMAT/equivalent

SN	Material	Approved Make/Manufacturers
55	Stainless Steel sink	Hindware/ Neelkanth/ Nirali/ Jayna/ Anupam/equivalent
56	G.I pipes	Jindal Hissar/ TATA/ BST/equivalent
57	G.I fittings	Unik/ ZOLOTOM/ DRP-M/ Kent/ equivalent
58	C.PVC pipe	Astral/ Ashirwad/ SFMC/ Finolex/ Ashirwad/equivalent
59	Rainwater & PVC pipes & fittings	Prince/ Supreme/ Finolex/ SFMC/ Astral/equivalent
60	Gun metal valves	Leader/ Sant/ Zoloto/ Kriloskar/ Cera/ Jaquar/equivalent
61	CPVC pipes & fittings	Supreme/ Finolex/ SFMC/ Astral/ Prince/equivalent
62	C.l covers & Manhole covers	RIF/ NICO/ SKF/equivalent
63	SS Gratings/ Soap Dish/ Towel Rail and other SS fitting	Camry/ Glacier/ Gem/ Jaquar/ Grohe/equivalent
64	CP Brass Fittings	Jaquar/ Hindware/ Crome/ Cera/equivalent
65	Floor Drain Fixture & Channel Gratings	Chilly/ Neer/ ACO/equivalent
66	C.P Grating for Floor Trap	Chilly/ CockroachTrap/ GMGR/equivalent
67	Cast Iron Pipes & Fittings Manhole covers and frames	Electro Steel Calcutta/ Kesoram Calcutta/ NECO/ R.I.F./ B.I.C./ Hepco/ SKF/ Kajeco/equivalent
68	PVC Storage Tanks	Sintex/ Rotoplast/ Electroplast/ Fusion/ Polycon / Prince/equivalent
69	Anticorrosive Tape for Pipe Protection	PYPKOTE/equivalent
70	Pressure Gauge	HGuru/ Fiebig/ Dwyer/equivalent
71	PTMT Fittings	Prayag/ Jaquar/ Cera/ Prayag/ Polytuf/equivalent

Note:

1. The Engineer-in-charge is at liberty to select any of the brands indicated above. The contractor obtains prior approval from Engineer-in-charge before placing the order listed above.
2. Change of any make of material in case of its non-availability or any other such reason shall be at the discretion of the Engineer-in-charge. The Contractor shall not be allowed to change the makes without their prior permission.
3. Equivalent make of any item may be added with the approval of Engineer in charge, wherever makes have not been specified for certain items, the same shall be as per BIS and as per approval of Engineer.
4. In case of items for which approved make is not given above, the Contractor shall place the order

with the prior approval of the Engineer-in-charge.

5. In case of Contradiction between the approved makes/brands specified above and mentioned in the Specifications /Bill of quantities. The decision of the Engineer-in-Charge shall be final and binding on the Contractor.

6. All materials should confirm to relevant standard and codes of BIS and shall have ISI mark.

TECHNICAL SPECIFICATION & CONDITIONS – ELECTRICAL & MECHANICAL SERVICES

1.1. SCOPE OF WORK

The bidder shall supply, install and commission along with requisite spare, maintenance tools and tackles the following equipment and system in the Project. The scope also covers the detailed engineering and calculations of the various equipment/system mentioned hereunder and the same shall be approved by the HLL/Engineer-in-charge prior to execution of the job.

• Light fixtures – internal

• Wiring devices – switches &sockets

• Earthing.

• Laying and termination of L.T. cables.

• Distribution Boards / Sub-Distribution Board.

• Providing power supply to equipment's

• Complete internal building wiring as per specification.

• Safety to personnel and equipment during both operation and maintenance.

• Ease of maintenance and convenience of operation.

• Electrical supply to equipment and machinery with in the design operating limits.

• Adequate provision for future expansion and modification.

• Maximum interchange ability of equipment.

• Fail-safe feature.

• Suitability for applicable environmental factors.

• All the necessary Approvals & Liasoning for Load enhancement from present approved load to the required load shall be in the scope of the contractor.

A. ELECTRICAL ITEMS:

GENERAL:

The contractor shall consider the following details in their scope of works no additional cost shall be paid, wherever required:

- All Switch gears shall conform Ics = 100% Icu as per IEC 61439 part 1 &2
- Proper bonding to earth.
- Supporting rigid steel framework.
- Painting/ lettering on Breakers and distribution boards, the location they serve, providing on each panel its c

Circuit diagram.

- Providing cable clamps/supports within distribution boards cable alley.
- All MCB's /MCCB shall be of minimum KA breaking capacity as per CPWD General Specification Part-IV

Substation

- All MCCB's shall be provided with operating mechanism for door interlock.
- All hinged door shall be earthed through 2.5sqmm tinned braided copper wire.
- Tinned copper earth bus shall be provided throughout the length of each board.
- Pad locking of Switch board doors.
- Medium voltage switch boards/distribution boards, the combination of both these and components shall

conform to the equipment's of the latest revision including amendments of the following codes and standards.

- All MCB's used for protection of resistive and lightly inductive load shall be type "B" characteristic and

inductive (motor) load shall be of type "C" characteristic and discharge lamps and UPS etc. shall be of type

D characteristic.

- The drawings, specification and BOQ complement each other and which is shown or called for one shall be

interpreted as being called for on both. Material, if any, which may not have been specified but fairly required

to make a complete assembly of switch gear as shown on the drawing, specifications shall be construed as

being required and no extra charges shall be payable on this account.

WIRING:

Control and protective wiring shall be done with copper conductor PVC insulated 1100 volts grade multi-stranded flexible wire of 1.5/2.5/4 sq.mm cross section. The colour coding shall be as per latest edition of IS: 375.

Each wire shall be identified by plastic ferrule. All wire termination shall be made with type connection. Wire shall not be taped or spliced between terminal points.

Terminal blocks shall preferably by grouped according to circuit function and each terminal block group shall have at least 20% spare capacity.

Not more than one wire shall be connected to any terminal block. All doorframe of L.T. switchboard shall be earthed with bare braided copper wire.

EARTHING:

All electrical equipment is to be earthed by connecting two earth tapes from the frame of the equipment to a main earthing. The earthing ring will be connected via several earth electrodes. The cable armour will be earthed through cable glands. Earthing shall be in conformity with provision of rules 32, 61, 62, 67&68 of Indian Electricity Rules 1956 and as perIS-3043-1989.

The following shall be earthed:

All fixtures, sockets outlets, fans, switch boxes and junction boxes etc. shall be earthed with PVC insulated copper wire as specified in item of work. The earth wires ends shall be connected with solder less bottle type copper lugs.

The resistance between earthing system and the general mass of earth shall not be greater than 1ohm.

The earth loop resistance to any point in the electrical system shall not be in excess of 1 ohm in order to ensure satisfactory operation of protective devices.

All earthing conductors shall be of high conductivity copper/ G.I. as per B.O.Q. and shall be protected against mechanical damage. The cross-sectional area of earth conductors shall not be smaller than half that of the largest current carrying conductor.

L.T. CABLES &WIRE

a) Wires

The design manufacture, testing and supply of single core LEAD FREE FRLS PVC insulated 1.1 KV grade multi-stranded twisted wires under this specification shall comply with latest edition of following standards.

IS:3961 Current rating for cables.

IS:5831 PVC insulation and sheath of electric cables.

IS:694 PVC insulated cables for working voltage up to and including1100volts. IEC:754(i) FRLS PVC insulated cable.

Copper multi-stranded twisted conductor FRLS PVC insulated wires shall be used in conduit as per item of work.

The wires shall be colour coded R Y B, for phases, Black for neutral and Green for earth.

Progressive automatic in line indelible, legible and sequential marking of the length of cable in meters at every one metre shall be provided on the outer sheath of wire.

Progressive automatic in line indelible, legible and sequential marking of the length of cable in meters at every one metre shall be provided on the outer sheath of wire.

The material & insulation of wires shall be ROHS compliant (Reduction of Hazardous Substance) and shall comply the following directives:

EU Directive 2002/95/EC Issued Jan 2003

EU Directive 94/62/EC and 2004/12/EC (amendment) EU Directive 91/338/EEC

EU Directive 91/157/EEC & 98/101/EC (amendment)

Summary on related directives

Directive Ref.	**Date**	**Objective**	**Remarks**
2002/95/EC	27Jan03	Restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) and to contribute to the protection of human health and the environmentally sound recovery and disposal of waste EEE.	6 banned materials included Pb (Lead), Hg (mercury), Cr6+ (Hexavalent Chromium), Cd (Cadmium) and Flame Retardants- Polybrominated Biphenyls – PBB 1000ppm &PolybrominatedDiphenyls Esters- PBDE1000ppm. Max. conc. value - 0.1% by weight in homogeneous material for Pb, Hg, Cr6+, PBB/ PBDE Max. conc. value - 0.01% weight in homogenous material for Cd.
94/62/EC	20Dec94	Amending directive 94/62/EC, on Packaging	The targets defined are the following:
2004/12/EC (amendment)	2Nov04	and Packaging Waste is to prevent packaging waste by encouraging packaging re-use and recycling while at the same time avoid distortions in the internal market.	Recovery of minimum 60% by weight of the packaging waste Recycling of at least 55% and a maximum80%byweightofthetotally of packaging materials, with a material-specific minimum recycling rate for plastic of22.5% Max. sum of concentration levels of Pb,

b) Cables

The design, manufacture, testing and supply of the cable under this specification shall comply with latest edition of following standards:

IS:8130 Conductors for insulated electric cables and flexible cords .IS:7098 XLPE insulation and sheath of electric cables.
IS:3975 Mild steel wires, strips and tapes for armoring cables. IS:7098 Current rating of cables.

IS:7098 XLPE insulated (heavy duty) electric cables for working voltage up to and including 1100volts.

IS:424-1475(F-3) Power cable-flammability test.

Specification for cross-linked polyethylene insulated XLPE sheathed cable for working voltage up to 1.1 KV.

Specification for XLPE insulated (heavy duty) electric cables for working voltages up to and including 1100 volts.

ASTM-D: 2863 Standard method for measuring the minimum oxygen concentration to support candle-like combustion of plastics (Oxygen Index).

ASTM-D: 2843 Standard test method for measuring the density of smoke from the burning or decomposition.

c) Technical Requirements:

The cables shall be suitable for laying in racks, ducts, trenches conduits and under-ground buried installation with uncontrolled back fill and chances of flooding by water.

They shall be designed to withstand all mechanical, electrical and thermal stresses under steady state and transient operating condition.

The aluminium /copper wires used for manufacturing the cables shall be true circular/sector in shape before stranding and shall be of uniformly good quality, free from defects. The conductor used in manufacture of the cable shall be of H2grade.

The cable should withstand 25 KA for 0.5 sec with insulation armour insulated at one end. Bidder shall furnish calculation in support of capability to withstand the earth fault currents. The current carrying capacity of armour and screen (as applicable) shall not be less than the earth fault current values and duration.

Laying of Cables:

The cable drum shall be placed on jacks before unwinding the cable. Great care shall be exercised in laying cables to avoid forming links. At all changes in directions in horizontal & vertical places, the cable shall be bent with a radius of bend not less than 8 times the diameter of cable.

The cable of 1.1KV grade shall be laid not less than 750mm below ground level in 36 a 375mm wide trench(throughout), where more than one cable is to be laid in the same trench, the width of the trench shall be increased such that the interaxial spacing between the cables except where otherwise specified shall at least be 150mm minimum or as per site requirements or as approved by the Engineer-in-charge. Where single core cables are used in multiphase systems, the cables shall be installed in trefoil where possible.

INTERNAL ELECTRICAL WORKS:

1) **PVC Conduit:**

All conduits shall be high impact rigid 2mm thickness PVC heavy duty type and shall comply with I.E.E. regulations for non-metallic conduit 2mm thick as per IS-40 9537/1983 (Part-III). All sections of conduit and relevant boxes shall be properly cleaned and glued by using epoxy resin glue and the proper connecting pieces. Inspection type conduit fittings such as inspection boxes, drawn boxes, fan boxes and outlet boxes shall be M.S. or otherwise mentioned. Conduit shall be terminated with adopter/PVC glands as required.

Accessories:

Conduit accessories such as normal bends, unions, circular junction boxes and pull boxes, locknuts etc. shall be heavy gauge type and approved make. Conduit accessories shall conform in all respects to IS: 3837-1966 with latest amendment. Wherever several conduits are running together, adequately sized adoptable boxes common to all runs shall be used to avoid inserting inspection boxes in the individual run. Where it is necessary to segregate wiring metal filler shall be fixed with in the box.

Separate conduit shall be used for:

1) Normal light, fan call bell
2) 16 A power outlet
3) Emergency Light Point
4) Fire alarm System
5) Computer Outlets
6) P.A System
7) Telephone system
8) TV Network
9) Or any other services not mentioned here.

Wiring for short extensions to outlets in hung ceiling or to vibrating equipments, motors etc. shall be installed inflexible conduits. Flexible conduits shall be formed from a continuous length of spirally wound interlocked wire steel with a fused zinc coating on both sides. The conduit shall

be provided with approved type adopter. A separate and accessible earth connection shall bond across the flexible conduit.

Conduit runs on surfaces shall be supported with metal 1.2mm thick saddles, which in turn are properly secured on to GI spacer to the wall or ceiling. Fixing screws shall be with round or cheese head and of rust proof materials. Exposed conduits shall be neatly run parallel or at right angles to the walls of the building and shall be painted in color matching the adjoining area. Unseemly conduit bends and offsets shall be avoided by using better appearance. Cross cover of conduits shall be minimum and entire conduit installation shall be clean and with good appearance. For surface work, the boxes shall be raised back pattern type, designed for use with distances addles to give clearance of 6mm between the back of conduit and the fixing surface.

Wiring:

All the wiring installation shall be as per IS: 732 with latest amendment. PVC insulated copper conductor cables as specified in bills of quantity shall be used for sub-circuit runs from the distribution boards to the points and shall be pulled into conduits. They shall be twisted copper conductors with the thermos-plastic insulations of 660/1100volts grade. Colour Code for wiring shall be followed.

