HSCC (INDIA) LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

E-6(A), Sector-1, NOIDA (U.P) - 201301

To,

All Prospective Bidder's

Dated: 30.10.2024

AMENDMENT NO. I

Project Name - **Tender for "Construction of Super Specialty OPD Block at Masjid Moth in AIIMS New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) Basis."**

NIT/ Tender No.: NIT/tender no. HSCC/AIIMS/OPD-AIIMS/EPC/2024/75 dated 18.10.2024

This Amendment No.-I is hereby issued along with following Amended Documents:

1. Amended – Volume - I (NIT & Pre-Qualification).
2. Amended – SCC (Vol.-III)
3. Amended – DBR (including furniture works) (Vol.-IV)
4. Amended – Tender Drawings (Vol.-VI)
5. Amended – Schedule of Stage Payment of Works (Annexure-A)
6. Amended – Quoting sheet for the bidders (BOQ) (Vol.-VIII)

This amendment becomes integral part of the tender/contract. Bidders are advice to submit their bid accordingly.

Prospective bidders are advised to regularly visit through HSCC e-tender portal **https://hscc.enivida.com** & HSCC website http://www.hsccltd.co.in as corrigendum/amendments etc. if any, will be notified on this portal only and no separate advertisement will be made for this.

All other terms & conditions of the Tender shall remain unchanged.

(- Sd -)
CGM (Engg.)
HSCC (India) Ltd.

HSCC(India) Limited

As Executing Agency of
AIIMS, New Delhi

EPC Contract

Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis

Section-1
Replacement of Section -1 (Page No. 1 to 11) of GCC

Amended - Volume – I

NOTICE INVITING e- TENDER

&

PRE-QUALIFICATION

OCTOBER' 2024

Executing Agency

HSCC (INDIA) LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
E-6A, Sector-01, Noida-201301

Tender No. HSCC/AIIMS/OPD -AIIMS/EPC/2024/75

HSCC(India) Limited
As Executing Agency of
AIIMS, New Delhi

Dated: 18.10.2024

AMENDED - NOTICE INVITING e-TENDER (NIT)

E-mail id : cpg-group@hsccltd.co.in

1.0 HSCC (India) Limited as an executing agency of AIIMS, New Delhi invites open e-tender through e-tendering from eligible applicants who fulfil qualification criteria as stipulated in Vol.-I (NIT/PQ) document for the works "**Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis"** and as per schedule as under:

Tendering Document No.	HSCC/AIIMS/OPD -AIIMS/EPC/2024/75 dated 18.10.2024
Name of the Work	Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis.
Brief Scope of Work	The Design, Engineering, Procurement and Construction (EPC) of RCC framed structure/Composite Structure building including Civil works, Internal & External Electrical, PHE, Fire-fighting, furniture works ETP, WTP, UGT, HVAC, IT, MGPS (Medical Gas Pipeline System), PTTS (Pneumatic Tube Transport System) , Lifts, Escalators, Solar Hot Water system, Solar PV System, Horticulture, Landscaping, Signages and External development works etc. as per scope of work and maintenance during the Defect Liability Period of 12 months. EPC agency shall design and prepare detailed working drawings for all works like Architecture, Finishing, Structural and services design such as Electrical, Lifts, Escalators, Plumbing, HVAC, Fire Fighting, furniture works, Information Technology (IT), MGMS, PTS, Solar hot water system, Solar PV System, ETP, WTP, UGT, Horticulture, landscaping, signages, Substation, DG Set and external development etc. as per scope of work and tender documents including preparation of coordinated drawings for all services and make all necessary co-ordination for satisfactory execution of all works/activities in time bound manner. Develop various 3 D views and model of the buildings. **This project consists of Construction of Super Speciality OPD Block as per scope of work with a Maximum of 3B+G+9 structure (excluding mumty) construction adopting new & latest technology of construction etc.**

Estimated Cost Put to Tender (ECPT) (in Rs.)	**Rs. 436.98 Crores** (**Rupees Four Hundred Thirty-Six Crores and Ninety-Eight Lakhs Only)**
Period for completion	**Overall, 21 Calendar Months (Twenty-One Calendar Months)**
Earnest Money Deposit/ Bid Security	**Rs. 446.98 Lakhs (Rupees Four Hundred Forty-Six Lakhs and Ninety-Eight Thousand only)** **Bank Details of HSCC (India) Ltd**. are provided herewith for the purpose of preparation of Bank Guarantee only: Name of Beneficiary: **HSCC (India) Limited** Bank: **Punjab National Bank, Sec-27, Noida** Current A/C No.: **2726001800000011** IFSCode: **PUNB0272600** Validity of EMD in terms of Bank Guarantee shall be minimum period of 180 (One Hundred Eighty) days or more from the last date of receipt of tenders or any extension thereof.
Non-refundable cost of Tender document	**Rs.59,000/- (Rupees Fifty-Nine Thousand only)** inclusive of GST @ 18.00% in the shape of Demand Draft in favour of "***HSCC (India) Limited***", payable at Noida/New Delhi.
Non-refundable cost of e-Tender processing fee	**Rs.5310/-** (Rupees Five Thousand Three Hundred and Ten only) through e payment gateway to RailTel Ltd.
Last date & time of submission of Online Tender	**Up to 18.11.2024 by 15:00 hrs (IST)**
Period during which hard copy in original of EMD, Cost of Tender Document, e-tender processing fee, Letter of Acceptance of tender conditions unconditional, enlistment order of the contractor and other document as per NIT shall be submitted.	Before and up to **15:00 hrs.** on 18.11.2024 at **HSCC (India) Ltd.,** E- 6(A), Sector – 1, NOIDA, (U.P.) - 201301.
Date & Time of Opening of Technical Tender	**18.11.2024 at 16:00 hrs.**
Date & Time of Opening of Financial Tender	Shall be opened either at the Bid opening or at a subsequent date to be intimated in advance to such eligible Bidders.
Validity of offer	**180 (One Hundred Eighty) days from the last date of submission of bid.**

The tender document can be downloaded from website **https://hscc.enivida.com** and www.hsccltd.co.in. **"Corrigendum, if any, would appear only on the website and not to be published in any News Paper".**

1.1 **Description of Works :**

Part – A : (Main Work) -
Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis.

Part – B : (Operation & Maintenance contract for 10 years from the start of Defect Liability Period)

Note : Evaluation of price bid & Award of work shall be considered on PART-A (Main works) only.

2.0 Minimum Eligibility Criteria:

The interested bidders should meet the following minimum qualifying criteria:

A. Work Experience:

i) Joint-venture / consortia of firms / companies shall not be allowed and the bidder should meet the eligibility criteria themselves individually.

ii) (I) Should have satisfactorily completed the following works in during Seven (7) years ending previous day of last date of submission of tenders:

a. *Three *Similar completed works each costing not less than 40% of the estimated cost put to tender.*

OR

b. *Two *Similar completed works each costing not less than 60% of the estimated cost put to tender.*

OR

c. *One *Similar completed work costing not less than 80% of the estimated cost put to tender.*

"*Similar Work" shall mean "Construction of Non-Industrial and Non-Residential multi-storied RCC framed structure/Composite structure having minimum Five Storeys with minimum One Basement including finishing works, water supply, drainage & sanitary installations, electrical works, Fire-fighting, LV works, Lifts and HVAC all executed under one agreement". Airports, Metro Infrastructure and Power Projects shall not be considered.

NOTE:

x) Mumty and Machine room shall not be counted as a storey.
y) Each Basement, Stilt constructed in the building shall be considered as a storey.

AND

ii) (II) Additional qualifying criteria (either part of ii)(I) above or a separate one) :-

The bidder should have successfully completed one work consisting of a) & b) as mentioned below separately or collectively during the last 7 years ending previous day of last date of submission of tenders:

a) Any multi-storeyed RCC framed structure/composite structure consisting Hospital and/or In-Patient Department (IPD) and/or Out-Patient Department (OPD) and/or Diagnostic building including finishing works, water supply, drainage & sanitary installations, electrical works, Fire-fighting, LV works, Lifts and HVAC all executed under one agreement as EPC/turnkey contract costing not less than amount equal to 40% of the estimated cost put to tender.

b) Any building with Minimum Two Basements with internal services including Firefighting, etc. all composite executed under one contract.

iii) The past experience of similar nature of work should be in the name of the bidder and not in the name of associate company/ parent company/ group company/ subsidiary company etc. Past experience as part of a Joint Venture/Consortium/SPV (Special Purpose Vehicles) etc. shall also not be considered. Own works / work under the same management / own certification of the bidder shall not be considered for pre-qualification.

iv) The past experience of similar nature of work should be supported by completion certificate(s) issued by the concerned organization. In case the work experience is of Private sector, the completion certificate shall be supported with copies of Letter of Award, Agreement, Bill of Quantities, Certified Copy of Bills and copies of Corresponding TDS Certificates. Value of work will be considered commensurate with the value of TDS Certificates.

v) The value of executed works shall be brought to the current level by enhancing the actual value of work done at a simple rate of 7% per annum, calculated from the date of completion to previous day of last day of submission of tenders.

vi) **Foreign Certificate**:

(a) In case the work experience is for the work executed outside India, the bidders have to submit the completion/experience certificate issued by the owner duly signed & stamped, and affidavit to the correctness of the completion/experience certificates. The EPC/Contractor shall also submit the completion/experience certificates attested by the Indian Embassy/Consulate/High Commission in the respective country along with the bid.

In the event of submission of completion /experience certificate by the Bidder in a language other than English, the English translation of the same shall be duly authenticated by Chamber of Commerce of the respective country and attested by the Indian Embassy/consulate/High Commission in the respective country.

(b) For the purpose of evaluation of Bidders, the conversion rate of such a currency into INR shall be the daily representative exchange rate published by the IMF as on 7(Seven) days prior to the Last Date of Submission of tender including extension(s) given if any.

In case of non-submission of above information by bidders, the outside India work shall not be considered for prequalification.

B. Financial Strength:

i) **Turnover:** Average annual financial turnover on construction works should be at least 50% of the estimated cost put to tender during the immediate last three consecutive financial years ending 31st March 2023. The requisite Turnover shall be duly certified by a Chartered Accountant with his Seal/ signatures and registration number.

ii) The value of annual turnover figures shall be brought to the level of the last Financial Year FY-2022-23 by enhancing the actual turnover figures at a simple rate of 7% per annum.

iii) The requisite Turnover shall be duly certified by a Chartered Accountant with his Seal/ signatures and registration number. Year in which no turnover is shown would also be considered for working out the average. In case a Company/Firm is less than 3 years old, then the average turnover shall be calculated taking the turnover for the year for which no data is provided as zero.

iv) The bidders are required to upload and submit relevant pages of summarised Balance Sheet (Audited) for last three years ending 31st March 2023.

v) The turnover of the bidder on a standalone basis only shall be considered. The turnover of parent company/group company/subsidiaries or Consolidated Turnover shall not be considered.

vi) **Profit/loss:** The bidder should not have incurred any loss (profit after tax should be positive) in more than two years during available last five consecutive financial years ending FY-2022-23. Balance sheet (balance sheet in case of private/public limited company means its standalone financial statement and consolidated financial statement both), duly audited by the Chartered Accountant.

The P&L Statement of parent company/group company/subsidiaries shall not be considered.

vii) The bidders are required to upload and submit relevant pages of summarised Profit & Loss Account (Audited) for last five years ending 31st March 2023.

viii) **Solvency Certificate:** Bank Solvency Certificate issued from Nationalized or any Schedule Bank should be at least 40% of Estimated Cost of the Project put to tender (ECPT). ***The certificate should have been issued within 6 months from original last date of the submission of the tender***.

ix) Net Worth of the company /firm as on last day of the preceding financial year i.e., FY-2022-23, should be positive.

3.0 The intending tenderer must read the terms and conditions of HSCC carefully. He should only submit his tender if he considers himself eligible and he is in possession of all the documents required. Information and Instructions for Tenderers posted on Website(s) shall form part of Tender Document.

4.0 Those intending tenderers/contractors not registered on the website i.e., https://hscc.enivida.com mentioned above with M/s RailTel Ltd. are required to get registered beforehand. If needed they can be imparted training on online tendering process as per details available on the website i.e., https://hscc.enivida.com.The intending tenderer must have class-III digital signature to submit the tender.

5.0 The Tender Document as uploaded can be viewed and downloaded free of cost by anyone including intending tenderer. But the tender can only be submitted after uploading the mandatory scanned documents such as a) Demand Draft / Pay order or Banker`s Cheque towards cost of tender document, b) proof of deposit of e-Tender Processing Fee, c) Demand Draft/Pay Order or Banker's Cheque / Bank Guarantee of any Nationalized or all Commercial Scheduled Bank against EMD & All other documents shall be as per Notice Inviting e-tender.

6.0 **Set of Contract/Tender Documents**:

The following documents will constitute set of tender documents:

a) Notice Inviting e-Tender
b) Quoting Sheet for Tenderer
c) Instructions to Tenderers & General Conditions of Contract
d) Special Conditions of Contract
e) Design Basis Report
f) Technical Specifications
g) List of approved makes of materials
h) Tender Drawings along with Schedule of Finishes
i) Payment Schedule
j) Memorandum Annexure-I of NIT
k) Acceptance of Tender Conditions (Annexure-II)
l) Integrity pact (Annexure-III) (To be signed and stamped by the contractors and scanned copy to be uploaded with the bid)
m) Addendum/Corrigendum, if any- Duly signed by authorized person
n) Pre-bid clarifications, if any

7.0 The tenderers are required to quote strictly as per terms and conditions, specifications, standards given in the tender documents and not to stipulate any deviations.

The bidders are advised to submit complete details with their bids as Technical Bid Evaluation will be done on the basis of documents uploaded on website by the bidders with the bids. The information should be submitted in the prescribed proforma. Bids with Incomplete /Ambiguous information will be rejected.

The Bank Guarantee for EMD submitted by the bidders shall be strictly in the format prescribed in GCC. In case, EMD is not found verbatim in the prescribed format, the bid will be liable for rejection.

8.0 The bidders are advised in their own interest to submit their bid documents well in advance from last date/time of submission of bids so as to avoid problems which the bidders may face in submission at last moment /during rush hours.

However, after submission of the tender the tenderer can re-submit revised tender `any number of times but before last time and date of submission of tender as notified.

9.0 When it is desired by HSCC to submit revised financial tender then it shall be mandatory to submit revised financial tender. If not submitted, then the tender submitted earlier shall become invalid.

10.0 On opening date, the tenderer can login and see the tender opening process.

11.0 Contractor can upload documents in the form of JPG format and PDF format.

12.0 Contractor to upload scanned copies of all the documents including valid GST registration /EPF registration/ ESIC registration certificate/ PAN NO. as stipulated in the tender document.

13.0 If the contractor is found ineligible after opening of tenders, his tender shall become invalid and cost of tender document and processing fee shall not be refunded.

14.0 If any discrepancy is noticed between the documents as uploaded at the time of submission of tender and hard copies as submitted physically by the contractor the tender shall become invalid and cost of tender document and processing fee shall not be refunded.

15.0 Notwithstanding anything stated above, HSCC reserves the right to assess the capabilities and capacity of the tenderer to perform the contract, in the overall interest of HSCC. In case, tenderer's capabilities and capacities are not found satisfactory, HSCC reserves the right to reject the tender.

16.0 Deleted (Refer GCC)

17.0 The tenderer(s) if required, may submit queries, if any, through E-mail and in writing to the tender inviting authority to seek clarifications **within 7 days** from the date of uploading of Tender on website but latest by so as to reach HSCC office not less than 2 days prior to the date of Pre-bid meeting (if to be held as per NIT). HSCC will reply only those queries which are essentially required for submission of bids. HSCC will not reply the queries which are not considered fit like replies of which can be implied /found in the NIT/ Tender Documents or which are not relevant or in contravention to NIT/Tender Documents, queries received after 7 days from the date of uploading of Tender on website, request for extension of time for opening of technical bids, etc. Technical Bids are to be opened on the scheduled dates. Requests for Extension of opening of Technical Bids will not be entertained.

The Pre-Bid meeting shall be attended by the intending bidders only and not by vendors/manufacturers. Further, the intending bidders should depute their authorized person with authorization letter in original to attend the pre-bid meeting.

18.0 **Integrity Pact (For all contracts valuing Rs.5.00 Crores and above)**

18.1 **Integrity Pact duly signed by the tenderer shall be submitted. Any tender without signed integrity Pact shall be liable for rejection.**

18.2 **Independent External Monitors**

(i) In respect of this project, the Independent External Monitors (IEMs) would be monitoring the bidding process and execution of contract to oversee implementation and effectiveness of the Integrity Pact Program.

(ii) The Independent External Monitor(s) (IEMs) have been appointed by HSCC in terms of Integrity Pact (IP)-Section 7, which forms part of the tenders/Contracts. The contact details of the Independent External Monitor (s) are posted on the HSCC's website i.e., www.hsccltd.co.in

(iii) This panel is authorized to examine / consider all references made to it under this tender in terms of Integrity Pact. The Independent External Monitors (IEMs) shall review independently, the cases referred to them to assess whether and to what extent the parties concerned comply with the obligations under the Integrity Pact entered into between HSCC and Contractor.

(iv) The Independent External Monitors (IEMs) has the right to access without restriction to all Project documentations of the Employer including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his Project Documentations. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder / Contractor / Sub-Contractors etc. with confidentiality.

19.0 List of Documents to be scanned and uploaded on the e-tender website within the period of tender submission:

a) Original - Demand Draft/Pay Order or Banker's Cheque/ Bank Guarantee of any Nationalized or all Commercial Scheduled Bank against EMD. **Validity of EMD in terms**

of Bank Guarantee shall be minimum period of 180 (One Hundred Eighty) days from the last day of submission of Tender/bid.

b) Original - Demand Draft/Pay Order or Banker's Cheque of any Scheduled Bank towards cost of Tender Document.

c) Unconditional Letter of Acceptance of Tender Conditions (**in original**) (Annexure-II of SCC) (On Letter Head of the Applicant/ Bidder).

d) Affidavit duly notarized by Notary Public on Non-Judicial Stamp Paper of Rs. 100 for correctness of Documents /Information (**in original**) (as per Form-H of GCC).

e) Integrity Pact and Agreement (Annexure-III) (for all contracts valuing Rs. 5.00 Crores & above) duly signed by the person authorized to sign the bid on behalf of the bidder. **The bidders are requested to download the Integrity Pact as uploaded in the tender documents, and sign on the same, put rubber stamp/seal and upload the signed copy on e-tendering websites. Any Tender without signed Integrity pact shall be liable for rejection.**

f) Memorandum Annexure-I of NIT.

g) Details of Work Experience Certificates - FORM-A

h) Details of Similar Works - FORM-B

i) Details of Additional qualifying criteria (Hospital Project Work) - FORM-B-I

j) Financial Details- FORM-C

k) TDS Details of Projects- FORM-D

l) Self-certified copy of Bank Solvency Certificate- FORM-E

m) Documents regarding Net Worth of the Company Firm.

n) Power of Attorney of the person authorised for signing & submitting the tender (as per Annexure – IV)

o) E-payment Transaction details towards cost of processing fees.

p) Valid GST registration/ EPF registration/ ESIC registration certificate/ PAN NO.

q) All pages of the entire Corrigendum (if any) duly signed by the authorized person.

r) Pre-bid clarifications, if any.

s) General Information – Form-F

t) Work Experience Certificates consisting of details as mentioned in Form-G

u) Registration Details of the contractor in the GST Act– Form-I.

v) Litigation History – Form-N

w) Pre-bid clarifications & All Addendum/Corrigendum, if any - Duly signed by authorized person.

NOTE:

The documents at sl. Nos. **a**, **b**, **c** and **d** (i.e. Cost of tender document, Demand Draft / Banker's Cheque/ Pay Order or Bank Guarantee against EMD as per NIT, Unconditional letter of acceptance duly signed on letter head, Notarized Affidavit for correctness of document/information) are required to be submitted in original in hard copy also within the period of tender submission. **All other documents are not required to be submitted in hard copy.**

All the uploaded documents should be in readable, printable and legible form failing which the Bids shall not be considered for evaluation. The document submitted uploaded on the website by the bidders with the bids should be indexed and duly page numbered also.

The bidders shall require to submit online "Integrity Pact and Agreement"- duly signed by the person authorized to sign the bid on behalf of the bidder. **Any Tender without signed Integrity pact shall be liable for rejection.**

20.0 (a) No Clarification will be sought in case of non-submission of Cost of tender document **or** EMD/ Bid Security of requisite amount **or** Unconditional letter of acceptance **or** Affidavit for correctness of document/information. In such cases the bid shall be rejected out rightly without seeking any further clarification/document.

(b) Bids not accompanied by EMD/ Bid Security and Tender fee (as per NIT), shall be treated as non-responsive, and will be summarily rejected.

(c) All the uploaded and submitted documents shall be considered as duly signed by contractor/ authorized representative.

21.0 HSCC reserves the right to reject any or all tenders or cancel/withdraw the invitation for bid without assigning any reasons whatsoever thereof. HSCC does not bind itself to accept lowest tender. The HSCC reserves the right to award the work to a single party or to split the work amongst two or more parties as deemed necessary without assigning any reason thereof. The contractor is bound to accept the portion of work as offered by HSCC after split up at the quoted/ negotiated rates. No claim of the contractor whatsoever shall be entertained by HSCC on this account.

22.0 Canvassing in connection with the tender is strictly prohibited, and such canvassed tenders submitted by the contractor will be liable to be rejected and his earnest money shall be absolutely forfeited.

23.0 In case of any query, please contact CGM (Engg.), HSCC during the Office hours & Further, any correspondence / clarifications these Email Id's: **cpghscc@gmail.com** & **cpg-group@hsccltd.co.in** can be used.

The completion certificates of the works, which will be submitted by the bidders with their bids are also verified form their respective clients by these HSCC - CPG Email Id's: **cpghscc@gmail.com** / **cpg-group@hsccltd.co.in**

CGM (Engg.)
HSCC (India) Limited

Annexure-I

MEMORANDUM

Sl. No.	Description	Cl. No. of NIT/ITT/ Clauses of Contract (CC)	Values/Description to be Applicable for Relevant Clause(s)
1)	Name of Work		Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis.
2)	Client/Owner		**All India Institute of Medical Sciences (AIIMS), New Delhi**
3)	Type of Tender		Design & Engineering, Procurement Construction (EPC Contract)
4)	Earnest Money Deposit	NIT	**Rs. 446.98 Lakhs**
5)	Estimated Cost Put to Tender	NIT	**Rs. 436.98 Crores**
6)	Time allowed for Completion of Work	NIT	**Overall 21 Calendar Months**
7)	Mobilization Advance	CC / 4.0	10.00% (Ten Percent) of Contract Value.
8)	Interest Rate of Mobilization Advance	CC / 4.0	Simple Interest Rate of 10.00% (Ten Percent only) Per Annum
9)	Schedule of Rates applicable		Not Applicable
10)	Validity of Tender	ITT / 8.0	**180 (One Hundred Eighty) days from the last day of submission of Tender**
11)	Performance Guarantee	CC / 2.0	5.00 % (Five Percent Only) of contract value within 15 days from the issue of Letter of Award
12)	Security Deposit / Retention Money	CC/3.0	2.50 % (Two point Five Percent Only) of the gross value of each running /final bill
13)	Time allowed for starting the work	ITT/14.0	The date of start of contract shall be reckoned from 15 days after the date of issue of letter of Award/handing over of the site whichever is later.

Sl. No.	Description	Cl. No. of NIT/ITT/ Clauses of Contract (CC)	Values/Description to be Applicable for Relevant Clause(s)
14)	Deviation limit beyond which clause 6.2 & 6.3 shall apply for all works except foundation.	CC / 6.0	Not Applicable
15)	Deviation limit beyond which clause 6.2 & 6.3 shall apply for foundation work	CC / 6.0	Not Applicable
16)	Escalations	CC /10.0	Not Applicable.
17)	Recovery rate of work Force supplied by HSCC to Contractor	CC/71	Not Applicable
18)	Defect Liability Period	CC/38.0	12 months from the date of taking over the works by the Client.
19)	GREEN BUILDING RATING		GRIHA Certification (Minimum 3 Star)
20)	ENGINEER-IN-CHARGE		ZIC or any other officer of higher rank nominated by Director (Engineering), HSCC (India) Limited.
21)	CONCILIATOR		One rank higher to ENGINEER-IN-CHARGE

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HSCC(India) Limited
As Executing Agency of AIIMS, New Delhi

EPC Contract

Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis

Amended Schedule of Stage Payment of Works

(Annexure -A)

October' 2024

Executing Agency

HSCC (INDIA) LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
E-6A, Sector-01, Noida-201301

Tender No. HSCC/AIIMS/OPD -AIIMS/EPC/2024/75

Annexure - A

SCHEDULE OF STAGE PAYMENT OF WORKS

Payment Schedule : The Amount quoted by the Contractor shall be divided as follows:

S.no	Description	Individual %	Cumulative %
1	Civil, plumbing & Firefighting works	59.40%	**59.40%**
2	Electrical Works	17.10%	**76.50%**
3	HVAC Works	9.00%	**85.50%**
4	IT Works	1.80%	**87.30%**
5	SES WORKS (MGMS AND PTTS)	1.35%	**88.65%**
6	Furniture	1.35%	**90.00%**
7	Testing & commissioning & handing over to Client	10.00%	**100.00%**
		100.00%	

Project Name :- Tender for "Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis".

Client :- ALL INDIA INSTIUTE OF MEDICAL SCIENCES (AIIMS), NEW DELHI

SCHEDULE OF STAGE PAYMENT

S/N	Particulars	Break-up of Total % Payable Cost		
		Item %	Individual %	Cumulative %
I	**Civil, plumbing & Firefighting works**		**59.40%**	**59.40%**
	Planning, Designing, and Construction on EPC Basis of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi as per Architectural Plan & Sections (Enclosed) with all plumbing and firefighting works, UGT, ETP, WTP etc., with support services & allied facilities by incorporating stipulated specifications as per scope of work and directions of Engineer In charge			
1-A	**On submission and approval of Good for construction Drawings & Design Deliverables from HSCC**			
1-A-i	Civil Architectural (Site Layout Plan with Building Coordinates, Submission of model,Building Plans, Sections and Elevations, Flooring Plans & Dado Details with sections and elevations, 3D Views for all locations such as Consultant room, lobby, ICU, Corridor, Toilet, Landscape Plan etc and finishing schedule for all floors, Door and Window details, Road, parking, footpath layout and external development plans with sections, Plantation Layout mentioning species names, size and height,External Street Lighting layout plan with material schedule,External and internal signages details etc,), Structure drawings (Foundation drawings, structural details, Beam and slab reinforcement details, Road, trench, culvert, parking, RCC Drain, sewerage, effluent, storm water layout,Footpath Details, Underground tank details WTP and ETP details etc.), PHE drawings (Building plumbing and sanitary details, Sewerage scheme and details, Drainage scheme and details, Water supply scheme and details, ETP, R.O- Mechanical GA, HFD etc., Rain Water Harvesting,Underground tank and water treatment plant schematic details, Water Pumps technical details and data sheet etc.), flooring & finishing & signage works.	100.00%	0.50%	
1-B	**Upon receipt of Pre and post Local Body Clearances/Approvals/NOCs**			
	Pre-Construction Approvals/Clearances viz., Approval from New Delhi Municipal Corporation ,Pre construction Clearance from Fire Department, Consent to establish from Pollution Control Board, Labour License, Tree Cutting/ Transplant Permisskion from Forest Department etc. Post-construction Approvals viz., Consent to operate including EC compliances from Pollution Control Board, Occupancy Certificate from New Delhi Municipal Corporation , Final Clearance/NOC from Fire Department, GRIHA Certification (Minimum 3 star),Clearance from Electrical Inspectorate & Lift Inspectorate etc.	100.00%	0.50%	
1-C	**Construction: Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi**			
1-C-1	**Foundation Work**:			
1-C-1.i	On completion of foundation and substructure works up to plinth level	10.00%	40.00%	
1-C-2	On completion of foundation and substructure works up to plinth level	35.00%		
1-C-3	Walls & Partion :Brickwork & partitioning work including brick work	7.00%		
1-C-4	Doors & Windows i/c windows to meet Acoustical requirement.	6.00%		
1-C-5	Flooring, skirting, dado, wall lining work, acoustic insulation, wall guard, tactile tile flooring etc.	17.00%		
1-C-6	False Ceiling , terracing , water prooofing etc.	8.00%		
1-C-7	Finishing work :Internal & External Plaster & Painting	5.00%		
1-C-8	External Structure Glazing, GRC Jali, External Cladding including framing and water-proofing etc	8.00%		
1-C-9	SS/MS Railing (including epoxy painting) /Grills/domes etc	4.00%		
1-D	**Fire fighting System works (Execution)**			
1-D-1-i	Wet Riser System /Down Comer System	35.00%	4.00%	
1-D-1-ii	Automatic Sprinkler System	20.00%		
1-D-1-iii	Fire Extinguishers	10.00%		
1-D-1-iv	Fire Hydrant Installation as per DBR/Specification	25.00%		
1-D-1-v	Fire sealing of the ducts and shafts	10.00%		
1-E	**Execution of Internal PHE works** including water supply and sewarage system including fittings and fixtures			
1-E-1-i	Laying & Fixing of Internal water Supply & Seweargae Pipe Lines	35.00%	4.00%	
1-E-1-ii	Installation of Fitting & fixtures	65.00%		
2	**External Development: Planning, Designing, and Construction on EPC Basis of External Development including various infrastructure required and as specified in the approved Master plan including Roads Street Lighting, Tree Plantation Horticulutre, Landscaping etc. with support services & allied facilities by incorporating stipulated specifications, as per scope of work and directions of Engineer In charge**			

S/N	Particulars	Break-up of Total % Payable Cost		
		Item %	Individual %	Cumulative %
2-A-x	Signage	15.00%	5.00%	
2-A-xi	Horticulture Operations including 30cm earth filing , grassing , tree plantations/shurbs and potted Plants etc.	15.00%		
2-A-xii	Roads, Footpaths & Parking,Compound Wall	70.00%		
2-B	**External PHE works (Execution)**			
2-B-i	Underground Tank	12.00%	5.40%	
2-B-ii	Domestic Terrace Tank	9.00%		
2-B-iii	Fire Terrace Tank	1.00%		
2-B-iv	Solar Hot water System	2.00%		
2-B-v	Water Treatment Plant and Effluent Treatment Plant (STP & ETP)	6.00%		
2-B-vi	Borewell	1.00%		
2-B-vii	Hydropneumatic system/WTP/Softner/RO/water cooler	5.00%		
2-B-Vii	Water curtain	1.00%		
2-B-viii	External Sewer & Drainage	9.00%		
2-B-ix	Filter Water Supply (Distribution Lines & Perpherial Grid)	10.00%		
2-B-x	Unfiltered Water Supply Distribution Lines	14.00%		
2-B-xi	Storm Water Drainage pipelines	14.00%		
2-B-xii	Rain water harvesting	12.00%		
II	**Electrical Works**		**17.10%**	**76.50%**
1-A	**On submission and approval of Good for construction Drawings & Design Deliverables from HSCC**			
1-A-i	Submission of Credential, Shop Drawings & technical datasheets for Electrical works viz., Electrical power and lighting layout plans, Transformer technical details and data sheet, Electrical Substation Layout and GA drawings and technical datasheets of all electrical panels such as HT,LT, MV and road lighting panels etc., GA drawings and technical data sheets of busduct , DG set and AMF panel, Earthing details Layout and lightening protection drawing, Cable schedule (Internal and external),External Street Lighting Layout,CCTV, IPABX , Fire alarm system, PAS, Solar PV Cells, IBMS Layout, Lift and Escalators Technical datasheets and drawings	**1.47%**		
1-A-ii	Submission and approval of shop drawings for conduting and wiring of elctrical layout of lighting , power of all the floors	0.15%		
1-A-iii	Submission and approval of shop drawings for conduting and wiring of elctrical layout of LV works (i.e. CCTV and PA system, FDA, IPABX, , IBMS, solar PV , external (CCTV and PA etc.) of all the floors	0.29%		
1-A-iv	Submission and approval of shop drawings for elctrical layout of sub station.	0.59%		
1-A-v	Submission and approval of Technical data sheet of all electrical equipments.	0.44%		
1-B	**Internal Electrical works :**			
1-B1-i	**Slab conduting ,wall condouting, wiring (Point wiring , 5amp & 15/20 amp) , GI Boxes, switch plates and sockets , , and all other accessories**	**9.09%**		
1-B1-ii	supply and laying of Slab conduting ,& wall conduting (complete up to points)	2.73%		
1-B1-iii	supply and Fixing of GI Boxes & wiring of Points , 5Amp plug and 15 Amp points etc ,complete	3.64%		
1-B1-iv	supply and Fixing of switch and sockets and terminations of wires	2.73%		
1-B2	**Distribution Boards and MCBs completes with Accessories**	**0.88%**		
1-B2-i	supply of Distribution Boards with MCBs	0.53%		
1-B2-ii	Installation with MCBs in DB all accesoories with termination of all wires with ferruling	0.35%		
1-B3	**Submain ,conduiting and submain wiring , cable tray raceway etc**	**10.90%**		
1-B3-i	Supply of Submain ,conduiting and submain wiring , cable tray raceway	5.45%		
1-B3-ii	Installation / laying of Submain ,conduiting and submain wiring , cable tray raceway	5.45%		
1-B4	**Rising Mains, end feed units & tap off etc completes with accessories**	**2.28%**		

S/N	Particulars	Break-up of Total % Payable Cost		
		Item %	Individual %	Cumulative %
1-B4-i	Supply of Rising Mains, end feed units & tap off etc completes with Accessories	1.60%		
1-B4-ii	Installation of Rising Mains, end feed units & tap off etc completes with Accessories	0.68%		
1-B5	**MV panels, /Floor panels, Metering panels**	**1.30%**		
1-B5-i	Supply of MV panels, /Floor panels, Metering panels	0.91%		
1-B5-i	Installation of MV panels, /Floor panels, Metering panels	0.39%		
1-B6	**Light Fixtures, fans Exhaust fans and Aviation Light and acessories including Lighting Automation and Occupancy Sensors**	**3.89%**		
1-B6-i	Supply of Light Fixtures, fans Exhaust fans and Aviation Light and acessories .	2.72%		
1-B6-ii	Installation of Light Fixtures, fans Exhaust fans and Aviation Light and acessories .	1.17%		
	L V SYSTEM			
1-C1	**CCTV Surveillance System including cameras, switches, cables, conduiting etc,**	**3.82%**		
1-C1-i	Slab conduiting/ wall conduting for CCTV system	0.38%		
1-C1-ii	Wiring of CCTV system	1.15%		
1-C1-iii	Supply of CCTV System	1.34%		
1-C1-iv	Installation of CCTV System	0.96%		
1-D1	**Fire Alarm System including conduiting ,all devices , panel, hooters , cables etc**	**3.31%**		
1-D1-i	Slab conduiting/ wall conduting for FDS system	0.33%		
1-D1-ii	Wiring for FDA devices	0.99%		
1-D1-iii	Supply of FDA system including , switches, patch cords etc	1.32%		
1-D1-iv	Installation of FDA System complete	0.66%		
1-E1	**Public Address system ncluding conduiting ,all devices, Speekers, ampilifries cables etc**	**0.98%**		
1-E1-i	Slab conduiting/ wall conduting	0.10%		
1-E1-ii	Wiring for PA system	0.29%		
1-E1-iii	Supply of PA system	0.39%		
1-E1-iv	Installation of PA System	0.20%		
1-F1	**Telepone/ IPBAX system completes with devices & accessories**	**3.03%**		
1-F1-i	Slab conduiting/ wall conduting	0.30%		
1-F1-ii	wiring for IPBAX system	0.91%		
1-F1-iii	Supply of IPBAX system including all software and all accessories to complete the commissioning the system	0.91%		
1-F1-iv	Supply of Instruments	0.30%		
1-F1-v	Installation of IPBAX System	0.61%		
1-G1	**TV system**	**0.18%**		
1-G1-i	Slab conduiting/ wall conduting	0.07%		
1-G1-ii	wiring for TV system/ GI boex and switch sokets and other necessary items for commisiiong the system	0.11%		
	LIFT AND ESCALATORS			
1-I1	Lifts & Escalators with all accesorries for commissioning	**11.28%**	15.53%	
1-I1-i	Supply of Lifts and Escalators	6.77%		
1-I1-ii	Installation of Lifts and Escalators for commissioning	4.51%		
	IBMS			
1-J1	Building Management system with devices & accessories	**5.09%**		
1-J1-i	Slab conduiting/ wall conduting	0.51%		
1-J1-ii	wiring for BMS system	1.27%		
1-J1-iii	Supply of BMS system including all software and all accessories to complete the commissioning the system	1.78%		
1-J1-iv	Installation of BMS System	1.53%		

S/N	Particulars	Break-up of Total % Payable Cost		
		Item %	Individual %	Cumulative %
	External Electrical:			
2A	**HT panels**	**2.54%**		
2A-i	supply	1.78%		
2A-ii	Installation	0.76%		
2B	**Main LT Panels**	**5.10%**		
2B-i	supply	3.57%		
2B-ii	Installation	1.53%		
2C	**APFC and AHF Panel**	**2.97%**		
2C-i	supply	2.08%		
2C-ii	Installation	0.89%		
2D	**BUS DUCT**	**2.41%**		
2D-i	supply	1.69%		
2D-ii	Installation	0.72%		
2E-i	**Transformer**	**6.75%**		
2E-i	supply	4.73%		
2E-ii	Installation	2.03%		
2F	**DG-Set and synchronisation panel and Exhaust Chimney with control cabling &other accessories to complete for commissioning the system**	**7.82%**		
2F-i	supply	5.47%		
2F-ii	Installation	2.35%		
2G	HT CABLES	**0.58%**		
2G-i	Supply of HT cables	0.41%		
2G-ii	Laying of HT Cabled	0.17%		
2H	LT CABLES	**5.01%**		
2H-i	Supply of LT/ Control Cables cables	3.51%		
2H-ii	Laying of LT/ Control Cables	1.50%		
2I	**Earthing**	**1.44%**		
2I-i	Supply	0.72%		
2I-ii	Installation	0.72%		
2J	**Solar Photvoltaic Power generation**	**3.20%**		
2J-i	Supply	1.60%		
2J-ii	Installation	1.60%		
2K	**External Lighting**	**0.74%**		
2K-i	supply	0.37%		
2K-ii	Installation	0.37%		
2L	**Saftey Materials**	**0.02%**		
2L-i	Supply	0.01%		
2L-ii	Installation	0.01%		
2M	**Boom barier**	**0.13%**		
2M-i	supply	0.09%		

S/N	Particulars	Break-up of Total % Payable Cost		
		Item %	Individual %	Cumulative %
2M-ii	Installation	0.04%		
2N	**UPS**	**2.86%**		
2N-i	Supply of UPS	1.72%		
2N-ii	Installation of UPS	0.29%		
2N-iii	Supply Battery of UPS	0.57%		
2N-iv	Installation Battery of UPS	0.29%		
2O	**Fire Suppession system (Gas flooding System)**	**0.93%**		
2O-i	Supply	0.56%		
2O-ii	Installation	0.37%		
III	**HVAC Works**		**9.00%**	**85.50%**
1-A	**On submission and approval of Good for construction Drawings & Design Deliverables from HSCC ``**			
	Submission of Credential, Shop Drawings for HVAC works viz., SLD layout for Master plan, HVAC electrical system, Plant Room technical details, drawings for cooling tower, chillers, pumps etc, Ducting layout, drawings of HVAC Plant Room etc.	60.00%	0.25%	
	Submission of technical datasheets for HVAC works viz., Plant Room equipment technical details, data sheet and drawings for cooling tower, chillers, pumps, AHU, HWG, Fans, etc, Low side & electrical technical data sheet etc.	40.00%		
1-B	**HVAC -Works**			
1-B-i	Highside Equipment		8.75%	
1	Supply of CHILLER	14.35%		
2	Installation of CHILLER	6.15%		
3	SUPPLY OF PUMP	2.10%		
4	INSTALLATION OF PUMP	0.90%		
5	SUPPLY OF COOLING TOWER	1.40%		
6	INSTALLATOION OF COOLING TOWER	0.60%		
7	SUPPLY OF OTHER EQUIP Viz. Hot Water Generator	0.35%		
8	INSTALLATION OF OTHER EQUIP Viz. Hot Water Generator	0.15%		
1-B-ii	Low Side Equipment			
1	SUPPLY OF AHU+CSU	7.56%		
2	INSTALLATION OF AHU+CSU	3.24%		
3	SUPPLY OF Ventilation Fans VIZ INLINE, AXIAL, CENTRIFUGAL, AIR WASHER, FAN SECTION ETC	3.99%		
4	INSTALLATION OF OF Ventilation Fans	1.71%		
5	SUPPLY OF OTHER EQUIP VIZ EXPENSION TANK	0.42%		
6	INSTALLATION OF OTHER EQUIP VIZ EXPENSION TANK	0.18%		
1-B-iii	SUPPLY OF Piping & Fittings VIZ VALVES ETC	12.32%		
1	INSTALLATION OF Piping & Fittings VIZ VALVES ETC	5.28%		
1-B-iv	SUPPLY OF Ducting	10.36%		
1	INSTALLATION OF Ducting	4.44%		
2	SUPPLY OF ADP	3.22%		
3	INSTALLATION OF ADP	1.38%		
1-B-v	SUPPLY OF Insulation	5.81%		
1	INSTALLATION OF Insulation	2.49%		
1-B-vi	HVAC Electrical works			
1	SUPPLY OF Panels VIZ Main HVAC, distribution , starter etc.	2.80%		
2	Installation OF Panels VIZ Main HVAC, distribution , starter etc.	1.20%		
3	Supply of Cable	5.32%		
4	Installation of of Cable	2.28%		
IV	**IT Works**		**1.80%**	**87.30%**
1-A	IT & Special Services drawing & Design Deliverables viz.,submission of agency credentials, technical datasheets, shop drawings	100.00%	0.25%	
1-B	**IT SERVICES (Execution)**			
1-B-i	**Network (Lan & Wifi) & Security Components**	**87.00%**		
	Delivery of the equipments at site subject to submission of inspection report.	60.90%		
	Installation and commissioning of the equipments.	17.40%		
	Handing over to client	4.35%		
	Successful completion of 5 years onsite OEM warranty & maintenance support.	4.35%		

S/N	Particulars	Break-up of Total % Payable Cost		
		Item %	Individual %	Cumulative %
1-B-ii (a)	**QMS Hardware**	**6.50%**		
	Delivery of the equipments at site subject to submission of inspection report.	4.55%		
	Installation and commissioning of the equipments.	1.30%	1.55%	
	Handing over to client	0.33%		
	Successful completion of 5 years onsite OEM warranty & maintenance support.	0.33%		
1-B-ii (b)	**QMS Software**	**6.50%**		
	Against Preparation & Acceptance by Client and Implementation and acceptance of Application Software (User Acceptance Testing).	0.65%		
	Completion of Training, Final Acceptance Test (FAT) and Go Live.	3.90%		
	Handing over of the system to client.	0.30%		
	Successful completion of 5 years onsite OEM warranty & maintenance support.	1.65%		
V	**SES WORKS (MGMS AND PTTS)**		**1.35%**	**88.65%**
1-A	**On submission and approval of Good for construction Drawings & Design Deliverables from HSCC**			
	Submission of Credential , Shop Drawings & technical datrasheets for specialized services viz. PTTS and MGMS System	100.00%	0.15%	
	Special Services			
1-A-i	Medical Gas Manifold System	60.00%		
1-A-iii	PTTS	40.00%	1.20%	
	*The stage payment of Special Services is further subdivided as (a) 75% against supply & installation of equipment/items (b) 15% against testing & commissioning of special services and (c) 10% against demonstration & handing over of special services to Client.			
VI	**Furniture**		**1.35%**	**90.00%**
1	On approval of drawings and samples	5%		
2	Supply of furnitures	70%	1.35%	
3	Installation, Testing and Commissioning of Furnitures	15%		
4	Handing over to Client	10%		
VII	**Testing, Commissioning and Handover**		**10%**	**100.00%**
1	Testing and Commissioning	50%	5%	
2	Handover to the Client	50%	5%	

Note:

A. Items/Specifications to be provided at any location even though left out in the above provisions but is required as per functional requirements and as per approved drawings shall be provided as per direction of Engineer-in-Charge and the rates for same shall be deemed to be inclusive in quoted rates of the contractor. Nothing extra on this account shall be payable.

B. <u>SUPPLY OF EQUIPMENT/ITEMS :</u>

1. **Supply** means the supply of complete items /equipments along with all accessories to complete the installation.
2. **Installation** means placing and installation of the equipment with all its accessories complete in all respect in their respective locations and ready for commissioning.

HSCC(India) Limited

As Executing Agency of
AIIMS, New Delhi

EPC Contract

Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis

Volume – III

AMENDED –
SPECIFIC CONDITIONS OF CONTRACT
(SCC)

OCTOBER' 2024

एच.एस.सी.सी
HSCC
A Miniratna Co.

Executing Agency

HSCC (INDIA) LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
E-6A, Sector-01, Noida-201301

Tender No. HSCC/AIIMS/OPD -AIIMS/EPC/2024/75

Description of Works :

Part – A : (Main Work) -

Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis.

Part – B : (Operation & Maintenance contract for 10 years from the start of Defect Liability Period) -

(i). Client (AIIMS, New Delhi)/HSCC will carry out the separate contract agreement, placement of order etc. with the contractor. The contractor will sign the O&M agreement with AIIMS, New Delhi/HSCC as per terms & conditions of contract after the completion of Main works (PART-A).

(ii). The Performance Bank Guarantee for the Part-A (Main Works) shall be returned back to the contractor after satisfactorily completed and handed over of Main Works (Part - A) to Client/HSCC by the contractor and after signing of separate contract agreement for the Part-B (O&M Works for 10 years) with AIIMS, New Delhi (client)/HSCC including submission of Performance Bank Guarantee of O&M works to AIIMS, New Delhi/HSCC.

(iii). The contractor shall submit irrevocable performance bank guarantee in the form BG (Bank Guarantee) in favour of AIIMS, New Delhi (Client) / HSCC from any Nationalized Bank or all Commercial schedule bank which is equivalent to 5% of the contract value of Part-B (O&M Works for 10 years). The Performance Guarantees shall be valid up to 10 (ten) years from the date of commencement of work of Part-B (O&M Works for 10 years).

(iv). Singing of Separate Agreement for O&M work & placement of order of O&M works (PART-B) will be decided by Client (AIIMS, New Delhi) only after successful completion of main work (PART-A) done by the contactor. The award of PART – B (O&M Works) to the contractor is solely at the discretion of AIIMS and if PART – B (O&M Works) is not awarded to the contractor for any reasons if any, then No Claim in this regard raised by the Contractor shall not be entertained.

(v). GCC & SCC in Vol-VII (Scope of work & Condition of Contract - for Operation & Maintenance contract for 10 years from the start of Defect Liability Period) for PART – B (O&M Works) wherein the term HSCC (INDIA) Limited/ HSCC may read as HSCC (INDIA) Limited/AIIMS, New Delhi in GCC/ SCC of Vol-VII (Scope of work & Condition of Contract - for Operation & Maintenance contract for 10 years from the start of Defect Liability Period) for PART-B Works.

1. Evaluation of price bid & Award of work shall be considered on PART-A (Main works) only.

1.1 The bidders will suitably plan and steer the processes, so that the construction activities could progress faster, so as to facilitate building's completion as per the timeline. Non completion of work of a particular milestone shall attract levy of LD/compensation in the same.

2. During construction as mentioned above fencing of the building shall be done with 1.8 M High/NGT guidelines barricading to separate the building under construction works with Completed building. The barricading of 1.8-meter height/NGT guidelines along from road side and outer boundary the periphery of the project site shall be constructed by contractor as per direction by Engineer-in-charge. The barricading constructed and shall be aesthetically maintained by regular cleaning and painting by the contractor as directed by the Engineer-in-charge. The expenditure Incurred for barricading and maintenance of barricading shall be borne by the contractor.

3. The Contractor shall have In-house design capabilities to provide the required specialized services as per the scope of work. In case, the in-house design capabilities are not available, then the Contractor shall enter into in an agreement with a specialized design consultant who has requisite credentials & shall be appointed after approval of Engineer-in-charge. The Contractor, within 7 days of award of work, shall submit details of such in house design capabilities or details of the design consultant proposed to be engaged by the bidder along with requisite credentials.

4. Maintenance during defect liability Period is included in the scope of bidder. The period of one (01) year for maintenance shall be started after handing over of project as a whole to the client.

5. The Contractor is required to use standard software like MS project/ Primavera etc. for project management, ensuring successful commissioning of project. Bidder will also implement contract management and project management through standard mutually agreed software etc. and will also provide customized dashboard in HSCC in format approved by HSCC for facilitating project monitoring including providing qualified manpower for updating the dashboard

6. One IT engineer & Biomedical Engineer shall be deployed by bidder as and when required for smooth running of the project, up to end of defect liability period.

7. Provision of 05 years warranty of complete equipment systems of MGPS, Pneumatic Tube System (PTS) and Electrical LV System (CCTV, Fire Alarm

System, Electrical Sub-Station Equipment's and All HVAC Equipment's from OEM.

8. After award of work, the Contractor, under its own expenses, shall appoint consultants for architecture, structure, MEP Works and other related services.

9. The Design, Engineering, Procurement and Construction (EPC) of RCC framed structure building including Civil works, Internal & External Electrical, PHE, Fire-fighting, STP, ETP, WTP, UGT, HVAC, IT, PTS, Lifts, furniture works, MGMS, Solar hot water system, borewell, tactile tile flooring, wall guard, Horticulture, Landscaping, signages and external development works etc. as per scope of work and operation and maintenance during the defect liability period of 12 months and tender documents including preparation of coordinated drawings for all services and make all necessary co-ordination for satisfactory execution of all works/activities in time bound manner. Develop various 3 D views and model of the buildings.

10.1 The efforts will be made by the HSCC pursuing with Client to handover the site to the Contractor free of encumbrances. However, in case of any delay in handing over of the site to the Contractor by the Client then HSCC shall only consider suitable extension of time for the execution of the work. It should be clearly understood that the contractor will not be entitled for any extra claim on such account and HSCC shall not consider any revision in contract price or any other compensation whatsoever. The contractor shall be responsible to obtain statuary approval for commencement of work from all statuary authority/Departments.

10.2 The contractor shall provide the required physical space and work fronts and support and facilitate the PSA/Medical Equipment supplier in installation and commissioning of various medical equipment. The Contractor shall also receive and take possession of the Medical Equipment supply as may be required from time to time and provide the security for safekeeping of the same.

11.1 Section-2 of GCC - Clause 21.0 "HANDING OVER & CLEARING OF SITE" of Sub-Clause 21.4 :

The sub-clause 21.4 of the GCC pertaining is entirely replaced and shall be read as under:

Necessary arrangement including its maintenance is to be made by the contractor for temporary diversion of flow of existing drain and road, as the case may be. The existing drain, road would be demolished, wherever required, with the progress of work under the scope of proposed project. The existing Road and Drain which are not in the alignment of the said project but are affected and/ or need to demolished during execution for smooth progress of the project, shall

be rehabilitated to its original status and condition (including black topping) by the contractor at his own cost. Any Bore-Wells, Live Cables and other Service Lines if any lying inside the Building Plan and its surrounding areas shall be shifted by the Contractor. The same services shall be restored in the Original Condition by the Contractor and the Cost incurred by the Contractor in this regard shall be deemed to be included in the quoted rates and Contractor shall not be entitled for any Extra payment whatsoever in this regard.

11.2 Section-2 of GCC - Clause 22 - Scope of works:

The Detailed Scope of works shall be as elaborated in the detailed Design Basis Reports (DBR's), Technical Specifications, Tender Drawings and conditions elaborated in this tender document. The scope of works shall include:

The concept Plan shall be provided by HSCC to the contractor. The Contractor shall design and prepare detailed working drawings, Shop drawings for all works like Architecture, Finishing, Structural and services design such as Electrical (Internal & External), Lift, furniture works, Plumbing, HVAC works, Fire Fighting, water supply, Fire detection and protection system, sewerage system, fresh & pure water system, underground sump, LAN, CCTV & Access control System, BMS, PA System, External electrification, Panels, DG set, Solar Power System, Rain Water Harvesting), ETP,WTP, UGT, MGPS, PTS, IT, BMWS, tactile tile flooring, wall guard, borewell, GRIHA Certification (3 Star) for the building and all services for the building including landscaping, signages, Road works, Horticulture and external development etc. including 12 months of defect liability period.

The contractor shall prepare all coordinated drawings for all services and make all necessary co-ordination for satisfactory execution of all works/activities in time bound manner. Develop various 3 D views and model of the buildings. The Contractor will appoint a competent architect having adequate experience in planning and design of hospitals and medical college. The architect will develop detail design and drawings based on concept drawing of the tender.

Contactor shall be the responsibility of the Contractor to incorporate the changes if any in the Drawings made from time to time by User Department/ AIIMS during the execution of work and the same shall be got approved by User Department/AIIMS.

The bidders may note that the work includes a number of specialized Civil/Electrical/Mechanical/Electronic Engineering services, furniture works, Medical Gas Pipeline System, PTTS, signages etc. which are to be executed as

integral part of the project by engaging specialized agencies after approval by the Engineer-in charge.

(a) Maintenance will also be carried out by deploying the specialized agency with prior approval of Engineer for all specialized works like PHE, firefighting, Electrical, furniture, HVAC, BMS and all other services etc.

(b) A model, 3D view and walkthrough will be prepared & presented to HSCC & Client within 15 days from award of work as per conceptual plan released by HSCC. The latest software of design engineering Including STAADPRO, Revitt, AutoCAD/BIM etc. will be used for design & Engg. Purpose. All softcopies shall be made available to HSCC as required.

(c) The soil investigation report will be provided by HSCC to Contractor for reference purpose only. However, they are required to get it done independently to satisfy themselves as per design requirements.

(d) Any changes as per requirement of Client/HSCC will be done by agency with no any extra charge and time overrun.

(e) Structural designs and drawings including electrical SLDs shall be vetted by IIT. The cost of IIT vetting will be borne by the contractor. The selection of IIT for the vetting of design and drawings will be approved by HSCC.

(f) The contractor shall at their own conduct topographical survey and geotechnical investigation, Hydrological survey etc. from specialized agencies.

(g) The activities to be carried out by the contractor for the completion of the Project shall include the following and any additional activities incidental to these:

a. Buildings and all services design and execution as specified.
b. Getting all approvals / permissions / environment clearance/ planning permits of the statutory / local / governmental agencies as required incidental to Pre-construction, Construction and completion.
c. Submission of the completion (i.e., ‘as-built’) drawings and other related documents, both a hard copy and the soft copy in Auto CAD or any other IT application used for the purpose.
d. Preparation of specifications and vender list (in case not already provided) for all equipment wherever necessary and called upon to do so and getting these approved from client.
e. Obtaining occupancy certificate and related NOCs from statutory/ local/governmental agencies. Statutory payment on this account will be reimbursed by the client at actual on submission of proof of deposition.

f. Executing the work in a befitting manner to obtain GRIHA Certification (Minimum 3 star) for the building including engaging an experienced Consultant to assist the Contractor in obtaining the rating. License/Application fee, if any, shall be reimbursed by Client/HSCC to the Contractor on actuals.

All expenditure of above deemed to be included in the tender cost. No any extra payment shall be made for this

11.3 Approvals Required

The Contractor shall obtain all pre & post construction clearances/approvals from Environmental Authority, Municipal and other relevant statutory authorities/local bodies/Village Panchayat including Water supply agencies concerned, Electric Supply and inspectorate. Agencies concerned, such as, but not limited to, Police and Security Agencies, Chief Controller of Explosives, Fire Department, Civil Aviation Department, concerned in accordance to prevailing rules, Building Bye-Laws, Environment clearance (EIA), tree cutting etc., as the case may be with related to/ required for Construction/Completion. All expenditure on this account will be borne by the contractor. However, statutory payment on this account will be reimbursed by the client at actual on submission of documentary evidence of payment made. The status of applications for pre-construction clearances submitted/applied to local authorities shall be provided to the contractor for obtaining clearances/approvals.

The approvals shall include the following in addition to any other approval which may be required for the project.

- Construction Permit if required
- NOC from Chief Fire Officer
- NOC from Lift Inspector where lifts are provided
- Occupancy certificate
- GRIHA Certification (Minimum 3 star)

HSCC/Client may, at the written request of the Contractor, assist him in obtaining the approvals from relevant authorities. However, any such request by the Contractor shall not bind the HSCC in any manner.

The contract comprises the construction, completion, remedying the defect of the works during defect liability period and except in so far as the Contract otherwise stipulates, the provision of all labour, materials, constructional plant, machinery temporary works and everything, whether of a temporary or permanent nature required in and for such construction, completion and maintenance so far as necessary for providing the same as specified in or reasonably to be inferred from the Contract.

12. Order of Precedence of Documents:

In case of difference, contradiction, discrepancy with regard to conditions of contract specifications, drawings, bill of quantities and rates quoted by the contractor and other documents forming part of the contract, the following shall prevail in order of precedence:

In case of Construction Contracts (EPC):

i. The letter of Award along with statement of agreed variations and its enclosures, if any
ii. Amendments to tender documents
iii. Stage Payment Schedule (Annexure-A)
iv. Special conditions of contract (SCC)
v. Design Basis Report (DBR) & Schedule of Finishes
vi. Technical specifications and Make list
vii. Drawings – between the written description on the Drawings and the Specifications and Standards, the latter shall prevail and between the dimension scaled from the Drawings and its specific written dimension, the latter shall prevail;
viii. The General Conditions of Contract (GCC)
ix. CPWD/MORTH specifications
x. Relevant BIS Codes
xi. Between two or more Clauses of this Contract, the provisions of a specific Clause relevant to the issue under consideration shall prevail over those in other clauses;

In general, between any value written in numerals and that in words, the latter shall prevail; and between two or more Clauses of a Contract, the provisions of a specific Clause relevant to the issue under consideration shall prevail over those in other clauses;

13. "**Acceptance of Tender Conditions" - Annexure-II**

The Format "**ACCEPTANCE OF TENDER CONDITIONS**" i.e. Annexure-II is revised, as under: -

From: (To be submitted in ORIGINAL on the letter head of the company by the authorized officer having power of attorney)

HSCC (India) Limited,

_____

_____

Sub: Name of the work & NIT No.:

Sir,

i) This has reference to above referred tender. I/We are pleased to submit our tender for the above work and I/We hereby unconditionally accept the tender conditions and tender documents in its entirety for the above work.

ii) I/we are eligible to submit the tender for the subject tender and I/We are in possession of all the documents required.

iii) I/We have viewed and read the terms and conditions of this GCC/SCC carefully. I/We have downloaded the following documents forming part of the tender document:

a) Notice Inviting e-Tender
b) Quoting Sheet for Tenderer
c) Instructions to Tenderers & General Conditions of Contract forming part of this tender(Vol-I) including all amendments
d) Technical Specifications & schedule of finishes.
e) List of Approved makes
f) Tender drawings
g) Memorandum
h) Power of Attorney (as per Annexure –IV)
i) Acceptance of Tender Conditions
j) Integrity pact & Agreement (Annexure –III) (To be signed and stamped by the contractors and scanned copy to be uploaded with the bid)

k) Special Conditions of Contract

l) Design Basis Report (DBR)

m) Schedule of Payment

n) Details of Work Experience Certificates - FORM-A

o) Details of Similar Works - FORM-B

p) Details of Additional qualifying criteria (Hospital Project Work) - FORM-B-I

q) Financial Details- FORM-C

r) TDS details for Private Sector Projects - FORM-D

s) Bank Solvency Certificate- FORM-E

t) Form H of GCC –Affidavit for correctness of Documents /Information.

u) Addendum/Corrigendum, if any- Duly signed by authorized person

v) Pre-bid clarifications, if any

iv) I/we have uploaded the mandatory scanned documents such as cost of tender document, EMD, e-Tender Processing Fee and other documents as per Notice Inviting e-tender AND I/We agree to pay the cost of tender document, EMD, e-Tender Processing Fee (only receipt/proof of online payment) and other documents in physical form in the form and manner as described in NIT/ITT.

v) Should this tender be accepted, I/We agree to abide by and fulfill all terms and conditions referred to above and as contained in tender documents elsewhere and in default thereof, to forfeit and pay HSCC, or its successors or its authorized nominees such sums of money as are stipulated in the notice inviting tenders and tender documents.

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vi) If I/we fail to commence the work within 15 days of the date of issue of Letter of Award and/or I/we fail to sign the agreement as per Clause 82 of Clauses of Contract and/or I/we fail to submit performance guarantee as per Clause 02 of Clauses of Contract, I/we agree that HSCC shall, without prejudice to any other right or remedy, be at liberty to cancel the Letter of Award and to forfeit the said earnest money as specified above.

Yours faithfully,

(Signature of the tenderer with rubber stamp)

Dated _____

Clauses of Contract (CC)

14. Clause-1.0 '**Definitions**'

The following definition is added as under:

i) '**Execution**' shall mean carrying out /cause to carry out every work by the contractor so as to fulfil his contractual obligation as per his Scope of Work commencing from the issue of Letter of Award including (but not limited to) Design, preparation of Drawings, Construction activities, approval processes etc. till completion/handing over of work also including defects liability period & maintenance for one (01) year.

ii) **Employer** shall means All India Institute of Medical Sciences (AIIMS) represented by Director, AIIMS, New Delhi.

iii) **Executing Agency** shall means: **HSCC India Limited**.

iv) Employer's Engineer shall mean Engineer-In-charge of HSCC

v) **Project Manager** shall means representative of Engineer-In-charge of HSCC

vi) **Bidder/Agency** shall mean contractor

vii) The words Tenderer, Bidder, Applicant shall have the same meaning.

15. Clause -6 "**Deviation/Variation extent and pricing**"

The clause is replaced as under.

The Engineer-in-Charge shall have power (i) to make any alterations in, omissions from, additions to or substitutions for, the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work and (ii) to omit part. of the works in case of non-availability of a portion of the site or for any other reasons and the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the Engineer-in-Charge and such alterations, omissions, additions, or substitutions shall form part of the contract as if originally provided therein and any altered, additions or substituted works which the contractor may be directed to do in the manner specified above as part of the work, shall be carried out by the contractor on the same conditions in all respects including price on which he agreed to do the main work except as hereunder provided:

(i) The time for the completion of the work shall in the event of any deviations resulting in additional cost over the tendered value sum being ordered be extended, if requested contractor, as follows:

(a) in the proportion which the additional cost of the altered, additional or sum bears to the original tendered value plus

(b) 25% of the time calculated in (i) above or such further additional time as may be considered reasonable by the Engineer-in-Charge.

(ii) In the case of extra item(s), (items that are completely new, and are in addition to the items contained in the contract) the contractor may within fifteen days of receipt of order or occurrence of the item(s) claim rates, supported by proper analysis, for the work and the engineer-in-charge shall within prescribed time limit of the receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates and the contractor shall be paid in accordance with the rates so determined.

(iii) Any operational incidental to or necessarily has to be in contemplation of tenderer while filing tender, or necessary for proper execution of the items included in the financial bid and schedule of payments whether or not specifically indicated in the description of the item and the relevant specifications shall be deemed to be included in the rate quoted by the tenderer or the rate given in the said schedule of rates as the case may be. Nothing extra shall be admissible for such operations.

(iv) In the case of substituted items (items that are taken up with partial substitution or in lieu of items of work in the contract), the rate for the agreement item (to be substituted) and substituted. item shall also be determined in the manner as mentioned in the following para:

(a) If the market rate for the substituted item so determined is more than the market rate of agreement item (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).

(b) If the market rate for the substituted item so determined is less than the market rate of the agreement (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so decreased to the extent of the difference

between the market rates of substituted item and the agreement item (to be substituted)

(v) Market Rates to be determined as per various sub-clauses under the clause 15 of SCC shall be on the basis of Prevailing rates of Material (unless mentioned otherwise), Relevant Labour authority rate for Labour, market rates of T&P etc. plus 15% towards Contractors' Profits and Overheads following CPWD guidelines for Analysis of Rates.

16. Clause-16 (GCC) **'Time Essence of Contract & Extension for Delay**'

The following is added to Clause 16:

A) Within 15 (Fifteen) days of the issue of LOA, the Contractor shall submit to the Employer and the Employer's Engineer a program (the "Program") for the Works, developed techniques giving the following details:

Part I : Contractor's organization for the Project, the general methods and arrangements for design and construction, environmental management plan, including design quality plan, and safety plan covering safety of users and workers during construction, Contractor's key personnel and equipment:

Part. II: Quality Assurance, Monitoring and Supervision system mechanism and records and documents, Methodology Monthly Progress Report Test

Part III: The program for completion of all major stages and project mile stone of the work as specified in project completion schedule. The program is required format such as MS project or other software as specified in the bid/ tender document shall include:

(i) The order in which the contractor intend to carry out the work including the anticipated time of each stage of design and major stage of works.