Looping system of wiring shall be used, wires shall not be jointed. Where joints are unavoidable, they shall be made through approved mechanical connectors with prior permission of the HLL. No reduction of strands is permitted at terminations. No wire smaller than1.5sq.mm shall be used and shall be as per B.O.Q. Wherever wiring is run through trunkings or raceways, the wires emerging from individual distributions shall be bunched together with cable straps at required regular intervals. Identification ferrules indicating the circuit and DB number shall be used for submains sub-circuit wiring. The ferrules shall be provided at both end of each submain and sub-circuit.

Where single-phase circuits are supplied from a three phase and a neutral distribution board, no conduit shall contain the wiring fed from more than one phase. In any one room in the premises where all or part of the electrical load consists of lights, fans and/or other single phase current consuming devices, all shall be connected to the same phase of the supply. Circuits fed from distinct sources of supply or from different distribution boards or through switches or MCBs shall not be bunched in one conduit. In large areas and other situations where the load is divided between two or three phase, no two single-phase switches connected to different phase shall be mounted within one box.

Conduit size	20mm		25mm		32mm		40mm		50mm		60mm	
Wire size in sq.mm.	S	B	S	B	S	B	S	B	S	B	S	B
1.50	7	5	12	10	20	14	-	-	-	-	-	-
2.50	6	5	10	8	18	12	-	-	-	-	-	-
4	4	3	7	6	12	10	-	-	-	-	-	-
6	3	2	6	5	10	8	-	-	-	-	-	-
10	2	-	4	3	6	5	8	6	-	-	-	-
16	-	-	2	-	4	3	7	6	-	-	-	-
25	-	-	-	-	3	2	5	4	8	6	9	7

Notes:

The above table shows the maximum capacity of conduits for a simultaneous drawing in of cables.

The columns heads 'S' apply to runs of conduits which have distance not exceeding 4.25 m between draw in boxes and which do not deflect from the straight by an angle of more than 15 degrees. The columns heads 'B' apply to runs of conduit which deflect from the straight by an angle of more than 15 degrees.

<u>The Contractor shall be responsible for:</u>

Detailed co-ordination with other services, shop drawings for various electrical layouts such as equipment layout, lighting layouts, cabling layouts, earthing and lightning protection layouts, including equipment installation and cable termination details etc. prior to start of work.

• Preparation of bill of materials for cabling, lighting, earthing and miscellaneous items etc.

• Cable schedule.

• Lighting/power panel schedule.

• Inter connection drawing.

• Protection co-ordination drawings/tables for complete power system.

• Shop inspection and testing procedures.

• Field testing and commissioning procedures.

• Preparation of as built drawings for all services.

B. ELV (EXTRA LOW VOLTAGE)

GENERAL:

All the material shall must confirm the good working condition as per the local weather/temperature and environmental condition. The work covered under this contract shall include furnishing of all labour, materials, equipments and services required for the Security systems in accordance with the drawings and specifications.
The specifications given here shall be used to identify the requirement for rich and a high standard integrated Fire Alarm system, CCTV System, Public Address System, Access Control System, Passive Security System and Structured Cabling & Active Devices. All systems shall provide satisfactory operations, in the range of 110% and 85% of rated voltage.

Technical specifications & schedule of quantities provided under different headings are as mentioned below:

1. Structured cabiling and active devices
2. Public address system
3. CCTV system
4. Access control
5. Fire detection system

1. STRUCTURED CABILING AND ACTIVE DEVICES

Structured Cabling: The cabling design to the department LAN cabling shall be as per the TIA/EIA-T568-A standards/ TIA/EIA-T568-B standards.

Faceplate: Faceplate shall meet the following requirements:

a) Shall have the ability to fit a dust cap or shutter to prevent dust and dirt getting into the outlet for single, dual, Quad or Hexa outlets.

b) Shall have clear label for application identification

c) Shall be able to have 1,2,3,4,6 or 12 outlets

d) Shall have options for vertical style or horizontal style.

e) The faceplate housing the UTP connector modules shall have no visible mounting screws.

f) The faceplate housing the UTP connector modules shall have aperture plugs to cover any unused openings in the faceplate.

g) The faceplate housing the UTP connector modules shall provide flexibility in configuring multimedia workstation outlets that respond to present of future network needs such as audio, video, coaxial and optical fiber application

Modular Jack connector: TIA / EIA-T568-A defines four basic modular jack styles. The 8-position and 8-position keyed modular jacks are commonly referred as RJ45 (Registered Jack) connector and keyed RJ45. The 6-position modular jack is commonly refereed as RJ11. RJ45 is the standard connector for unshielded twisted pair cabling. RJ 45 is a plastic connector with eight pins. It allows insertion in only one way. The jack wiring specification is as per the Universal Service Ordering Codes (USOC).

Patch Cord: The Patch cord shall meet the following requirements:

a) Shall consist of 8 Solid copper conductors terminated with RJ 45 plugs at both ends.
b) Shall meet transmission performance and comply to EIA/TIA 568-B.2 and ISO/IEC 11801- CAT 6 minimum standard for patch cord testing (as per Annex 3)
c) Factory terminated with options for 1.2 meter, up to 12.8 meters with a long flexible boot and in different colors. The boot material should be injected into the plug to retain the position of the conductors. The Boot should be at least 2" long with built-in bend radii maintaining technology. (d) Shall have Characteristics impedance of 100□ +/- 5%@ 100 MHz. (e) The Patch cord sh

Patch Panel: Rack mounted patch panels shall be used for termination of copper cables or rack mount fiber termination unit shall be used for termination of optical fiber cable. 111.2.8.

Patch cords shall be provided for cross-connections to facilitate Moves, Adds and Changes (MACs). They shall be able to support up to Category 6 applications and shall be NEXT compliant. 1.2.8.2 The cross connect module shall be (a) (b) (c) Fire -retardant, molded plastic modules UL 94 VO rate, consisting of horizontal index strips for termination of Cat5 25 pair module to ensure ease of re-termination in case of wrong pair termination or NEXT compliant RJ 45 Modular jack panel. 10/25 pair disconnection module for incoming voice or 8/10/25 pair disconnection module for all data services.

The UTP copper cables: The UTP copper cables meet the following requirements: (a) Shall be CMR, LSZH, CMP, or MPR rated form. (b) Shall consists of 23-24 AWG, twisted pair copper conductor with UL approved insulator. (c) Fire retardant PVC Sheath shall have improved frictional properties, allowing it to be pulled through conduit without the use of lubricants. (d) The insulation should be made from Polyolefin for ruggedness (e) Available in the form of 25 pairs. - minimum Cat5 UTP cable. (f) The UTP multi pair cable shall meet the following electrical specifications: - i. EIA / TIA 568 A commercial wiring standard. ii. iii. All applications as per annex 4 Mutual capacitance (at) 1Khz: 22 nF / 1000 feet. iv. Dc resistance (Ohms/1000 feet: 28.6 v. Characteristics Impedance: 100 ohms +/- 15 % @ 100Mhz (except 4 Pr)

Optical fiber requirements: Cable must be Armored Single Mode (OM1), Multi-mode (OM1, OM2 or OM3) color coded fibers, jelly filled color coded loose tubes, around the dielectric central strength member, jelly filled, plastic tape, dielectric strength member and outer PE jacket for outdoor use and shall be tight buffered with color-coded PVC for identification for multi-core fiber optic cable (OM1, OM2, OM3 and OS1) for Indoor use

NETWORKING SWITCH: Key considerations for network are – gigabit connectivity to each user from the nearest distribution rack to various users/departments/devices in a topology consisting of core switches at central server room followed by the distribution and edge/access switches.

a. The network shall have a mix of components for supporting PoE+ as well as non-PoE devices.
b. A robust fiber optics based backbone is being provided. It shall be based on ring topology using single mode fiber optics cable. The vendor shall ensure that the networking switches shall be populated with the necessary transceivers for achieving this design objective.
c. Several applications are proposed to run on this network – IP-based voice communications supporting voice-data-video, network based cameras and storage, integrated audio-video, video conferencing, interactive learning, integrated building management systems and important services integration such as fire detection.
d. The integrators shall propose and supply enterprise class networking switches only

a) **WALL /FLOOR MOUNTED NETWORK RACK:**
Construction shall be single section welded robust with ventilation holes on the sides and top
& bottom covers with provision to mount 2 fans
b) Top/ Bottom covers and side panels shall be of sheet steel, powder coated Vertical 19" metric
panel mounts and door trims shall be of sheet steel and powder coated
c) The top and bottom covers shall be provided with four cut outs on top and bottom cover for
cable entry and round cuts shall be edge protected with rubber grommets
d) Two pairs of 19" equipment mounting angles with mounting holes conforming to IEC 297-3
e) Toughened glass front lockable door
f) Wall mounted Networking rack shall be available in various heights
g) Cooling shall be achieved with the help of two fans, 90 CFM capacity each, mounted on top
h) Power shall be provided in form 19" rack mountable power strip which shall consist of minimum four 5/15A power sockets.
i) Cantilever shelf – at least one front mounting 1U cantilever shelf shall be provided with depth
of 250 mm or more
j) 1U vertical cable managers on a/r (as required basis) for dressing of cables for 24 ports patch panel, 24 ports switch Hardware Pack / Rack mounting accessories and hardware – as required Horizontal managers on A/R basis for ensuring neat and aesthetically clean installation

2. PUBLIC ADDRESS SYSTEM

The Public Addressing system shall be as per the IEC 60268-7 (Audio equipment - Part 7: Public address systems), IS 10201 (Audio equipment - General requirements and

methods of test), and specific guidelines regarding power supply, noise levels, intelligibility, and safety features depending on the project's requirements and location, with consideration for local regulations and building codes

The scope of work under this shall include designing supplying and installing of Public Address System. The work under this system shall consist of furnishing all materials, equipment's and appliances and labour necessary to install the said system, complete with Speakers, Amplifiers, Mike and Zone Selection Panel.

System Design

The Speakers shall be distributed in the entire floor and shall be configured into multiple zones. The announcement can be made zone wise or to all the speakers simultaneously in ALL CALL mode. Fire Alarm shall be announced immediately on receipt of Fire signal from the panel to all zones.

The PA System shall serve to,
a) Play the music
b) Making general announcement
c) Make announcement in car park
d) Transmit fire tone under fire condition

Amplifier

Amplifier shall be USB/BLUETOOTH player and AM/FM Tuner with World space receiver, with remote control and suitable to for 220-240V AC supply operations.

Speakers

Speakers shall be especially designed for broadcasting high quality, integrated emergency fire alarm signals and voice communications and approved by an appropriate authority for use in such situations.

Speakers shall be ceiling or Column mounted as shown in the schedule of work and shall be completed with mounting brackets accessories etc. Speakers shall be in wooden or metal enclosures.

P A System Wiring

High-quality twisted pair cable designed for connecting speakers and amplifiers in commercial l A/V systems. The speakers in each zone are connected in parallel and are connected to the respective output. The cables from each zone are separately routed and terminated in the Panel.

Testing and commissioning

Entire PA system shall be tested to establish the following.

a) Functionality of the PA system

b) Combined systems shall be tested for the overriding feature for prioritizing fire alarm and life safety requirements.

c) Acceptable audibility of the public address in all spaces and record sound pressure levels of the Public address viz the ambient noise levels.

DOCUMENTATION:

The contractor, upon completion of the commissioning activity, shall hand over the system to the customer. At the time of hand over, the contractor shall provide the customer with the following documentation:

a) Copy of detailed report
b) Component and equipment list
c) Product description sheets
d) System design drawing(s)
e) System schematic diagram(s)
f) System operating manuals

3. CCTV SYSTEM

CCTV cameras and recorders must be registered and manufactured according to IS 13252 (Part 1):2010 under the BIS Compulsory Registration Scheme from the Bureau of Indian Standards (BIS)

The camera shall meet the following networking standards:

- **IEEE 802.3af (Power over Ethernet)**
- **IPv64**
- **IPv67**
- **QoS – DiffServ (RFC 2475)**

Work includes providing all material, equipment, accessories, hardware, software, licenses, services and tests necessary to complete and make ready for operation by the NETWORK/IP based CCTV System in accordance with the design & specifications given in Technical Specifications of the Security Surveillance System.

System should be programmed such that operator's intervention if required shall be minimal and the system should provide features like guard tours, preset positions and the preset positions will be linked to perimeter protection system/intrusion system in future. The NVR/DVR should allow for recording of events both continuous and motion triggered as per requirement and recordings should be able to create evidences and support post event analysis.

GENERAL REQUIREMENTS

- The camera shall be of manufacturer's official product line, designed for commercial/industrial 24/7/365 use.
- The camera shall be based upon standard components and proven technology using open and published protocols.

QUALITY ASSURANCE

- All camera installation, configuration, setup, program and related work shall be performed by electronic technicians thoroughly trained by the manufacturer in the installation and service of the equipment provided.
- All equipment provided shall be backed by a minimum of one-year manufacturer warranty.
- The specified unit shall be manufactured in accordance with ISO 9001 / EN 29001.

CCTV wiring standards

Using RG59 or RG6 cables for video transmission, ethernet cables for IP-based systems, and coaxial cables for analog video transmission. Optical fiber cables are also used for high-speed CCTV.

RG59 and RG6 cables

- RG59 is the industry standard for transmitting video signals.
- RG6 is a thicker gauge cable that can also be used for surveillance cameras.
- These cables are shielded from most video interference.

Ethernet cables

- Ethernet cables (Cat5e, Cat6) are used for IP-based systems.
- They connect IP cameras to the internet and power the cameras.

Coaxial cables

- Coaxial cables are used for analog video transmission.

Optical fiber cables

- These cables use pure glass to transmit data via light.
- They are the fastest option of all the cables mentioned.
- They are expensive, delicate, and require more technical know-how than other cables.

CCTV wiring

A standard practice is to use PVC conduit with a minimum diameter of 20mm (¾ inch), depending on the number of cables being run, with larger diameters needed for multiple cables or long runs; always consult local building codes for specific requirements in your area.

- **Cable type:** The type of CCTV cable (e.g., coaxial, UTP, or fiber optic) will influence the conduit size needed.
- **Number of cables:** More cables require a larger conduit diameter.
- **Environmental factors:** Outdoor installations may require heavier duty conduit with additional protection against weather elements.

Common conduit sizes for CCTV:

- **Small installations:** 20mm (¾ inch) conduit for a few cables.
- **Medium installations:** 25mm (1 inch) conduit for moderate cable runs.
- **Large installations:** 32mm (1 ¼ inch) conduit for multiple cable runs or long distances.

4. ACCESS CONTROL

Proposed system should consist of Biometric Finger/Face scan for staff access entry to have extreme security. Offered Reader should be high quality, technologically advanced and high pixel face detection camera. Single door Electromagnetic Locks Capacity of Holding Pressure 300 /600 Lbs should be installed at the entry door for staff entry. Entire system should have Access Server PC along with required Hardware & SQL Database Software.

A. Common Features:
   1. Software to generate time and attendance report
   2. Door Controls:
      a. Door open and close alarm activation
      b. Door lock capabilities with locks
      c. Door Switch
      d. Switch or keypad (internal)
   3. Status control and anti-pass back
   4. Flexible (minimum 32) sets of time zone to provide user to set up each time zone with different time districts
   5. Self-hardware testing function when equipments are activated
   6. Internal battery included during power shortage
   7. Battery operation possible when AC power is interrupted
   8. Data logging facility for minimum 5,000 Access transaction
   9. Capable of communicating with multiple readers to provide online information
   10. Add more readers without changing software
   11. Communication, information Inquiry / Setting through RS-232/422/485 and Ethernet
   12. Remote Web Management Interface or functionality to be accessed from any workstation.
   13. Grant or deny access to single or group of employees to a single or all entrances.
   14. Back-end Database (industry Standard)

CABLING FOR ACCESS CONTROL

0.5 Sq mm X 8 Core Shielded Flexible FRLS Cable

- Size : 1.5 Sq mm
- Core : 8 Core
- Conductor Type : Flexible Copper
- Insulation : PVC
- Sheathing : FRLS
- Shielding : Foil
- Voltage Grade : 300/500 V

The vendor will be responsible for all the related accessories, software, locks, cables, minor civil work (if required), documentations, configuration and commissioning of the devices

at the existing network (Ethernet CAT-5). The cost of items should be inclusive of these services and items.

PANIC / EMERGENCY EXIT SWITCH:

Specification

- Weight: 0.18 kg
- Dimensions (HxWxD): 93x89x59.5mm
- Operating Temperature: -10 °C to +55 °C
- IP Rating: IP24D

5. FIRE DETECTION SYSTEM

This section of the specification includes the furnishing, installation, connection and testing of the conventional and microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete, operative, coordinated system. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, Fire Alarm Control Panel (FACP), auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.

The fire alarm system shall comply with requirements of NFPA Standard 72/EN54 LPCB for Protected Premises Signaling Systems except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.

The system and its components shall be Underwriters Laboratories or Loss Prevention Certification Board Inc. listed under the appropriate UL/ EN54testing standard as listed herein for fire alarm applications and the installation shall be in compliance with the UL/EN54 listing

EQUIPMENT AND MATERIAL

General:

All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the National Fire Alarm Code.

All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.

All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

Where required, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.

Cable must be separated from any open conductors of power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, per NEC Article 760-29.

Wiring for 24 volt DC control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.

Conduit shall not enter the fire alarm control panel, or any other remotely mounted control panel equipment or back boxes, except where conduit entry is specified by the FACP manufacturer.

Conduit shall be 25mm minimum.

Wire:
All wires shall be of FRLS PVC insulated copper conductor as per BOQ

Intelligent thermal or Heat Detectors

Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signalling line circuit.

The detector shall be capable to configure and to be addressed manually as well as from software or remote locations also.

Beam Smoke Detectors

Sensing Range: 5 to 50 meters Adjustment Angle: ±10° horizontal and vertical.

Typical sensitivity levels: Level 1 — 25%. Level 2 — 30%. Level 3 — 40%. Level 4 — 50%.]

Fault Condition (trouble): 96% or more obscuration blockage. In alignment mode. Improper initial alignment. Self-compensation limit reached.

Alignment Aid using optical gun sight or integral signal strength indication or Two-digit display.

Addressable manual call box

Addressable manual fire alarm boxes shall on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.

All operated stations shall have a positive, visual indication of operation and utilize a key type reset. All entrances and stair levels shall be equipped with a pull type manual call point toactivate an alarm. Manual call points shall be located in a manner so as to give aneasy access to occupants in emergency; these shall be at entry/exits and within 30meters distance.

Sounder and strobe:

Shall follow NFPA 72 2013.

1. Electronic sounders shall operate on 24 VDC nominal.

2. Electronic sounders shall be field programmable without the use of special tools, at a sound level of at least 90 dBA measured at 3 meters from the device.

Addressable Control Module (Whether Applicable Separately)

Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered polarized audio/visual notification appliances.

a) Audio/visual power shall be provided by a separate supervised power circuit from the main fire alarm control panel or from a supervised remote power supply from the same OEM
b) . The control module shall be suitable for pilot duty applications and rated for a minimum of 2.0 amps at 24 VDC.

Isolator Module (whether Applicable Separately)

Isolator modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Class A or branch. The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC loop segment or branch. Each loop shall have isolator module after every 20 detectors to protected zone of the building.

a) If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section.
b) The isolator module shall not require address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.
c) The isolator module shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

TEST

The service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment shall be provided to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with NFPA 72

Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

Open initiating device circuits and verify that the trouble signal actuates.

Open and short signalling line circuits and verify that the trouble signal actuates. Open and short notification appliance circuits and verify that trouble signal actuates. Ground all circuits and verify response of trouble signals.

Check presence and audibility of tone at all alarm notification devices.

Check installation, supervision, and operation of all intelligent smoke detectors using the walk test.

Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

When the system is equipped with optional features, the manufacturer's manual shall be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar

FINAL INSPECTION

At the final inspection, a factory-trained representative of the manufacturer of the major equipment shall demonstrate that the system functions properly in every respect

C. FIRE FIGHTING SYSTEM

GENERAL

The scope of work includes the design, engineering, supply, installation, testing, and commissioning of a complete fire-fighting system for the buildings. The system specified in the BOQ must adhere to the tender specifications outlined below. All materials used will comply with the relevant IS specifications, where applicable, and are subject to the approval of the Engineer-in-Charge. The fire-fighting system will be designed and executed in strict accordance with the prevailing norms of NBC-2016, CPWD General Specifications for Electrical Works, Part-V, Wet Riser & Sprinkler System: 2020, and relevant Indian Standards such as IS:13039:2014 (External Hydrant Systems), IS:15105 (Fixed Automatic Sprinkler Fire Extinguishing System), as well as local bye-laws and requirements from the relevant fire inspection authorities. The work will cover the complete process from design and supply to installation, testing, commissioning, and obtaining necessary statutory approvals from fire inspection authorities, including securing the No Objection Certificate (NOC) for the occupation of the buildings.

1.1 WET RISER AND DOWNCOMER

The firefighting system's pipeline design must ensure that the pressure at both the hydraulically remote hydrant and the highest hydrant does not fall below 3.5 kgf/cm² and does not exceed 7 kgf/cm². The pipeline should be engineered to allow discharge at any given location. The design parameters include a maximum flow velocity of 2.5 m/s and a maximum friction loss of 5 meters per 100 meters of pipeline run. The number of risers should be determined based on the following

criteria: no corner of the building should be more than 30 meters from the nearest riser, the horizontal distance between two risers should not exceed 50 meters, and one riser must be provided for every 1000 sqm of plinth area or part thereof. These specifications are essential for ensuring adequate water flow and pressure for firefighting operations across the building

However, number of Risers may be suitably increased to meet given situation as per directions of Engineer-In-Charge. The quantity of Sprinkler & Hydrant, Wet Risers etc. and all other allied equipment shall be provided as per norms of NBC-2016 latest as amended.

All down comer pipes shall be inter connected at the terrace level. In case terraces are not interconnected, all building will be treated as individual buildings. Fire service inlet shall be provided with each Riser/down comer for facilitating pumping of water from fire service tenders.

1.2. **INTERNAL HYDRANTS**

Internal hydrants shall be installed on each floor at the same location and connected to risers. The firefighting hydrants will be placed in the lobby within the firefighting shaft. Hydrants near the fire exit staircase on each floor must be located within 5 meters from the exit door along the exit access. The number and placement of risers will be determined according to the norms specified in the preceding sections. Each building wing should preferably have independent hydrants.

The landing valve will feature an oblique pattern and will include a GI twist release chain and cap. The manufacturer's name, trademark, year of manufacture, size, and type must be clearly marked. Valves will be coated with a primer followed by two coats of red paint (Shade No. 536, as per IS-5), with paint conforming to IS 2932. The hand wheel will be painted black, and the valve will be BIS-approved. Blank caps will be made of gunmetal. A hydrostatic pressure test will be conducted at 21 kg/cm² for 2.5 minutes, and a flow test will be performed at 7 kg/cm² at 900 LPM. The water-tightness seat test will be conducted at 14 kg/cm². In case of any discrepancies between the manufacturer's standards and the specified values, the parameters must comply with the relevant IS codes.

The RRL hose pipe will be of the non-percolating type, ISI marked (IS:8423), with a 63 mm diameter and 15-meter length (2 Nos.), complete with instantaneous type gunmetal 63 mm dia ISI marked Male & Female couplings (IS:903), securely bound and riveted with copper rivets and 1.5 mm copper wire, and a bursting pressure not less than 22 kg/cm². The external hydrant post will include a standard short size 63 mm dia gunmetal branch pipe with a gunmetal nozzle of 20 mm nominal bore outlet, featuring an instantaneous type 63 mm dia coupling, in compliance with IS:903. The internal hydrant will be equipped with a fireman's axe with a heavy rubber handle. A swing-type first aid hose reel in red color will be provided with a 30-meter-long, 20 mm dia heavy-duty rubber water hose, a 20 mm dia globe valve stopcock, terminating with a GM coupling and nozzle with a 5 mm outlet and shut-off valve, confirming to IS:8090-1976. It will come complete with a drum and wall-mounted brackets, bolts, and nuts conforming to IS:884-1969.

A mild steel door made of 16gauge MS sheet, capable of accommodating the fire hose reel, landing valve, hose pipes, fittings, 1 CO2 fire extinguisher, and 1 dry powder fire extinguisher, along with accessories, shall be provided. The door will feature a 1250 mm high front glass with a lock and key arrangement and will be painted with one coat of primer and two coats of finished stove enamelled post office red color paint.

The internal hydrant will be clearly marked on the front with the inscription "FIRE HOSE CABINET" in letters of 75 mm height and 12 mm width, with a luminous sign. The location of these cabinets will be shown on the floor plan and displayed on the landing of the respective exit

fire staircase. Internal hydrants must be easily accessible, with a minimum clearance of 1.5 meters in front for operation. They shall not be placed in a lockable room.
A masonry enclosure will be provided on three sides, with minimum dimensions of 1200 mm wide, 800 mm deep, and 2100 mm high. A 200 mm x 200 mm cutout will be provided in one corner of the slab for the wet riser/down comer pipe, and an additional cutout of the same size will be made for the sprinkler pipe and drain pipe.

1.3 **BUILDING TO BE SPRINKLER PROTECTED**

The sprinkler pipes shall be installed throughout the area to be protected. The structure shall be designed to support sprinkler pipes and the contained water. Inbuilt drainage with slope shall be provided throughout the area so that in the event of operation of sprinkler, water is drained out without spreading to other parts of the building. Storage racks/platforms shall be sufficiently raised above floor. It is essential to make provisions for avoiding water from Sprinkler/hydrant operation entering lifts and electrical rooms.

1.4 **FIRE BRIGADE INLET CONNECTIONS/ DRAW OFF CONNECTION**

One set of 2/4 ways collector head Fire Brigade connection shall be provided at underground tank, Ring Main, Sprinkler system and individual wet risers as specified conforming to IS 904.
The inlet to the wet riser sprinkler header shall be with 150 mm dia butterfly or sluice valve and non-return valve. The scope shall include necessary reducers, tees bends and special fittings as required. Construction of Health Facilities under ECRP-II (PKG-I) Vol-5 Tech Specifications
It should be provided with M.S. enclosure fabricated from 1.5 mm thick M.S. sheet, front glass locking arrangement supported on M.S. structural members, painting with two coats of postal red enamel.
Fire brigade inlet connection (fire department connection) consisting of 4 Nos. 63 mm dia instantaneous inlet arranged on a 50 mm dia header, 1 No. 150 mm diameter sluice valve, with in built Non-return valve and wall mounted box of M.S. construction made out of 16 gauge MS Sheet with glass door to house the above mentioned components.
Fire brigade draw out connection (fire department connection) with suction pipe MS class 'C' 100 mm dia. & 100 mm dia. foot valve & steel chain including wall mounted box M.S. construction made out of 16 gauge MS Sheet with glass door to house the above mentioned components.
Inlet breeching having C.I. body Two-way gun metal 63 mm dia instantaneous inlets conforming to IS 903 fitted with non-return valves, 25 mm dia gun metal drain cock, blank cap, brass chains and 150 mm dia flanges with all accessories suitable for local fire tender complete as required.

2. PORTABLE FIRE EXTINGUISHERS:

2.1) **ABC Powder stored pressure type Fire Extinguishers** of 4 kg capacity IS:15683 & CO_2 gas based Fire Extinguisher of 4.5 Kg capacity with IS :15683, IS 2878 is proposed for all floors near internal hydrant locations.
2.2). **4.5 kg Carbon Dioxide Extinguisher,** IS marked shall be complete with high pressure discharge tube, horn, control valve & CCE approved cylinder. It shall be suitable for extinguishing Class B & C fires. It shall be provided with Wheel type /Squeeze grip type with discharge hose & horn. It shall be suitable for operation within the temperature range of -20°C to 55°C. The test pressure shall be 250 Bar. The minimum effective discharge shall be 95 percent.

2.3). The ISI marked extinguishers and their installations shall be in accordance with acceptable standards of NBC 2016. These units shall be mounted at a convenient height & locations to enable quick access at all times. All requirement of fire extinguishers shall be fulfilled as per as per NBC 2016, Part-4, Table -7, other statutory norms and directions of Engineer-In-Charge.