(ii) The period of review

(iii) The sequence and timing of inspection and test specified in the contract. The contractor shall submit a revised program whenever the previous program is inconsistent with the actual progress or with the contractors' obligations.

B) **Milestone**:

The Tentative milestone for the execution of the project is given as under; however, the contractor shall finalize the milestone in consultation with the Engineering in charge (EIC) after award of the work without changing the project duration (phase wise as given in Clause 1 above). The decision of

EIC shall be final and binding on the contractor in this regard. The Contractor has to achieve the agreed milestone during the execution of this contract. Failure to achieve these milestones shall invite withholding of appropriate amount from the Running Account bill. The withheld amount against the non-achievement of any milestone can be released if delay is covered and subsequent milestone is achieved. The withheld amount against the non-achievement of any milestone may be provisionally released till the finalization of the Re-scheduling of milestone case at the discretion of Engineer-in-Charge on submission of a security of like amount in the form of a Bank Guarantee by the Contractor as per the format approved by the Engineer-in-Charge.

The amount withheld against the non-achievement of milestone shall be adjusted against Liquidated Damages (LD)/compensation for delay, if any levied on final completion. If Extension of Time is granted without any LD, the withheld amount shall be released to the contractor. However, the decision of HSCC shall be final and binding in this matter.

Milestones	**Activity to be completed**	**Time allowed in months (from date of start)**	**Amount to be withhold from non-achieving of each milestone (% of Total Awarded Value)**
1.	To obtain all pre-construction approvals from concerned statutory/local authorities.	2 months	0.25%
2.	Submission and approval of GFC drawings duly vetted by IIT for Structure Drawings.	3 months	0.25%
3.	Substantial completion of RCC work up to plinth level	5 months	0.50%
4.	Substantial completion of RCC work up to Floor level 4 and Brickwork upto Floor level 2 including Connectivity with Existing Basements.	8 months	0.50%
5.	Preparation of Sample Toilet	9 months	0.25%
6.	Substantial completion of RCC work up to Floor level 7 and Brickwork upto Floor level 2 including Connectivity with Existing Basements.	11 months	0.50%
7.	Substantial Completion of all RCC works up to terrace level and Brickwork upto Floor Level 8	15 months	0.50%
8.	Substantial Completion of Brickwork and Internal Plaster/flooring,fixing of Doors and Windows.	18 months	0.75%
9.	Substantial Completion of all External Plaster/External finishing, UG tanks, ETP, WTP, Special services, Internal Plumbing, firefighting, Electrical wiring/HVAC & IT work.	20 Months	0.75%

Milestones	Activity to be completed	Time allowed in months (from date of start)	Amount to be withhold from non-achieving of each milestone (% of Total Awarded Value)
10.	Completion of all internal and external works in all respects including all civil, electrical, HVAC works, ETP, WTP, Special services (PTTS and MGMS), Solar hot water system and external development works like Roads, footpath, Horticulture works and furniture works etc. Testing and commissioning and obtaining all post construction local & statuary body approvals.	21 Months	0.75%

The above time lines are outer limit for achievement of milestones. However bidder has to ensure the milestones, according to phase wise completion schedule for various components as mentioned in SCC which may result in occurrences of milestones at an early date which are to be mandatorily adhered.

17. Clause No.23.0 '**Payments**' Sub-Clause 23.1

The sub-clause 23.1 of the GCC pertaining to "Payments" is entirely replaced and shall be read as under:

(A) Stage Payment Statement for Works :

i) The Employer/HSCC shall make interim payments to the Contractor as certified by the Employer's/HSCC's Engineer, as specified and valued in accordance with the proportion of the Contract Price assigned to each item and its stage in Schedule of Stage Payment as per attached Annexure separately.

ii) The Contractor shall base its claim for interim payment for the work executed till the end of the month for which the payment is claimed, supported with necessary particulars and documents in accordance with this Agreement. The basis of payment on "Pro rata basis" shall be worked out on the percentage of work done of total scope of work under their activity/item for the respective Cost Centre/Stage payment schedule. The contractor shall not be entitled to be paid any such interim payment if the gross work done together with net payment/ adjustment of advances for material collected, if any, since the last such payment is less than (a) Rs. 7.5 Crores for 1st three R/A Bills and (b) Rs. 15 crores for all intermediate bills (except the final Bill), in which case the interim bill shall be prepared on the appointed date of the month after the requisite progress is achieved.

iii) The proportion assigned to an item will apply only to the Awarded Contract Price.

It shall not apply to any additions or reductions to the Contract Price arising from the issue of any Change of Scope Order. A Change of Scope Order shall specify the stages of interim payments for the works covered by such order.

iv) The Contractor shall submit a statement (the "Stage Payment Statement")' in 3 copies, by the 1st (First) day of each month (statement for the previous month) to the Employer's Engineer in the form as directed, showing the amount calculated to which the Contractor considers himself entitled for work executed under their activity/item for the respective Cost Centre/Stage payment schedule. The Stage Payment Statement shall be accompanied with the progress reports, at least two set of photographs and any other supporting documents & with the satisfaction of Engineer-in-charge.

v) Within 7 (seven) days of receipt of the Stage Payment Statement from the Contractor, the Engineer-in-chargeshall broadly determine the amount due to the Contractor and recommend the release of 75% (seventy-five) percent of the amount so determined as part payment against the Stage Payment Statement, pending issue of the Interim Payment Certificate (the "IPC") by the Engineer. -in-charge. In case of discrepancy or for want of correction in the bill submitted by contractor is returned back to the contractor, then time of 7 days will be considered from submission of bill after attending observations of the Engineer-in-charge. Within 7 (seven) days of the receipt of recommendation of the Engineer-in-charge, the Employer/HSCC shall make payment to the contractor through electronic payment directly to the Contractor's bank account.

vi) Within 14 (fourteen) days of the receipt of the Stage Payment Statement, the Engineer-in-charge shall determine the amount due and payable to the Contractor, --after adjusting the payments already released to the Contractor against the said statement. In cases where there is a difference of opinion as to the value of any stage, the Engineer-in-charge's view shall prevail.

vii) Balance payment against IPC shall be made to contractor by the Employer/HSCC within 28 (twenty-eight) days of submission of Stage Payment Statement to the Engineer-in-charge. Payment by the Employer/HSCC shall not be deemed to indicate the Employer's/HSCC's acceptance, approval, consent or satisfaction with the work done.

viii) All such interim payments shall be regarded as payment by way of advances against final payment only and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be rejected, removed, taken away and reconstructed or re-erected. Any certificate given by the Engineer-in-charge relating to the work done or materials delivered forming part of such payment, may be modified or corrected by any subsequent such certificate(s) or by the final payment certificate and shall not by itself be conclusive evidence that any

work or materials to which it relates is/are in accordance with the contract and specifications. Any such interim payment, or any part thereof shall not in any respect conclude, determine or affect in any way powers of the Engineer-in-charge under the contract or any of such payments be treated as final settlement and adjustment of accounts or in any way vary or affect the contract.

ix) In case of delay in payment of bills due to any reason after prescribed time limit, the contractor shall not be entitled to any interest and other financial claim in this regard.

x) Appropriate amount will be deducted from the running bill of the agency for any non-compliances to safety measures/safety audit at site.

(B) Final Bill Payment:

(i) Within 60 (Sixty) days after receiving of the Completion Certificates and upon completion of all incomplete and outstanding works, the Contractor shall submit to the "Engineer-in-charge" for consideration six copies of a Final Payment Statement (the "Final Payment Statement") for Works, with supporting documents showing in detail, in the form prescribed by the Engineer-in-charge

a) the summary of Contractor's Stage Payment bills for Works
b) the amounts received from the Employer/HSCC against each bill; and
c) any further sums which the Contractor considers due to it from the Employer/HSCC.

If the Engineer-in-charge disagrees with or cannot verify any part of the Final Payment Statement, the Contractor shall submit such further information as the Engineer-in charge may reasonably require. The Engineer-in-charge shall deliver to the Employer:

(a) an IPC for those parts of the Final Payment Statement which are not in dispute, along with a list of disputed items which shall then be settled in accordance with the provisions of contract; or
(b) Final Payment Certificate if there are no disputed items.

(C) Final Payment Certificate:

(i) Within 90 (Ninety) days after receipt of the Final Payment Statement for Works, and the written discharge, and there being no disputed items of claim, the Engineer-in-charge shall deliver to the Employer, with a copy to the Contractor, a final payment certificate (the "Final Payment Certificate") stating

a) the amount which, in the opinion of the Engineer-in-charge, is finally due under this Agreement or otherwise; and

b) after giving credit to the Employer for all amounts previously paid by the

Employer and for all sums to which the Employer is entitled, the balance, if any, due from the Employer to the Contractor or from the Contractor to the Employer as the case may be.

(ii) The Employer shall pay to the Contractor the amount which is finally due, less all amounts previously paid by the Employer/HSCC and any deductions for the amounts the Employer considers itself to be entitled in accordance with this Agreement, and shall provide the particulars thereof to the Contractor.

(iii) Payment against Final Payment Certificate shall be made not later than 60 (sixty) days from the date of issue of the Final Payment Certificate for Works.

(D) Production of Records:

a) The Contractor shall, whenever required by the Engineer, produce or cause to be produced for examination by the Engineer, any quotation, invoice, cost or other account books, vouchers, receipts, letters, memoranda or any copy of or extract from any such documents and also furnish information and returns, as may be required, relating to the execution of this Contract or relevant for verifying ascertaining the cost of execution of this Contract or ascertaining the Materials supplied Contractor are in accordance with the Specifications laid down in the contract. The Engineers in charge's decision on the question of relevancy of any document information or returns shall be final and binding on the parties.

b) If any part or item of the work is allowed to be carried out by a subcontractor, assignee or any subsidiary or allied firm, the Engineer-in-charge shall have power to secure the books of such sub- Contractor, assignee or any subsidiary or allied firm through the Contractor, and shall have power to examine and inspect the same. The above obligations are without prejudice to the obligations of the Contractor under any statute, rules or order.

18. Clause No. 32.0 (GCC) 'Mobilization **of Men, Materials and Machinery**' Sub-Clause No. 32.6

The Sub-Clause No. 32.6 is entirely replaced with the following Sub-Clause as under: -

The Preparation of design/drawings & bill of quantities (of his stated scope of work) etc.: Bar Bending Schedule, Shop & Fabrication drawings for all work shall be supplied by the Contractor as per agreed schedule/ as the work progresses. However, it shall be the duty and responsibility of the Contractor to bring to the notice of the HSCC in writing as to any variation, discrepancy or any other changes required in Drawing, design etc. whether of HSCC's Scope or Contractor's Scope of work and to obtain/prepare (as the case may be) revised drawings and designs and / or approval of the HSCC in writing for the same.

19. Clause No.·51.0 (GCC) 'Schedule of Quantities / Bill of Quantities:' stands deleted.

20. The contractor shall have to obtain all Approvals including Connections/ NOCs/ Completion Certificates/ Occupancy Certificate, etc from the concerned Local/Statutory authorities for Sewerage works, Water Supply works, Fire Fighting work, Fire Alarm system work, DG set /pollution clearance, lift, Forrest etc. at his own cost and nothing extra other than statutory fee/charges shall be payable on this account to the contractor. However, the letters required from the owner for the needful stated purposes will be arranged by HSCC from the owner as per the request of contractor along with the statutory charges/fee demanded by the local/statutory authorities.

21. Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed/payable.

    The bidder shall be responsible for arranging and maintaining at its own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

22. Deviation/variation of Area with respect to quoted price: Any decrease in area with respect to prescribed in the tender, if approved by HSCC, shall be recovered proportionately. However, additional cost on account of increase in area over and above prescribed area upto 2% shall not be payable and deemed to be included in the quoted rates. No area shall be increased without approval of Client/State Govt. The drawings consisting any increase in area submitted by the EPC contractor shall be deemed to be within the area mentioned in DBR.

23. Site office and Infrastructure

A reasonably furnished site office of area about 150 sqmt. having a sample room, A.C. meeting room, A.C. staff rooms with file storage facility along with computers & printers and its consumables, a telephone with STD facility, Fax Machine, internet and toilets & pantry and vehicle(s) 01 nos. (Swift Dzire or equivalent) complete with driver, fuel and consumables and transit accommodation shall be provided for Executing agency/HSCC by the Contractor at his own cost for the duration of the Contract. Electricity & drinking water for the site office will have to be provided by the contractor at his own cost for the site office.

Additionally, the contractor shall provide required stationeries, furniture for project site office within his quoted rates. It also includes brand new computers (minimum 02 nos.) with 128 GB RAM, 2 TB Hard disk along with printers and all accessories, BIM software, BEXEL software, BIM collaborator, other required software & hardware, internet connections for the day to day use in office work during the contract period including extended period, if any at site office within ten (10) days of the issue of LOA. Nothing extra shall be paid to the contractor for providing the above items (facilities). However, the total expenditure on stationary etc. will not exceed Rs. 10,000/- per month. After completion of work, the contractor can take back these items except consumable items.

24. Testing facilities

The Contractor/EPC shall, at his own cost, provide testing facilities as per CPWD scale and IS Codes at site as stipulated in the CPWD Works manual / as per Contract document or as directed by the Executing Agency/Engineer-in-charge.

The laboratory shall be equipped and manned by the Contractor at his own cost with all necessary apparatus to carry out the above-mentioned tests in accordance with relevant Indian Standards or equivalent approved Standards. Contractor/EPC agency shall bear the cost of 02 nos. qualified staff having experience of 3 years for quality control of works as directed by Engineer In charge. The same may be replaced/terminated as per discretion of Engineer In charge.

i) Cement testing:

Tests for fineness, Strength, setting time and soundness in accordance with IS:4031.

ii) Concrete Testing:

Test for workability, proportions, density and strength in accordance with IS:516 and 1199. In particular the cube testing machine shall be cable of exerting a slowly applied force up to 200 tonnes and the platens shall be suitable for crushing both 150mm and 200 mm cubes. A Vibrating table of suitable design shall be provided for compaction of cubes.

iii) Aggregate Testing:

In accordance with IS: 2386 (part I to VIII) for the following tests on both fine and coarse aggregates:

a. Sieve analysis
b. Determination of bulk density and voids on fine aggregates only:
c. Determination of moisture content, specific gravity and absorption on coarse aggregates only:
d. Determination of specific gravity and absorption

The contractor shall carryout inspection, testing, checks and also shall maintain records of inspection, testing & checks of material, works and activities related to construction works in the ISO 9001 quality system formats, checklists etc. to be given by Executing Agency during execution period. After getting approval from the Engineer, The contractor shall print at his own cost all forms, tables, formats etc.

The laboratory shall be connected to the main water and electricity Services. It shall also be supplied with portable gas equipment.

On completion of the Maintenance period, the laboratory is to be dismantled and removed from Site. The dismantled materials and equipment shall be the property of the Contractor.

In case certain tests are to be carried out in approved outside laboratory, as stipulated in the contract document / as directed by the Executing Agency, the Contractor shall bear the entire cost including samples, taking samples, testing, reports etc. The design mix for the concrete is to be get done from IIT/NIT/other government institutes only.

25. Damages & Defect Liability

25.1 During progress of work

If the contractor or his working staff or workers damage any part of the work in the scope of contract, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, grass, grassland,

cultivated ground, etc. contiguous to the premises on which the work or any part of it is being executed, the contractor shall make good the same at his own cost.

Contractor shall repair/replace and restore the damaged structures/services in a time bound manner as required and as directed by the Engineer-in-Charge. Contractor shall not be given any benefit of hindrance caused in the execution of the work owing to such damaged structure/service and time taken in its restoration by the contractor.

25.2 During defect liability period

The contractor shall be responsible for all the defects and deficiencies in the work within the scope of this contract, during the defect liability period which shall be for one (01) year after the date on which user Occupies the Part Building/ Complete Building or Obtaining Occupancy Certificate from Local Body whichever is earlier.

The liability of contractor for defects and deficiencies may arise due to:

(a) Improper planning and design of the project, if in the scope of contract.

(b) Works, Tools, Plant & Machinery, Materials or Workmanship not being in accordance with this contract.

(c) Improper upkeep & maintenance during construction of the work.

(d) Improper upkeep, operation and/or maintenance during defect liability period, if these are in the scope of this contract.

(e) Failure by the contractor to comply with any other obligation under this contract.

Such defects and deficiencies shall be made good by the contractor at his own cost after getting instructions/notice from the Engineer-in-Charge within the time period specified in such instructions/notice.

However, contractor need not wait for instructions/notice from Engineer-in-Charge for rectification of defects in work which come to his notice and he should initiate action for needful rectification of defect on priority, under intimation to Engineer-in-Charge, to avoid any untoward incident.

25.3 Structural soundness

The contractor shall follow the good engineering practice for safety, serviceability and structural soundness of the building/ structure/road work etc. as covered in the scope of contract.

The contractor is required to ensure that all materials used in construction as well as in electrical/ mechanical equipment is resistant to the weather conditions of Jalgaon. Proper care for waterproofing treatment beneath the external wall

cladding is to be taken by the contractor to avoid any seepage in the walls or any detachment of the cladding from its surface.

Lead lining in radiation areas such as X-Ray, CT scan, MRI etc is to be done as per site requirement.

25.3.1 Structure design in the scope of contract

The contractor shall have obligation to rectify all defects in the structural elements or any other part of building/structure/road etc. due to design deficiency at his own cost for 10 (ten) years from the date of completion as recorded in the completion certificate by the Engineer-in-Charge. Such defects shall be made good by the contractor at his own cost after getting instructions/notice from the Engineer-in-Charge within the time period specified in such instructions/notice and as per the methodology duly approved by the Engineer-in-Charge.

25.3.2 - Deleted

25.3.3 Liability for execution

The contractor shall be fully liable for any deficiency in structural soundness of work owing to execution of the work under the scope of this contract. The contractor shall have obligation to rectify all defects in the structural elements owing to any deficiency in execution of work at his own cost for 10 (ten) years from the date of completion as recorded in the completion certificate by Engineer-in-Charge. Such defects shall be made good by the contractor at his own cost after getting instructions/notice from the Engineer-in-Charge within the time period specified in such instructions/notice and as per methodology duly approved by the Engineer-in-Charge.

26. Settlement / Adjudication of Disputes

Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions hereinbefore mentioned and as to the quality of workmanship or materials used in the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned hereinafter.

26.1 **Conciliation:** If the contractor considers any work demanded of him to be outside the requirements of the contract, or disputes any drawing, record or decision given in writing by the Engineer-in-Charge; or if the Engineer-in-Charge considers any act or decision of the contractor on any matter in connection with or arising out of the contract or carrying out of the work to be unacceptable and

disputed; such party may promptly refer such disputes and amount claimed for each dispute to the Conciliator (One rank higher to Engineer-In-Charge) under intimation to the other party. The Conciliator may then request each party to submit to him a brief written statement describing the disputes and the points at issue. Each party shall send a copy of such statement to the other party. At any stage of the conciliation proceedings, the Conciliator may request a party to submit to him such additional information as he deems appropriate. When it appears to the Conciliator that there exist elements of a settlement which may be acceptable to the parties, he shall formulate the terms of a possible settlement and submit them to the parties for their observations. After receiving the observations of the parties, he may re-formulate the terms of a possible settlement in the light of such observations. If the parties reach agreement on a settlement of the disputes, they may draw up and sign a written settlement agreement on non-judicial stamp paper as per Stamp Act. The Conciliator shall authenticate the settlement agreement and furnish a copy thereof to each party. No party shall be represented before the said Conciliator by an advocate or legal counsel. The conciliation proceedings shall be completed within 45 days from the receipt of reference. This time may be enlarged by 15 days by the Conciliator. The conciliation proceedings shall be deemed to have been terminated at the end of 60 days from the receipt of reference.

26.2 If the aforesaid conciliation proceedings fail or the Conciliator fails to give proposal for settlement within the aforesaid period, either party may approach the Court of Competent Civil Jurisdiction at Delhi for adjudication of the disputes.

26.3 It is also a term of this agreement that for disputes for the payment of money, Contractor shall not claim pre-reference, pendenlite and future interest.

26.4 During the settlement/Adjudication of disputes the contractor shall not stop the work & shall continue to work in terms of the contract.

27.0 Implementation of Software Tool for Quality Management System for project / site.

The contractor shall engage a specialized agency within his quoted rates for Implementation of Software Tool for Quality Management System for project / site. Nothing will be extra paid to the contractor in this regard.

Prior approval of HSCC for engaging specialized agency for Implementation of Software Tool for Quality Management System at project / site, shall be obtained by the Contractor from HSCC engineer in-charge.

The following will be scope of work & condition for Implementation of Software Tool for Quality Management System at project / site:

1. Software should have the following Areas/modules:

i) Quality Activity Checklist - Android Mobile App - This should have Maker/Checker/Approver work flow on mobile app device and there should be facility to reject with photographic evidences.

ii) EHS Activity Checklist - Android Mobile App - This should have Maker/Checker/Approver work flow on mobile app device and there should be facility to reject with photographic evidences.

iii) Material Checklist - Android Mobile App - Material check list system should have Maker/checker/approver workflow for client / contractor material.

iv) Snag/Observation - Android Mobile App - One should be able to raise the snag and assign to contractor through mobile App. Contractor should be able to complete the snag.

v) Material Lab test certification - Software should be able to provide following test lab format on laptop/desktop:

Steel Register, Compressive Strength of Cement, Cube Register, AAC Block Testing, Ph Value & TDS Value, Stone Type Water Absorption (Sp Gravity), Cement Testing, Atteberg's Limt (LL & PL), Sieve Analysis - Sub Granualar Base, Field Density Test, Binder Content Test, Impact Value of Coarse Aggregate, Coarse Aggregate - Flankiness & Elongation Index, Sieve Analysis - Wet Mix MACADAM, Bulk Density of Coarse Aggregate, Sieve Analysis of Coarse Aggregate, Ten Percent Fine Value of Coarse Aggregate, Sp Gravity & Water Absorption Test of Coarse Aggregate, Bulking (Sand), Sieve Analysis of Fine Aggregate(Sand), Sand Stilt Content Test.

2. Conditions:

i. Android Mobile App should be published on the play store.
ii. Software should be 'make in India'
iii. Software providers must have served one or more government entities and (Company/Board/Central government directly or indirectly
iv. Software should have used in construction of any hospital.
v. Software tool having Cloud Model Subscription. Hosting of the data on cloud for the duration of the contract as per Industry norms.
vi. Any other work as per the requirement of HSCC.

The Quality Management System would be established in following stages;

1. Requirements gathering
2. Customization
3. Integration

4. Implementation
5. Training

Broadly, the activities to be covered shall also include:

- Project Initiation
- Supply, Customization, Installation, Implementation, Integration and Maintenance.
- Training of the users for effectively use of the system
- Documentation of the complete scope of work.
- Provide Maintenance and Support including software upgrades etc.
- Provide support and assistance for resolution of major technical problems or technical Issues.

Documentation Required:

- User Manuals
- Training Manuals
- Implementation Manuals

28.0 Implementation of Software tools by the contractor within his quoted rates for Design and Construction Methodology for Project / site:

1. Implementation of BIM software, BEXEL Software, BIM Collaborator at project site and office.

2. Required software for the checking the followings according to the applicable BIS code and standards:

a. Excavation & Filling works

b. Masonry and allied works

c. Concrete works including:
- Grade of concrete, Slump requirement, Cement – type & grade, Aggregates – grading & maximum size, Exposure conditions, Maximum water-cement ratio, Minimum cement contents, Admixture – requirements & details, Fly ash – to be used or not
- Testing data / report of aggregates
- Mix design details and record of trial mixes
- Testing records of admixture
- Approved scheme for concreting
- Hourly records of concreting including pour card
- Dimensional tolerance and details
- Bar bending schedule

- Details of checking of reinforcements before concreting and conformance to the reinforcement details as shown in the construction drawings
- Photographs showing the areas where rectification works have been carried out. Photographs should be taken before and after rectification
- Details of curing, staging and fixing / removal of formwork, checklist for formwork
- Batching Plant calibration record
- Record of NDT test, if required
- Construction water quality test and records including chloride sulphate etc.
- Site QC Lab – requirements & details

d. Structural Steel Works:

- Material testing data / report
- Welding / bolting procedures specification and records
- Technical Specification requirements and records

29. Clause No. 32.6 of General Condition of contract (Vol-II) which read as "All designs, drawings, bill of quantities, etc., except Bar Bending Schedule, Shop & Fabrication drawings, for all works shall be supplied to the contractor for their scope of work all buildings services and development works by HSCC in phased manner as the works progress. However, it shall be the duty and responsibility of the contractor to bring to the notice of the HSCC in writing as to any variation, discrepancy or any other changes required and to obtain revised drawings and designs and / or approval of the HSCC in writing for the same" hereby stands deleted.

30. In case any contractor / agency who will be undertaking civil works in Delhi or carrying out any civil works in Delhi the contractor/ agency must ensure the works which are to be commenced within two meters radius from any existing tree, the permission of the Tree Officer shall have to be taken by Contractor/ agency and it's a mandatory condition.

In case there is non-compliance of the aforesaid condition of taking permission from the Tree Officer, the Contractor/ agency shall entail for strict penalty.

31. Contractor's Warranty of Design:

a) The Contractor shall be fully responsible, for the suitability, adequacy, integrity, durability and practicality of the Contractor's proposal.

b) The Contractor warrants that the Works have been or will be designed, manufactured, installed and otherwise constructed to the highest standards available using proven up-to-date good practice. By submitting the Drawings for review to the Engineer, the Contractor shall be deemed to have represented that it has determined and verified that the design and engineering, including field construction criteria related thereto, are in conformity with the Scope of the Project, the Specifications and Standards and the Applicable Laws.

c) The Contractor warrants that the Contractor's Proposals meet the requirements and is fit for the purpose thereof. Where there is any inadequacy, insufficiency, impracticality or unsuitability in or of the Requirements or any part thereof, the Contractor's Proposal shall take into account, address or rectify such inadequacy, insufficiency, impracticality or unsuitability at Contractor's own cost.

d) The Contractor warrants that the Works will, when completed, comply with enactments and regulations relevant to the Works.

e) The Contractor shall also provide a guarantee from the Designer for the design for suitability, adequacy, and practicality of design for Employer's Requirements.

f) The Contractor shall indemnify the Employer against any damage, expense, liability, loss or claim, which the Employer might incur, sustain or be subject to arising from any breach of the Contractor's design responsibility and/or warranty set out in this Clause.

g) Notwithstanding that such design may be or have been prepared, developed or issued by the Employer, any of Contractor's consultants, his sub-contractors and/or his qualified personnel/persons or cause to be prepared, developed or issued by others.

h) Notwithstanding any warranties, guaranties and/or indemnities that may be or may have been submitted by any other person.

i) Notwithstanding that the same have been accepted by the Engineer, the Contractor shall be fully responsible for the Plants, Materials, goods, workmanship, preparing, developing and coordinating all design Works to enable that part of the Works to be constructed and/or to be fully operational in accordance with the Contract's requirements.

No claim for additional payment or extension of time shall be entertained and/or no review and/or observation of the Engineer and/or its failure to review and/or convey its observations on any Drawings shall relieve the Contractor of its obligations and liabilities under this Agreement in any manner nor shall the Engineer or the Employer be liable for the same in any manner; and if errors, omissions, ambiguities, inconsistencies, inadequacies or other Defects are found in the Drawings, they and the construction works shall be corrected at the Contractor's cost, notwithstanding any review under this section.

END OF VOLUME

HSCC(India) Limited

As Executing Agency of
AIIMS, New Delhi

EPC Contract

Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis

Volume – IV

Amended

Design Basis Report (DBR)

OCTOBER' 2024

Executing Agency

HSCC (INDIA) LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
E-6A, Sector-01, Noida-201301

Tender No. HSCC/AIIMS/OPD -AIIMS/EPC/2024/75

INDEX

Sl. No.	Description
1	DBR Architecture
2	DBR Structure
3	DBR PHE & Fire
4	DBR Electrical
5	DBR HVAC
6	DBR IT
7	DBR SES
8	DBR Furniture

ARCHITECTURE DBR

FOR THE

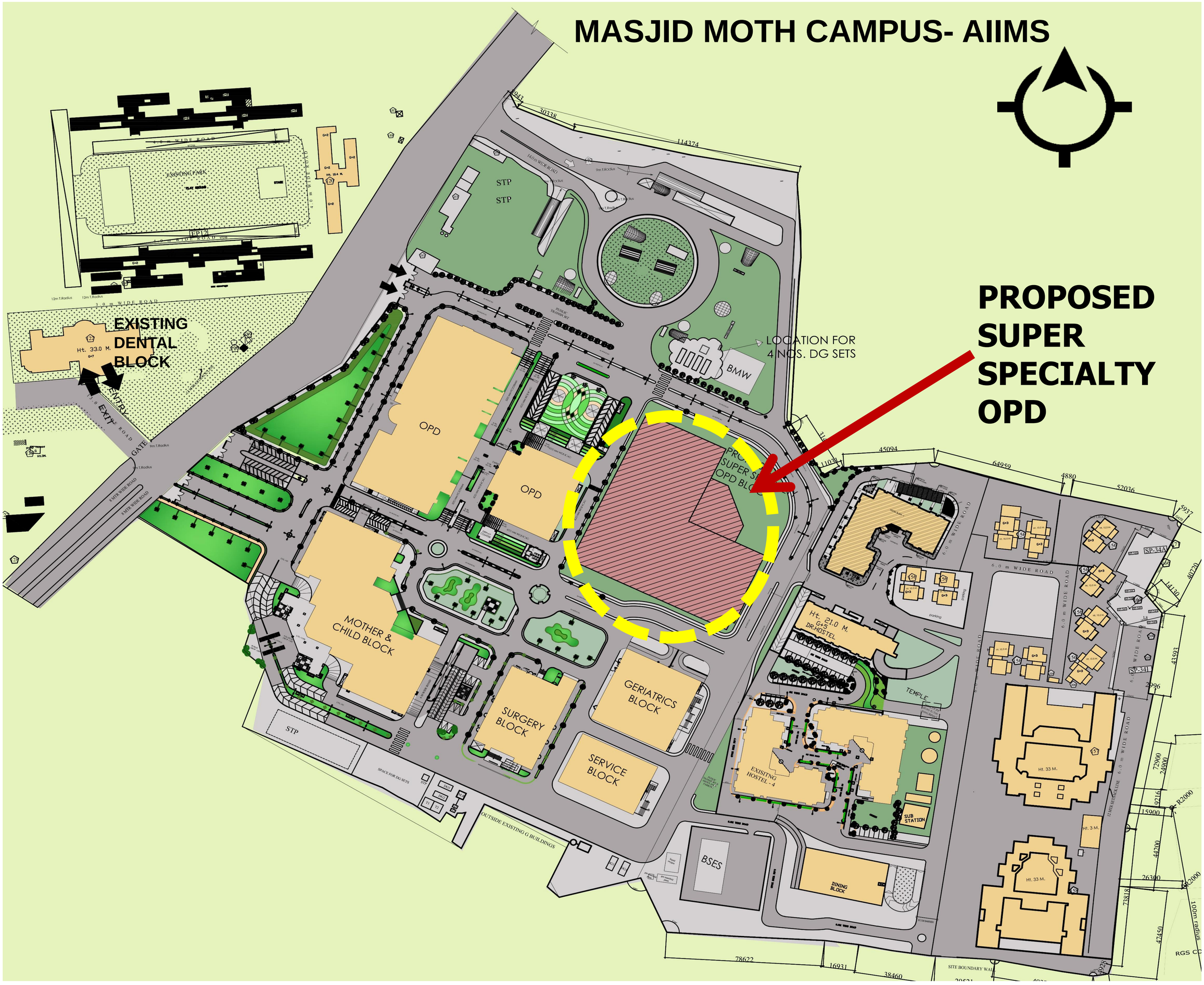
PROPOSED SUPER SPECIALTY OUT PATIENT DEPARTMENT- AIIMS, NEW DELHI

AUG’2024

h.स.कं.क.
HSCC

LOCATION

- THE SUPERSPECIALITY OPD BLOCK IS PROPOSED IN THE MASJID MOTH CAMPUS AT AIIMS NEWDELHI.



DEPARTMENTS

•THE PROPOSED OUT PATIENT DEPARTMENT IS TO BE CONSTRUCTED AT MASJID MOTH CAMPUS WITHIN AIIMS NEW DELHI CAMPUS TO DECONGEST THE VARIOUS EXISTING OPDs AND HOSPITAL BLOCKS.

• THE PROPOSED NEW OUT PATIENT DEPARTMENT (3BASEMENT+GROUND+NINE) WILL HAVE TOTAL BUILT UP AREA OF 78,210 SQM .

FACILITIES PROPOSED :

• OUT PATIENT DEPARTMENTS

• HELPDESK/RECEPTION.