3. FIRE SIGNAGES:

Various types of signage will be provided throughout the building/complex in compliance with NBC-2016, Part-4. On each floor, near the lift landing, a diagram indicating stairways shall be displayed with the instruction: "IN CASE OF FIRE USE STAIRS UNLESS INSTRUCTED OTHERWISE." This signage will be positioned above the call button in the lift lobby. Additionally, floor signage indicating the exit path will be placed on each floor within the staircase. The numerical text on these signs will be in bold type, with a minimum height of 75 mm. Directional signage indicating the fire escape route will be placed in each corridor on every floor. All fire-related signage will be LED-lit with UPS power backup or made using photo luminescent paint to ensure visibility in the event of a power failure. These signs will be printed on Photo luminescent U1000 aluminium sheets (1.0 mm ±10%) or acrylic boards containing Lumigen II as the base chemical, covered with a UV-stabilized coating. The signs will be of the appropriate size and will be securely fixed to walls, doors, or ceilings using proper clamps, hangers, cleats, anchor fasteners, etc. Text will be either double-sided or single-sided, depending on the requirements. Samples of all fire signage must be submitted for prior approval by the Engineer-In-Charge.
The signage will be lightweight yet highly powerful, capable of penetrating even the finest grills and meshes. It will feature an easy snap safety seal that can be broken in seconds. Each fire extinguisher will be equipped with a pressure gauge, discharge mechanism with an easy snap lever lock, and an EPDM rubber hose. It will be capable of fighting Class A, B, and electrically started fires. The extinguisher will have ISO 9001 and CE certifications, and preferably UL listing and FM approval, conforming to ISI standards. It should come with a warranty of at least 5 years. The extinguisher will preferably have a minimum capacity of 4 kg, a discharge time of approximately 8 seconds, and a range of around 2 meters.

4.PIPE WORK

4.1 SCOPE

This chapter covers the requirements of pipe work in firefighting installations.

4.2 PLUMBING DESIGN

Pipe sizes shown in tender documents are purely for contractor's guidance. The contractor shall be responsible for selection of sizes as per detailed engineering to be done by him. Plumbing design to be done by the contractor shall incorporate the following: -

(a) Sluice valves shall be provided at suction and delivery sides of pumps.
(b) External hydrant
(c) Fire service connection/inlet.
(d) Test valve.
(e) Drain connections.

(ii) For testing the system healthiness and automatic operation on daily basis, one test pipe with sluice valve shall be provided in common discharge header. For avoiding wastage of water, this pipe shall discharge water in the tank.
(iii) Non-return valve shall be provided at the delivery of each pump and fire service inlet. This shall be of swing type.
(iv) Air release valves with ball valve shall be provided in the piping system for venting trapped air with a size of 25 mm for pipes up to 100 mm and 40 mm for larger pipes.
(v) Plumbing drawings showing the sizes of pipe, valves, layout and other details shall be prepared and shall be got approved from the Engineer-in-Charge before the execution of the plumbing work.

4.3 PIPE MATERIALS

Pipes shall be of the following materials:
(a) Mild steel heavy class (C-class) conforming to IS:1239 for sizes up to 150 mm.
(b) Welded black steel pipe, Class 2, conforming to IS: 3589, for sizes greater than 150 mm. These pipes shall be factory rolled and fabricated from minimum 6mm thick M.S. Sheet for pipes upto 350 mm diameter and from minimum 7 mm thick M.S. sheet for pipes of 400 mm diameter and above.
MS pipes may be allowed for extension of existing systems which are laid with CI pipes.
(c) Cast iron double flanged pipe, Class-A conforming to IS 1536 or IS: 1537 (to be provided only in underground application).

Note: For pipe work of Automatic Sprinkler System inside the building, Stainless Steel Pipes and fittings of grade AISI 304 as per JIS standard 3448 are also permitted particularly where replacement of pipes is not easy like areas above false ceiling etc., subject to the condition that these pipes with associated fittings are suitable to safely withstand the system test pressures.
(d) (i) GI Pipe Medium Class (B-class) conforming to IS:1239 (For Drain)
(ii) Cadmium plated steel nuts/bolts/washers shall be used.
(iii) Flex drop of stainless steel metallic pipe with mounting accessories, frame for installation on false ceiling.

4.4 PIPE JOINTS

i) Electric welding joints shall be provided in the MS pipe work. Flanged joints shall be provided for connections to valves, pumps, air vessels etc. and also on straight lengths at suitable points to facilitate erection and subsequent maintenance.
ii) For connection of C.I. Pipe, fittings shall also be of C. I. heavy grade conforming to IS:1538. The flanges shall be smooth faced and neoprene gasket shall be provided between joints. All bolt holes in flanges shall be drilled. The drilling of each flange shall be in accordance with the relevant Indian Standards. Where un-avoidable and to connect underground pipe with risers, MS pipe may be used in the form of distant pieces. The joint between C.I. and MS pipe shall be flanged type. MS pipe laid at such locations shall be provided anti-corrosive treatment as per Para 7.5.
iii) Mild steel flanges shall be in accordance with Table - 17 of IS : 6392 i.e. “Plate Flanges for Welding" and flange thickness shall be as under. Gasket thickness shall not be less than 3 mm.

Pipe diameter	Flange Thickness
200 mm	24 mm
150 mm and 125 mm	22 mm
100 mm and 80 mm	20 mm
65 mm	18 mm

40 mm and below 16 mm

iv) Fittings installed underground shall be of cast iron 'heavy' grade conforming to IS 1538 whereas those installed above ground shall normally be of medium grade wrought steel or mild steel conforming to IS 1239 (Part 2) or malleable iron fittings conforming to IS 1879.

v) All hardware items such as Nuts, Bolts, Washers shall be of appropriate size. Washers shall be used on both sides of the bolt.

4.5 ANTI-CORROSIVE PROTECTION ON UNDER GROUND MS PIPE

Corrosion protection tape shall be wrapped on MS pipes to be buried in ground. This corrosion protection tape shall comprise of coal tar/asphalt component supported on fabric of organic or inorganic fibre and minimum 4 mm thick and conform to requirement of IS:10221-Code of practice for coating and wrapping of underground mild steel pipe line. Before application of corrosion protection tape all foreign matter on pipe shall be removed with the help of wire brush and suitable primer shall be applied over the pipe thereafter. The primer shall be allowed to dry until the solvent evaporates and the surface becomes tacky. Both primer and tape shall be furnished by the same manufacturer. Corrosion protection tape shall then be wound around the pipe in spiral fashion and bounded completely to the pipe. There shall be no air pocket or bubble beneath the tape. The overlaps shall be 15 mm and 250 mm shall be left uncoated on either end of pipe to permit installation and welding. This area shall be coated insitu after the pipe line is installed. The tapes shall be wrapped in accordance with the manufacturer's recommendations. If application is done in cold weather, the surface of the pipe shall be pre- heated until it is warm to touch and traces of moisture are removed and then primer shall be applied and allowed to dry.

Holiday Testing for wrapping and coating is essential. Holiday testing may preferably be carried by flexible and detachable ring probe, which will enable the entire 360o of the surface of the pipe to be scanned.

At least 10 percent of all the welded joints shall be radio graphically tested and half of the joints radio graphed shall be the 'field joints'.

4.6 VALVES

Each pump shall be provided with a non-return valve and a sluice valve on the delivery side, the sluice valve being installed on the upstream side of the non- return valve. A pressure gauge shall also be provided between the pump and the non-return valve. The size of the non-return valve and cut off (sluice) valve shall not be less than the size of the initial delivery pipe and, in no case, less than the delivery outlet of the pump. No butterfly valves shall be installed inside the pump room.

Sluice valve shall conform to IS: 780.

Butterfly valve, wherever used, shall conform to IS:13095.

All valves shall be suitable to with-stand the pressure in the system and rating shall be PN 1.6. All valves shall be right handed (i.e. handle or key shall be rotated clock wise to close the valve), the direction of opening and closing shall be marked and an open/shunt indicator fitted.

(i) The material of valves shall be as under:

Body - Cast iron
Disc - Cast Bronze or Stainless Steel
Seat - Either integral or Nitrile rubber
O-ring - Nitrite/ Silicon

(ii) Non return valves shall be swing check type in horizontal run and lift check type in vertical run of pipes.

(iii) Air release valves shall be of gunmetal body.

4.7 ISOLATION VALVES:

(i) Isolation valves shall be provided in the network to enable isolation of any section of the network without affecting the flow in the rest. These valves are distributed according to the general layout of the installation. The isolation valves shall be normally located near the loop junctions. Additional valves shall be provided in the segments where the length of the segment exceeds 300 m.

(ii) Cut-off valves shall conform to IS 780 (PN 1.6 rating)/IS 14846, Class 3.

(iii) Butterfly valves can be accepted subject to the condition that the valves of diameter exceeding 150 mm shall necessary be of gear operated.

(iv) All Cut-off valves shall be of the right-hand type and enclosed in properly constructed surface boxes, at least 1 m2 in area so as to allow for broken joints being easily remade. The top of the surface box shall be 80 mm above ground level, except where it is located on a road. Valve wheels shall have an arrowhead engraved or cast thereon showing direction for turning open and close.

It is recommended that the position of the surface box be indicated by an iron plate painted fire red with distinct lettering. Such plates shall also show the open and close direction as cast or indicated on the valves and the serial number of the sluice valve.

(v) Locations where vehicles can pass shall be avoided for provision of valve below ground. (CPWD Specs Para 7.10 (xii))

(vi) In case of installations in earthquake prone zones, flexible couplings shall be used for jointing purposes at required locations.

4.8 Valves in fixed firefighting installations shall have supervisory switch with its signaling to fire alarm panel or to have chain(s), pad lock(s), label and temper-proof security tag(s) with serial number to prevent tempering/unauthorized operation. These valves shall be kept in their intended 'open' position.

4.9 STRAINERS

Stainless steel strainers shall have minimum 1 mm thick screen with 3 mm perforations. Strainers shall be provided with flanges.

4.10 ORIFICE PLATE

Orifice plate shall be made of 6 mm thick stainless steel and shall have an identification tag projecting beyond any flange between which it is clamped. The orifice shall be plain central hole without burs and diameter not less than one-half of the internal diameter of the pipe to which it is fitted.

4.11 INSTRUMENTS

(i) Pressure gauge of appropriate range and 150 mm diameter size shall be provided.

(ii) The pressure gauge shall be duly calibrated before installation and shall be complete with shut off valve.

4.12 AIR VESSEL

Air vessel shall be provided on top of each riser and shall be fabricated out of 8 mm thick M.S. Sheet. The ends shall be dished. This shall be of 250 mm diameter, 1.2 m high and installed vertically on suitable legs. The legs shall be provided with M.S. Plate of size 75 mm x 75 mm x 5 mm at the bottom so that the legs do not puncture the roof. The legs shall be grouted in CC foundation. Flange connection shall be provided for connection with wet riser pipe. Air release valve and pressure gauge with shut off valve shall be provided. The air vessel shall be tested at 25 kgf/cm2 pressure before installation.

4.13 INSTALLATION

(i) The installation work shall be carried out in accordance with the detailed drawings prepared by the contractor and approved by the Engineer-in-charge.
(ii) In pipe above ground level, expansion loops or joints shall be provided to take care of expansion or contraction of pipes due to temperature changes.
(iii) Tee-off connections shall be through equal or reducing tees, otherwise ferrules welded to the main pipe shall be used. Drilling and tapping of the walls of the main pipe shall not be resorted to.
(iv) Open ends of piping shall be blocked as soon as the pipe is installed to avoid entrance of foreign matter.
(v) Piping installation shall be supported on or suspended from structure adequately. The contractor shall provide, clamps, hangers etc.
Proper lines and levels shall be maintained while installing exposed pipes.
(vi) Pipe supports in pump house shall be floor mounted and of mild steel/ G. I. Spacing of pipe supports shall not be more than that specified below:

Nominal Pipe Size (mm)	Spacing (m)
20 and 25	2.00
32 to 125	2.50
150 and above	3.00

Extra supports shall be provided at the bends and at heavy fittings like valves to avoid undue stress on the pipes.
(vii) Anti-vibration pads, springs or liners of resilient and non-deteriorating material shall be provided at each support, so as to prevent transmission of vibration through the supports.
(viii) Pipe sleeves of diameter larger than the pipe by least 50 mm shall be provided wherever pipes pass through walls and the annular spaces shall be filled with felt and finished with retaining rings.
(ix) (a) Vertical risers shall be parallel to walls and column lines and shall be straight and in plumb. Risers passing from floor to floor shall be supported at each floor by clamps.

5. AUTOMATIC SPRINKLER SYSTEM

This section covers the general requirement of selection, design, installation, testing, commissioning and maintenance of automatic sprinkler system for firefighting in buildings used for other than industrial, storage purpose, hotels and mercantile buildings.
References: For additional information regarding definitions, planning, design, hydraulic calculations, tables etc. following documents are to be referred to:
i. IS: 15105: Design and Installation and Maintenance of Fixed Automatic Sprinkler Fire Extinguishing Systems- Code of Practice (First Revision).
ii. IS: 9972: Specification for Automatic Sprinkler Heads for Fire Protection Service (First Revision).

5.1 INTRODUCTION

Firefighting systems for Wet Risers, Downcomers, and Wet Riser cum Downcomer are designed to be operated manually. Any delay in manual operation due to late detection or response could lead to the rapid spread of fire. In an automatic sprinkler system, sprinkler heads are installed throughout the protected areas at specified locations such as on roofs or ceilings, walls, between racks, and below obstructions. These sprinkler heads are connected to water supply lines that are

permanently charged with water at a specified pressure. The sprinklers activate at a predetermined temperature, discharging water over the affected area to provide sufficient coverage for controlling or extinguishing the fire. Only those sprinklers near the fire, which reach the necessary heat level, will activate. The operation of the sprinkler system triggers the flow of water, which in turn initiates the fire alarm. Therefore, sprinklers serve two primary functions: detecting the fire and distributing water to control or extinguish it. Water distribution from the ceiling cools the hot gases forming under the ceiling of the enclosure, helping prevent the fire from spreading to adjacent areas and containing the damage within a limited area.

5.2 **CLASSIFICATION OF OCCUPANCIES AND PROVISION OF AUTOMATIC SPRINKLER FIRE SYSTEM**

Sprinklers are provided in industrial and non-industrial buildings. The design of sprinkler installation depends upon type of occupancy. For the purpose of designing and installation of automatic sprinkler system, buildings are categorized under the following classes in IS: 15105.

(a) Light hazard class

(b) Moderate/Ordinary hazard class

(c) High hazard class

(d) Storage hazards

For details of classifications, IS:15105 is to be referred. Light Hazard Occupancies shall be understood as those with low fire loads and with materials within having low rates of heat release. Light Hazard Occupancies are of non-industrial type subject to the condition that "No single compartment greater than 210 m2 are allowable within light hazard occupancies and such compartments shall be fire separated by walls having 30 min rating and doors. Otherwise the sprinkler system shall be designed as per Ordinary Hazard Occupancy."

Office buildings (excluding store rooms), education institutions, hospitals (excluding kitchens, stores, utilities), libraries, museums, nursing homes, prisons and residential apartments are classified under light hazard occupancies.

Airport terminal buildings, car parking areas within building or basement, departmental stores/retail shops are classified under ordinary hazard class.

In order to satisfy above conditions, all buildings classified under Light Hazard shall be designed under Ordinary Hazard class. Accordingly, these specifications cover Ordinary Hazard class only.

5.3 **PLANNING**

Automatic sprinklers shall be installed wherever required in terms of Table 7 of Part-4, Vol-1 of NBC 2016 (amended up to date).

Automatic Sprinklers shall also be installed in false ceiling voids exceeding 800 mm in height. Ramps at all levels shall also be protected with sprinklers. Pressure in the sprinkler installation piping shall not exceed 7 bar and pressure at the most remote sprinkler at any level shall not be less than 0.5 bar and also not more than 5 bar.

5.3.1. **Extent of Sprinkler Protection:** Sprinklers shall be provided, but for following exceptions:

a. Areas, rooms or places where the water discharged from a sprinkler may pose a fire or explosion or toxic hazard. In such areas alternative arrangement shall be made.

b. Stairs, spaces below stair headings (but not rooms above a stair) and lift wells. Any part of the building not provided with sprinkler protection shall be fire separated by walls. Fire doors not less than 1 hour in fire resistance shall be provided in the opening of such walls.

c. Wash rooms, toilets and WCs (but not cloak rooms) of area less than 5 m2. If area of these rooms exceed 5 m2, these shall be provided with sprinkler protection unless fire separated by walls and all openings in the walls are protected.
d. Sprinklers shall not be required in electrical equipment rooms where all of the following conditions are met:
i. The room is dedicated to electrical equipment only.
ii. Only dry-type electrical equipment is used.
iii. Equipment is installed in a 120 minutes' fire-rated enclosure including protection for penetration in walls.
iv. Cable coating is done in trays or trenches to prevent flame spread.
v. Storage is not permitted in the room.
In addition, for firefighting provisions to be provided for Substation/Transformers, Electrical MV main distribution panel and lift panel Clause 3.4.6.3 and 3.4.6.4, Page-22-23 of NBC 2016, Vol-1, Part-4 may be referred to.
e. Rooms like server room or electrical control room where alternate protection by other automatic extinguishing systems, (for example gas, powder and water spray).
f. In areas having height 17 m or above such as in atria, sprinkler installations may be rendered ineffective and hence may be avoided.
5.3.2. The area to be protected by sprinkler is divided in to various zones. For detecting operation of sprinkler in a zone, flow switches are provided which are wired to an annunciation panel installed in the Fire Control Room. In the event of operation of sprinkler(s) in an affected area. The annunciation panel will give audio-visual alarm and indicate the affected zone. This arrangement will be independent of fire alarm system.
5.3.3. Design, Density and Assumed Maximum Area of Operation (AMAO): - This is different for different hazards classified in Para 13.4. For moderate hazard, water discharge shall be at least 5 litre/min/m2 over an assumed area of operation covering 360 m2.
5.3.4. Sprinkler Spacing, Arrangement, Distribution and Locations: - Sprinkler heads may be installed on ceiling and or side walls. For selection of number of sprinkler and their location in a given area, following factors shall be considered:
i. Maximum Area Coverage per Sprinkler
(a) Ceiling sprinkler: 12 m2
(b) Side Wall sprinkler:

- Combustible ceiling: 7.5 m2
- Non-Combustible ceiling: 9 m2

ii. Maximum Distance between Sprinklers
(a) Ceiling Sprinkler: 3.5 m
(b) Side wall sprinkler

- Combustible ceiling 2.7 m
- Non-combustible ceiling 3 m

iii. Minimum Distance between Sprinklers (for Ceiling as well as Sidewall sprinklers):1.8m
In case of intermediate ceiling suspended sprinklers, protecting commodities in racks, distance lower than 1.8 m may be considered if necessary. Construction of Health Facilities under ECRP-II (PKG-I) Vol-5 Tech Specifications

iv. Maximum distance of sprinklers from end walls (for ceiling & sidewall sprinklers) shall not exceed half of the allowable distance between sprinklers

Note: For ceiling sprinklers:

(a) Where the external walls are combustible or built with metallic or otherwise or open sided; and in case of open joisted ceilings or where the roof has the rafters exposed, the distance between the boundary and the sprinklers shall not exceed 1.5 m.

(b) Distance shall be measured perpendicular to the wall.

v. Sprinklers shall not be located at a distance less than 100 mm from the wall (for ceiling sprinklers). Sprinklers shall not be located at a distance less than 100 mm from the end wall (for sidewall sprinklers)

vi. While designing sprinklers installation, the recommendation of sprinkler manufacturer shall be considered. Typical layout of side wall sprinklers shall be shown in shop drawings.

5.3.5. **Spacing below Sprinkler Heads**: Clear minimum space of 0.5 m shall be maintained below the deflector of sprinkler head.

6. TESTING

a. **Initial Testing**

i. During laying of pipes, the same shall be subjected to 10 kgf/cm2 hydraulic pressure for a period of 24 hours, in sections.

ii. After completion of the work, all vaIves/ fittings shall be installed in position and entire system shall be tested for 24 hours at a pressure of 10 kgf/cm2. The drop of pressure up to 0.5 kgf/cm2 shall be accepted.

b. **Final Testing**

i. After completion, all operation checks as per norms in relevant Para shall be carried out for automatic operation of the systems. For this purpose, landing valves may be opened at different locations. The exercise shall be repeated couple of times to ensure trouble free operation of the system.

ii. **Flow Test**: The design flow of pumps shall be checked. The pump shall be operated after opening a number of landing valves at different locations. Design pressure is to be maintained in the pump house. Water discharge is to be measured by drop in level in UG tank for a certain period. All pumps shall be tested one by one. The flow rate shall be not less than as specified while maintaining the design pressure in pump house.

7. **COMMISSIONING**

Before commissioning, the entire firefighting system must be thoroughly flushed to remove any earth or foreign materials that may have entered during installation. This can be done by operating the pump and opening valves at various locations. Once the work is complete, the system shall be commissioned and made ready for use. The need for functioning firefighting installations is crucial, even during the occupancy phase of the building. If only part of the building is occupied, the completed firefighting system must be commissioned by isolating the system serving the under-construction areas. From the moment of commissioning, the firefighting system must be properly maintained and manned. Any defects identified during the warranty period must be promptly addressed by the contractor, ensuring the system is fully operational at all times.

8.**TRAINING TO CLIENT'S PERSONNEL**

The contractor shall conduct orientation and training sessions on the Fire Fighting System for the client's personnel assigned to this task. Training will cover all aspects of operation, maintenance,

and troubleshooting, and will be provided on mutually agreed-upon dates as per the instructions of the Engineer-In-Charge.

D. HVAC SYSTEM

GENERAL:

The tender Bill of Quantities (BOQ) may include any combination of Split AC systems, VRV/VRF Systems including indoor units such as Hi-Wall, Cassette, Ductable units, Air Handling Units (AHUs) etc. The specific HVAC system(s) required for this project will be clearly delineated within the BOQ. Bidders shall base their tender submissions on the system(s) indicated therein. The Contractor is required to follow the detailed specifications outlined in the BOQ, which take precedence and shall be read in conjunction with these general tender specifications. It is the Contractor's responsibility to thoroughly review and understand both this tender specification document and the BOQ in its entirety to ensure accurate and compliant bid preparation and project execution. All systems must comply with relevant Indian standards (IS, BIS, and IEC) and be energy-efficient, reliable, and suitable for the local climate.

1. SPLIT AC SYSTEMS

All Hi-Wall Split AC units shall operate with R-410A refrigerant or an environmentally equivalent alternative. The minimum Indian Seasonal Energy Efficiency Ratio (ISEER) ratings for each unit must correspond to the 3-star or 5-star energy rating specified in the BOQ, in accordance with the most recent standards by the Bureau of Energy Efficiency (BEE). Hi-Wall indoor units shall be equipped with auto-swing functionality and operate with low noise levels. Outdoor units must be weatherproof, corrosion-resistant, and designed for low-noise operation. Cassette-type units shall feature 4-way airflow distribution and a compact design for easy maintenance. Ductable units shall be designed for concealed installation and seamless integration with the building's ductwork system. The power supply requirements are 230V, 50Hz for smaller units and 415V, 50Hz three-phase for larger capacity units.

2. VRV/VRF SYSTEMS

VRV/VRF systems shall be modular and have a scalable capacity range, utilizing R-410A refrigerant. The system must meet the minimum ISEER rating as specified in the BOQ. It should incorporate heat pump functionality appropriate for varying climatic conditions, inverter-driven compressors, and individual zone control. Indoor units should be available in Hi-Wall, Cassette, Ductable, and Ceiling Concealed configurations. Outdoor units must be weatherproof, compact, and designed for low-noise operation. A centralized control system shall enable individual zone temperature adjustment. The system shall operate on a 415V, 50Hz, three-phase power supply.

3. AIR HANDLING UNIT (AHU)

All the AHUs supplied shall be factory-built. The AHU configuration, as detailed in the BOQ, shall be adaptable to either ceiling or floor mounting and shall be either a single-deck or double-

deck type, contingent upon the specific requirements of the installation location. The AHUs shall be fully compatible with the intended system type, whether DX, VRF, or CHW. In addition to the specifications detailed herein, all other characteristics including tonnage, CFM, and external static pressure, must comply with the individual AHU requirements as defined in the BOQ. AHUs shall include the following components and features:

- The construction shall consist of double-skinned panels with a minimum thickness of 40 mm, with both inner and outer skins being 0.8 mm thick. The specific material—either pre-coated galvanized stainless steel (GSS) or aluminium sheet—will be as detailed in the Bill of Quantities (BOQ). The panels shall be filled with factory-injected polyurethane foam (PUF) insulation with a minimum density of 40 kg/m³. Thermal break aluminium extruded profiles shall be provided at all corners and joints to ensure thermal efficiency.
- The AHU shall be equipped with a two- or three-stage filtration system. The MERV rating for each stage, as well as any HEPA filter requirements, shall be as specified in the BOQ.
- Unless otherwise specified the cooling coil shall be a six-row DX cooling coil with aluminium fins and copper tubes for efficient heat transfer.
- A plug fan with a variable frequency drive (VFD) and a suitable IE3 class TEFC drive motor with IP55 protection, designed for 415V ±10%, 50 Hz, three-phase AC supply shall be provided. The fan shall be Eurovent/AMCA certified.
- An 18-gauge stainless steel 304 drain pan with 19 mm NBR insulation and necessary drain connections shall be included.
- UV-C emitters with reflectors shall be mounted on the coil surface using removable extruded aluminum frames. The emitters shall be UL certified, capable of producing 254 nm wavelength radiation, and provide a minimum of 7.5 watts/sq. ft. of coil surface area for uniform distribution.
- Slip-in type tubular heaters with a step controller shall be provided inside the AHU. The heaters shall be arranged in two independently operating banks, one controlled by a humidistat and the other by a thermostat. Safety features such as a safety thermostat, air stat/airflow switch, and interlocking with the fan motor shall be included.
- The AHU shall include essential accessories and components, including a mixing box (if required) for blending fresh and return air, aluminium volume control dampers (VCDs) on air inlets and outlets to regulate airflow, and minimum two-bend GSS/PVC eliminators to prevent water carryover. Vibration isolation arrangements shall minimize noise and vibration. Safety and maintenance features include limit switches on access doors and an inspection lamp. AHU shall be equipped with an expansion valve, drier, complete with DX/VRF AHU kit, and a corded remote controller.
- The AHU shall be Eurovent/AHRI certified.
- The scope of supply shall include all necessary supporting GI hangers, MS angles, channels, nuts, bolts, washers, and other installation materials. All incoming power and control cabling, earthing, and interconnections between the AHU, strip heaters, and control panel shall also be included.
- The Contractor shall submit a comprehensive AHU datasheet for approval, detailing the proposed AHUs' specifications and demonstrating compliance with this tender document.

4. AHU CONTROL PANEL

The AHU control panel shall be a CPRI-approved (IEC 61439-1 and 2), factory-fabricated, wall-mounted unit designed to control the AHU and associated components. The panel shall include the following features:

- Motor Control: The panel shall incorporate a variable frequency drive (VFD) for fan motor control, along with a bypass DOL/star delta starter and a manual changeover switch for transitioning between VFD and DOL/star delta operations.
- Control Elements: The panel shall include contactors, overload relays (OLR), single-phase preventors (SPPR), control switches, and MCBs for AC units. It shall also feature a 24V AC power supply for fire interlock.
- User Interface: The panel shall have an auto/manual selection switch, ON/OFF push buttons, and indicator lamps for ON, OFF, and trip status.
- Heater Control: The panel shall include contactors and breakers for the heater banks, with necessary power and control wiring to maintain the desired temperature and relative humidity (RH%) as per the design conditions. The fan/blower motor shall be interlocked with the heaters to ensure that the heaters are powered only after the blower has reached full designed speed.
- Safety and Monitoring: The panel shall be equipped with a humidistat, thermostat, air stat/airflow switch, and safety thermostat for precise control and safety.
- Wiring and Interconnections: All necessary control and power cabling between the AHU and the panel shall be included in the scope of supply.
- Data Sheets: Contractor shall provide AHU panel drawings & data sheets for prior approval.