• DIANOSTIC CENTRE

• LABORATORIES

•REHABILITAION

• CAFETERIA

•PUBLIC AMENITIES

- NEW OPD BLOCK IS PLANNED TO ADJOIN THE OPERATIONAL NEW RAK OPD BUILDING ALLOWING EASY PATIENT MOVEMENT BETWEEN THE TWO SIMILAR FUNCTIONALITY BLOCKS THEREBY FACILITATING EASIER CROSS CONSULTATION.
- NEW OPD WILL HAVE THE CAPACITY OF HANDLING OVER 10000 PATIENTS DAILY.
- THERE SHALL ALSO BE 3 TIMES INCREASE IN THE CAPACITY OF LAB & RADIO-DIAGNOSTICS THEREBY REDUCING THE WAITING TIME FOR OPD PATIENTS AS COMPARE TO CURRENT SITUATION.

AIIMS New Delhi has shifted the OPD for most of its broad specialities & super specialities functional in main hospital to the new RAK OPD Block

This has led to improved patient experience as the new OPD is well planned, spacious and designed to handle a load of 10000 patients

However, OPD's in various Centres are extremely overcrowded due to lack of space and increasing demand of specialized care

For OPD cross consultations between Centres & broad specialities, patients now walk across AIIMS campus for nearly 1km as OPD's are spread out

There is acute shortage of space for diagnostics like MRI CT Scan leading to long waiting times for the said investigations despite all efforts

THE PROPOSED OPD SHALL HAVE THE FOLLOWING AREAS.

➢ OPD UNITS WITH CLINICAL SPECIALITIES

THE TYPICAL OPD FLOOR PLATE INCLUDES CONSULTING ROOMS AND MINOR PROCEDURE ROOMS

- **DIAGNOSTIC IMAGING**

– MRI- CARDIO & GENERAL
– CT SCAN- NEURO, CARDIO & GENERAL
– RADIOLOGIST ROOM
– ECG ROOM & USG ROOM
– X-RAY ROOM
– MAMMOGRAPHY ROOM
– HOLTER ROOM
– ECHO ROOM, ECH & HUTT

- SCREENING OPD
- PMR (PHYSICAL MEDICINE & REHABILITATION)
- ART CENTRE (ANTI-RETROVIRAL THERAPY)
- SAMPLE COLLECTION
- RPC (DR. RAJENDRA PRASAD CENTRE FOR OPHTHALMIC SCIENCES)
- PHYSIOTHERAPY DEPT.
- NEURO PHYSIOTHERAPY
- CARDIAC REHAB
- HYDROTHERAPY
- PMR (ORTHOTICS & PROSTHETICS WORKSHOP & REHAB)
- PULMONARY REHAB & DOTS CENTRE
- NEUROSCIENCE CENTRE
- CTC (CARDIO THORACIC CENTRE)
- DEPARTMENT OF ONCOLOGY
- PEDIATRICS
- LAB SERVICES

➢ **ADMINISTRATIVE AREAS**

- CENTRAL RECEPTION AND PATIENT RELATIONS SERVICE
- HOSPITAL ADMINISTRATIVE SERVICE
- HOSPITAL MEDICAL RECORDS
- HOSPITAL ENGINEERING SERVICES
- HOSPITAL CATERING SERVICE
- HOSPITAL STORES & SUPPLY
- HOUSE KEEPING SERVICES
- HOSPITAL SECURITY SERVICES
- PATIENT UTILITY SERVICE
- SOCIAL SERVICES

➢ **BUILDING SUPPORTS AND SERVICES**

- PUBLIC TOILET
- STAFF TOILET
- MEP SERVICES
- CLEAN AND DIRTY UTILITY
- LIFT & STAIRCASES
- PARKING
- LOADING & UNLOADING AREAS
- PTTS & MGPS

BUILDING AREA STATEMENT AND FACILITY SHEET

PROPOSED SUPER SPECIALTY O.P.D. – AIIMS, NEW DELHI

h.s.kं.k.
HSCC

S.NO	FLOOR NAME	FACILITIES	AREA (IN SQM)
1	GROUND FLOOR	CENTRAL REGISTRATION, PUBLIC WAITING, CAFETERIA, DOTS CENTRE, BACK OFFICE, PUBLIC AMENITIES, STOREROOM	7143
2	FIRST FLOOR	ANTI-RETROVIRAL THERAPY (ART CENTRE), SAMPLE COLLECTION, PMR (ORTHOTICS & PROSTHETICS WORKSHOPS & REHAB), ADMINISTRATION AND SUPPORT, SAMPLE COLLECTION, SAMPLE PROCESS ROOM, PUBLIC WAITING AREAS, STOREROOM	5584
3	SECOND FLOOR	OPHTHALMOLOGY CENTRE (RPC), LAB SERVICES, FACULTY ROOMS, REFRACTION ROOMS, DILATATION ROOMS, SCREENING ROOMS, BACK OFFICES, USG, MINOR PROCEDURE ROOM, VITAL ASSESSMENT AREA AND RECEPTION	5584
4	THIRD FLOOR	OPHTHALMOLOGY CENTRE (RPC), LAB SERVICES, FACULTY ROOMS, REFRACTION ROOMS, DILATATION ROOMS, SCREENING ROOMS, BACK OFFICES, USG, MINOR PROCEDURE , ROOM, VITAL ASSESSMENT AREA AND RECEPTION	5584
5	FOURTH FLOOR	NEURO REHAB, CARDIAC REHAB, PULMONARY REHAB, NEURO PHYSIOTHERAPY, ROBOTICS, ELECTROTHERAPY , GYM, MAT EXERCISE, VIRTUAL REHABILITATION, ADMIN & SUPPORT (IT, ADMIN, SOCIAL & SUPPORT SERVICES)	5575
6	FIFTH FLOOR	NEUROSCIENCES CENTRE, RECEPTION, NEURO CONSULTANT'S ROOMS, MINOR PROCEDURE ROOMS, EEG, VEEG, ANS, RTMS, EMG, PROGRAMMING ROOM, ECG, NEURO-SONOLOGY, NEURO INTERVENTION EXAM ROOM, PULSE DRUG THERAPY, PACE EXAM ROOM, SOCIAL WORKER ROOM	5575
7	SIXTH FLOOR	CARDIO THORACIC CENTRE (CN CENTRE), RECEPTION, CONSULTANT'S ROOMS, DISEASE MANAGEMENT ROOM, PAIN PROCEDURE, EXERCISE LAB, ECH, HUTT, ECHO HOLTER ROOM, FLUOROSCOPY, RADIOGRAPHY, RADIOLOGY, REVIEW, ANGIO-REVIEW, SCREENING ROOM, MINOR PROCEDURE ROOMS, REFUGE AREA	5575+330
8	SEVENTH FLOOR	DEPARTMENT OF ONCOLOGY (IRCH), RECEPTION, CONSULTANT'S ROOMS, MINOR PROCEDURE ROOMS	5575
9	EIGHTH FLOOR	PAEDIATRICS, PAEDIATRICS SURGERY, RECEPTION, CONSULTANT'S ROOMS, MINOR PROCEDURE ROOMS	5575
10	NINTH FLOOR	CAFETERIA, LAB SERVICES, LAB AND LAB SERVICES, EQUIPMENT ROOM, FACULTY ROOM & ROOMS FOR TECHNICAL STAFF	5575
11	BASEMENT 1 FLOOR	GENERAL DIAGNOSTIC &IMAGING DEPARTMENT, CARDIO, NEURO IMAGING DEPARTMENT, EQUIPMENT ROOM, MRI, CARDIO MRI, TECH WORK ROOM, HOLTER, ECG, X-RAY, RADIOLOGY, ECHO, CT SCAN, CONTROL ROOM, USG, MAMMOGRAPHY, PATIENT HOLD AREAM CARDIO PREP-INJECTION ROOM, CARDIO CT	6317
12	BASEMENT 2 FLOOR	SERVICE FLOOR	7953
13	BASEMENT 3 FLOOR	PARKING	6202
14	TERRACE FLOOR	SERVICES	393
		AREA OF CONNECTING CORRIDORS IN ALL BASEMENTS	1,150
	TOTAL AREA		79,690 SQM

IMPORTANT NOTE:

A. The following areas shall not be reckoned with for working out the plinth area & other facilities and their cost shall be deemed to be included in the overall quoted cost of works:

1) **Lift wells (except one floor), Staircase wells (except one floor), Shafts, Lift machine rooms, Stair, Mummties, Chajjas, Water tank storage elevated platform, handicap ramp etc.**

2) **Covered balconies, Cantilever projections, Refuse terrace area, Entrance porch.**

3) **Architectural Features like boxing, pergolas etc.**

4) **External Façade such as Wet/Dry stone cladding, Structural glazing, Pump rooms, Underground structures including UG Tanks, ETPs, STPs, WTPs, Bore wells, fencings etc.**

5) **Road works, Pathways, Surface parking's, surrounding grading of area, Kerb stones, Horticulture, Paved area etc.**

B. Any decrease in the area with respect to the prescribed area shall be recovered proportionately. However additional cost on account of increase in area over and above prescribed area upto +2% shall not be payable and deemed to be included in the quoted rate. No area shall be increased without approval of client/state govt. The drawings consisting any increase in area submitted by contractor shall be deemed to be within the area mentioned.

CODE & REGULATIONS

BUILDING CLASSIFICATION (NBC 2016)

Character of occupancy: Group E: Business Building, Subdivision E2.-Laboratories, outpatient clinics, research establishments, libraries, and test houses Ref: NBC 2016, VOLUME 1, PART 4- Fire and Lift Safety, Page No. 15, Clause 3.1.6

FIRE PREVENTION (NBC 2016)

- Fire Zone: Ref: NBC 2016, VOLUME 1, PART 4- Fire and Lift Safety, Page No. 17, Clause 3.2.2.2(a)
- Fire Compartmentation: Ref: NBC 2016, VOLUME 1, PART 4- Fire and Lift Safety, Page No. 38, Clause-4.5
- Fire Extinguisher: Ref: NBC 2016, VOLUME 1, PART 4- Fire and Lift Safety, Page No. 52, Clause-5.1.
- Pressurization of staircases and Lift Lobbies: Fire hose cabinet details are being followed in the building as per Ref: NBC 2016, VOLUME 1, PART 4- Fire and Lift Safety, Page No. 37, Table 6.
- Automatic sprinklers: Ref: NBC 2016, VOLUME 1, PART 4- Fire and Lift Safety, Page No. 50, Table 7.

OCCUPANCY LOAD REQUIREMENT AND CONSIDERATIONS (UBBL 2016)

- Occupancy load: Ref: UBBL 2016, Page no. 58-59, Clause 7.9, Table 7.3
- Staircases: Ref: UBBL 2016, Page no. 61, Clause 7.11.1(b).

CAPACITIES OF EXITS/PASSAGE/CORRIDORS (UBBL 2016)

- The capacity of exists (staircase, ramp and doorways) indicating the number of persons could be safely evacuated through a unit width of 0.5 m shall be given as per (Ref: UBBL 2016, Page no. 58-59, Clause 7.9, Table 7.2)
- Roll-in access at main entry on ground level, with no stairs or ramps into the building from the drop-off area.

TRAVEL DISTANCE (UBBL 2016)

- The common path of travel shall be 45 m. The maximum dead end of corridor distance shall not exceed 6 m. (Ref: UBBL 2016, Page no. 75, Clause 8.4.5, Table-8.2)

VERTICAL DISTANCE (NBC 2016)

- Other types of patients and occupancies incidental to the hospitals such as consultation rooms, nurse stations, medical shops, canteens, etc may be housed at heights beyond 30 m but not more than 45 m. (Ref: NBC 2016 VOLUME 1, PART 4- Fire and Lift Safety, Page No. 61, Clause 6.3.2.g(4).

RAMPS (UBBL 2016)

- Ramp details are being followed in the building as per Ref: UBBL 2016, Page no. 76, Clause 8.4.7.
- The minimum width of the ramps in hospitals shall be 2.4 m for stretcher and not for vehicular movement in this case, handrails shall be provided on both sides of the ramp.

LIFTS (NBC 2016)

Fire lift details are being followed in the building as per Ref: NBC 2016 VOLUME 2, PART 4- Fire and Lift Safety, Part 8-Building Services, Section 5_Installation of lifts, escalators and Moving walks: 5A LIFTS, Page No. 38, Table no. 19.

BASEMENTS (UBBL 2016)

As per UBBL 2016, Page no. 182, Clause 8(5).

Every basement shall be in every part at least 2.4 m in height from the floor to the underside of the roof slab or ceiling.

Adequate ventilation shall be provided for the basement.

Fire Compartmentation: As per NBC 2016, VOLUME 1, PART 4- Fire and Lift Safety, Page No. 38, Clause-4.5

LIFT LOBBY (NBC 2016)

In a dual line arrangement (lifts opposite to each other) the lobby should be between 1.5 times and 2.5 times the depth of one car. Ref: NBC 2016 VOLUME 2, PART 4- Fire and Lift Safety, Part 8-Building Services, Section 5_Installation of lifts, escalators and Moving walks: 5A Lifts, Page No. 21, Clause 5.2.

PARKING (UBBL 2016)

As per File no. PLG/MP/0039/2020/F-3/D-55 of Delhi Development Authority dated 25-03-2022.

Norms	As per MPD – 2021
FAR	225
Ground Coverage	40%
Parking	@1.0 ECS per 100 Sqm of FAR

STAIRCASES & LIFTS CALCULATION

- Conforming to the norms of Capacities of exits/passage/Corridors (UBBL 2016):
- The capacity of exits (staircase, ramp, and doorways) indicating the number of persons could be safely evacuated through a unit width of 0.5 m shall be given as per (Ref: Annexure-4, clause 7.9, table 7.2.)
- Staircases have been provided & located as per UBBL 2016, The travel distance to an exit from the dead end of the corridor shall not exceed half the distance, except in the case of institutional and assembly occupancy in which case it shall not exceed 6.0 m.
- Occupancy Factor is taken as per UBBL under Institutional Building.

OCCUPANT LOAD

Typical Floor Built Up Area	Typical Floor Gross Area	Occupancy Factor	Total Population
5575	5372	15	358

***Occupancy load is taken as per UBBL 2016, clause no. 7.9, Table no. 7.3 & the gross area definition is considered as per UBBL 2016, clause no. 7.9, note 2.**

EXIT DOOR & STAIRCASE WIDTH CALCULATION

Door Exit Width 75 PAX Per 0.50m		Staircase 25 PAX Per 0.50m For 358 PAX Per Floor	
Required	Provided	Required	Provided
2.39	6	7.16	7.2
			2.4 Wide Flight

***The calculations have been taken as per UBBL 2016, clause no. 7.9, Table no. 7.2. In OPD Block, 3 staircases of flight width 2400mm have been proposed.**

PUBLIC TOILET CALCULATIONS

Population Per Floor (As Per Occupancy Load)		**358**		
Population (Split based on NBC)		Male	Female	
		70%	30%	
		250	108	
Toilet Fixtures	Required	Proposed	Required	Proposed
W.C	5	5	4	4
Ablution Taps	5	5	4	4
Wash Basin	3	3	2	2
Urinal	5	5	--	--
Cleaner's Sink	1 Per Floor		1 Per Floor	

STAFF TOILET CALCULATION

Staff Toilets (Taken for Typical Floor with Maximum No. of Doctor's Room)				
Population Per Foor= Total Staff Population/ No. Of Active Floors **Total Staff Population = 3600***	300			
Population (Split Based On Nbc)	Male		Female	
	70%		30%	
	210		90	
Toilet Fixtures	Required	Proposed	Required	Proposed
W.C	5	6	3	4
Ablution Taps	5	5	3	4
Wash Basin	3	3	1	4
Urinal	5	5	--	--
Cleaner's Sink	1 Per Floor		1 Per Floor	

*AIIMS-65th Annual report 2020-2021

Toilet fixture calculation, Classification of building has been taken to Group C: Institutional. (Ref: UBBL 2016, Page no. 11, Clause 1.4.75), to support the daily functionality of the building.

SITE PLAN

SITE PLAN

SYMBOL	DESCRIPTION
	Electric Pole
	High Tension Tower
	Electric pole Mounted Transformer
	Electric Box
	Telephone Pole
	Telephone Box
	Telephone Booth
	Traffic Signal Post
	Petrol Pump
	Bus Stop
	Name Board
	Kilometer Stone
	Traffic Sign Board
	Manhole
	Level Crossing Manually
	Level Crossing Automatic
	T B M
	G P S
	WATER TAP
	WATER SUPPLY VALVE
	WELL
	TUBE WELL
	Hand Pump
	Fire Hydrant
	Bore Hole Location
	Temple
	Mosque
	Church
	Optical Fiber Stone
	Gas Pipe Stone
	Gate/ Compound Wall
	Hectometer Stone
	MOBILE TOWER
	BSF TOWER
	LAMP POST
	TREE1 30CM-60CM
	TREE2 60CM-90CM
	TREE3 90CM-120CM
	TREE4 120CM & ABOVE
	Traverse Point Reference Point
	Flood Light
	Solar Light
	MASJID

PROPOSED SUPER SPECIALTY O.P.D. – AIIMS, NEW DELHI

HSCC

SUSTAINABLE DESIGN

- Sustainable design concepts have been incorporated in different aspects of the building design starting from sustainable site planning to simulation and analysis of various alternatives, leading to optimization of building envelope, thereby reducing external solar gains.

- Compliance as per GRIHA norms and obtaining approval and certification for minimum 3 Star, Green Building Rating for buildings /blocks from GRIHA Council .

- All the design and documents prepared for Civil, Structural, MEP, HVAC, and Firefighting Systems etc. have been in conformity to GRIHA requirements.

- Incorporates principles of energy efficiency and sustainability

- Incorporated renewable energy measures like

❑ Roof top solar panels
❑ Rain water harvesting
❑ STP - use of recycled water

Strategies to achieve 3 star GRIHA rating -

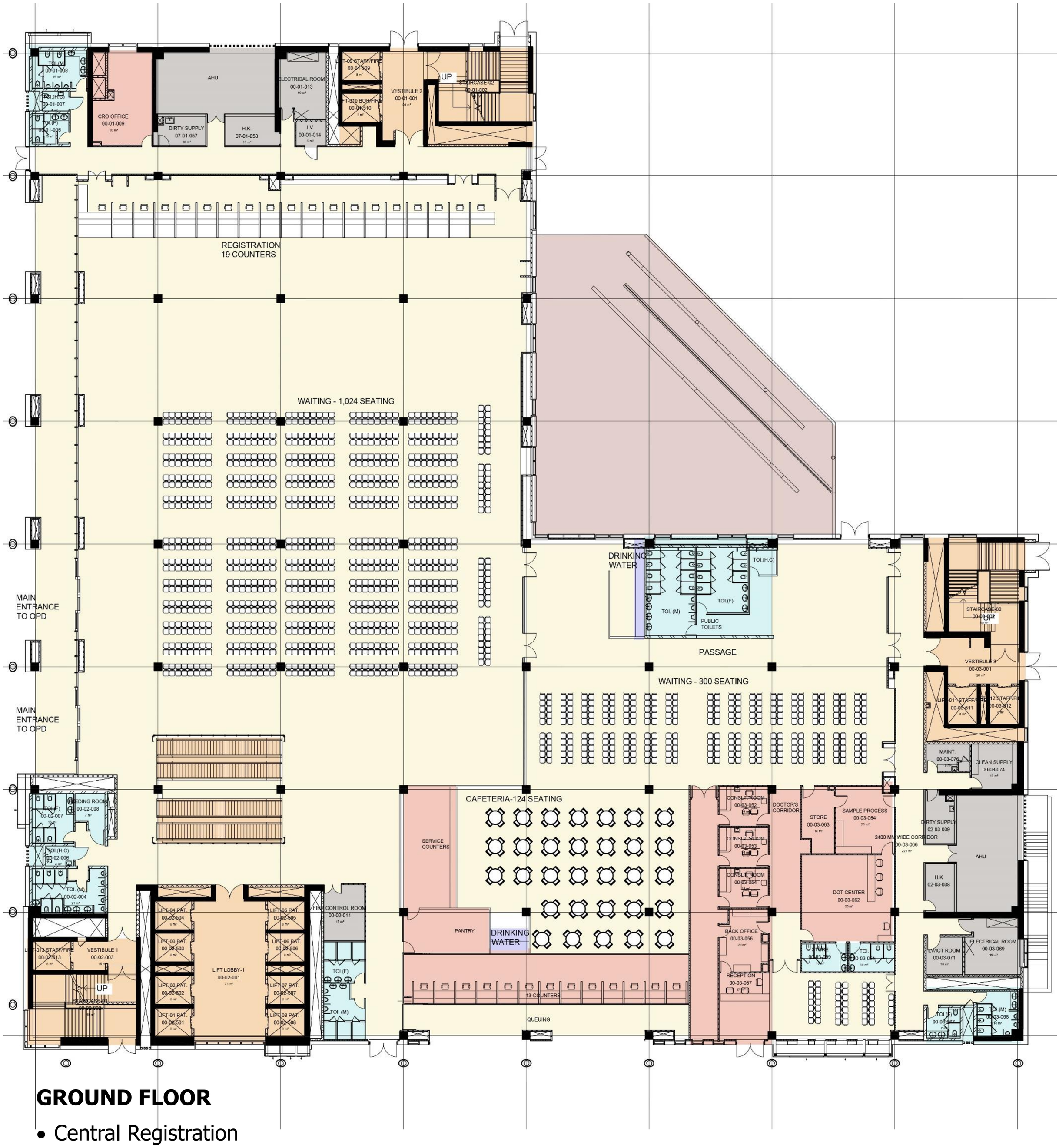
- WATER MANAGEMENT
- ELECTRICAL MANAGEMENT
- WASTE MANAGEMENT

BUILDING FLOOR PLANS

STACK DIAGRAM - The Super specialty OPD block will have over 300 Outpatient clinics

SERVICES & WATER TANKS	TERRACE
LAB SERVICES / STAFF CAFE	NINTH FLOOR
PEDIATRIC SURGERY / PEDIATRICS	EIGHTH FLOOR
DR. BRAIR CANCER HOSPITAL	SEVENTH FLOOR
CARDIO THORACIC CENTRE	SIXTH FLOOR
NEUROSCIENCE CENTRE	FIFTH FLOOR
I.T., ADMIN, SOCIAL & SUPPORT / NEURO REHAB / CARDIAC REHAB / PULMONARY REHAB	FOURTH FLOOR
DR.R.P. CENTRE FOR OPHTHALMIC SCIENCES	THIRD FLOOR
DR.R.P. CENTRE FOR OPHTHALMIC SCIENCES	SECOND FLOOR
SAMPLE COLLECTION / ANTI RETROVIRAL THERAPY / PHYSICAL MEDICINE & REHABILITATION (O.P.D., WORKSHOP & REHAB)	FIRST FLOOR
CENTRAL REGISTRATION / CAFETERIA / DIRECTLY OBSERVED THERAPY SHORT COURSE (DOTS)	GROUND FLOOR
RADIODIAGNOSIS / CARDIAC & NEURO RADIOLOGY	BASEMENT - 1
HYDRO THERAPY / SERVICES / PARKING	BASEMENT - 2
PARKING	BASEMENT - 3

GROUND FLOOR PLAN



GROUND FLOOR

- Central Registration
- Public Waiting, Cafeteria
- Dots Centre
- Central Registration Office, Back Office, Washroom Facilities, Storeroom, Staircases, Lift Lobbies for Visitors and Service Staff

FIRST FLOOR PLAN

FACILITIES

- ANTI-RETROVIRAL THERAPY (ART CENTRE)
- SAMPLE COLLECTION
- PMR (ORTHOTICS & PROSTHETICS WORKSHOPS & REHAB)
- ADMINISTRATION AND SUPPORT
- SAMPLE COLLECTION
- SAMPLE PROCESS ROOM
- PUBLIC WAITING AREAS
- STOREROOM

FIRST FLOOR

- Anti-Retroviral Therapy (Art Centre)
- Sample Collection
- PMR (Orthotics & Prosthetics Workshops & Rehab)
- Public Waiting Areas, Washroom Facilities, Storeroom, SWEC, Staircases, Lift Lobbies For Visitors And Service Staff

SECOND FLOOR PLAN

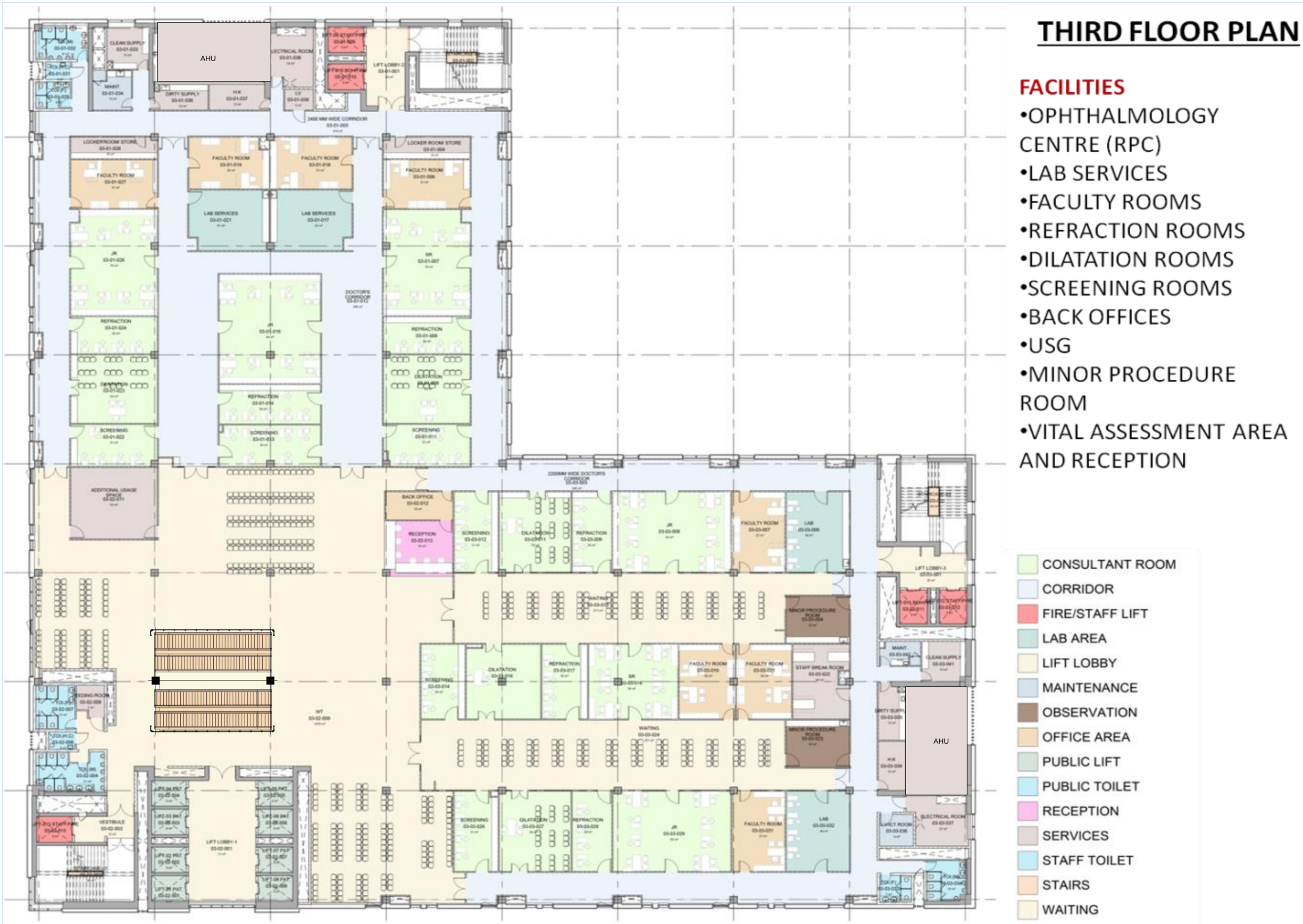
FACILITIES

- OPHTHALMOLOGY CENTRE (RPC)
- LAB SERVICES
- FACULTY ROOMS
- REFRACTION ROOMS
- DILATATION ROOMS
- SCREENING ROOMS
- BACK OFFICES
- USG
- MINOR PROCEDURE ROOM
- VITAL ASSESSMENT AREA AND RECEPTION

SECOND FLOOR – OPHTHALMOLOGY CENTRE (RPC)

- Ophthalmology Centre (RPC)
- Lab services, faculty rooms, refraction rooms, dilatation rooms, screening rooms, JR, SR, back offices, USG, minor procedure room, LVA, FA/Laser general, vital assessment area and reception.
- PMR (Orthotics & Prosthetics Workshops & Rehab)
- Public Waiting Areas, Washroom Facilities, Storeroom, SWEC, Staircases, Lift Lobbies For Visitors And Service Staff

THIRD FLOOR PLAN



THIRD FLOOR PLAN

FACILITIES

- OPHTHALMOLOGY CENTRE (RPC)
- LAB SERVICES
- FACULTY ROOMS
- REFRACTION ROOMS
- DILATATION ROOMS
- SCREENING ROOMS
- BACK OFFICES
- USG
- MINOR PROCEDURE ROOM
- VITAL ASSESSMENT AREA AND RECEPTION

THIRD FLOOR – OPHTHALMOLOGY CENTRE (RPC)

- Ophthalmology Centre (RPC)
- Lab services, faculty rooms, refraction rooms, dilatation rooms, screening rooms, JR, SR, back offices, USG, minor procedure room, LVA, FA/Laser general, vital assessment area and reception.
- PMR (Orthotics & Prosthetics Workshops & Rehab)
- Public Waiting Areas, Washroom Facilities, Storeroom, SWEC, Staircases, Lift Lobbies For Visitors And Service Staff

FOURTH FLOOR PLAN

FACILITIES

- NEURO REHAB
- CARDIAC REHAB
- PULMONARY REHAB
- NEURO PHYSIOTHERAPY
- ROBOTICS
- ELECTROTHERAPY
- GYM, MAT EXERCISE
- VIRTUAL REHABILITATION
- ADMIN & SUPPORT (IT, ADMIN, SOCIAL & SUPPORT SERVICES)

- CARDIAC REHAB
- CONSULTANT ROOM
- CORRIDOR
- FIRE/STAFF LIFT
- LIFT LOBBY
- NEURO PHYSIOTHERAPY
- OBSERVATION
- OFFICE AREA
- PUBLIC LIFT
- PUBLIC TOILET
- PULMONARY REHAB
- RECEPTION
- SERVICES
- STAFF TOILET
- STAIRS
- WAITING

FOURTH FLOOR

- Neuro Rehab
- Cardiac Rehab
- Pulmonary Rehab
- Neuro physiotherapy, robotics, electrotherapy, gym, mat exercise, 3D gait assessment, virtual rehabilitation, cardiac rehab & pulmonary rehab
- Admin & Support (IT, Admin, Social & Support Services)
- Public Waiting Areas, Washroom Facilities, Storeroom, SWEC, Staircases, Lift Lobbies For Visitors And Service Staff

FIFTH FLOOR PLAN

FIFTH FLOOR PLAN

FACILITIES

- NEUROSCIENCES CENTRE
- RECEPTION
- NEURO CONSULTANT'S ROOMS
- MINOR PROCEDURE ROOMS
- EEG, VEEG, ANS, RTMS, EMG
- PROGRAMMING ROOM, ECG
- NEURO-SONOLOGY
- NEURO INTERVENTION EXAM ROOM
- PULSE DRUG THERAPY
- PACE EXAM ROOM
- SOCIAL WORKER ROOM

FIFTH FLOOR – NEUROSCIENCES CENTRE

- Neuro-science centre, reception, Neuro Consultant's rooms, minor procedure rooms, EEG, VEEG, ANS, RTMS, EMG, programming room, ECG,
- Neuro-sonology, Neuro intervention exam room, pulse drug therapy, pace exam room, social worker room, SWEC, back office, Vital assessment area & storage Cardiac Rehab
- Public Waiting Areas, Washroom Facilities, Storeroom, SWEC, Staircases, Lift Lobbies For Visitors And Service Staff

SIXTH FLOOR PLAN

SIXTH FLOOR PLAN

FACILITIES

- CARDIO THORACIC CENTRE (CN CENTRE)
- RECEPTION
- CONSULTANT'S ROOMS
- DISEASE MANAGEMENT ROOM
- PAIN PROCEDURE
- EXERCISE LAB, ECH, HUTT, ECHO
- HOLTER ROOM
- FLUOROSCOPY
- RADIOGRAPHY
- RADIOLOGY, REVIEW
- ANGIO-REVIEW
- SCREENING ROOM
- MINOR PROCEDURE ROOMS

SIXTH FLOOR – CARDIO THORACIC CENTRE

- Cardio Thoracic Centre
- Consultant's rooms, disease management room, pain procedure, exercise lab, ECH, HUTT, ECHO, HOLTER room, Fluoroscopy, Radiography, Radiology, review, Angio-review, Screening room, minor procedure Rooms, back office, Vital assessment area & storage.
- Public Waiting Areas, Washroom Facilities, Storeroom, SWEC, Staircases, Lift Lobbies For Visitors And Service Staff, REFUGE Area

SEVENTH FLOOR PLAN

FACILITIES

- DEPARTMENT OF ONCOLOGY (IRCH)
- RECEPTION
- CONSULTANT'S ROOMS
- MINOR PROCEDURE ROOMS

SEVENTH FLOOR – DEPARTMENT OF ONCOLOGY (IRCH)

- Department of Oncology (IRCH)
- Consultant's rooms, minor procedure rooms, SWEC, back offices, board rooms, vital assessment area & storage.
- Public Waiting Areas, Washroom Facilities, Storeroom, Staircases, Lift Lobbies For Visitors And Service Staff.

EIGHTH FLOOR PLAN

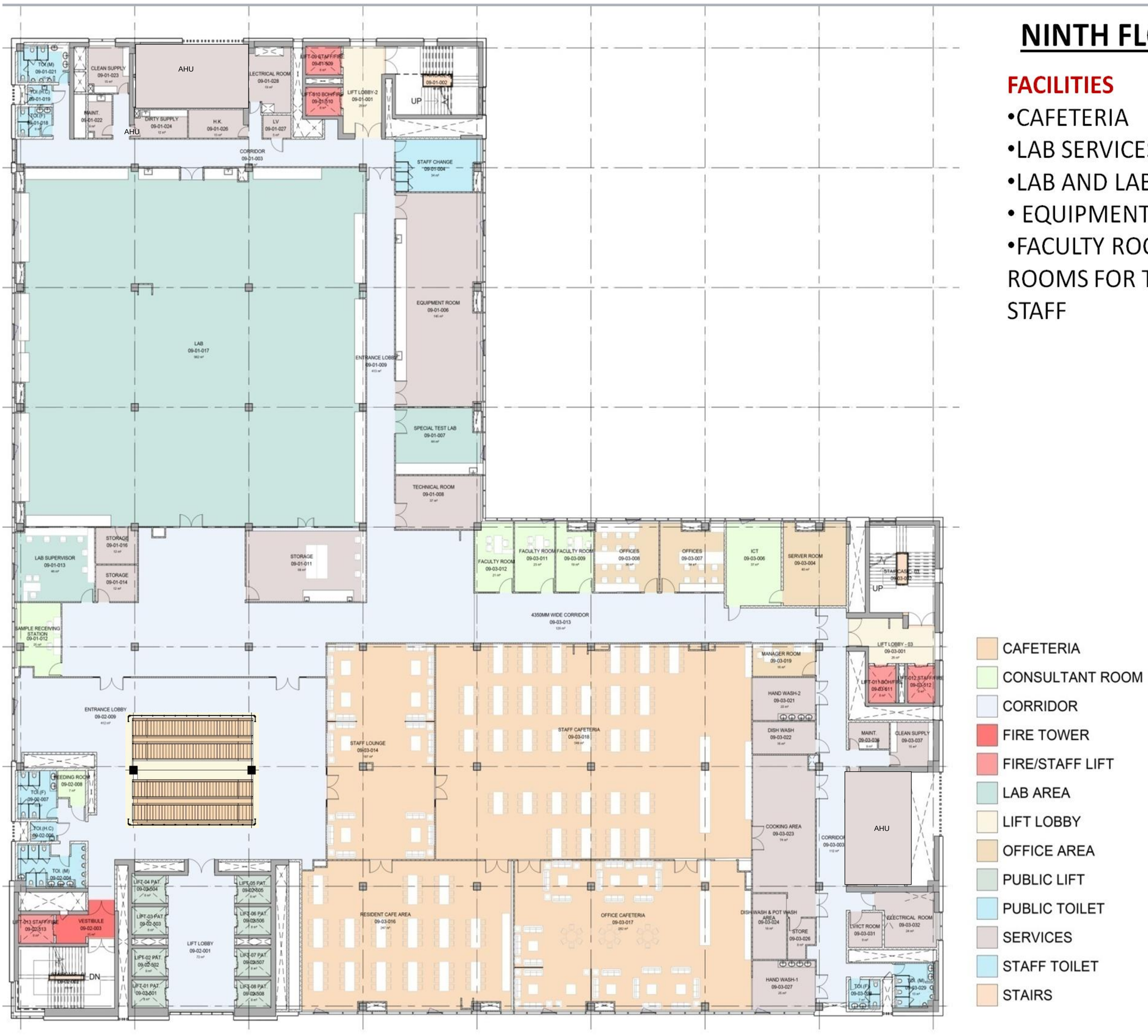
EIGHTH FLOOR PLAN

FACILITIES

- PAEDIATRICS
- PAEDIATRICS SURGERY
- RECEPTION
- CONSULTANT'S ROOMS
- MINOR PROCEDURE ROOMS

EIGHTH FLOOR – PEDIATRICS AND PEDIATRICS SURGERY

- Pediatrics Department
- Pediatrics Surgery
- Consultant's rooms, minor procedure rooms, SWEC, back office, vital assessment area & storage
- Public Waiting Areas, Washroom Facilities, Storeroom, Staircases, Lift Lobbies For Visitors And Service Staff



NINTH FLOOR PLAN

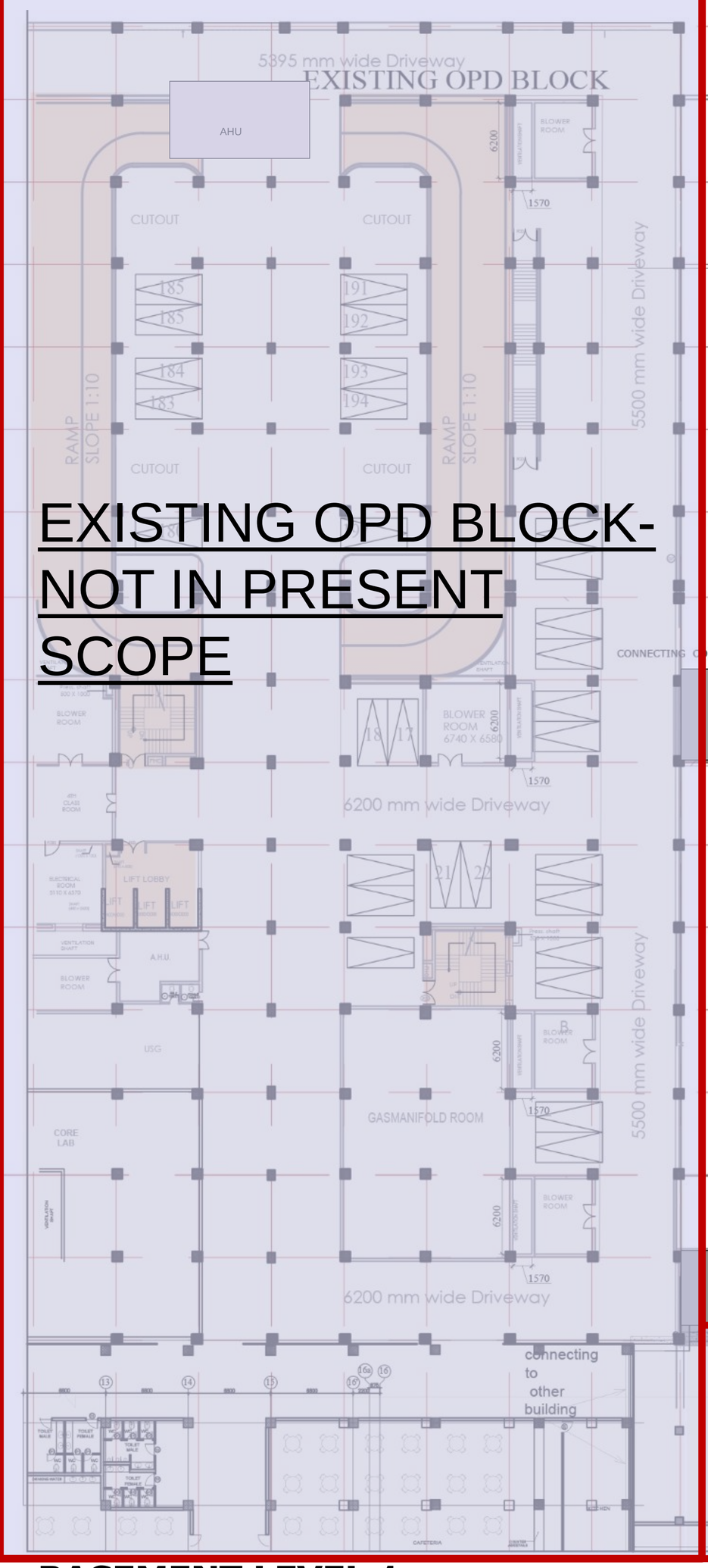
FACILITIES

- CAFETERIA
- LAB SERVICES
- LAB AND LAB SERVICES
- EQUIPMENT ROOM
- FACULTY ROOM & ROOMS FOR TECHNICAL STAFF

NINTH FLOOR – CAFETERIA AND LAB SERVICES

- Cafeteria
- Lab Services
- Kitchen services, lab and lab services, equipment room, faculty room & rooms for technical staff
- Public Waiting Areas, Washroom Facilities, Storeroom, Staircases, Lift Lobbies For Visitors And Service Staff

BASEMENT-1 FLOOR PLAN



EXISTING OPD BLOCK- NOT IN PRESENT SCOPE

BASEMENT LEVEL 1

- Equipment room, MRI, Cardio MRI, tech work room, Holter, ECG, X-Ray, Radiology, ECHO, CT scan, Control room, patient changing room, USG, mammography, patient hold area, support, packs room, cardio prep-injection room, cardio CT, ABI, USG Doppler, cardio Exam room, Fluoro, Pacs server, Neuro CT, radiologist's room SWEC & back office
- Public Waiting Areas, Washroom Facilities, Storeroom, Staircases, Lift Lobbies For Visitors And Service Staff

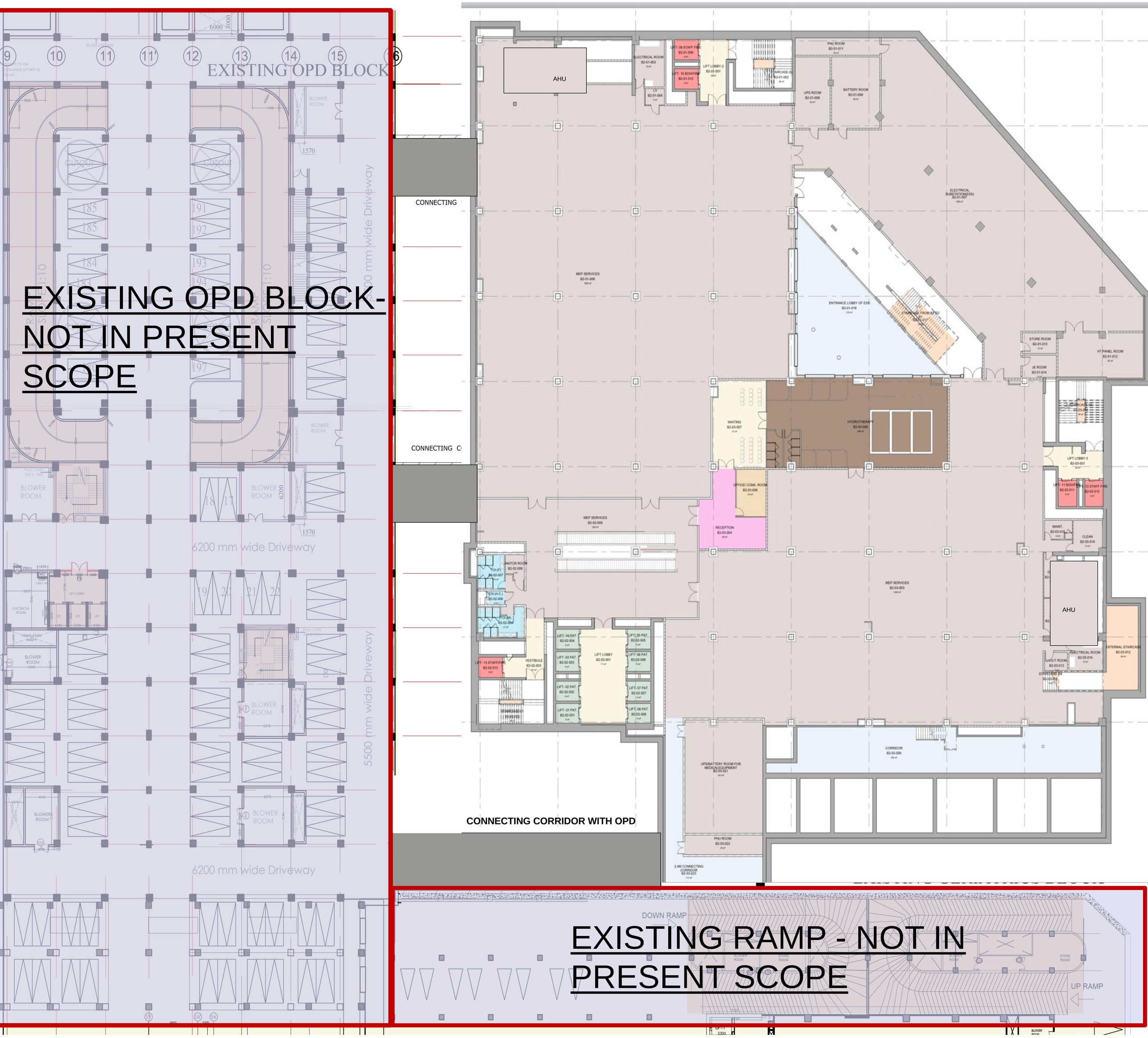
CORRIDOR
DIAGNOSTIC
FIRE/STAFF LIFT
LIFT LOBBY
OBSERVATION
OFFICE AREA
PUBLIC LIFT
PUBLIC TOILET
RECEPTION
SERVICES
STAFF TOILET
STAIRS
WAITING
CONNECTING CORRIDOR

BASEMENT - 1 FLOOR PLAN

FACILITIES

- GENERAL DIAGNOSTIC &IMAGING DEPARTMENT
- CARDIO, NEURO IMAGING DEPARTMENT.
- EQUIPMENT ROOM
- MRI, CARDIO MRI,
- TECH WORK ROOM
- HOLTER, ECG, X-RAY, RADIOLOGY
- ECHO, CT SCAN, CONTROL ROOM,
- USG, MAMMOGRAPHY
- PATIENT HOLD AREA
- CARDIO PREP-INJECTION ROOM, CARDIO CT

BASEMENT-2 FLOOR PLAN



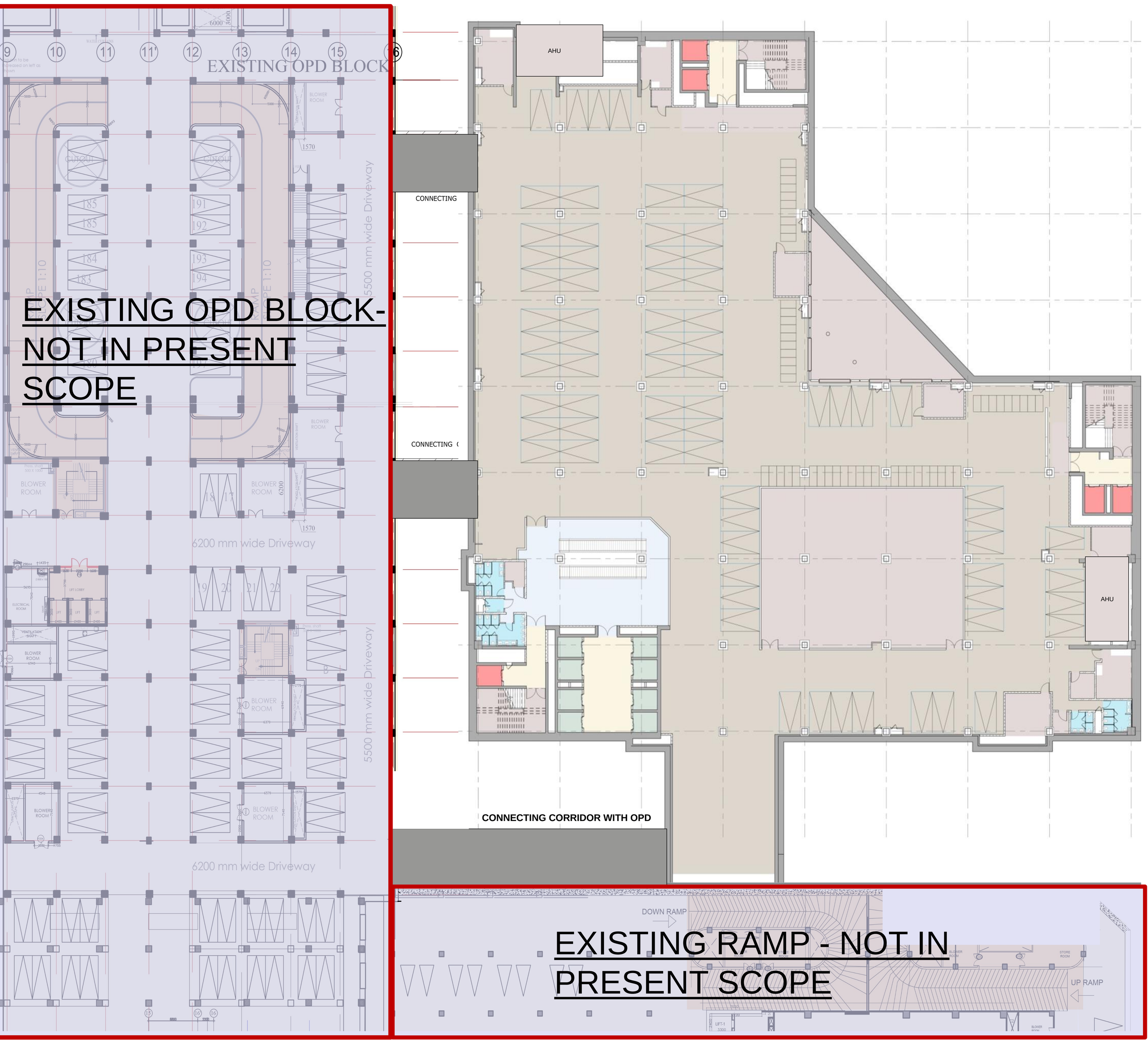
BASEMENT LEVEL 2

- MEP and other services
- Storeroom, Staircases, Lift Lobbies for Visitors and Service Staff

CORRIDOR
FIRE/STAFF LIFT
LIFT LOBBY
OBSERVATION
OFFICE AREA
PUBLIC LIFT
PUBLIC TOILET
RECEPTION
SERVICES
STAIRS
WAITING

CONNECTING CORRIDOR

BASEMENT-3 FLOOR PLAN



BASEMENT LEVEL 3

- Parking
- Parking requirements services like fan room, blower room

CORRIDOR
FIRE/STAFF LIFT
LIFT LOBBY
PARKING
PUBLIC LIFT
PUBLIC TOILET
SERVICES
CONNECTING CORRIDOR

FINISHING MATERIALS

EXTERNAL FACADE

PICTURE FOR REFERENCE

- COMBINATION OF STONE UPTO 2 FLOORS AND TEXTURE PAINT ABOVE.
- GRC JAIL FOR COVERING OF SHAFTS
- ALUMINUM EXTRUDED FRAME AND SHUTTERS WITH DOUBLE GLASS UNIT (1/3 OPENABLE IN EACH WINDOW WITH 2/3 FIXED).
- STRUCTURAL GLAZING IN REFLECTIVE DOUBLE GLASS UNIT.
- ELEVATION TO BE MATCHED WITH EXISTING O.P.D. BLOCK TO MAINTAIN THE SAME TEXTURE OF CAMPUS.
- MECHANISM FOR FAÇADE CLEANING TO BE PROVIDED AT TERRACE.

EXTERNAL FINISHES

- UNITIZED GLAZING SYSTEM (GRIHA COMPLIANCE)
- SPIDER GLAZING AT EXTERNAL WALL OF ENTRANCE LOBBY.
- SAND BLASTED & FLAMMED GRANITE COMBINATION ON ENTRANCE & HANDICAP RAMP.
- ALL OPEN CORRIDORS WILL HAVE SS RAILING BRUSH FINISH
- CONCRETE KERB ON EDGES OF FOOTPATHS, GREEN ISLANDS, ETC.
- PAVER TILES + SANDSTONE + GRANITE + BLUE HARD STONE ON FOOTPATHS
- PLANTERS & WATER BODY IN FLAMMED GRANITE.
- BOTTOM SURFACE OF THE PORCH & BUILDINGS WILL BE FAIR FACED CONCRETE FINISH / PLASTER / FALSE CEILING / PLASTIC EMULSION PAINT.
- BUILDING FACADE LIGHTING
- DRIVEWAYS @ PAVER BLOCKS / TRIMIX CONCRETE.
- CAR PARKING @ GRASS PAVERS.
- WINDOW CILL & JAMB OPENING SHALL BE COVERED BY THE SAME FINISHIES AS MENTIONED UNDER
- ART WORK, SCULPTURE, WALL MURALS (METAL, GLASS MOSAIC TILES ETC) SHALL BE AS PER APPROVED VIEWS & DECIDED BY ENGINEER-IN –CHARGE.
- ALL PARAPET TOPS- SHALL BE OF STONE COPPING

NOTE:

- ALL FINISHING ITEMS WITH ANY COMBINATION(S) AND PATTERN(S) WILL BE DECIDED BY ENGINEER-INCHARGE WITH 100 % VARIATION OF ANY ITEM / MATERIALS / SHADE/ COLOUR.
- SIZES UPTO 1200 X 1200 MM TILES , STONES, FALSE CEILINGS, ALUMINIUM ITEMS, TROLLEY GUARDS, WATER PROOFING AND ANY OTHER ITEMS AT ANY LOCATIONS WILL BE DECIDED BY ENGINEER-IN-CHARGE.
- PRESENTATION(S) AND ARTISTIC VIEWS SHALL BE PRESENTED FOR DECISION OF MATERIALS, FINISHES AND COLOURS ETC. FOR INTERNAL AND EXTERNAL FINISHES OF THE BUILDING(S).
- MAIN ENTRY TO THE BUILDING SHALL HAVE TOUGHENED GLASS SLIDING SENSOR CONTROLLED DOOR.

PICTURE FOR REFERENCE ONLY

(a) CENTRAL REGISTRATION & WAITING

The main entry for OPD Block at ground floor has large waiting area with adequate comfortable seating space. The overall theme will be light colored with natural stone and portions of warm finishes to augment this open area.

To have an emphasis on the registration counters/reception areas, metal false ceiling shall be provided with warm lightings. The counters shall be designed with the combination of granite.

On flooring granite shall be provided, whereas on walls - Vitrified dado with granite band up to 1300 mm and at Columns- Granite Dado upto Ceiling with SS strips at Horizontal Joints shall be given to build the environment which will help reducing anxiety of patient and feel calm.

ENTRANCE LOBBY

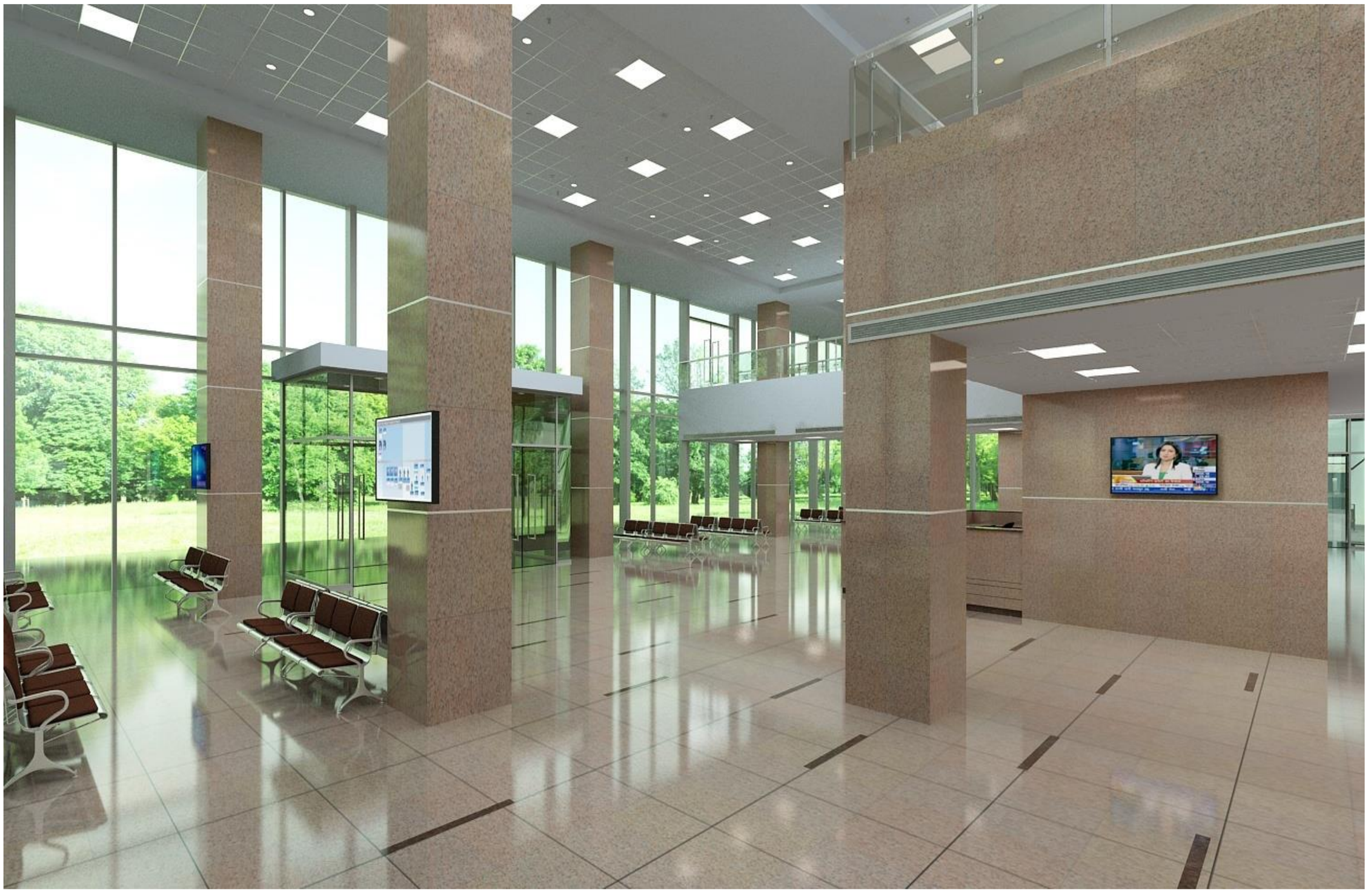
ARCHITECTURAL FINISHES

FLOORING- COMBINATION OF LIGHT AND DARK SHADE GRANITE

WALL DADO- COMBINATION OF LIGHT AND DARK SHADE GRANITE

CEILING- Combination of moisture resistant gypsum board & GI metal tiles.

PICTURE FOR REFERENCE



OPD WAITING AREA

PICTURE FOR REFERENCE

ARCHITECTURAL FINISHES

FLOORING- COMBINATION OF LIGHT AND DARK SHADE VITRIFIED TILES

WALL & COLUMN FINISH - VITRIFIED TILE DADO

CEILING- COMBINATION OF MOISTURE RESISTANT GYPSUM BOARD & PERFORATED GI METAL TILES.

OPD CONSULTANT ROOM

PICTURE FOR REFERENCE

ARCHITECTURAL FINISHES

FLOORING- VITRIFIED TILES

WALL FINISH- SKIRTING & PAINT FINISH

CEILING- Combination of moisture resistant gypsum board & GI metal tiles.

TYPICAL LAB

PICTURE FOR REFERENCE

Note: Lab furniture, equipment, wall posters are shown indicatively for view & not in scope.

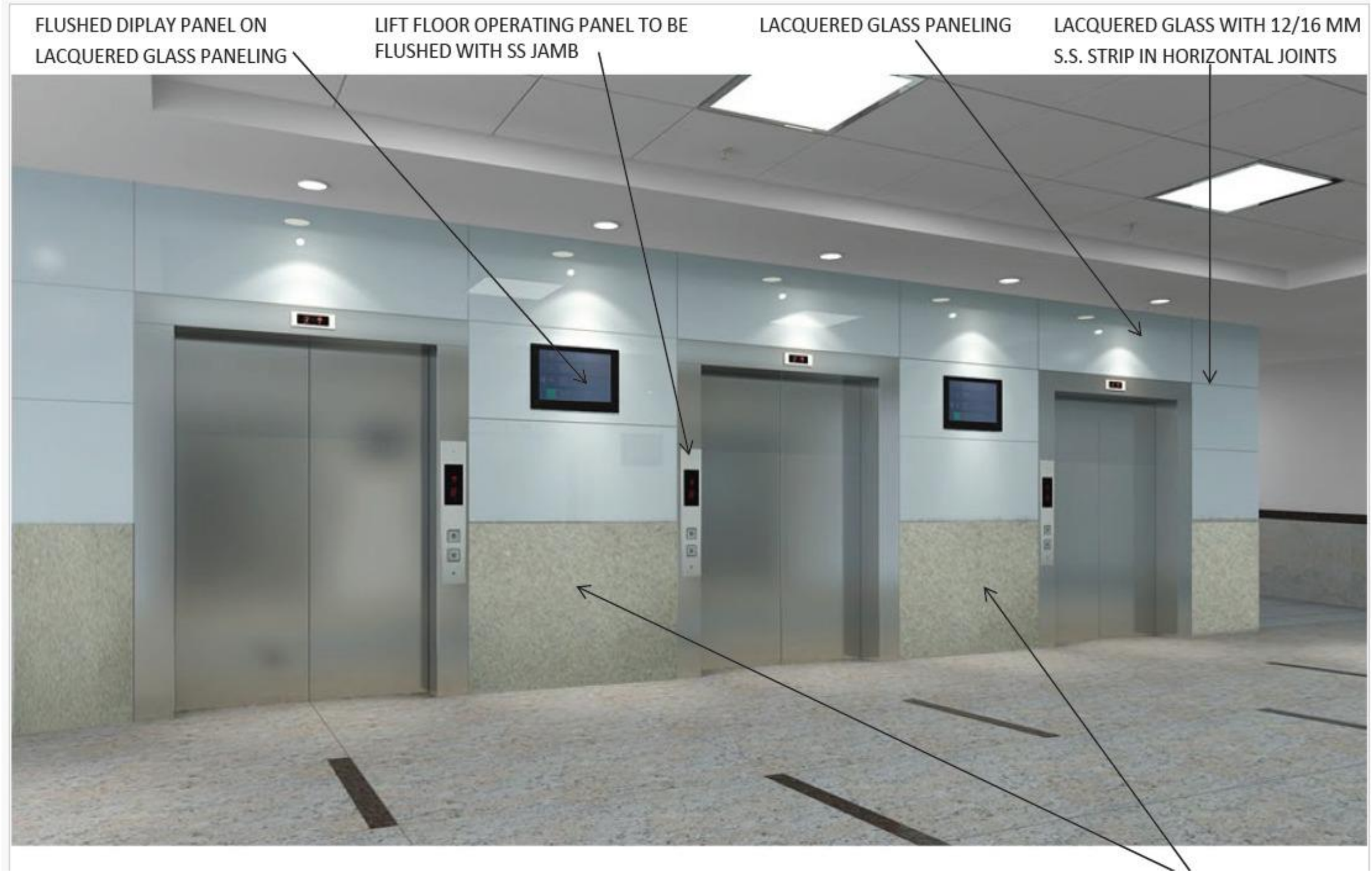
ARCHITECTURAL FINISHES

FLOORING- VITRIFIED TILE

WALL DADO- VITRIFIED TILE

CEILING- Combination of moisture resistant gypsum board & GI metal tiles.

TYPICAL LIFT LOBBY



FLOORING- COMBINATION OF LIGHT AND DARK SHADE GRANITE

WALL FINISH- COMBINATION OF SS JAMB AND LACQUER GLASS PANELING WITH SS INSERTS IN JOINTS

CEILING- Combination of moisture resistant gypsum board & GI metal tiles.