5. FANS

All ventilation fans, including inline and cabinet fans, must be AMCA certified for both air and sound performance. The material of construction and the static pressure rating shall conform to the specifications detailed in the BOQ. Installation shall be all-inclusive, incorporating an electronic speed regulator for single-phase fans. Three-phase fans shall utilize VFD-compatible motors and include a VFD starter panel. All related power and control wiring between the power supply and fan speed regulator/panel, a suitable enclosure, a plug top for connecting to the socket, mounting brackets, and all other necessary accessories must be incorporated in the installation.

6. THERMAL INSULATION

- The insulating material shall be a closed-cell elastomeric compound based on Nitrile Butadiene Rubber (NBR). The thermal conductivity of the elastomeric NBR insulation must not exceed 0.035 W/m·K when tested at a mean temperature of 20°C, following the procedures outlined in EN 12667. The insulation material shall have a density ranging from 40 to 60 Kg/m3.

- Prior to insulation, all duct surfaces must be thoroughly cleaned to remove contaminants, including grease, oil, and dirt. Accurate surface measurements should be taken to ensure precise cutting of the closed-cell elastomeric rubber sheets, with sufficient allowance for proper fitting. The insulation material must be installed under compression, without stretching. Apply a thin, uniform layer of adhesive to both the back of the insulation sheet and the prepared metal surface. Allow the adhesive to become tack-dry before carefully positioning the insulation sheet and pressing firmly to achieve a secure bond. All longitudinal and transverse joints shall be sealed in accordance with the insulation manufacturer's recommendations, using only the adhesive specified by the manufacturer.
- For ductwork installations directly exposed to solar radiation, a UV-resistant and mechanically protective coating, as recommended by the insulation manufacturer, shall be applied after allowing the adhesive to cure for 36 hours.
- All refrigerant and condensate drain lines shall be insulated as detailed herein, maintaining a 25 mm air gap between adjacent insulated chilled water or refrigerant surfaces. Prior to applying insulation, all pipes shall be cleaned and brushed to remove any surface contaminants (dirt, dust, mortar, grease, oil, etc.). Only the insulation manufacturer's recommended adhesive should be used for all applications.

7. ACOUSTIC INSULATION

To mitigate noise transmission, specified areas shall incorporate acoustic insulation with the following attributes:

- The acoustic insulation shall be of engineered, open-cell Nitrile Rubber foam. The insulation must demonstrate specific sound absorption capabilities as measured by Random Incidence Sound Absorption Coefficients (RISACs) across a range of octave band frequencies. Testing must adhere to the methodology defined in ISO 354. The insulation material shall be manufactured without the use of fibers. The acoustic insulation must possess a minimum density of 140 Kg/m3. The insulation shall incorporate an integrated anti-microbial agent during the manufacturing process. This agent must provide sustained protection against fungal and bacterial growth. The acoustic insulation shall exhibit a thermal conductivity not exceeding 0.047 W/m·K when tested at a temperature of 20°C. The insulation shall conform to a Class 1 rating for surface spread of flame. Additionally, it must comply with UL 94 (HBF, HF1 & HF2) flammability standards.
- Duct Acoustic Lining: For ductwork designated on the project drawings and listed in the Schedule of Quantities, an internal acoustic lining with a thickness of 10mm shall be applied. Unless otherwise specified, the lining shall extend for a minimum distance of 6 meters along the duct length or 30% of the total duct length, whichever is greater.

8. DUCT WORK – GENERAL SPECIFICATION

- All ducts shall be fabricated from either Galvanized Sheet Steel (GSS) conforming to IS: 277 or aluminium sheets conforming to IS: 737. The steel sheets shall be hot-dip galvanized with a MAT finish and a coating of minimum 120 grams per square meter (GSM) of zinc. GI sheets shall be lead-free, eco-friendly, and RoHS compliant.

- The thickness of sheets for the fabrication of rectangular ductwork shall be as follows. The thickness required corresponding to the longest side of the rectangular section shall be applicable for all four sides of the ductwork:

Longest Side (mm)	**Minimum Sheet Thickness (GSS)**	**Minimum Sheet Thickness (Aluminum)**
750 mm and below	0.63 mm	0.8 mm
751 mm to 1500 mm	0.8 mm	1.0 mm
1501 mm to 2250 mm	1.0 mm	1.5 mm
2251 mm & above	1.25 mm	1.8 mm

- All sheet metal connections, partitions, and plenums required for the flow of air through the filters, fans, etc., shall be at least 1.25 mm thick galvanized steel sheets in the case of G.I. sheet ducting or 1.8 mm thick aluminum sheets in the case of aluminum sheet ducting and shall be stiffened with 25 mm x 25 mm x 3 mm angle iron braces.
- Aluminum ducting shall normally be used for clean room applications, hospital works, and wherever high cleanliness standards are functional requirements.

8.1 ASSOCIATED ITEMS

- Supply/return air outlets, F.A. (Fresh Air) grilles, and accessories shall be constructed from extruded aluminum sections.
- Flanges for matching duct sections, stiffening angles (braces), and supporting angles shall be of rolled steel sections and shall be of the following sizes:

Application	Duct Width	Angle Size
Flanges	Up to 1000 mm	35 mm x 35 mm x 3 mm
-do-	1001 mm to 2250 mm	40 mm x 40 mm x 3 mm
-do-	More than 2250 mm	50 mm x 50 mm x 3 mm
Bracings	Up to 1000 mm	25 mm x 25 mm x 3 mm
-do-	More than 1000 mm	40 mm x 40 mm x 3 mm
Support Angles	Up to 1000 mm	40 mm x 40 mm x 3 mm
-do-	1001 mm to 2250 mm	40 mm x 40 mm x 3 mm
-do-	More than 2250 mm	RS section size decided individually

- Hanger rods shall be of mild steel and of at least 10 mm dia for ducts up to 2250 mm size, and 12 mm dia for larger sizes. All nuts, bolts, and washers shall be zinc-plated steel. All rivets shall be galvanized or shall be made of magnesium-aluminum alloy. Self-tapping screws shall not be used.

8.1.2 DUCTWORK FABRICATION AND INSTALLATION STANDARDS

- Ducts shall be fabricated either on-site or factory-fabricated, adhering to IS: 655 "Specifications for Metal Air Ducts," unless otherwise specified. The interior surfaces of the ducting shall be smooth to ensure efficient airflow. Ducts up to 600 mm on the longest side shall be cross-broken between flanges by a single continuous break. Ducts 600 mm and above shall be cross-broken by single continuous breaks between flanges and bracings. Alternatively, beading at 300 mm centers shall be provided for stiffening. Long-radius elbows and gradual changes in shape shall be used to maintain uniform velocity, reduce turbulence, minimize resistance, and lower noise. The ratio of duct size to the radius of the elbow shall not be less than 1:1.5. Flanged joints shall be used at intervals not exceeding 2500 mm. Flanges shall be welded at corners first and then riveted to the duct.
- Stiffening angles shall be fixed to the sides of ducts by riveting at 1.25 meters from joints for ducts 600 mm to 1500 mm, and 0.6 meters from joints for ducts larger than 1500 mm. Diagonal angles may be used as bracings for ducts larger than 1500 mm. Plenums for filters shall include a suitable access door of size 450 mm x 450 mm. Factory-fabricated ducts shall be supplied in L-sections, with lengths not exceeding 1800 mm for ducts with the longest side of 600 mm and above, and 3000 mm for smaller ducts.

8.1.3 AIR OUTLETS AND INLETS (SUPPLY AND RETURN)

- All air outlets and intakes shall be made of extruded aluminum sections, presenting a neat appearance and rigid mechanical joints. Square and rectangular wall outlets shall have a flanged frame with returned or curved edges (5 to 7 mm) and a flexible gasket between the flange and the wall face. Supply air registers shall have adjustable front louvers for vertical deflection (up to 22.5 degrees) and back louvers for horizontal spread (at least 45 degrees). Return air grilles shall have only front louvers. The outer framework shall be made of at least 1.6 mm thick aluminum sheet, with aerofoil-designed louvers of 0.8 mm thickness.
- Square and rectangular ceiling outlets/intakes shall have a flange flush with the ceiling or be of anti-smudge type. The outer shell shall be made of at least 1.6 mm thick extruded aluminum, with a removable diffusing assembly. Linear diffusers shall have a flanged frame with returned edges (3.5 mm) and adjustable slots. The construction shall use at least 1.6 mm thick extruded aluminum sheet.
- Grilles and diffusers shall have grille bars set straight or deflected, assembled by mechanical interlocking to prevent distortion. Adjustable rear blades shall be provided for deflection. Supply air outlets shall include volume control devices with mill-finish/block-shade blades pivoted on nylon brushes to avoid rusting and noise. Opposed blade dampers shall be used for circular outlets, while radial/shutter-type dampers shall be used for square and rectangular outlets. All products shall be supported by manufacturer performance curves.

8.1.4 FRESH AIR INTAKES

Fresh air intake grilles shall be made of extruded aluminum sections. A bird wire screen of 12 mm mesh in 1.6 mm steel wire shall be fixed to the rear face of the louver frame.

8.1.5 FIRE DAMPERS

- Fire dampers shall be installed in all supply and return air ducts, return air passages, and at floor crossings. Access doors shall be provided before each set of fire dampers. Fire dampers shall be multi-blade louver type, constructed with at least 1.6 mm thick galvanized sheet, and factory-fitted in a 400 mm long sleeve. They shall include a locking device, motorized actuator, and control panel.
- Unless otherwise specified, Fire dampers shall be motorized smoke and fire dampers, equipped with a UL-stamped fusible link to close in case of temperature rise or fire alarm activation. An electric limit switch shall cut off power to the AHU blower motor and strip heaters upon damper closure. Fire dampers shall be CBRI tested and certified for 90 minutes of fire resistance as per UL 555-1995.
- Fire dampers shall be compatible with the building's fire detection system and operate automatically via an electric motor upon receiving a signal from the fire alarm panel. Wiring from the fire alarm panel to the AHU electric panel shall be provided by the department, while wiring from the AHU panel to the fire damper shall be provided by the air conditioning contractor.

8.1.6 INSTALLATION OF METALLIC DUCT

- Fabrication and installation shall be performed in a workmanlike manner. Ductwork shall be rigid and straight, free from kinks. All exposed ducts within the conditioned space shall utilize slip joints. Flanged joints are prohibited in these areas. All joints must be airtight.
- Ducts shall be independently supported from the building structure with adequate support to maintain their true shape. Support spacing shall not exceed 2 meters. In situations where ducts cannot be suspended from the ceiling, wall brackets or alternative arrangements, as approved by the Engineer-in-Charge, shall be implemented. Neoprene or other vibration isolation packing, with a minimum thickness of 6 mm, shall be provided between the ducts and the angle iron supports/brackets. Vertical ductwork shall be suitably supported at each floor level by steel structural members.
- Where metal ducts or sleeves terminate in woodwork, tight joints shall be achieved using closely fitting heavy flanged collars. Where ducts pass through brick or masonry openings, wooden framework shall be installed within the openings, and the crossing ducts shall be equipped with heavy flanged collars on either side of the wooden framework to ensure a leak-proof duct crossing. Duct connections to the air-handling unit shall be established by inserting a double canvas sleeve, 100 mm in length. The sleeve shall be securely bonded and bolted to both the duct and the unit casing.

- Dampers shall be installed in branch duct connections to facilitate proper volume control and balancing of air quantities within the system, regardless of whether they are indicated in the drawings. Suitable links, levers, and quadrants shall be provided for the proper operation, control, and setting of the dampers. Every damper shall feature an indicating device that clearly displays its position at all times.
- Where electrical heaters are mounted within the duct, they shall be of the low-temperature, totally enclosed type, fitted with radiation fins. A removable panel shall be provided in the

duct to allow access to the heaters. Any openings in the duct for electrical wiring must be equipped with suitable bushes to prevent leakage. A 6 mm thick asbestos board lining shall be installed around the inside of the duct for a distance of 30 cm on either side of the electrical heaters. A manually reset thermostatic safety switch shall be positioned near the duct section housing the heaters. Furthermore, the heaters must be interlocked with the connected fan motor of the AHU.

8.1.7 AIR OUTLETS AND INLETS

- The locations of the air outlets and intakes are indicated in the tender drawings. The air conditioning contractor shall provide the necessary openings and wooden framework for fixing the grilles. The location of these outlets/inlets is subject to change, and the approval of the Engineer-in-Charge must be obtained before final fixing of the grilles/diffusers. When installing fresh air intakes, no fixing devices shall be visible from the face of the frame.
- Where louvers are to be fixed in masonry or concrete, they shall be secured using either expanding plugs or raw plugs. Where louvers are to be fixed in steel or wood, non-ferrous screws or bolts shall be used. Supply air outlets and return air intakes shall be anodized/powder-coated aluminum in a color that matches the surrounding wall/ceiling. Fresh air intakes shall be anodized/powder-coated aluminum, subject to the approval of the Engineer-in-Charge. The paint color shall be approved by the Engineer-in-Charge.
- The air-conditioning contractor shall repair any damage to the finish of the structure that occurs during the installation work before handing over the installation to the Department.

8.1.8 AIR BALANCING

Air systems shall be balanced to minimize throttling losses. The entire air distribution system shall be balanced with the help of an anemometer. Measured air quantities at the fan discharge and at the various outlets shall be within + 5 percent of the specified/quoted values. For fans greater than 0.75 KW (1.0 HP), fan adjustments must be made to meet design flow conditions. Branch duct adjustments shall be permanently marked after air balancing is completed to allow for restoration to their correct position if disturbed.