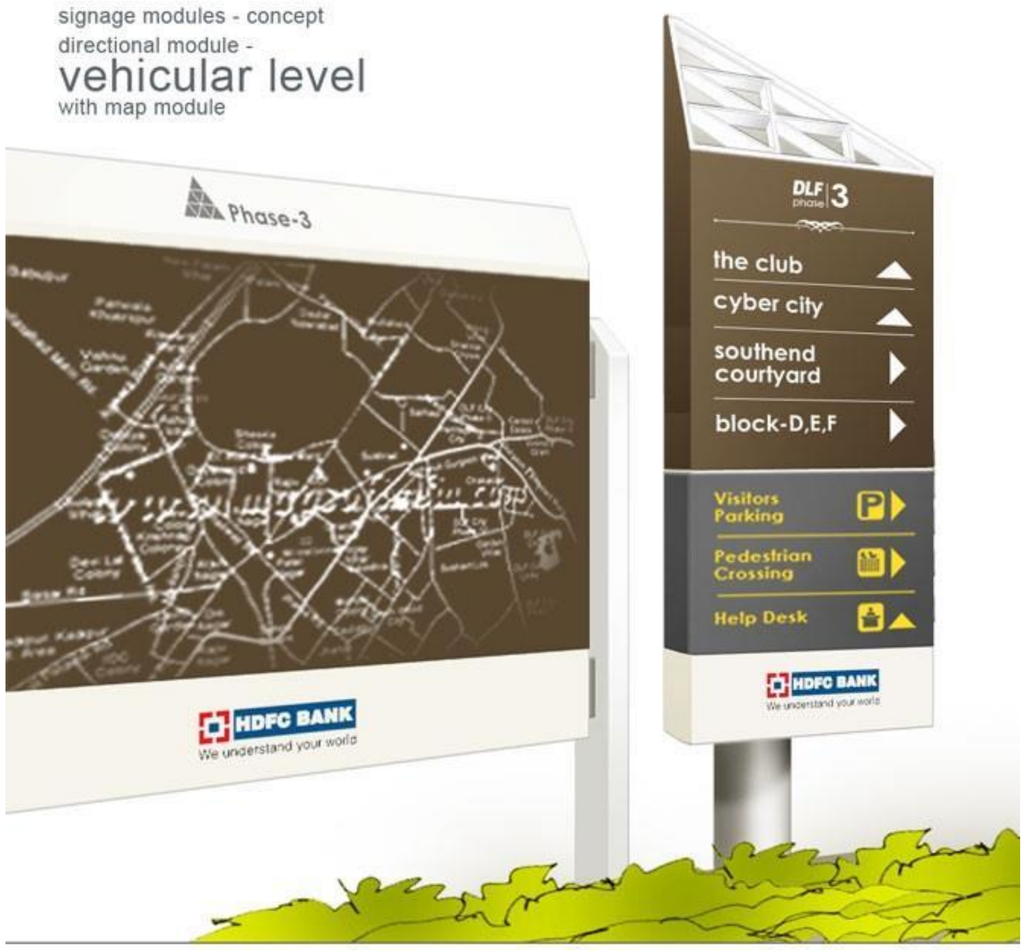
STRETCHER GUARD RAIL

PICTURE FOR REFERENCE

CURTAIL RAIL FOR BEDS

PICTURE FOR REFERENCE

SIGNAGE


signage modules - concept
directional module -
vehicular level
with map module
Phase-3
HDFC BANK
We understand your world
DLF phase 3
the club
cyber city
southend courtyard
block-D,E,F
Visitors Parking
Pedestrian Crossing
Help Desk
HDFC BANK
We understand your world

signage modules - concept
directional module -
vehicular level
with pedestrian level signs
phase signature
the primary info -
font - century gothic -
bold lower case case
secondary info / pedestrian
level info will be in grayscale
background with yellow
forground info
qadvertisements -
in laquered sticker or
painted with stencil
DLF phase 3
the club
cyber city
southend courtyard
block-D,E,F
Visitors Parking
Pedestrian Crossing
Help Desk
HDFC BANK

NICU

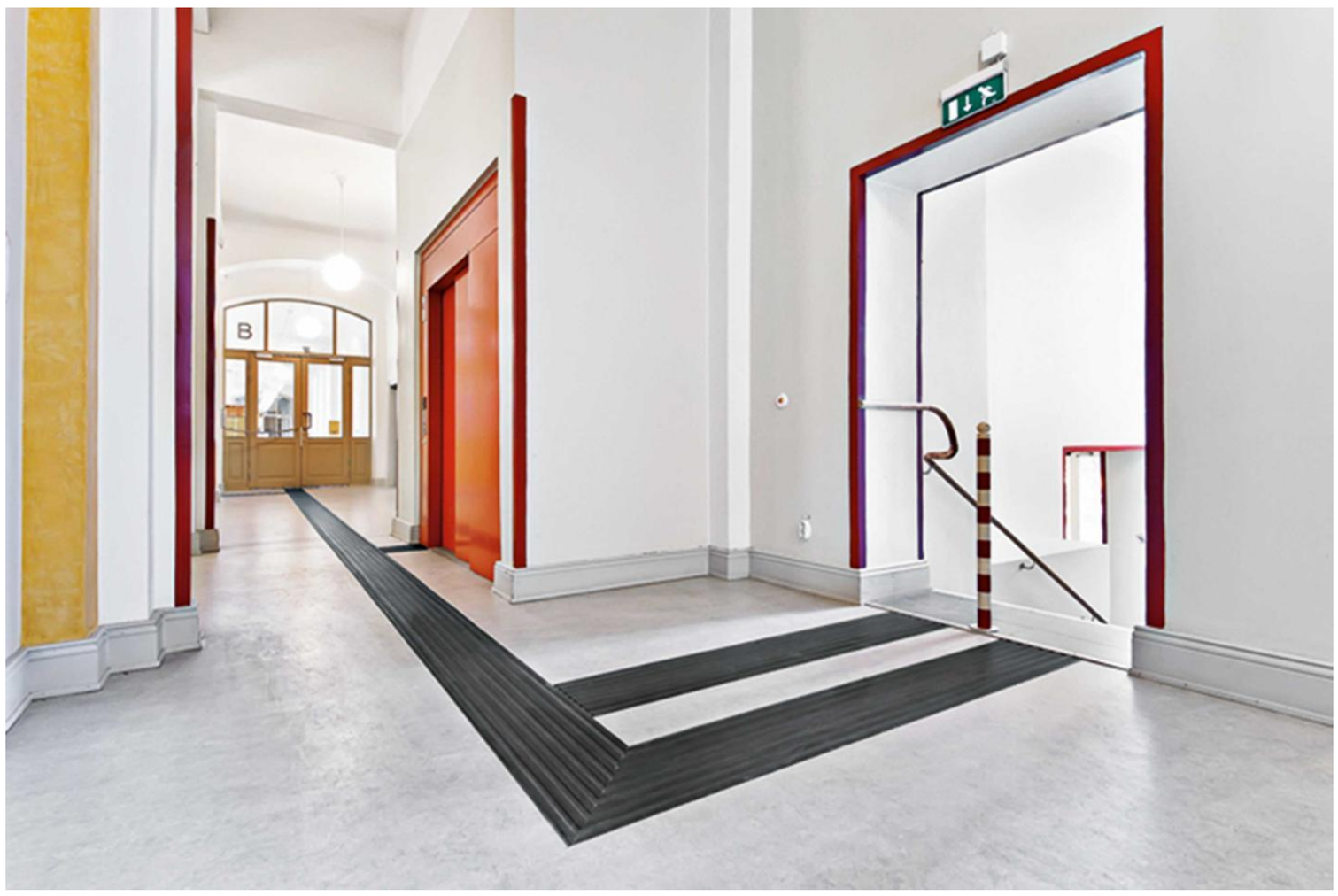
General Pediatrics 6
Adult Heart Unit 5
Pediatric Critical Care 4
Neonatal ICU 3
2
Main Lobby
Testing Center 1
Surgery/Cardiovascular
Procedures G
EMERGENCY
Department LL

Patient Room
Isolation:
Fall precautions
Newspaper Please
2232

STAFF
RESTROOM
Available

TACTILE FLOOR TILES

Specially designed to assist the visually impaired internal and external.



PROPOSED SUPER SPECIALTY O.P.D. – AIIMS, NEW DELHI

FINISHING SCHEDULE

Abbreviations	OBD	Oil Bound Distemper	
	HDVT	Heavy duty anti-skid vitrified tiles (Double charged)	
	HGVT	Heavy duty Glazed vitrified tiles (Double charged)	
	TTWC	Patterened Terrazzo Tiles in White Cement	
	MGT	Marbogranito heavy duty tiles	
	SS Shell	Stainless Steel Shell	
	HD glasswool	High Density Glasswool (resin bonded & enclosed in a teflon sheet for sterile / patient care / wards areas & sensitive environments); Medium Density Glasswool for other areas	
	Powder Coated AL	Powder coated Aluminium	
	AL GZ W	Aluminium Glazed Window	
	PL FD	Prelaminated Fixed Door	
ADDITIONAL NOTE :			
	STRETCHER GUARD RAILS/ CRASH RAILS	SS GUARD/ SS CRASH RAILS ARE TO BE PROVIDED AT A HEIGHT OF 840 mm IN PUBLIC AREAS (PATIENT WAITING, TRIAGE/ PATIENT HOLDING, CORRIDORS AND PUBLIC LOBBIES)	

FINISHING SCHEDULE FOR SUPER SPECIALTY OPD- AIIMS, NEW DELHI

FACILITIES	**Flooring / Skirting**	**Dado**	**Internal Walls**	**Ceiling**	**Door**		**Window**	
Finishing Schedule					**Frame**	**Shutter**	**Frame**	**Shutter**
ENTRY PORCH	SANDBLASTED GRANITE (LIGHT & DARK COLOR IN PORCH)		PLASTIC EMULSION	WOODEN/ HPL BATTENS WITH COVE/ PROFILE LIGHTS	POWDER COATED AL	PL FD	POWDER COATED AL	POWDER COATED AL GZ W
ENTRANCE LOBBY & WAITING AREA	GRANITE WITH DARK INSERTS	GRANITE CLADDING UPTO 1300MM ON WALLS + GRANITE CLADDING UPTO CEILING ON ALL FREE STANDING COLUMNS WITH 2 NO. S.S. STRIPS AS / DETAIL	PLASTIC EMULSION	COMBINATION OF GYPSUM BOARD CEILING AT DIFFERENT LEVELS , COVE LIGHTING AND GI METALLIC TILE IN SOME PORTION	POWDER COATED AL	PL FD	POWDER COATED AL	POWDER COATED AL GZ W

FACILITIES	Flooring / Skirting	Dado	Internal Walls	Ceiling	Door		Window	
Finishing Schedule					Frame	Shutter	Frame	Shutter
OUT PATIENTS DEPARTMENTS								
GENERAL								
Entrance Hall/enquiry + Record area + queueing space	GRANITE WITH DARK INSERTS	GRANITE CLADDING UPTO 1300MM ON WALLS + GRANITE CLADDING UPTO CEILING ON ALL FREE STANDING COLUMNS WITH 2 NO. S.S. STRIPS AS / DETAIL	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Lavatories - Gents Lavatories - Ladies Lavatories - Staff (F) Lavatories - Staff (M)	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Consultation /Examination (1)	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
DOT CENTRE	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
SAMPLE PROCESS	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
DOCTORS CORRIDOR	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
SAMPLE COLLECTION	HDVT	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
ORTHOTICS / PROSTHETICS WORKSHOP	HDVT, MGT		Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
FACULTY ROOMS	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
LAB / LABORATORIES	HDVT	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
MINOR PROCEDURE ROOM	HDVT	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
OFFICES	HDVT, MGT		Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
WORK STATIONS	HDVT	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
MEETING ROOMS	HDVT, MGT		Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
GYMNASIUM	RUBBERISED/ SPORTS	VITRIFIED TILES	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
TRAINING & EXERCISE AREA	RUBBERISED/ SPORTS	VITRIFIED TILES	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
ELECTROTHERAPY	HDVT	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
REHAB ROOMS	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
RECORD ROOM	VITRIFIED TILES	VITRIFIED TILES	OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
EQUIPMENT ROOM	HDV	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
SERVER ROOM	HDVT	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
CAFETERIA	HDVT	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
REFRACTION ROOM/ DILATION ROOM/ SCREENING ROOM	HDVT	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W

FACILITIES ↓	Flooring / Skirting	Dado	Internal Walls	Ceiling	Door		Window	
Finishing Schedule →					Frame	Shutter	Frame	Shutter
OUT PATIENTS DEPARTMENTS								
GENERAL								
Entrance Hall/enquiry + Record area + queueing space	HDVT, MGT, TTWC	HGVT - 1500mm	Plastic Emulsion	Find	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Nurse-in-charge	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Lavatories - Gents Lavatories - Ladies Lavatories - Staff (F) Lavatories - Staff (M)	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
MEDICAL CLINIC								
Consultation /Examination (1)	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Consultation /Examination (2)	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Consultation /Examination (3)	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
LABORATORY SERVICES DEPARTMENT								
Reception + Patients waiting	HDVT, MGT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Patients toilet	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Pathologist's office	HDVT, MGT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD		Powder Coated AL GZ W
Office and record	HDVT /VITRIFIED TILES		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Stores (common area preperation)	VITRIFIED TILES		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Biochemistry	HDVT	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Microbiology with incubator	HDVT	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Media room	HDVT, TTWC		OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Haemotology - blood bank unit		HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Urinalysis unit	HDVT	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Clinical pathology	HDVT	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Histology and cytology unit	HDVT	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Serology-Bacteriology unit	HDVT	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Washing and sterlizing area	HDVT, TTWC	HGVT- Ceiling height	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Museum	HDVT, MGT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Staff toilets (M&F)	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Janitor's closet	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Specimine disposal + sluice	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Blood Storage room	HDVT		OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W

FACILITIES ↓	Flooring / Skirting	Dado	Internal Walls	Ceiling	Door		Window	
Finishing Schedule →					Frame	Shutter	Frame	Shutter
RADIOLOGY DEPARTMENT								
ADMINISTRATIVE SPACES								
Reception / Registration + waiting	HDVT, MGT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Doctors view area	HDVT, TTWC		OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Film storage	VITRIFIED TILES		Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
DIAGONISTIC X-RAY ROOMS								
X-Ray room	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Ultrasound room	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
CT scanning :	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
CT imaging room	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
CT console room	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
CT computer room	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
				Combination of moisture resistant gypsum board & GI metal tiles				
Scrub up/ Gowning area	HDVT, TTWC	HGVT- Ceiling height	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Patient holding area	HDVT, TTWC	HGVT- Ceiling height	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Patient toilet and change facilities	HDVT	HGVT- Ceiling height	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Circulation area of 35% is additionaly required	HDVT, MGT, TTWC	HGVT- Ceiling height	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
MRI :								
MRI computer room	HDVT, TTWC		OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
MRI console room	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
MRI room	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Patient bay	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
				Combination of moisture resistant gypsum board & GI metal tiles				
Office for single person or as per staffing	HDVT, MGT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Hand washing bay (many may be required)	HDVT	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Anesthesia induction (optional)	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Toilet for patients	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Shared areas : If MRI is provided as a free standing unit , following facilities will have to be provided as additional requirement:	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Reception	HDVT, MGT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Waiting	HDVT, MGT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Film storage	VITRIFIED TILES		Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Clean utility	HDVT	HGVT- Ceiling height	OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Dirty utility	HDVT	HGVT- Ceiling height	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W

FACILITIES ↓	Flooring / Skirting	Dado	Internal Walls	Ceiling	Door		Window	
Finishing Schedule →					Frame	Shutter	Frame	Shutter
RADIOLOGY DEPARTMENT								
Lenin bay	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
				OBD				
Trolley bay	HDVT, TTWC	HGVT - 1500mm	OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Toilet for staff	HDVT	HGVT- Ceiling height		Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Locker room for staff	HDVT		OBD	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Shared Areas:								
Clean utility	HDVT	HGVT- Ceiling height	Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Dirty utility	HDVT	HGVT- Ceiling height	Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Preparation Room	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Reception	HDVT, MGT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Staff station	HDVT, TTWC		Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Store	VITRIFIED TILES		Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Mobile Equipment	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Toilet for staff	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Waiting (for non injected patients and visitors)	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
X-ray imaging and reporting	HDVT, TTWC	HGVT - 1500mm		**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
General X-Ray room	HDVT, TTWC	HGVT - 1500mm	OBD	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Film X-ray	HDVT, TTWC		Plastic Emulsion	**Combination of moisture resistant gypsum board & GI metal tiles**	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W

FACILITIES ↓	Flooring / Skirting	Dado	Internal Walls	Ceiling	Door		Window	
Finishing Schedule →					Frame	Shutter	Frame	Shutter
RADIOLOGY DEPARTMENT								
Portable X Ray	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
300 MA Units	HDVT, TTWC		OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Film developing + Processing & Film drying room	HDVT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Dark Room	HDVT		Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Chemical store (barium)	VITRIFIED TILES		Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
X Ray record room	VITRIFIED TILES		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Radiologists office	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Sonography	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Clean utility	HDVT	HGVT- Ceiling height	Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Dirty utility	HDVT	HGVT- Ceiling height	Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Reception	HDVT, MGT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Reporting room	HDVT, MGT		OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Store	VITRIFIED TILES		Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Toilet for patient	HDVT	HGVT- Ceiling height	Plastic Emulsion	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Toilet for disabled person	HDVT	HGVT- Ceiling height	OBD	Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Computer Processing area(Optional)	HDVT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Fluoroscopy preparation/storage	HDVT, TTWC		OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Fluoroscopy viewing	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Fluoroscopy imaging	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Patient Change room	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Hand Washing	HDVT	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Collection and distribution area	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Switch room	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Trolley bay	HDVT, TTWC	HGVT - 1500mm	Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Staff and support Areas	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Office single person(Depending on staff establishment)	HDVT, MGT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Office (4 person shared)	HDVT, MGT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Shared Areas	HDVT, TTWC		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Staff room (Depending on staff establishment)	HDVT, MGT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Toilet staff	HDVT	HGVT- Ceiling height		Calcium silicate	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Waiting (depending on patient load)	HDVT, MGT, TTWC	HGVT - 1500mm	OBD	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Meeting Room	HDVT, MGT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W

FACILITIES ↓	Flooring / Skirting	Dado	Internal Walls	Ceiling	Door		Window	
Finishing Schedule →					Frame	Shutter	Frame	Shutter
ENGINEERING/OTHER SERVICES								
Building maintainance	HDVT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Horticulture	HDVT		Plastic Emulsion	Combination of moisture resistant gypsum board & GI metal tiles	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Pump house	KOTA		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Air conditioning plant	KOTA		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Electric sub station	KOTA		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Stand by generator	KOTA		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Medical gas supply	KOTA		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Manifold room	KOTA		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Compressor room for suction	KOTA		OBD	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Communication system Public address system	HDVT		Plastic Emulsion	OBD	Powder Coated AL	PL FD	Powder Coated AL	Powder Coated AL GZ W
Electrical room and AHU all floors	KOTA		OBD	OBD	METAL FIRE DOOR		Powder Coated AL	Powder Coated AL GZ W
Main Staircases	Granite	1200 mm HDVT 100 MM granite band	Plastic Emulsion	Plastic Emulsion	METAL FIRE DOOR		Powder Coated AL	Powder Coated AL GZ W
Other Staircases	KOTA	1200 mm HDVT 100 MM granite band	Plastic Emulsion	Plastic Emulsion	METAL FIRE DOOR		Powder Coated AL	Powder Coated AL GZ W

- All public toilet will have laminated board partition system with acrylic solid surface
- All urinals will have frosted toughened glass partition
- All railing to be stainless steel including ramp.

BARRIER FREE ACCESSIBILITY

Design conforming to "Harmonised Guidelines and Space Standards for Barrier Free Built Environment for Persons
with Disability and Elderly Persons - 2016" publish by Ministry of Urban Development, Govt. Of India.
The salient features are as below:

Sr. No.	Topic		Barrier Free Guidelines by MoUD
1	Reach	Forward Reach	1300 mm High 380 mm Low
		Side Reach	1300 mm High 250 mm Low
		Forward Reach with obstruction	1100 mm High with 500 max arm stretch 1100 mm High with 600 max arm stretch
2	Space Allowance	Clear floor space for one wheelchair	1000w x 1200d
		Clear floor space for two wheelchair	1800
		For Rotating one wheel chair	1500 x 2000
3	Controls	Doors handles, lift buttons, Handrails switches, etc	Shall not be higher than 1000 mm Shall be placed between 900- 1200 Power points shall be between 600-1100 from finished floor levels.
4	Levels & Ramps	Maximum Gradient	1:12
		Min. Width	900mm
		Maximum Length of Ramp in one go	9 Meter
		Height of Handrail	between 760- 900mm
		Minimum Gap between Handrail and wall	50 mm
		Diameter of Handrail	38-45 mm
5	Entrance & Exit Doors	Minimum Clear Openings	900 mm
		Threshold level difference	not more than 12 mm
		Height of Door Handle from Floor lvl	850 mm - 1100 mm
		Door Handle Length	100 mm
6	Parking	car	Not specified
		Parking Bay	2400 mm wide
		Unloading Platform	1200 mm

7	**Lifts**	**No. of Lifts**	**One Lift is provided**
		Clear Internal Dimensions	1500 mm X 1500 mm
		Entrance Door Widths	900 mm
		Lift control heights	800-1000 mm High
8	Toilets	Size of Toilet	2200 X 2000 mm
		Flooring Material	Non Slip Surface without level difference
		Door Shutter	Light Weight door shutter
		Door Shutter Opening	900 mm
		Grab Bars	40 mm dia vertical grab bar up to 700-800
		WC Height	450-480 mm
		Wash Basin Height	Not specified
		Urinal Height	430
		Signage	Braille Signage at 1400 mm along with illuminated symbol for disabled at 1500 mm
9	Signage	Height of Letters	Depends on Viewing distance (2m. To 50m) ranges from 6 mm - 150 mm
		Height for Notices/ signs for wheelchair users	750 mm
		Height for door, safety or other notices for ambulant users	1200 mm
		Minimum Clearance for suspended or projected signs	2000 mm

FINISHES GENERAL NOTES

•All urinals will have frosted toughened glass partitions. All attached Toilet counters to be in granite finish and as per detailed drawing.

•Entrance Lobby/waiting: Granite flooring with dark granite inserts and wall dado upto 1300mm (1200 vitrified tile + 100 granite top border) all free standing columns to have granite cladding upto false ceiling height with 2 nos. SS strips inserts as per detail

•All Railings in Hospital and in Open Areas to be in Stainless Steel with minimum 6 nos. horizontal members (other than handrails to be provided a two levels)

•Terraces on intermediate levels and above porches will have potted plants and water proofing.

•Tact tiles to be installed in Entrance lobby, corridor leading upto the ramps, staircases & lift lobbies.

•In Faculty area rooms wall towards the corridor will have glass / aluminum partition system with frame as per specs.

•Braille Switches in Lifts with sound systems to be provided as per disability Norms / guidelines.

•Decibel level at various areas like OPD, Waiting as per NBC / Hospital Norms /Standards.

•All parapets Top shall be of stone coping.

•Main entries of Hospital building shall have toughened glass sliding sensor controlled door.

•Lift floor operating panel to be flushed with SS jamb.

•All finishing items with any combination(s) and pattern(s) will be decided by engineer-in-charge can vary at any extent of any item/ materials/ shade/ colour.

•Sizes upto 1200x1200 mm tiles, stones, false ceilings, aluminum items, trolley guards, water proofing and any other items at any locations will be decided by engineer-in-charge.

•Presentation(s) and artistic views shall be presented for decision of materials, Finishes and colours etc for internal and external finishes of the building(s)

Corner guards and Wall guards to be provided. Aluminium Partitions to be provided between each beds in ICUs. Aluminium Partitions to be provided above low height wall in wards

SS Railing to be provided on both sides of Staircases and Ramps for PwD.

Codal provisions for persons with disabilities need to be complied. Feasibility report complying IGBC Gold rating or GRIHA 3 star rating certification to be provided

DBR for Structural Works

1.0 INTRODUCTION

This chapter provides brief design basis concept related to Civil and Structural work for the Proposed Construction of Superspeciality OPD Block at AIIMS Delhi**.** The Superspeciality Outpatient Department (OPD) block is a 3B+G+9 story structure primarily designed for outdoor patient consultations. The first basement of the block is dedicated to various diagnostic tests including MRI, CT-scan, and other imaging procedures. The Basement – 2 Level are for MEP services and Basement – 3 Level for vehicular parking.

2.0 STRUCTURAL SYSTEM:

Structural system for the building shall be combinations of RCC shear walls and/or columns with conventional Beam-slab system and/or Composite structure system as per relevant BIS code and standards.

Appropriate foundation system will be considered based on soil investigation report and its recommendation. Project consists of three basements. The structural system for basements wall shall be adopted as per the site, considering necessary safety measures, site constraints, traffic movements, water proofing requirements, treatment of joints at interconnection at all three basement levels with existing basements.

3.0 DESIGN PHILOSOPHY

Structures shall be designed according to the method as specified in IS:456-2000 and other relevant codes. The three-dimensional analysis will be carried out using the mentioned analysis /design software for seismic load evaluation. For seismic analysis slab at each floor shall be considered as Semi-rigid diaphragm so that all frames sway equally at floor levels under application of lateral load. The software should be used as ETAB, STAAD and SAFE appropriately. However, for design requirements where Indian code is not given in detail and/ or not clear, requirements as given in international standards such as ACI and BS shall be used.

Serviceability limits considered are as follows:

Crack width	0.3 mm for beams and slabs
	0.2 mm for Footing, Retaining wall and water tanks
Drift Ratio:	0.004 (displacement/height)

Steel structure shall be designed as per IS: 800-2007.

Rebar coupler may be used for reinforcement splices.

4.0 LOADING ON STRUCTURE:

4.1 Dead Loads:

The self-weight of the various elements shall be computed based on the unit weight of materials as given below as per IS: 875 (part 1).

This load case comprises of self-weight of all the frames and shell elements shall be modeled into the Structure.

4.2 Dead Imposed Loads:

Items	UDL (KN/m^2)
Floor finishes @ 50 mm thickness	1.20
Sunken portion	Depends up on the depth of filling (with light weight density of $10KN/m^3$) as applicable
Screed for water proofing in Terrace	Actual
Equipment Load	As specified
Water tank	As per relevant IS code
Landscape on suspended floor	Depth of earth filling @600mm
Fire tender	60 MT Fire Tender load as per relevant code and standard engineering practice

Wall Loads:

It comprises of load from walls including partitions in floors. Loads are to be calculated and applied at appropriate locations uniformly distributed load.

4.3 Live Loads

The live loads shall be assessed based on the occupancy classification as per IS: 875 (Part-2).

4.4 Wind Loads

The wind pressure shall be calculated based on the data furnished below and other provision laid in IS: 875 (Part3) –2015 or latest

Wind Load Parameter	Details
Location	Delhi
Basic wind speed	47 m/s
Risk coefficient	As per table -1 of IS:875 (Part 3)
Terrain category	As appropriate
Topography factor	As appropriate

Return period of 100 years for Hospital/OPD to be considered to estimate the risk coefficient. However, this requirement is not applicable to replaceable materials.

4.5 Earthquake Load

The loading due to earthquake shall be assessed based on the provision of IS: 1893-2016 or latest.

Seismic Parameter	Details
Location	Delhi
Seismic zone	IV
Zone factor	0.24
Soil type	As per approved geotechnical report
Lateral Load resisting System	As per relevant code and standards
Response reduction Factor (R)	5
Importance Factor	**1.5/As per IS1893-2016

4.6 Temperature Load

Temperature load and its combinations shall be considered as per relevant codes.

4.7 Special Loads

Imposed load of 10 KN/Sqm is to be considered in LMR base slab.

Imposed Load of Medical equipment's, MRI, CT-scan and other imaging procedures considered as per manufacturers specifications & details.

4.8 Load Combinations

The various loads shall be combined accordance with the stipulations in IS: 456 - 2000. Whichever combination produces the most unfavorable effect in the building, foundation or structural member concerned shall be adopted.

Load Combinations	Limit State of Collapse			Limit State of Serviceability		
	DL	LL	WL/EL	DL	LL	WL/EL
DL+LL	1.5	1.5	--	1.0	1.0	--
DL+/-WL	1.5or0.9$	--	1.5	1.0	--	1.0
DL+LL+/-WL	1.2	1.2	1.2	1.0	0.8	0.8
DL+/-EL	1.5or0.9$	--	1.5	1.0	--	1.0
DL+LL+/-EL	1.2	1.2	1.2	1.0	0.8	0.8

$ This value is to be considered when stability against overturning or stress reversal is critical. Note: DL-Dead load; LL-Live load; WL- Wind load; EL- Earthquake load.

The above load combinations will be considered and effect of worst combinations will be taken for design of various elements.

5.0 MATERIALS

5.1 Concrete

Grade of Reinforced Concrete - M30 (Minimum)
- M35 (Minimum) for retaining wall, water retaining structures

Note:

- Normal weight aggregates are considered for all concrete works.
- Minimum Cement content and water cement ratio are to be considered as per IS: 456 –2000 Table – 5.

5.2 Reinforcement

Steel reinforcement shall be Grade Fe500D/550D confirming to IS: 1786.

Structural steel of grade E250/E350/E450and other requirements confirming to IS: 800 - 2007 shall be used.

5.3 Nominal cover to reinforcement

For the durability requirement, exposure condition shall be considered for both internal and external structural elements as per IS: 456-2000

For two-hour fire resistance, the nominal cover shall be followed as below:

S. No.	Structural Member	Nominal Cover (mm)
1	Isolated Footings, Raft	75
2	Pile Caps	75 for bottom, 60mm for top & side
3	RCC Retaining wall	40 for Contact with earth and 30 for building / water side
4	Shear Wall	Up to 250 thickness – 30 More than 250 thickness – 40
5	Columns	40 from face of ties
6	Beams	30
7	Conventional Slabs	30 for bottom & 20 for top
8	RCC walls	30
9	STP Base Slab & walls	45 for Contact with Sewage, 30 for building / earth / waterside

For other elements not specified above, nominal cover shall be as per the clause 26.4 of IS: 456-2000.

6.0 DESIGN CODE

The relevant Indian Standard Codes, as given below, shall be followed for structural design:

Sr.	Code	Description
1.	IS:875(Part1)	Code of Practice for design loads (other than earthquake) for buildings and structures–Unit weights of buildings materials and stored material.
2.	IS:875(Part2)	Code of Practice for Design loads (other than earthquake) for buildings and structures–Imposed loads
3.	IS:875(Part3)	Code of Practice for Design loads (other than earthquake) for buildings and structures – Wind loads

4.	IS:875(Part5)	Code of Practice for Design loads (other than earthquake) for buildings and structures–special loads and load combinations.
5.	IS:456-2000	Code of Practice for Plain and Reinforced Concrete.
6.	IS:800-2007	Code of Practice for General Construction in steel.
7.	IS:1893-2016	Criteria for Earthquake resistant design of structures.
8.	IS:13920-2016	Ductile detailing of reinforced concrete structures subjected to seismic forces– Code of practice
9.	IS:1786-2008	Specification for High Strength Deformed Steel Bars and Wires for Concrete Reinforcement
10.	IS:6313(Part2) 2001	Code of Practice for Anti–Termite Treatment measures in buildings - pre-Constructional chemical treatment measures.
11.	IS:2911 -2010	Code of practice for design and construction of pile foundations
12.	IS:4326 - 2013	Code of Practice for Earthquake Resistant Design and Construction of Buildings
13.	IS:18168 - 2023	Earthquake Resistant Design and Detailing of Steel Buildings — Code of Practice

**Any other relevant codes shall be followed as per requirements from Indian, British & Euro standards. Latest, updated with correction slip shall be considered for the design purpose.*

DBR for PHE and Fire Fighting Works

A. DESIGN BASIS REPORT- PLUMBING

Water Supply and Sanitary Installation

The EPC Contractor shall carryout Design of Water Supply and Sanitary Installations, Fire Fighting installations in 'New OPD Block' at AIIMS New Delhi as per NBC Guidelines and Local Fire Department Norms. The EPC Contractor shall take prior approval of Engineer-In-Charge for approval of specialized agencies for carrying out the Plumbing and Fire Fighting Works. The EPC Contractor shall also be responsible for obtaining Consent to Establish (CTE) before beginning of Construction activities and getting Consent to Operate (CTO) at time of Operationalization from Delhi Pollution Control Committee (DPCC).

1.0 General:

The water supply and sewerage demand has been estimated, based on the population as required by NBC norms, Local bye Laws & statutory norms. Planning of PHE system has been done taking into account various topographical, meteorological, hydrological etc. reports, identifying the source & quality of water, interaction with local bodies, conducting survey of existing water supply system, sewerage system, drainage system etc. The different components related to services are listed as below: -

1.1 Internal Plumbing Works

- Sanitary fixtures & C.P brass fittings
- Soil, waste & rain water piping system
- Internal water supply system
- Dual Plumbing System
- Hot water supply system
- Disposal of soil, waste & rain water pipe to 1st manhole.

1.2 External Water Supply System

- The external water supply shall be met from Bore wells.
- The water so received shall be treated to make it fit for Human consumption & New OPD needs.
- Providing water supply distribution network system of the campus.
- Storage of Water
- Distribution System

1.3 Sewerage System

- Sewerage generated from the proposed 'New OPD Block' at AIIMS New Delhi shall be fed into the Proposed **Packaged Type Sewage treatment plant (STP) of capacity 300 KLD at Site of New OPD Block Masjid Moth Campus, AIIMS New Delhi.** The EPC Contractor is required to plan the Sewerage Network (External and Internal) accordingly.

- Separate system shall be provided for treatment of effluent discharge**. The EPC Contractor shall carry out the Planning, Designing, Construction, Testing and Commissioning of a New ETP Plant of 30 KLD Capacity as per relevant NBC Norms/ State Pollution Board Norms.** Treated Effluent from Effluent treatment plant (ETP) 30 KLD will be finally fed to equalization tank of Proposed Packaged Type Sewage treatment plant (STP) of capacity 300 KLD at Site of New OPD Block Masjid Moth Campus, AIIMS New Delhi.

1.4 Storm Water Drainage System & Rain Water Harvesting

- Collection and conveyance around the proposed building.

- Disposal of storm water to rain water Harvesting Pits/ Soak galleries, and balance shall be disposed in local city main drain/Natural Drains.

1.5 Garden Hydrant System

- External garden hydrant system to supply the water for horticulture purpose to all landscaping/green area around the proposed building.

1.6 Pumps &Water Treatment Equipment’s

- Water supply pumps & Flushing System (Dual Plumbing System) has been for proposed New OPD Block.

1.7 Basic Objectives

The basic objective is to provide all sanitary engineering services and specification in relation to:

- High standards of materials and workmanship.

- Leak proof plumbing.

- Reliable and dependable engineering systems.

- Plan the system in such a way as to minimize the energy requirements.

- Create minimum nuisance and disturbance to the environment.

1.8 List of Codes and Manuals

The following codes of practice and design manuals are being referred for designing the Sanitary Plumbing and Fire -Fighting Systems:

- National Building Code 2016

- Hand Book on Water Supply & Drainage (with Special Emphasis on Plumbing), Bureau of

Indian Standards SP-35

- Manual on Water Supply & Treatment (Ministry of Urban Development)
- Manual on Sewerage & Sewage Treatment (Ministry of Urban Development)
- CPWD Specifications
- National Building Code 2016 (Part-IV — Fire Protection)

1.9 Proposed Water Management System: -

Reduce, Re-use, Re-cycle Model has been adopted for meeting the water requirement. The following measures are proposed for reducing water consumption:

- Discipline use of water
- Installing water conserving cooling towers
- Adopting water saving landscape techniques (selection of grass and plants) including irrigation.
- Dispose roof run-off and surface water flows into the proposed harvesting Pits which will help in ground water recharge.
- Achieve water conservation by use of low flow fixtures. The flow rate shall be equivalent or better than that prescribed in green building standard.
- The requirements of Flushing Water in the New OPD Building shall be met out from the Treated Water Tank of STP of 300 KLD. However, provision shall also be made for a separate network to meet out the flushing requirements in case the proposed STP is under maintenance. The schematic drawings for such arrangement shall be submitted by the EPC Contractor and work shall only be carried out after prior approval of schematic drawing by Engineer-In-Charge.
- Overhead Tanks of New OPD Building (like Fire tank, Domestic tanks, Flushing tanks) shall be provided with automatic water pumping system to ensure that hydro pneumatic pumps shall start & stop automatically to feed these overhead tanks.
- Water levels of all overhead tanks shall be controlled & monitored through BMS system. Water levels of all overhead tanks shall be continuously displayed in WTP Plant Rooms as well as BMS Control Room. Electrical panels of WTP shall also be integrated with BMS system.

2.0 WATER SUPPLYSYSTEM

Water requirements has been estimated on the basis of present acceptable standards, references from various sources such the National Building Code of India, Public Health Manuals, Ministry of Environment, Forests Guidelines, and CPWD Specification as well as Inputs from other services consultants involved on the projects.

2.1 Designs for Water Supply Distribution System Pipes

For continuous water supply at adequate pressure, complete water supply system is designed with following three type of pipe-lines.

2.1.1 Ductile Iron Class K-9 Pipe confirming to I.S.8329

The main water supply lines from treated water underground tank shall be connected with designed pipe line grids for building which shall be ductile iron class K-9 pipes confirming to IS 8329 including fittings. The water supply lines have been designed with ductile iron class K-9 pipes of different diameters with push on joints, as per requirements. All the operational valves/fittings also designed with same D.I. Specials of class K-12 as per I.S 9523 material as per IS Code and shall be fixed in clay bricks/fly ash masonry chambers as per specification.

2.1.2 Galvanized Iron Pipes

DI pipe grids all around the building shall be connected to overhead tanks (rising main) by GI pipes(Medium Class) , conforming to the requirements of IS 1239 Part-I for medium grade. To regulate the water supply, valves and fittings, at required places, shall be fixed as per specification.

Laying of these pipe lines upto building shafts shall be underground and in shafts, supported with standard clamps up to the overheads tanks complete as per specification. These G.I Pipe/CPVC line shall be used for domestic flushing and HVAC water supply system.

2.1.3 Chlorinated Polyvinyl Chloride (CPVC) Pipes

All concealed Water supply lines shall be of CPVC pipes & fittings used in hot & cold potable water distribution system shall conform to requirement of IS 15778. These CPVC pipe lines shall be for domestic and flushing water supply systems. Hot water supply shall be properly insulated.

3.0 SANITARY WORKS

3.1 Sanitary Fixtures & C.P Brass Fittings

Plumbing fixtures, Chrome Fittings and accessories will be as per IS: 781-1984.

- Porcelain fixtures of fairly high quality as given below.
- **WCs** -Low volume dual flushing system comprising concealed cistern are proposed as per IS: 2556.
- **Lavatory Basins** available in all size and shapes including wall hung, over or under counter types etc with infra-red sensor as per IS: 2256 (Part 7) 1995.
- **Urinals** shall be provided with Infra-red sensor battery operated as per IS: 2556 part.
- **Accessories** - Soap dispensers, toilet paper holders, hand drier, etc. shall be of Stainless Steel.
- **Chrome Fittings** Provision for additional and special New OPD fittings where required shall be made as per IS: 781 - 1984.
- **Fixtures installation** height shall be as per NBC 2016 Norms.

3.2 Soil, Waste Pipe System

- Above ground piping shall be designed on the basis of two pipe system as recommended in code of practice for soil and waste Hubless centrifugally cast (Span) iron pipes epoxy coated in sides and side as per IS code 15905.
- Soil pipes shall carry the wastes from WC‘s & urinals etc. Soil pipes shall connect directly to the 1st manhole outside the New OPD building.
- Internal building sanitary disposal system will be under the RCC slab (By core cutting RCC slab and suspended at bottom) for New OPD zone and with sunken floor in other residential buildings if any.
- Waste pipes shall carry the wastes from waste appliances (lavatory basins, kitchen sinks etc.). Waste pipes shall connect to Gully Traps outside the New OPD building and shall be connected to the external manholes.

3.2.1 Design Parameters

- Piping system has been designed in accordance with Code of Practice for Installation of Soil & Waste Pipes up to the 1st manhole with Hubless centrifugally cast (Span) iron pipes epoxy coated in sides and outside as per IS code 15905.
- All vertical stacks will terminate as vent pipes at terrace level.
- All Vertical Stacks in the building will terminate at the ground floor level and connected to the external sewer. Pipe dia. and slope will be as per connected load.

3.2.2 Pipe Work

- All vertical stacks will be installed in pipe shafts on the external face of the building or in internal shafts within the building according to the architectural planning of the toilets.

- Provision has been made to provide cleanout doors and plugs for Roding and maintenance where necessary and required.

3.2.3 Materials for Soil, Waste&Vent Pipe System

- Pipes used for Soil, Waste and Vent system shall be Hubless centrifugal cast (Span) iron pipes epoxy coated in-sides and out-side as per IS: 15905 . The pipes and fitting are jointed with SS 304 grade coupling with EPDM rubber gasket joints as per requirement and specifications.

4.0 SEWERAGE SYSTEM

- Sewerage generated from the proposed 'New OPD Block' at AIIMS New Delhi shall be fed into the Proposed Packaged Type Sewage treatment plant (STP) of capacity 300 KLD at Site of New OPD Block Masjid Moth Campus, AIIMS New Delhi. The EPC Contractor is required to plan the Sewerage Network (External and Internal) accordingly.

- Pipes of adequate diameter used for Sewerage disposal system shall be of RCC NP2/NP3 with fittings as per design parameter.

4.1 DesignParameters

Flow of Sewage	= 80% of daily water requirement.
Peak Flow	= 3 x Average Flow.
Sub Soil Infiltration	= 25% of Average Flow
Velocityof flow in pipes	= 0.75 m/sec. flowing half full Min.
Velocity of flow in pipes	= 2.0 m/sec. Max.

4.2 FlowConditions in pipe

Pipes up to 250 mm dia.	= 0.75 m/sec. flowing half full Min.
Pipes From 400-900 mm dia.	= 2.0 m/sec. Max.

4.3 Min.depth for sewers

For branches	= 1M.
For lateral, main & trunk sewers	= 1.5 M / as per required gradient

4.4 Type of Distribution

Sewer flow shall be by gravity up to the final disposal point. The external sewer shall be connected to centralized sewage treatment plant.

4.5 Kitchen Effluent

Kitchen waste shall be passed through drain channel to grease trap / oil separator before discharging in to the external sewer line.

4.6 Manholes

The manholes are to be constructed with brick/fly ash masonry as per standard specifications of NBC 2016 and shall have details as follows:

- Rectangular manhole of size 900 x 800 mm upto 1.0 mtr depth.

- Circular manhole of size 910 mm dia for 1.0 to 1.67 mtr depth.
- Circular manhole of size 1220 mm dia for 1.68 to 2.29 mtr depth
- Circular manhole of size 1520 mm dia for 2.3 mtr depth and above.

4.7 Spacing of Manholes

- Manhole shall be provided with all the junctions, change of directions, change in diameters and as per connection requirement from every units.
- A distance of 20 meters on the main sewer line depending on diameter of pipes and local conditions.

4.8 Manholes Covers

- Medium duty S.F.R.C. Manhole covers for manholes on service roads, gully traps and manholes / chambers not following in the road / pedestrian ways.
- Heavy duty S.F.R.C. manhole covers for manholes on main roads.

4.9 Treatment of Sewage

- Treatment of sewage shall be through the existing sewage treatment plant, the details for the same are specifically indicated hereinafter.

5.0 STORM WATER DRAINAGE & RAIN WATER HARVESTING SYSTEM

5.1 Planning of Storm Water Drainage System

The EPC Contractor shall carry out Design of Storm Water Drainage System for 'New OPD Block' at AIIMS New Delhi.

- Storm water pipe/Rain water pipe from inside the building to the 1st manhole outside the proposed building shall be of uPVC of required grade/class, 6kg/sq.cm pressure rating conforming to relevant IS codes. The network system from 1st manhole onwards shall be NP2/NP3 pipes as required.
- The network of storm water system shall be mostly catch basins and RCC pipe network, as per requirements.
- All paved/road/green areas, the runoff shall directly connected to the main storm water drains.
- Rainwater harvesting system to capture at least ‘one-day rainfall’ runoff volume from roof and non-roof areas shall be provided. Detail calculation shall be submitted for approval before planning the storm water drainage system.

5.2 Design Parameters

The rainfall intensity should be considered as per meteorological data for proposed 'New OPD Block' at AIIMS New Delhi, Minimum Pipe diameters for main storm water drain will be 250 mm diameter in line with local authority requirements.

- All construction specifications with respect to the manhole sizes etc. will be respected and followed and as per CPWD specification.
- The complete campus storm water drainage system proposed 'New OPD Block' at AIIMS New Delhi. Designed with RCC pipes, brick masonry chambers and manholes etc.

6.0 IRRIGATION SYSTEM FOR LAWNS AND GARDENS

- Gardens and lawns shall be irrigated in combination of Garden Hydrant System and Sprinkler Irrigation System.

6.1 Garden Hydrant System, Net work System

- The EPC Contractor shall carry out Design of Garden Irrigation System in view of proposed 'New OPD Block' at AIIMS New Delhi.

- It is proposed to provide a separate and independent captive garden hydrant system to supply water for horticultural operations to all landscaped areas.

- The distribution grid for garden mains will be by a separate grid of HDPE pressure pipes and connected to a separate pumping set obtaining its water supply from STP & raw water tank.

- The Main Distribution grid shall be with HDPE and balance distribution system will be with UPVC pressure pipes confirming to specifications.

- Garden hydrant points will be of 25 mm outlets and located approximately 45-50 m apart.

- The garden hydrant pumping system is proposed to be planned so that the grid is sized to cater for a maximum of 6 outlets operated at the same time.

6.2 Sprinkler Irrigation System, Network System

- Sprinkler Irrigation is a method of applying irrigation water which is similar to rainfall. Water is distributed through a system of pipes usually by pumping. It is then sprayed into the air and irrigated entire soil surface through spray heads so that it breaks up into small water drops which fall to the ground.

- Sprinklers provide efficient coverage for small to large areas and are suitable for use on all types of properties.

- It shall be designed to ensure maximum water saving, combining high quality, affordability and ease of installation. All the products are made out of high strength & chemical resistance engineering plastics to achieve functional satisfaction and to maintain cost economics.

- All sprinklers undergo extensive quality testing in our well-equipped state of the art lab. Performances of the products shall also be tested, as per relevant specifications, in the field to ensure uniform water distribution and higher efficiency.

7. TUBE-WELL/BORE WELL PUMP

- The pumps shall be vertical, submersible, multistage centrifugal, stainless steel (304) casing, stainless (304) impeller, stainless steel (316) shaft, ceramic bearings, tungsten carbide shaft protection bushes and mechanical seal driven suitable rated motor with 1500/2900 RPM, 415±10% Volts, 50 Cycles, AC 3 – phase Each pump shall be capable of operating within a performance pressure characteristics range sufficient below and above the required working pressure.

- The Pump shall be confirmed to Indian standard IS: 8034.

- Pumps and motors shall be mounts on a common MS structural base plate.

- The pump shall be water cooled coupled to induction motor of suitable H.P and R.P.M specified in schedule of quantities.

- Pumping set shall be provides with a Gun Metal “Bourden” type pressure gauge with gunmetal isolation cock and connecting piping.

- The pump set shall be provided with gun metal gate valve of appropriate sizes on delivery. & non-return valve of appropriate size and a pressure gauge with cock shall be provided on the delivery line

- Suction and delivery lines of the pumps shall be provided with double flanged reinforced Neoprene flexible pipe connectors. Connectors shall be suitable for a working pressure of each pump as specified in Schedule of Quantities. These pumps shall be confirming to Indian Standard (IS) CPWD specifications.

8.0 LIST OF IS CODES FOR REFERENCE OF PLUMBING DESIGN

Sr. No.	IS CodeNo.	Description
1	I.S : 1536 : 1989	Specification for centrifugally cast (spun) iron pressure pipes for water, gas and sewage (3rdRev.)(Amendment2)
2	I.S : 1538 : 1993	Specification for cast iron fittings for Pressure Pipes for water, gas and sewage (3rd Rev.)
3	I.S : 3114 : 1994	Code of Practice for laying of C.I. pipes (2nd Rev.)
4	I.S. : 782 : 1978	Specification for caulking lead (3rdRev.)
5	I.S. : l239 (Part 2):1992	Specification for mild steel tubes; tubular & other wrought steel fittings: Part 2 Mild steel tubular and other wrought steel pipe fittings (4th Rev.) (Amendment 1)
6	I.S.:1879:1987	Specification for malleable cast iron pipe fittings (2nd Rev.) (Amendment)
7	I.S.:4984:1995	High density polyethylene pipe for water supplies (4th Rev.) (Amendment1)
8	I.S. : 783 : 1985	Code of practice for laying of concrete pipes (1stRev.) (Amendment 1)
9	I.S:4127:1983	Code of practice for laying of Glazed Stoneware pipes (1st rev.)
10	I.S : 780 :1984	Specification for sluice valve for water works purposes (6th rev)(50 to 300 mm size)(Amendment 3)
11	I.S : 651 : 1992	Specification for salt glazed stoneware pipes and Fittings (5th rev.) (Amendment 1)
12	I.S. : 456 : 1978	Code of practice for plain and reinforced concrete (3rdRev.) (Amendment2)
13	I.S:12820 :1989	Code of practice for dimensional requirements of rubber gaskets for mechanical joints and push on joints for use with cast iron pipes and fittings for carrying water, gas & sewage.
14	I.S.:1172:1993	Code of basic requirements for water supply, drainage & sanitation(4th Rev.)
15	I.S.:1200(Part- 16) 1979	Code of practice for methods or measurements of building and Civil Engineering works: Part 16 Laying of water and sewer lines including appurtenant items (3rdRev.)
16	I.S.: 1200 (Part- 19) 1981	Code of practice for methods or measurements of building and Civil Engineering works: Part 19 Water supply, plumbing and drains (3rd Rev.)
17	I.S:1729:1979	Specification for sand cast iron spigot and socket soil, waste and ventilating pipes, fittings and accessories (1st rev.) (Amendment4)
18	I.S:1742:1983	Code of practice for building drainage (2nd Rev.)

19	I.S:3989:1984	Centrifugally cast (spun) iron spigot and socket soil, waste and ventilating pipes, fittings and accessories (2nd rev.) (Amendment
20	I.S :778:1984	Copper alloy gate, globe and check valves for water works purposes (4th rev.) (Amendment 2)
21	I.S:13095:1991	Butterfly valves for general purposes
22	I.S:5312(part1): 1984	Swing check type Reflux valve (non-return valve): Part 1 Single door pattern (1st Rev.) (Amendment 1)
23	I.S:5312(part2): 1986	Swing check type Reflux valve(non-return valve):Part2 Multi door pattern
24	I.S:1239(part1): 1990	M. S. tubes, tubular and other wrought steel fittings: Part 1 Mild steel tube(5th Rev.)
25	I.S : 1879:1987	Malleable Cast Iron pipe fittings (2nd rev.)(Amendment 5)
26	I.S : 651:1992	Salt glazed Stoneware pipes & fittings (5th Rev) (Amendment 1)
27	I.S:458:1988	Precast Concrete pipes (with or without reinforcement) (3rd rev.) (Amendment 2)
28	I.S:1726:1991	C.I. Manhole covers & frames (3rd rev.)
29	I.S:1916:1989	Steel cylinder pipe with concrete lining and coating (1st rev.)
30	I.S:12592(part1) : 1988	Pre-cast concrete manhole covers and frames: Part 1 Covers (Amendment3)
31	I.S : 12592(part2) : 1991	Pre-cast concrete manhole covers and frames: Part 2 Frames
32	I.S : 6392 : 1971	Steel pipe flanges (Amendment 1)
33	I.S : 6418 : 1971	C.I & malleable flanges for general Engg. Purposes.
34	I.S : 4985 : 1988	Unplasticized PVC pipes for potable water supplies (2nd Rev) (Amendment2)
35	I.S : 7181 : 1986	Horizontally cast double flanged pipes for water, gas and sewage.(1st Rev.) (Amendment 1)
36	I.S : 210 : 1993	Grey iron casting. (4th Rev.)
37	I.S : 4985 : 1988	Un-plasticized PVC pipes for potable water supply.
38	I.S: 7558-1974	Code of practice for domestic hot water installation.
39	I.S: 2064-1973	Code of practice for selection, installation and maintenance of Sanitary appliances
40	I.S: 2065-1983	Code of practices for water supply in building
41	I.S: 2183 (Part- I) - 1987	Code of practice for Plumbing in multistoried buildings.
42	I.S: 8329-2000	Code of practice for Ductile iron class K9 pipes for water supply system
43	I.S: 15905-2011	Code of practice for Hubless centrifugal cast (Span) iron pipes epoxy coated in sides and out side

B. DESIGN BASES REPORT OF WATER TREATMENT PLANT (WTP)

1.0 The EPC Contractor shall carry out Design, Engineering, Supply, Installation, and Testing & Commissioning for WTP for the construction of proposed 'New OPD Block' at AIIMS New Delhi

1.1 Population

Estimation of population is most critical element in identifying the infrastructure requirements for any development. All the demand estimations are based on the population or maximum expected capacity of the proposed development. The norms adopted for population estimation for entire campus is as per NBC2016.

2.0 Concept Planning

It is proposed to provide Water Treatment Plant as per following details:

2.1 Water Treatment Plant (225 KLD)

It is proposed to provide Water Treatment Plant of suitable Capacity to meet the specified outlet parameters of water. The system shall consist of following components but not limited to:-

- Water supply/lifting Pumps/filter feed pumps/Non Clogging type submersible sump pumps etc.–MoC preferably should be -SS-304/C.I casing, SS-304 /Brass /Bronze impeller & SS shaft suitable for operation 400/440 volts, 3 phase, 50 Hz, 2900 rpm, TEFC electric motor with best efficiency class preferably IE-3 complete with all accessories like flexible rubber bellows, strainers, valves, pressure gauges etc. Suitable PCC/RCC foundation with plaster, MS channel plate with primer and two coats of paint, Anti-vibration arrangement of cushy foot mountings should be provided.

- MS/FRP Filters (dual media/activated carbon/pressurized sand/multi grade), Softeners sized for optimum working pressure etc.

- Panels, Allied Equipment & Accessories (level controllers, probes, vibration eliminators, starters, valves, pressure gauges etc.)

- All equipment shall be installed on suitable foundations true to level and in a neat workman ship.

- Equipment shall be so installed as to provide sufficient clearance between the end walls and between equipment to equipment.

- Piping within the pump house shall be so done as to prevent any obstruction in the movement within the pump house.

- The water treatment process shall be designed depending upon the quality of water. pH, TDS, Turbidity, Total Hardness & other biological factors shall conform to latest IS Codes/GRIHA Norms. Suitable nos. of Filters/Softeners shall be considered & sized taking into consideration the diameter, OBR, depth of filter media, backwash arrangement, interconnecting pipes of suitable material (GI/CPVC/UPVC/PVC) & grade, instruments, valves etc.

- One standby pump shall be provided considered for each type.

Expected Treated Water Characteristics after Filtration (Domestic Water Requirements for 'New OPD Block' at AIIMS New Delhi)		
Sl. No.	**Parameters**	**Characteristics**
1	pH	6.5–8.5
2	Total Dissolved Solids	Less than 500ppm
3	Suspended solids	<1mg/ litre
4	Turbidity	Nil
5	Total Hardness	Lessthan150ppm

Expected Treated Water Characteristics after Filtration & Softener (For HVAC/ DG sets / Cooling Tower Make-up)		
Sl. No.	**Parameters**	**Characteristics**
1	pH	6. 0 – 7.0
2	Total Dissolved Solids	Lessthan 500 ppm
3	Suspended solids	< 1 mg/ litre
4	Turbidity	Nil
5	Total Hardness	Lessthan 40 ppm

2.2 Source of Water Supply

- The main sources of water are from the state water supply network/ Bore wells. Water received from state water supply shall be stored in a Under Ground water Tank. Domestic water requirements will be fulfilled from Under Ground Tank for New OPD Block. Flushing water requirements of New OPD Block shall be fulfilled from proposed packaged type STP treated water. Irrigation water requirements for entire campus & HVAC Cooling Tower make up & Flushing water requirements shall be met with STP treated water.

2.3 Pumps & Water Treatment Equipment

- It is proposed to provide all type of pumps including that for filter feed pumps, domestic water supply pumps, flushing water supply pumps (flushing pumps will be installed in STP), make up pump to STP treated tank from raw water (in case of failure/maintenance of STP), Plant Room Sump Pump etc. catering to proposed 'New OPD Block' at AIIMS New Delhi etc.

- Water Treatment Plant is being considered with various types of Filters and Softening Plant to ensure proper quality of water within acceptable limits of hardness, as well as bacteriological limits.

- Activated Carbon Filter/Pressurized Sand Filter/Dual Media Filters/Chlorinators for catering Domestic Water Requirements for Building. Softeners will be installed only where soft water requirement is there

like for HVAC Make up (For Cooling Towers, DG Sets etc.), other critical areas etc.

- Sufficient maintenance space shall be provided inside the water treatment plant room for accessibility of various pumps, panels etc. during repair & maintenance activities.

- Water Treatment Plant Room shall be suitably ventilated considering adequate ACPH as per NBC 2016 code.

- In proposed 'New OPD Block' minimum 1.5 bar pressure shall be maintained at each outlet for both hot and cold water supply.

- Suitable size Sumps with sufficient sized submersible pumps & level controllers to be considered in plant room for drainage. Also, proper slope to be provided in Water Treatment Pump room so that there is no stagnancy of water during any leakage & it is properly channelized to nearest drainage sump.

- Water treatment Pump Room shall be provided with safety equipment/items like suitable elastomeric mat (as per relevant IS codes) for Panels, fire buckets, fire extinguishers, hand gloves, safety charts, framed Schematic/SLD etc.

2.4 Basic Objectives

It is proposed to provide all sanitary engineering services and specification which are:

- High standards of materials and workmanship.
- Provide leak proof plumbing.
- Reliable and dependable engineering systems.
- Provide adequate safety and means to egress easily in case of fire.
- To plan the system in such a way as to minimize the energy requirements.
- To create minimum nuisance and disturbance to the environment.

2.5 Water Supply System

- Water requirements has been estimated on the basis of present acceptable standards, References from various sources such the National Building 2016 Code of India, Public Health Manuals, Ministry of Environment, Forests Guidelines, and CPWD Specifications etc.

2.6 Water Demand Projection

As per the estimated population and water demand norms discussed above, Total water demand for proposed 'New OPD Block' at AIIMS New Delhi has been estimated as 350 KLD, out of which domestic water demand is 247 KLD, Flushing demand is 103 KLD, Waste water generation is 297(Sewage generation-275 KLD and effluent generation: 22 KLD), 238 KLD treated water use in Flushing, Gardening, HVAC/DG Cooling. It may be noted that the loads and demands are indicative only and may vary as per actual requirements. It is proposed that all the Underground Tanks shall be constructed in the phase of execution itself.

Note: Domestic Treated Water Demand One day Storage breakup (i.e Total Domestic Water 247 KLD): 70% of 247 KLD Underground Domestic Treated Water Storage Tank Capacity = 173 KLD approx. and 30% of 247 KLD- Over Head Domestic Treated Water Storage Tank Capacity= 74 KLD)

2.7 Water Storage

2.7.1 Under Ground/Overhead Water Storage Tanks:-

It is proposed to have underground storage of water equal to minimum one day requirement in case of Raw/Domestic/Flushing /Soft Water Tank/ Irrigation Water Tank. The Over Head Tanks at Terrace level shall be half day capacity and made up of Either RCC or SS (Stainless Steel) Grade Tanks of 304 Grade.

Tube well water supply is collected in underground storage reservoirs with firefighting storage capacity. It is proposed to provide adequate static Storage for firefighting as per the norms of National Building Code 2016 and Local Fire Services. To prevent the stagnation of the water in the static storage tank, water would be made to circulate through overflow into the storage chamber for the domestic requirement.

Over flow from fire water tank will fill the raw water tank. After treatment of raw water up to portable water condition with the aid of water treatment plant water shall be stored in treated water tanks. Treated water will be further directed to Softener for catering needs of Filter back wash, HVAC/DG Set make up demand & shall be stored in soft water tanks.

In UG Tanks- Proper waterproofing & hydraulic testing as per relevant IS code before water filling /water testing of equipment.

SL. No	TANKS TYPE	UNDERGROUNDTANK CAPACITY(Approx.)
LOCATION - (NEW OPD BLOCK AT AIIMS NEW DELHI)		
1.	Fire Tank	300 KLD (2x 150 KLD) (As per NBC-2016) PART IV
2.	Raw Water Tanks In WTP– One (1) Day storage	375 KLD (1 x 200 KLD +1x 175 KLD)
3.	Domestic Water Tank(Treated Water Tank) In WTP - One (01) day storage	173 KLD (1 x 100 KLD+ 1 x 73 KLD)
4.	Soft Water Tanks	300 KLD

- The Tank Details & capacity given in the above table are indicative only. During detailed designing, if required and found necessary, the capacity / rating of the equipment may be upgraded subject to concurrence of Engineer-In-Charge.

2.7.2 Sizing of Pumps:

- The Flow Rate of Various Pumps (Water Supply Transfer Pumps, Softener Pumps) including the Sump Pumps (Drainage as well as Sewerage) shall be suitably selected to meet New OPD building water demand & of Sufficient Head depending upon Building Height, Pipe Friction losses, Bends etc. and other relevant Site Conditions. One Standby Pump to be considered in each & every variant. The Pumps shall be sized so as to ensure approximately 4 hours of operation time to fill the overhead tanks.

2.7.3 Construction of UGT-WTP:

- It is proposed the Underground Tank of required capacity catering to purpose shall be constructed.

Filter and Softener of required size shall also be installed catering to requirement of proposed 'New OPD Block' at AIIMS New Delhi.

Note: Proper marking to be done use of labels and tags on tanks, pumps, panels, FHC (Fire Hose Cabinet), EYH (External Yard Hydrant), Plumbing shaft & pipelines.

C. DESIGN BASIS REPORT OF REVERSE OSMOSIS PLANT (RO PLANT)

1. General

The EPC Contractor shall carry out Design, Engineering, Supply, Installation, Testing & Commissioning for RO System.

For meeting the requirements of laboratories other critical areas of proposed 'New OPD Block' at AIIMS New Delhi., Centralized Reverse Osmosis Plant is proposed at the terrace level of proposed 'New OPD Block' at AIIMS New Delhi. Portable type R.O Systems (preferably 9 to 18 LPH) is also proposed for Drinking facility & essential uses as per site requirements. The Output of RO Water should comply with the minimum requirement specified as per BIS: 10500 for Drinking Water.

2. Concept Planning

The Centralized RO shall comprise of RO High Pressure Feed Pumps (HPP), RO Raw Water Pumps (RWP) of Vertical multistage centrifugal type and suitable head to generate permeate flow as per requirements. The pump casing construction shall be preferably of SS-316 & impeller shall be also SS 316.

The motor shall be TEFC with min. IE-2/IE-3 efficiency suitable for a supply of 415V / 3 Phase at 50 Hz supply. The pump shall be supplied complete with base channel, coupling foundation bolts, pressure gauge, valves at inlet and outlet of each pump. One standby pump needs to be considered for each type.

Centralize R.O Plants shall be preferably placed at terrace floor for proposed 'New OPD Block' at AIIMS New Delhi.

Capacity of Centralized R.O Plant shall be selected based on meeting functional requirement (RO water demand of New OPD building/day) as stated above within minimum operating hours (preferably 10 hrs /day).

It shall consist of Package type RO module capable of giving a net treated water output as per requirement, Special Anti-scalant dosing system consisting of suitable no. HDPE tank of capacity as per requirement with a positive displacement diaphragm dosing pump having variable flow rate, Micron cartridge filter (shall be made of FDA compliant high quality poly propylene or some other suitable material) suitable for a flow rate as per requirements, CIP system (Cleaning in Place) consisting of HDPE tank with agitator complete with inlet/outlet, drain overflow etc. along with SS pump of capacity and cartridge filter of 10 micron, PH correction dosing system consisting of one HDPE tank with a positive displacement diaphragm dosing pump having variable flow rate, High

Pressure side piping from the RO high pressure pumps to the rejects stream control valves shall be of SS 316 using all SS fittings ball valves of suitable pressure rating shall be used till 50 mm size, above50 mm, flanged globe / water butterfly valves in SS construction shall be used.

Rejects pressure control valves shall be globe valve and feed flow control valve shall be of SS 316, SS 316 RO Water storage tank (Capacity as per requirements) of required thickness. Tank shall be provided with water flow meter at inlet & outlet, inlet / outlet valves, overflow / drain connection with MH cover.

Centralized control panel made out of CRCA sheet min. 2mm thick having main contactors for all pumps.

All control and power cabling along with double earthing between the panels shall be provided. An emergency stop push button shall be provided in the panel.