8.1.9 MEASUREMENT

- Duct measurements (for insulated ducts) shall be taken before the application of insulation. Ductwork shall be measured section-wise based on the external surface area, calculated by multiplying the axial length from flange face to flange face for each section by the corresponding duct perimeter at the center of that section length. Uniformly tapering straight sections shall be measured as described above. However, for special pieces like tees, bends, etc., surface area computations shall be performed according to the shape of such pieces.
- The quoted unit rate for external surfaces of ducts shall include all wastage allowances, flanges, gaskets for joints, vibration isolators, bracings, hangers and supports, inspection chambers/access panels, splitter dampers with quadrants and levers for position indication,

turning vanes, straightening vanes, and all other accessories required to complete the duct installation per the specifications. These accessories shall not be measured separately.

- Grilles and diffusers (excluding linear diffusers) shall be measured by their cross-sectional areas, perpendicular to the airflow, excluding the flanges. Volume control dampers, where provided, shall not be accounted for separately.
- Linear diffusers shall be measured by linear measurements only, not by cross-sectional areas, and shall exclude flanges for mounting the linear diffusers. The supply air plenum for linear diffusers shall be measured as described above for ducting.
- Fire dampers shall be measured by their cross-sectional area perpendicular to the direction of airflow. Quoted rates shall include the necessary collars and flanges for mounting, inspection pieces with access doors, fusible links/solenoids with wiring, but excluding fire detectors, etc.

LISTOFAPPROVEDMAKES		
Sl.	**Item**	**Makes**
1	Steel conduit	BEC/AKG/PRECISION/ATUL
2	PVC Conduit & Accessories	AvonPlast,Atul,Polycab,Precision,Balco,Konseal,Anchor
3	PVC Insulated CU, Conductor FRLS Wires/Cables	RR-KABEL/National/Ralison/Finolex/Polycab/Havells.
4	Modular type Switches and Socket Outlet.	Clipsal/Legrand/Crabtree(Havells)/Wipro/MK
5	Step Type Electronic Regulators	Clipsal/Legrand/Anchor/WIPRO/Havells/Schneider
6	Single Phase Industrial Type Socket Outlet	Legrand/Siemens/ABB/Havells
7	LT Panel/M.V Cubicles Boards	L&T/Siemens/Schneider/Tricolite/Milestone/or CPRI Approved Panel Manufactures.
8	Air Circuit Breakers	L&T/Siemens/ABB/Schneider/GE
9	MCB's/Isolators/RCBO/RCCB	Legrand/C&S/L&T/ABB/Siemens/Schneider/Havells/HPL
10	MCCB	Siemens/ABB/Schneider/L&T/C&S/Legrand/HPL/Havells
11	Protection relays	L&T/ABB/Schneider/C&S/Siemens
12	Fuse Disconnector Switch/SFU/Fuse	L&T/Siemens/ABB/C&S
13	Multifunction meter	Schneider/Siemens/L&T/ELMeasure
14	LT Cables (XLPE)	Polycab/RRKabel/KEI/Bonton/Havells/Finolex
15	Rising Mains/BUS Trunking	Tricolite/L&T /Zeta /C&S
16	Acoustic Enclosure	Jakson/ Sudhir power/SuperNova
17	Anti-Vibration Mountings	Dunlop/Resistoflex

LISTOFAPPROVEDMAKES		
Sl.	**Item**	**Makes**
18	Light Fittings	Philips/ Bajaj/Crompton/Havells/Wipro
19	Ceiling fans	Orient/Crompton/Khaitan/Polar/Usha/Havells
20	Motor	Siemens/ABB/Crompton/Kirloskar
21	Exhaust Fan	Havells/Crompton/Anchor by Panasonic/Almonard/Bajaj
22	Servo Stabilizer	Approved ISI Standards
23	Indicating Meters	HPL/L&T/Meco/Rishabh/Universal/ABB
24	kWH, kW Meters/TOD	HPL/L&T/Enercon/Meco/Rishabh/Universal/ABB
25	Capacitor	L&T/Conzerv/SHREEM
26	Earth leakage relay	L&T/ELMEASURE/ABB
27	Battery Chargers	Uptron/VolstatElectronics/StatconAE
28	Change over switch	L&T/C&S/Socomec/ABB
29	Diesel Generators	Cummins/Ashok Leyland/Kirloskar/TATA
30	AMF	Siemens/C&S/Schneider
31	Transformer	ABB/Intrans/Unipower/KEL
32	Cast resin current Transformers:	AE/L&T /Kappa/ Rishab
33	Cable Trays/ Raceways	OBO/Legrand/Anant Power
34	**UPS**	
a	Upto 3 KVA	Microtek/APtech/Luminous/V-guard
b	Above 3 KVA	Microtek/Luminous/Hykon/Eaton/Numeric
c	Battery (150 Ah/160Ah)	Relicell/Exide/Luminous/Amaron/Eveready
35	Lifts/ Dumb Waiters/Escalators	Otis /Kone/ Mitsubishi/ Scheindler/ Thyssenkrupp
	ELV(EXTRA LOW VOLTAGE)	
36	CCTV/ NVR/DVR	Hikvision/CP Plus/Dahuva/Honeywell.
37	CCTV Cable	Polycab/finolex/Hikvision/V-Guard
38	LED TV/SMART TV	Samsung/LG/Panasonic/Sony.
39	Routers	Alcatel/Cisco/TPLINK/NETGEAR/D-Link
40	Cat 6/6a Cable.	Finolex/D-Link/Polycab/V-guard
41	Socket, Keystone Module & Face Plate	Havells/Schnieder/ Honeywell/Indo Asian/Legrand
42	Speaker Wire	Finolex/MX/Polycab/V-guard.
43	Network rack	Legrand / D Link / Netrack / Wal Rack
44	Server PC	DELL / HP / Lenovo

LISTOFAPPROVEDMAKES		
Sl.	**Item**	**Makes**
45	Hard Disk	Seagate / Toshiba /WD
46	Network switch/POE switch & Wifi access points	Netgear/Cisco/Alcatel/ D-Link/TPLINK/Hikvision
47	Door Controller, Card Reader, Biometric Reader, Access Control Server Software, Smart card	Honeywell/Siemens /ESSL/ZKTeco/Biomax
48	PA System, Amplifier, PA Speaker, Voice Controller, Paging Station, Microphone	AHUJA/Bosch/ Honeywell/Yamaha
49	PVC Conduits & Raceways	Balco/TOMS/Finolex/Modi's/Precision
50	Video Conferencing System & Secondary Camera	Logitech/Jabra/Polycom/Sony
51	RG-6, RG-11Wire/ Coaxial Cables	Finolex/KEI/Polycab/Havells/DLINK
52	Digital/ANALOG PHONES/ Handsets/IP	Beetel /Panasonic /Alcatel
53	IPABX / EPABX System	CRYSTAL/Alcatel/ Matrix/ Panasonic/Coral
	FIRE ALARM AND DETECTION SYSTEM	
54	Smoke detector/Heat detector	Honeywell /Minimax/Ravel/ADT/Siemens/Agni
55	Fire Alarm control Panel	Honeywell /Minimax/Ravel/ADT/Siemens/Agni
56	Response indicator/Fault isolators/sounder/Manual Call Point/Phone control module	Honeywell /Minimax/Ravel/ADT/Siemens/Agni
57	Talk back unit	Honeywell /Minimax/Ravel/ADT/Siemens/Agni
58	Fire alarm cable	RR-Kabel/Finolex/V-guard/PolyCab/Valuecon
59	Fire Extinguisher	Minimax/New age/Vijay/Cease fire/Superax/Safex
	FIRE FIGHTING SYSTEM	
60	G.I./M.S. Heavy Class Pipe	Jindal-Hissar, Tata, Prakash
61	Gate, Butterfly, Air Release Valve	Leader, Zoloto, Castle, Sant, Crescent, Fouress, Audco, Viking
62	Forged Steel Fittings	True Forge, Sant, Zoloto
63	SS/Brass/Gunmetal Ball Valve (Fullway Check and Globe Valves)	Sant, Zoloto, Leader
64	C.I. Double Flanged Sluice Valve	Zoloto, AIP, Kirloskar
65	Fire Hose Pipes	Newage, Minimax, Safex, Ceasefire, Superex, Safeguard
66	Fire Hydrant Valves	Minimax, Safex, Ceasefire, Newage, Safe Guard, Kanex, , Superex, Agni, AAAG
67	Sprinkler Heads	Tyco, Viking, HD, Grinnel, Life Guard, Getech, Newage
68	Sluice and Non-return/Check Valve	I.V.C., Kilburn, Zoloto, Castle, Sant, KSB, Kirloskar, Leader, Crescent, AIP

LISTOFAPPROVEDMAKES		
Sl.	**Item**	**Makes**
69	First Aid Fire Hose Reels	Minimax, Safex, Ceasefire, Newage, Safe Guard, Kanex, Safe Fire, Superex.
70	Horizontal Centrifugal/Fire Pumps	Mather & Platt (WILO), GRUNDFOS, Kirloskar, Beacon
71	Diesel Engine	Cummins, Ashok Leyland, Caterpillar, Kirloskar
72	Electric Motors	GEC, Siemens, ABB, Crompton
73	G.I. Fittings	Unik, K.S., Zoloto
74	Yard Hydrant Stand Post	Eversafe, Safe fire, Minimax, Newage, Safe Guard
75	Pressure Gauge	H.GURU, Fiebig, HD, Manometer, GIC, Emerald, WIKA
76	Flow Switch	Potter, Safex, system sensor, Rapid flow, TRAC, Levcon, Switchgear, Honeywell, Siemens.
77	Pressure Switch	Indfoss, Switcher, Honeywell, Vexma Trafag, Danfoss, H-Guru, Switzer, Waaree
78	Fire Suppression System	KANEX, SVS Buildwel (p) ltd
79	Sprinkler Flexible Drops	VICTAULIC, SMITH COOPER, ANVIL, Tyco, HD, Agni
80	Branch Pipe	New Age, Steelage, Minimax, Superex, Safeguard
81	First Aid Hose Reel Drum	New Age, Minimax, Vijay
82	Alarm Valve & Hydraulic Alarm Motor	HD, Mather & Platt, Central Spray Safe, Grinnel
	HVAC	
83	Split AC Units (Hi Wall / Cassette Units / Ductable Split)	Hitachi, Daikin, Toshiba, Trane, O-General, Mitsubishi Electric, Voltas, Bluestar, Carrier
84	DX Condensing Unit	Hitachi, Daikin, Toshiba, Trane, O-General, Mitsubishi Electric, Voltas, Bluestar, Carrier
85	VRV/VRF	Hitachi, Daikin, Toshiba, Trane, O-General, Mitsubishi Electric, Voltas, Bluestar, Carrier
86	Air Handling Units	Flaktwood, Trane, Systemair, VTS, Edgetech, Zeco, Citizen, Euroclima
87	Circular Inline Fans / Cabinet Fans	Systemair, Greenheck, Kruger, Nicotra, Flakt, Comefri, Ostberg, Airmaster
88	Variable Frequency Drives	Siemens, Danfoss, ABB, Schneider, Yaskawa, Fuji Electric
89	Factory Fabricated Ducting	Zeco, Rollastar, Multiline, Sevenstar, Western Air
90	GI Sheets/Ducting	SAIL, Jindal, Tata
91	Aluminium Sheets/Ducting	SAIL, Jindal, Tata, Hindalco
92	Nitrile Rubber Insulation	Armacell, K Flex, ALP Aeroflex
93	Grilles / Diffusers / Louvers	Systemair, Greenheck, Ruskin, Titus, Dynacraft, Cosmos, Ravistar, Airmaster
94	Fire Dampers / Volume Control Dampers	Systemair, Greenheck, Ruskin, Titus, Dynacraft, Cosmos, Ravistar, Airmaster

LISTOFAPPROVEDMAKES		
Sl.	**Item**	**Makes**
95	Drain Pumps	Aspen
96	Electrical Panels	CPRI Approved Make List
97	Laminar Airflow Hood	Thermadyne, AAF, Camfil
98	MERV Filters	Spectrum, Camfil, Pyramid, EMW, AAF, Klenzaids, Thermadyne, Aerofil
99	HEPA Filters	Spectrum, Camfil, Pyramid, EMW, AAF, Klenzaids, Thermadyne, Aerofil
100	Magnehelic Gauges	Dawson, Omicron
101	Stabilizer	V-Guard/V-stab / Microtek
102	Thermostat / Humidistat	Honeywell, Johnson Control, Siemens, Danfoss, Schneider, Omicron, Belimo
103	Copper Piping	Mexflow, Mandev, Rajco, Totaline
104	Drain Piping	Supreme, Astral, Finolex, Prince
105	Communication Cable / Power Cable	Polycab, RR Kabel, KEI, Havells

Note:

1. Change of any make of material in case of its non-availability or any other such reason shall be at the discretion of the Engineer-in-charge. The Contractor shall not be allowed to change the makes without their prior permission.
2. Equivalent make of any item may be added with the approval of Engineer in charge, wherever makes have not been specified for certain items, the same shall be as per BIS and as per approval of Engineer.
3. In case of items for which approved make is not given above, the Contractor shall place the order with the prior approval of the Engineer-in-charge.
4. In case of Contradiction between the approved makes/brands specified above and mentioned in the Specifications /Bill of quantities. The decision of the Engineer-in-Charge shall be final and binding on the Contractor.
5. All materials should confirm to relevant standard and codes of BIS and shall have ISI mark.

SIGNATURE & SEAL OF THE BIDDER

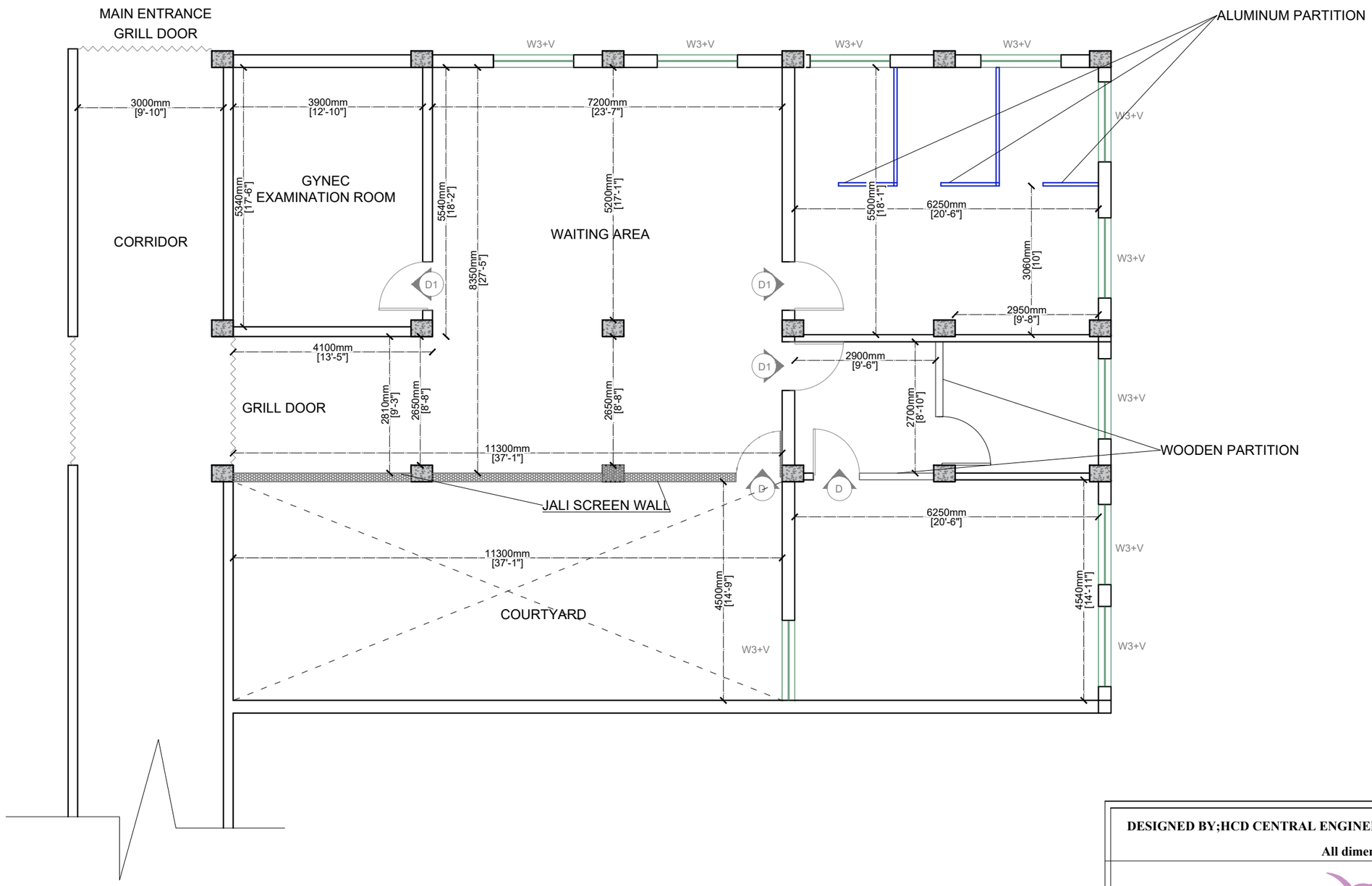
Part VI

MILESTONE SCHEDULE

Milestone No.	Milestone Description	Duration (Days)	Cumulative Days
1	Site Mobilization, Approvals, Barricading, Material Procurement & Setting Out	10	10
2	Civil Modifications, Masonry & Plastering Works	30	40
3	Plumbing, Drainage, Sanitary & Concealed Pipe Works	15	55
4	Electrical Conduiting, Cabling, Earthing & First Fix Services	15	70
5	Flooring, Wall Finishes, Doors, Windows & Aluminium/Glass Works	15	85
6	Painting, Electrical Fixtures, Medical Equipment Fixtures, Plumbing Fixtures & Final Finishes	20	105
7	Testing, Commissioning, Snag Rectification & Quality Inspection	10	115
8	Final Cleaning, Documentation, Client Inspection & Handing Over	5	120

Part VII

DRAWINGS



DESIGNED BY;HCD CENTRAL ENGINEERING HLL

All dimensions are in mm

EX.SCHEDULE OF OPENINGS

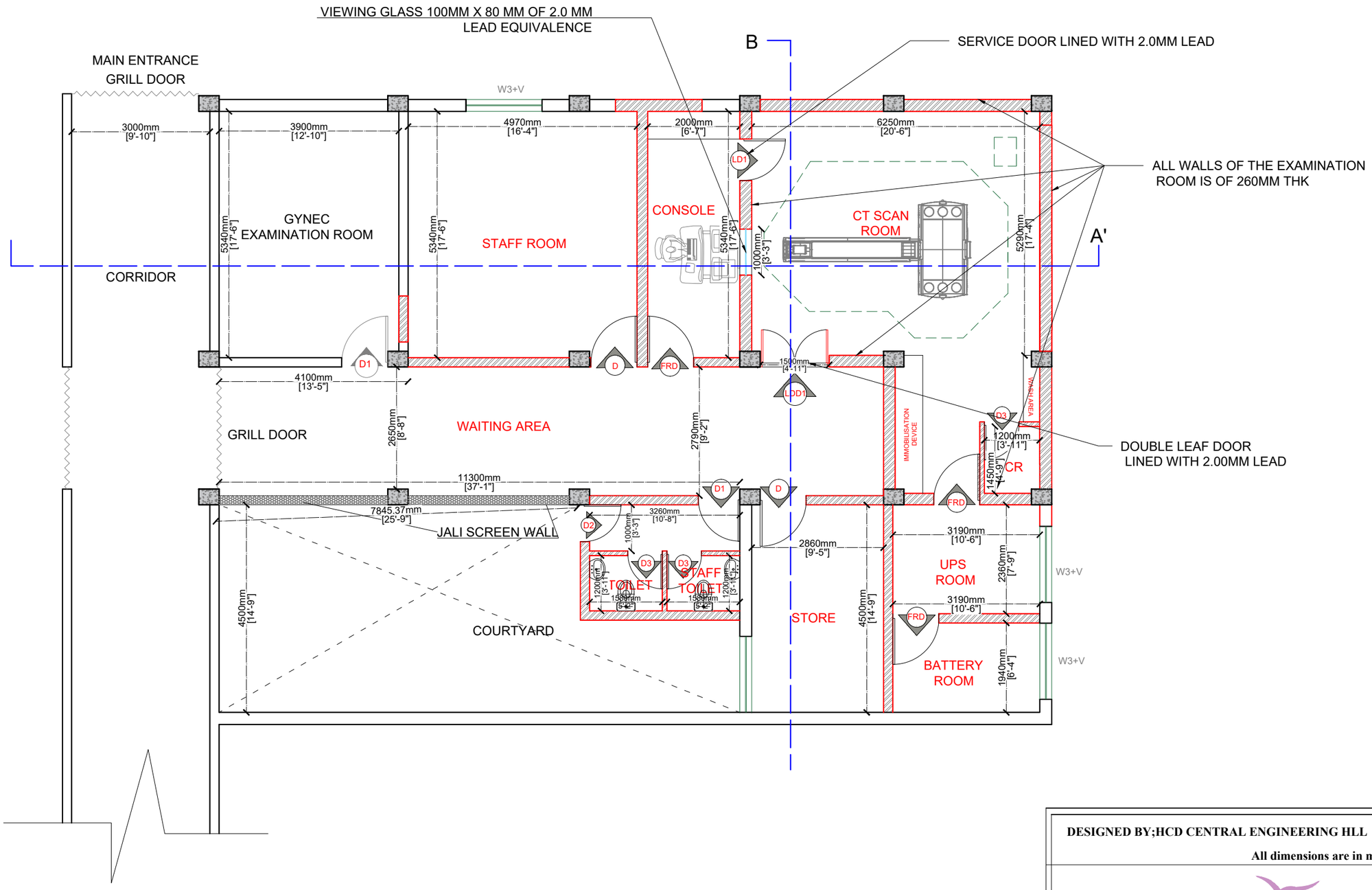
MARK	SIZE(mm)	TYPE
D	950X 2000	WOODEN DOOR
D1	1000X 2000	WOODEN DOOR
W3	1650X 1350	THREE PANEL WINDOW
V	1650X450	VENTILATOR

PROJECT NAME;ESTABLISHMENT OF CT SIMULATOR FOR RIMS,MANIPUR

EXISTING PLAN

ALL DIMENSIONS ARE IN MM

HLL Lifecare Ltd.
(A Government of India Enterprise)
Mahilamandiram Road , Poojappura
Thiruvanathapuram,Kerala,India



DESIGNED BY;HCD CENTRAL ENGINEERING HLL

All dimensions are in mm

.SCHEDULE OF OPENINGS

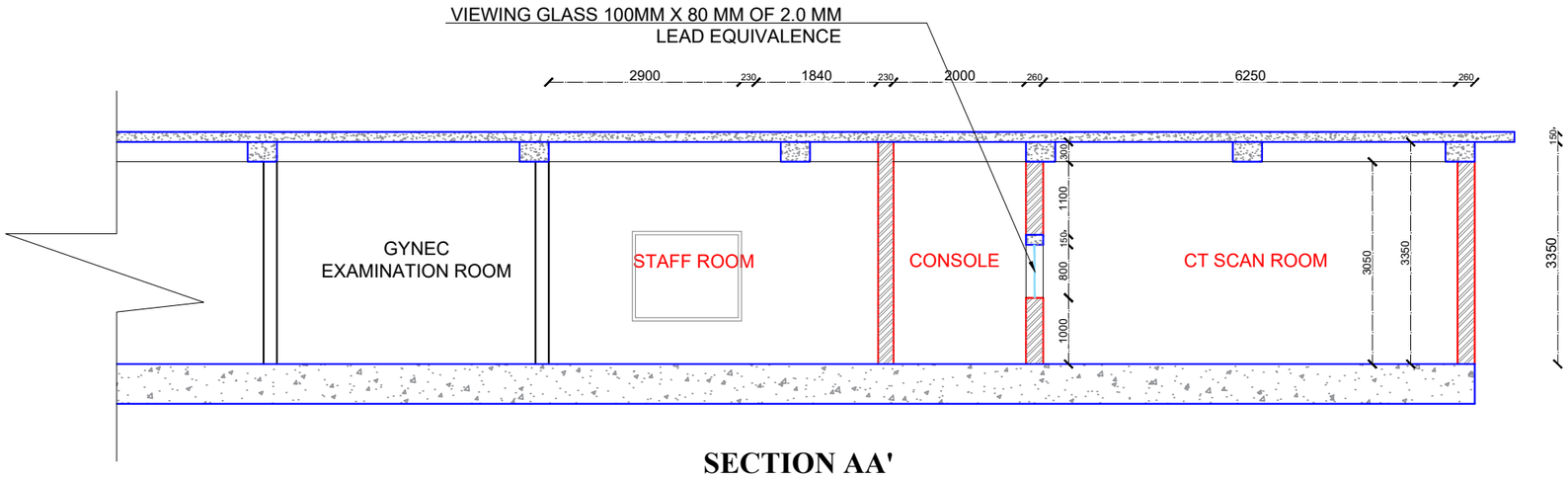
MARK	SIZE(mm)	TYPE
FRD	1000X 2100	FIRE RESISTANT DOOR
D	1000X 2100	WOODEN DOOR
D1	900X 2100	WOODEN DOOR
D2	800X 2100	WOODEN DOOR
D3	750X 2100	PVC SINGLE DOOR

PROJECT NAME;ESTABLISHMENT OF CT SIMULATOR FOR RIMS,MANIPUR

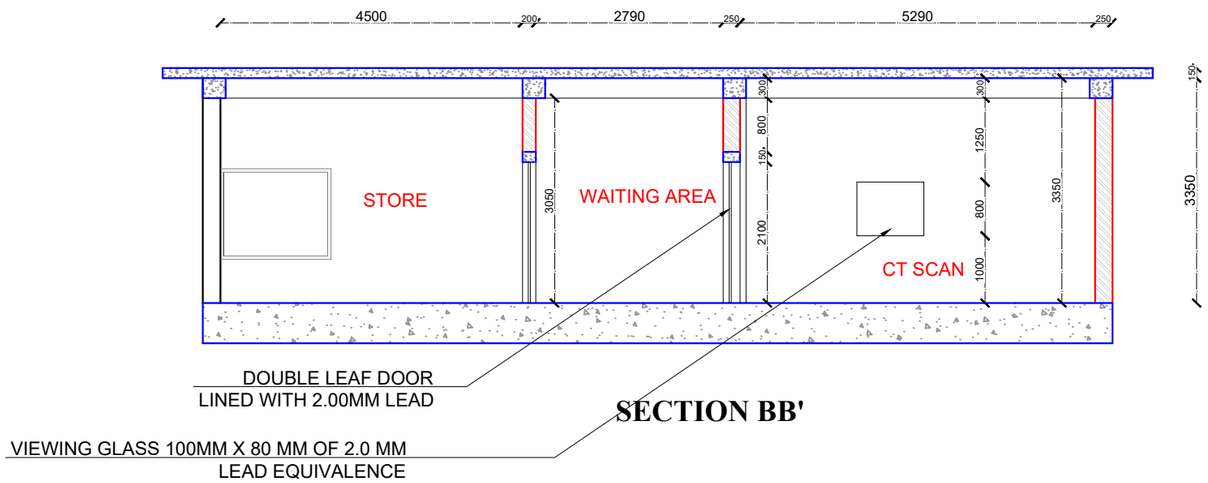
PROPOSED PLAN

ALL DIMENSIONS ARE IN MM

HLL Lifecare Ltd.
(A Government of India Enterprise)
Mahilamandiram Road , Poojappura
Thiruvanathapuram,Kerala,India



SECTION AA'



SECTION BB'

.SCHEDULE OF OPENINGS

MARK	SIZE(mm)	TYPE

PROJECT NAME;ESTABLISHMENT OF CT SIMULATOR FOR RIMS,MANIPUR

SECTIONS

ALL DIMENSIONS ARE IN MM

DESIGNED BY;HCD CENTRAL ENGINEERING HLL

All dimensions are in mm

HLL Lifecare Ltd.
(A Government of India Enterprise)
Mahilamandiram Road , Poojappura
Thiruvanathapuram,Kerala,India