3. Portable RO Unit

Portable RO water unit shall be of suitable Flow rate (preferably 9 to 18 LPH) with min. 10-12 litre water storage or as per OEM standards meeting New OPD building drinking/cooking water requirement as per site requirement. The R.O Units shall be placed at different locations as per Site requirement. It should be complete with all interconnecting SS piping, valves, cartridge filters, diaphragm type pumps, RO membranes, cable, drain pipe & other related accessories. It shall be with UV unit. The system shall be suitable for a supply of 240 V AC / 50 Hz.

For proposed 'New OPD Block' at AIIMS New Delhi, the R.O Water requirement per bed is being considered at approximately 40 Liters& 5 Liters each for other supporting staffs& visitors.

With the number of New OPD Block beds being 15, the total requirement comes out to be 67600 Liter/day (Approx 600 Liters/day for Beds + for 67000 Liters/day for New OPD staffs, Doctors & Nurse's staff, maintenance staff, visitors etc.). Considering 8 to10 Hours of operation, the capacity of Centralized R.O Plants 2000 LPH (2 Nos.), R.O Plants 1000 LPH (3 Nos.), capacities as per site requirement should be proposed.

General Assembly drawing of RO system including the static load & dynamic load of RO system. The laminated copy of the RO flow chart (as built flow chart) including do and don't details, shall be fixed near the RO plant.

RO capacity (portable & centralized) mentioned above indicative only. During detailed designing, if required and found necessary, the capacity / rating of the equipment may be upgraded/ revised subject to concurrence of Engineer-In- Charge.

Water Supply Pipe for RO shall be of SS-316.

4. DESIGN BASIS (RO Plant)

Expected Treated Water Characteristics after RO(Reverse Osmosis Plant)	
Parameters	**Characteristics**
PH	6.0–7.0
Total DissolvedSolids	<50 ppm
Suspended solids	Nil
Turbidity	Asper
Iron asFe	Nil
Total Hardness	Less than5ppm

The Output of RO Water should comply with the BIS 10500 for Drinking Water.

5. INSTRUMENTS LIST including but not limited to (Provision to be considered in the Centralized R.O Plant)

Sr. No.	INSTRUMENT
1	Flow Indicator
2	Pressure Gauge
3	Pressure Switch (Low & High)
4	Conductivity Indicator
5	PH Meter etc.

D. DESIGN BASIS REPORT OF WATER STORAGE COOLER

Water storage cooler of approved make and brand with SS 304 body, ISI Marked, complete in respects - 230V Single Phase. Minimum flow rate of 40 litres per hour and storage capacity 80 litres as per requirement of drinking water to be provided at each floor of New OPD Building. The EPC Contractor shall also consider the provision of Centralized Water Cooler System instead of Individual Water Coolers at every Floors at the time of designing. However, the decision of Engineer-In-Charge in this regard shall be final and binding on the Contractor. The tentative Drinking Water requirement is 67KL. The EPC Contractor will submit the scheme and schematic drawings along with calculations as per NBC Norms and shall take prior approval of Engineer-In-Charge before execution of work.

E. DESIGN BASIS REPORT – PACKAGED TYPE SEWAGE TREATMENT PLANT (300 KLD) & EFFLUENT TREATMENT PLANT (30 KLD)

1. GENERAL

The EPC Contractor shall carry out Design, Engineering, Supply, Installation, Testing & Commissioning for proposed Packaged type Sewage Treatment Plant & Effluent Treatment Plant.

The source of sewage is soil and waste water namely from Toilets, Pantry/Kitchen etc. of proposed 'New OPD Block' at AIIMS New Delhi. Sewer lines for sewerage and pantry/kitchen waste needs to laid right up to the Sewage treatment area. All equipment must be designed to fit within the allowable space and height at site. Treated Waste Water shall be used for meeting Flushing /Cooling tower make up/Landscape irrigation water demand as much as possible. The packaged type STP capacity shall be sized taking into account ETP treated water. STP & ETP shall be designed considering preferably 16/20 hours of operation. Packaged type STP & ETP may be located in basement area of 'New OPD Block' at AIIMS New Delhi.

Sufficient maintenance space shall be provided inside the STP/ETP room for accessibility of various pumps, panels etc. during repair & maintenance activities.

STP/ETP Room shall be suitably ventilated considering adequate ACPH as per NBC 2016 code. Suitable size Sumps with sufficient sized submersible pumps & level indicators to be considered in plant room for drainage. Also, proper slope to be provided in STP/ETP room so that there is no Stagnancy of water during any leakage & it is properly channelized to nearest drainage sump.

STP/ETP Room shall be provided with safety equipment/items like suitable elastomeric mat (as per relevant IS codes) for Panels, fire buckets, fire extinguishers, hand gloves, safety charts, framed Flowchart, Schematic/SLD etc.

2. Packaged Sewage Treatment Plant (MBR Technology) - 300 KLD

Package type Sewage Treatment Plant of suitable Capacity and MBR Technology shall be provided to meet the specified outlet Parameters of water. It should comprise of pumps with maximum efficiency {non clogging mono block type of suitable capacity & head as per design}, blowers, bar screen chambers, grit chamber, Equalization tanks, Anoxic Tank, Aeration Tank, MBR Tank, Sludge Holding tank, Screw press, MBR Membrane-Hollow Fiber, level sensors, instruments, interconnecting piping of SS for all waste water piping and all air piping etc .pressure gauges, control panel, electrical wiring, etc. complete including all necessary safety requirements. Tanks are made of suitable size of MSFRP (MS Thickness - 5mm minimum with 2 layer of FRP for inside and Primer + 2 coat of epoxy minimum for outside). STP plant room shall be suitably ventilated. Proper marking on tanks, pumps & pipeline should be done, sustainable to weather condition.
One standby pump needs to be considered for each type. One set of Dewatering Pump(1W+1S) of capacity 25 m3/hr and 15 mtr head complete set including all electrical works in case surplus water from STP and during maintenance of same also.

STP Panels of required size and number of feeders as per technical requirement.

Online Monitoring System for BOD, COD, PH, TSS, should be complete in all respect. Hardware and

software shall be compatible to match with the Delhi Pollution Control Committee (DPCC) Server.

MBR Package Type (Complete MBR System including all components MBR Package Type shall be supplied in one lot and system supplier shall stand Guarantee for successful performance for 5 Years).

Installation of Additional softener (capacity as per design) for Cooling Towers make up STP treated Water is in the scope of EPC Contractor.

The shop drawings & design of STP/ETP shall be prepared by the agency. As per site condition/available space most of the unit will be placed in basement. The STP/ETP shall comprising of the all units of required size as per detail process and hydraulic design. The Design Drawing shall be carried as per provision of IS code. The agency has to get their Design Drawing checked and approved by IIT or any other govt. Engineering college approved by HSCC.

Sewage Quantity and Characteristics

I (A) IN PUT DATA (Raw Sewage)

Design Flow	-	300 KLD

PHYSICAL PROPERTIES

Colour	-	Mixed Colour
Odour	-	Mild Odour
Turbidity	-	Turbid

CHEMICAL PROPERTIES

pH	6.5 to 8.5
BOD	350 mg/l
COD	450 mg/l
Total Suspended Solids	250 mg/l
Oil and Grease	30 mg/l

I (B) OUT PUT DATA (Treated Sewage)

Treated Sewage Discharge	300 KLD

PHYSICAL PROPERTIES

Colour	-	Colourless
Odour	-	Odourless
Turbidity	-	Clear

CHEMICAL PROPERTIES

pH	6.5 to8.5
BOD	<5mg/l
COD	<10 mg/l

Total Suspended Solids	<5 mg/l
Oil and Grease	NIL

Note:- The above parameter are the minimum requirement. The treated water shall meet the prescribe standard by MOEF and Delhi Pollution Control Committee (DPCC).

3. Effluent Treatment Plant (30 KLD)-

The effluent generated namely from the Laboratories Area etc. shall be disposed by gravity system into the effluent treatment plant. After treatment in the ETP, the discharge shall be connected to the main sewer line /Equalization tank of proposed STP

In ETP, Flocculator, Flash Mixer & Chemical dosing system should be proposed for preliminary treatment of proposed 'New OPD Block' at AIIMS New Delhi. Labs effluent after which semi treated water will be treated through the entire proposed STP Plant.

Effluent Treatment Plant of suitable Capacity shall be provided to meet the specified outlet parameters of water. ETP shall comprise of oil and grease trap/chemical reaction with suitable chemical dosing, flash mixer, settler, neutralization chamber, dosing pump and agitator, holding tank, equalization tank, blower treated water transfer pump level sensors, instruments, interconnecting piping {PVC piping (10kg/sqcm)- For all submerged waste water piping, MS (C Class).

For all exposed air piping and flexible stainless steel pipe for submerged air piping. GI (C class) for all other water piping }, valves, tube settler, media in tube settler, chlorine dosing, pressure gauges, instruments, level sensors, non-clogging mono-block pumps of suitable capacity & head, lime/alum/polyelectrolyte dosing system consisting of ABS dosing pump with suitable capacity HDPE tank including all piping from the dozer to the reaction tank etc. control panel, high speed Agitator of SS 304 and Flocculator complete with single phase motor for flash mixer, electrical wiring, etc. complete including all necessary safety requirements.

One standby pump needs to be considered for each type.

All RCC/HDPE tanks shall be constructed as per requirements.

Separate ETP line of HDPE pipe (CLASS -PE 80, pressure rating PN-6, conforming to IS : 4427), will be used for effluent/ waste water system of the laboratories proposed 'New OPD Block' to ETP Plant. Water supply & drainage provision shall be provided in all laboratories based on functional area. Lab waste water/effluent pipeline should not connect to any waste or soil pipeline. The laminated copy of the flow chart shall be fixed in the ETP Area.

ETP Rooms shall be provided with safety equipment/items like suitable elastomeric mat (as per relevant IS codes) for Panels, fire buckets, fire extinguishers, hand gloves, safety charts, framed Schematic/SLD etc.

F. DESIGN BASIS REPORT-HOT WATER SYSTEM- HEAT PUMP AND ITS INTEGRATION WITH SOLAR HOT WATER SYSTEM

1.0 General

The EPC Contractor shall carry out Design, Engineering, Supply, Installation, Testing & Commissioning for Heat Pump and its integration with SWH system. Hot water proposed New OPD building in the project is 74 cum/day

Entire Hot Water Requirement of the proposed 'New OPD Block' at AIIMS New Delhi shall be met from Heat Pump and its integration with SWH system as per green building requirements.

The EPC Contractor shall be responsible for designing, planning, supply, installation and testing and commissioning of entire Hot Water supply scheme/ system. The EPC Contractor shall submit the Technical Data Sheet, Schematic Drawings and shall take prior approval of Engineer-In-Charge before execution of works.

2.0 Electric Water Heaters (Geysers)

It is proposed that Electric Geysers shall be also provided for proposed 'New OPD Block' at AIIMS New Delhi. Hot Water needs to be considered for proposed 'New OPD Block' including showers, Surgical Instrument cleaning, kitchen/Pantry sinks, Labs, wash basins etc. depending upon site requirement.

3.0 Solar Hot Water Heating

Thermo Syphon type solar water heating system with copper-copper type flat plate collector with stainless steel insulated hot water storage tank made of stainless steel 304- food grade quality with 100 mm Glass wool insulation and cladding with 24 SWG Aluminum sheet, heat exchanger made of SS pipes shall be provided inside the Solar Tank and suitable make up tank for heat exchanger circuit. The solar collector shall be arranged on the roof of the building in such a way that shadow can be avoided. The solar hot water will supply the hot water to all the geyser, in view of this provision the backup electrical heating system at terrace hot water tank will be provided for non-solar days. The Solar hot water supply pipeline shall be insulated.

4.0 Heat Pump

The heat pump should be complete with hermetic scroll compressors , Four way reversing valve, Electronic Expansion Valve, defrosting cycle, Liquid receiver, Copper tube/ aluminium fins air cooled heat exchanger with Axial fans with IP54 protection, braze plate type(SS316) primary heat exchanger, anti-vibration rubber mounts with factory assembled with required fittings, valves, piping with proper insulation, Electrical panel mounted on a civil platform including the disconnect switch with suitable vibration isolators etc and integrating with the Solar Water Heating System as per direction of Engineer-In-Charge as requirement as site.

The per capita per day hot water demand for proposed 'New OPD Block' at AIIMS New Delhi is considered to be 30 LPCD for per beds and 5 LPCD for other building staffs etc. The requirement of total Hot water proposed New OPD building in the project is 74 cum/day. During detail designing the capacity may vary.

G. DESIGN BASIS REPORT- FIRE FIGHTING SYSTEM

1.0 GENERAL

The EPC Contractor shall carry out Design, Engineering, Supply, Installation, and Testing & Commissioning of Fire Fighting Works.

Fire Fighting system shall comprise of Wet Riser /Hydrant (Internal & External), Sprinkler system, Gas flooding system for panels, Computer Rooms & other sensitive areas, Fire Extinguishers, Fire Signage's near Fireman's lift, Fire Exits, Fire Brigade Inlet/Draw Out Connections etc. proposed for New OPD Building.

Suitable size shafts, cutouts, Niche, openings etc shall be provided to facilitate installation of Pipelines etc. in all floor slabs of building for various service areas, as required. All shafts, cutouts, Niche, openings etc provided on floor slabs shall be suitably closed after laying of services lines as per fire safety norms as per NBC 2016. Doors shall be provided for all shafts at all floors as per fire safety norms as per NBC 2016.

The ratings and capacities of various equipments are based on NBC 2016 Part - IV and subject to revision during detailed designing stage.

The firefighting system is proposed on basis of type of occupancy as per NBC 2016 Part -IV and building Height. The system proposed are water based and gas based. Water based Fire suppression system is having piping network inside and outside the buildings with internal and external Hydrants, First Aid Hose reel at regular intervals according to various type of occupancy. The distribution system is finally connected to ring main system for firefighting.

Sprinkler system with water distribution pipes sprinkler heads above and below false ceiling is designed to actuate automatically to extinguish the fire by discharge of water when room temperature crosses 68˚ C in case of fire.

The following standards, bye-law, manual has been followed in designing the firefighting system:-

- Relevant IS codes published by Bureau of Indian Standards.
- National Building code Part IV for fire Protection System 2016.
- Valves and Accessories shall be of BIS/UL listed and FM approved
- CPWD General Specifications for Electrical Works-part V (Wet Riser & Sprinkler System- 2006).

2.0 WATER REQUIREMENTS:

Water services for Hydrants and sprinkler system shall be stored in underground / overhead tanks.

2.1 Underground Static Fire tank:-

Underground Fire reservoir/tank shall be provided of 300 KL capacity as per latest NBC-2016 requirement/ Local Fire Authority Bye laws.

2.2 Overhead storage fire tank:-

Overhead fire water tanks on the terrace will be provided for down comer system and as supplementary fire storage as per NBC requirement/ Bye laws.

The effective capacity of reservoir for various type of occupancy as per Table 7 of NBC 2016 Part – 4.

2.3 SYSTEM DESCRIPTION

The Fire Fighting System shall consist of Diesel Fire Pumps, Electrical Driven Fire Hydrant pump, Electrical Driven Sprinkler pump, Water Curtain pump, Jockey Pumps, Fire hydrant (Internal & External), Air Cushion Tank with air release valves for all risers, Down comer system with /without terrace pumps, Pressure vessel, ,associated instruments, cabling, piping (internal & external), valves, Fire Brigade inlet connections, draw out connections for each wet riser, fire signage's, extinguishers, Gas based fire suppression system, Fire detectors, Discharge Nozzles, control panel etc. has to be provided as per NBC 2016 requirements. Jockey pumps shall maintain pressure in all water lines for Hydrants & Sprinklers fully charged under pressure for full Automatic operation in case of fire. In case of slow pressure loss, jockey pump will start and at about 1 kg/cm2 pressure loss in the system, jockey pump will not start and main pump will start automatically.

2.4 Shafts/Cutouts & Room Provisions:-

Minimum size of shafts to be provided to accommodate sprinkler/wet riser/down comer /drain pipes etc. will be 1200 X 600 MM (approx.) and to be provided at suitable locations as per relevant codes & standards.

Shafts & Inspection doors shall be minimum of 120 minutes fire rated or as desired by relevant codes.

Fire Control Room to be provided In Ground Floor which shall be easily accessible & shall accommodate all fire alarm system panel/public address system panel etc.

2.5 Egress components:-

Egress components to be considered are the no. of exits to which access is provided, capacity of exit access, travel distance to an exit, directional exit etc.

The width of corridors, aisles/ramps required for exit access shall be sufficient to ensure smooth flow of occupants to exit. Exits shall be so located that the travel distance on the floor shall not exceed distance as mentioned in NBC 2016.

No exit doorway shall be less than 1000 mm in width except in assembly building where door width shall not be less than 2000 mm in width. All exit doorways shall not be less than 2000 mm in height.

The requirements of nos. of staircases shall supplement the requirements of different occupancies as per NBC 2016 norms.

2.6 Pressurization &Compartment System:-

Pressurization of enclosed Staircase/Lift Lobby/Lift well provisions to be considered as per NBC 2016 requirements.

Mechanical ventilation system for basement to be designed to permit min. 12 ACPH or as per relevant codes in case of fire or distress call.

All floors shall be compartmented / zoned with area of each compartment conforming to NBC 2016 provisions depending upon usage & area/building type.

Smoke exhaust fans in mechanical ventilation system shall be fire rated &shall withstand 250 degree Celsius for 120 minutes.

2.7 Access to Fire Tenders:-

For access to fire tenders, a clear motorable approach of at least 6 meters shall be kept for movement of fire tenders all around the building. The width of the main entrance to the complex shall not be less than 6.0 meters.

2.8 Location& size of Fire Pump House:-

The fire pump house shall be located adjacent to underground fire tanks. The slab of UGT shall be designed structurally to take the load of fire rescue tender (if coming in the drive way area).

The base of the water tank shall be kept at a level preferably 450 mm to 600 mm (or as desired as per codes) above the level of base of fire pump room so that pumps operate under positive suction conditions & the entire water capacity is above the body of the fire pumps as per best fire engineering practice.

Fire Pump House shall be separated by fire walls all around & doors shall be protected by fire doors (120 mins rated).

The size of Fire pump house & distance between pumps, pumps & walls, panel & wall etc. shall be as per latest IS codes/NBC 2016.

Sufficient maintenance space shall be provided inside the fire plant room for accessibility of various pumps, panels etc. during repair & maintenance activities.

Fire Plant Room shall be suitably ventilated considering adequate ACPH as per NBC 2016 code.

Suitable size Sumps with sufficient sized submersible pumps & level indicators to be considered in plant room for drainage. Also, proper slope to be provided in Fire Pump room so that there is no stagnancy of water during any leakage & it is properly channelized to nearest drainage sump.

Fire fighting pipes from Fire Pump Room to New OPD building shall be laid underground at suitable depth as per CPWD specs. Adequate no. of hume pipes having suitable dia. with spare shall be laid across the roads/pathways etc.

Fire Pump Room shall be provided with safety equipment/items like suitable elastomeric mat (as per relevant IS codes) for Panels, fire buckets, fire extinguishers, hand gloves, safety charts, framed Schematic/SLD etc.

2.9 Pumps & related Equipment/Piping & Related Accessories:-

Quantity & Type of Fire Pumps (Electric driven Jockey/ Electric driven Terrace Booster/ Electric driven Hydrant/ Electric driven Sprinkler/ Diesel driven Pumps) shall conform to NBC 2016/relevant IS codes. All fire pumps shall be with positive suction arrangements.

Capacity of the Pumps shall be selected as per latest NBC 2016 /IS codes & Head as per Building Height &

Frictional losses due to bends, pipe lengths etc.

Horizontally mounted split case single/multi stage, single/multi outlet energy efficient centrifugal pump, suitable for operation on 415 volts ± 10%, 3 phase, 50 HZ A.C supply, IE-2 Class efficiency motor, complete with flexible coupling (double arch) and coupling guard as required. Fire pump having C.I. Body, bronze/gunmetal impeller and S.S. Shaft with mechanical seal to be considered. Casing shall be designed to withstand 1.5 times the working pressure.

Diesel driven pump with engine (Min. 4 Cylinders), water cooled radiator based cooling & shall be complete with cooling system, fuel system, fuel tank (to cater for min. 2 hours), inter connecting piping, starting system, governing system, PRV, exhaust system with residential silencer suitable for outdoor installation & silencer piping shall be extended upto 1 m, outside pump house duly insulated with 50 mm thick glass wool/ rock wool & 1 mm thick aluminum cladding. Flexible connection in between exhaust pipe & pump needs to be provided to suppress vibrations.

All the fire pumps shall cut-in automatically based on the pressure settings in pressure switch, so as to ensure that the entire fire main line, risers etc. are pressurized on a continuous basis.

The jockey pump shall automatically cut-out based on the pressure settings of pressure switch. However, the remaining fire pumps shall cut off only in the manual mode.

All Foundation (PCC/RCC) for Equipment including foundation bolts & vibration isolation springs/pads to be provided.

Mild steel class _C' pipes confirming to IS: 1239/3589 including all ductile iron fittings like bends, elbows, tees, couplings etc. shall be used in Fire Fighting system.

GI Suspenders, Brackets & Floor/Wall supports for suspending / supporting pipes to be provided.

Till 50 mm dia. Pipe, screwed joints with DI Threaded Fittings shall be provided & 65 mm dia. & above, DI Grooved Fittings joints to be considered.

Suction dia. & discharge dia. of pumps shall be as per pump discharge as per OEM standards.

The entire pipe work (above ground), pump etc. shall be painted with one coat of primer & two or more coat of red colour shade no. 536 of IS:5 (Post Office synthetic enameled red paint) as per directions of Engineer- in-Charge.

At terrace/Remote level hydrant, minimum 3.5 kg/sqcm pressure shall be maintained.

The pipeline shall be designed with suitable flow velocity & friction factor as per relevant standards.

All pipes below ground will be protected against soil corrosion by wrapping & coating material as per IS: 10221.

Pipes of 150 mm dia. & below, will conform to IS: 1239. Pipes of 200 mm dia. & above will conform to IS:3589.

Suitable Nos. of Installation control Valve (ICVs) to be considered conforming to latest IS codes depending

upon no. of sprinklers.

All necessary valves of PN 16 rating (min.) like butterfly/ globe/ gate/ non return/ sluice, Y/Pot Strainers, pressure gauges etc. to be considered as per requirement (controlling flow/ isolating/one way flow etc.) & meeting the functionality.

Pressure vessels shall be provided with all the terrace pumps & at plant room also.

All Pumps shall be provided with flexible bellows (double arch, PN-16 Rating) to dampen vibration/noise at source.

Vibration Isolators/Anti Vibration Pads needs to be provided for all pumps to absorb vibration at source. Orifice Plate shall be considered to reduce pressure on individual hydrant to maintain operating pressure of 3.5 kg/sqcm.

Air vessel/Pressure vessel of suitable size need to be provided in fire plant room & near terrace pump. To compensate for slight losses of pressure in the system and to provide an air cushion for counteracting pressure surges / water hammer in the pipe work air vessel conforming to IS: 3844 shall be furnished in the pump room near pump. The air vessel shall normally be half full with water and remaining filled with air which shall be under compression when the system is in normal operation.

Air cushion tanks with air release valves needs to be provided for all risers of sprinkler/hydrant pipes.

Pump/ Motor placed on Terrace /open area should be weather proof type & required size of canopy also needs to be provided.

All pipes should be placed at fixed support. Pedestals at suitable distance to be provided as per requirements & directions of Engineer-Incharge

EPC Contractor shall be responsible for obtaining of Pre-Construction Fire NOC and Post Construction Fire NOC from local Fire Department without any extra cost.

2.9.1No. of Pumps with capacities proposed in Fire Pump Room:-

Sl. No.	Fire pump RoomEquipmentasperNBC2016	Remarks
1.	2850 LPM – 2 Nos. (Electric Driven Pump (For Sprinkler& Wet Risers)	Considering Stringency of Building
2.	2850LPM–1No. (Diesel Driven Pump (For Both Sprinkler & Wet Risers)	Considering Stringency of Building
3	180LPM – 2 Nos. (Jockey Pump(For Sprinkler &Wet Risers)	Considering Stringency of Building
4	Water Curtain Pump -2850 LPM 50 M Head – 1 No.	Considering Stringency of Building

3.0 Wet Riser & Hydrants System:-

3.1 External Yard Hydrants

External yard hydrants shall be of ‗Stand Post' type conforming to IS: 908 and comprising of stand post for single or double (conforming to NBC 2016) outlet with oblique pattern hydrant valve, Controlled Percolating (CP) Hose ISI marked (IS:8423) 63 mm dia. x 15 m long complete with instantaneous type Stainless Steel 63 mm dia. ISI marked Male & Female couplings, 63mm dia. Stainless Steel branch pipe with Stainless Steel l nozzle of 20 mm nominal bore outlet with instantaneous type 63 mm dia. coupling M.S. fire hose weather proof cabinet (750x600x250mm approx. or as per requirement) made out of 16 gauge M.S. sheet capable of accommodating landing valve, hose pipes, branch pipe, nozzle, fittings & accessories. The box shall have a front glass door with lock and key arrangement & shall be painted with one coat of primer & two coat of finished stove enameled post office red colour paint & "External Fire Hydrant" written on front.

The ring main around the building will be laid min. 1 m below ground level, 2 m away, within 15 m from face of the building.

The distance between the external hydrant post shall be considered as per hazard classification conforming to relevant IS codes. However, maximum distance shall be 45 m.

3.2 Internal Hydrants

It shall consists of Type -A- single headed, Stainless Steel ISI marked oblique pattern hydrant landing valve with 80 mm dia. flange inlet and 63 mm dia. instantaneous type female out let, swinging type First Aid hose reel in red colour drum with 36 mtr long and 20 mm dia. heavy duty rubber water hose, 20 mm dia. globe valve stop cock, terminating with Stainless Steel coupling & nozzle of 5mm outlet with shut off valve, 63mm dia. Stainless Steel branch pipe with Stainless Steel nozzle of 20 mm nominal bore outlet with instantaneous type 63 mm dia. coupling, fireman's axe with heavy duty insulated rubber handle, 2 Nos. of 15 m long Non Percolating Hose Pipe, suitable size of MS door made up of 16 gauge MS Sheet capable of accommodating fire hose reel, landing valve, hose pipes, fittings. The door shall have a front glass with lock and key arrangement & shall be painted with one coat of primer & two coat of finished stove enameled post office red colour paint & "Internal Fire Hydrant" written on front.

Quantity for the same need to conform to NBC 2016/relevant IS codes.

One no. pressure gauge & 80 mm dia CI Butterfly Valve to be provided in each internal hydrant riser per floor.

No. of risers/floor in each building shall be governed by the max. Travel distance as specified in NBC 2016.

3.3 Fire Brigade Inlet Connections/ Draw Out Connection

4 Way Fire Brigade Inlet connection complete with all accessories (sluice valve/NRV etc.) shall be provided for connection to Ring mains, Wet riser/down comer system, underground tank.

2 way draw out connection to be considered near fire Pump House.

3.4 Sprinkler System:-

Automatic sprinkler system shall be provided as per requirements of NBC 2016 Part IV, relevant IS Code &IS 15105: 2002.

As per hazard classifications, maximum/minimum distance between sprinklers, between sprinkler & walls to be maintained. Coverage area of each sprinkler & Assumed maximum area of operation shall conform to relevant IS codes.

Side wall/pendant/upright sprinklers to be provided as per requirements, shall be UL & FM certified, complete with rosette plate, glass bulb temperature rating of 68 degree celcius (red colour),Quick response type, chrome plated finish & in compliance with NBC 2016 & relevant IS codes.

Suitable Nos. of Installation control Valve (ICVs) to be considered consisting all accessories (Butterfly valve, Y strainer, water gong, Alarm Valve ,drain valve, Pressure gauge etc.) conforming to latest IS codes.

Sprinkler shall be selected as per temperature rating which shall be based on usage type. Colour code shall be in conformance to relevant IS codes.

Inspection test assembly/zonal control valve complete with flow switch & other related accessories

(NRV/Butterfly, drain valve, Pressure gauge, sight glass etc.) to be provided in each floor sprinkler riser.

Flexible pipe for connecting sprinklers (braided type) & UL & FM certified to be considered of various sizes as per site conditions to maintain symmetry & crossing of ducts & other utilities.

Water Curtains: -Brass water curtain nozzles with 15 mm dia nickel chrome plated bras, BSPT (K factor as per design) of approved make and manufacturer.

Motorized butterfly valves, Deluge valve (to be used for water curtains) UL listed with wet pilot basic trim assembly for DVA with test and alarm, drip and drain valve with water motor gong complete and Separate Mild steel(MS) class_C'Water curtain pipeline for basement area including Water curtain pump.

3.5 Portable Fire Extinguishers:-

The sufficient qty. of portable/trolley mounted type fire extinguishers (Gas Based stored pressure type CO2 type /Ammonium Phosphate Type/ Mechanical Foam etc.) shall be provided at all levels of the building, plant room, basement, substation etc. at strategic locations as per requirements, generally to follow NBC- 2016 and IS – 2190: 1992 to extinguish fire of class A, B ,C.

Location of the Fire Extinguishers shall be considered near all the Internal Hydrants, HT Panel Room, LT Panel Room, Lift Machine Room, Fire Pump House, Server Room, UPS Room, Fire Control Room, Security Control Room, Car Parking, STP/ETP/WTP etc. etc.

K (Kitchen) type 6 Ltr. Stored Pressure type Fire Extinguisher, with UGTS Pressure Gauge, Deep Drawn, Stainless Steel Body, EPDM Rubber Hose with SS Nozzle, CE Mark Valve with Safety Release Provision, Helium Leak Detection Tested, Controllable discharge mechanism applicable on Class K (Kitchen) Fire, maintenance, care and refilling as per IS 2190:2010

Modular type ceiling mounted clean agent (FE-36) Hexaflouropropane type fire extinguisher(10 Kg) , ISI Marked IS 15683:2006, Gas listed under EPA SNAP, having sprinkler with glass bulb rated at 68 deg.C, CE Marked Valve, suitable for Class A,B and C type of fires, conforming to ISO 14520, FM approved and UL listed.- For Electrical, UPS, Server, Battery Rooms etc.

Sand buckets 1 set of 9 liter capacity for each DG Set/Transformer/Diesel Driven Pump shall be provided. It shall also be in line with relevant norms & standards.

Clean agent fire extinguishers to be provided in laboratories.

All Fire Extinguishers shall be Halon/ Zero ODP Free as per GRIHA.

4. For Server Rooms & Data Centre:

The flooding system of fire detection and quenching is proposed in all Low Voltage Equipment rooms where Water sprinklers cannot be used. The Gas cylinder assembly should be UL/FM approved with seamless CCOE approved cylinder and will be connected to discharge nozzles through metal Piping. The master cylinder Kit fitted on Gas cylinder will be operated through separate Fire detection Panel and will release zero Ozone depletion potential Gas through the nozzles in case of fire. The SHOP drawings along with Technical Data Sheet (TDS) for the same shall be prepared by EPC Contractor and works shall be executed after prior approval of Engineer-In-Charge.

5. For Electrical panels:

Tube based Fire protection system is used in the Electrical Panels to be installed in Electric substations. The detection Tube shall be installed throughout the compartment of panels. The location and spacing of tube shall be above the hazard to be protected. Cylinder equipped with brass valve, pressure Gauge isolation valve will be fitted on the wall of the panel with suitable brackets and will be connected to the detection tube. in case of fire the tube shall rupture at a point. The rupture Tube shall result in formation of discharge point and release Gas Agent in Uniform pattern.The SHOP drawings along with Technical Data Sheet(TDS) for the same shall be prepared by EPC Contractor and works shall be executed after prior approval of Engineer-In-Charge.

6. Fire Suppression System for Kitchen Hoods

The specifications for design, materials, testing and installation of Automated Kitchen Fire Suppression System that are to be protected using 100% wet chemical extinguishing system shall include the following: -

1. The system shall be a pre-engineered with with ANSI/UL-300, ANSI/UL-1254, UL-Ex.6885, UL (Underwriters Laboratories), wet chemical, stored pressure type system distributing to a network of fixed nozzles. The wet chemical shall be a liquid fire suppressant like Aqueous Potassium Carbonate or Potassium Acetate based solution that suppresses cooking grease fires both through saponification and cooling. The agent stored in a cylinder shall be working at 195 psig (1344 kpa) @70oF (21oC). The unit shall be self-contained and shall be self-equipped with its own non-electric automatic detection system to detect the fire and wet chemical release into the hood, suppressing the fire. In case the Firm uses a patented chemical and does not wish to disclose the composition, it needs to get a certificate from a reputed Fire Test Laboratory like UL that the chemical is suitable for "K" class of fires. The System shall be designed to completely extinguish the "K" class of fires (Fires due to Vegetable Oils, Animal proteins and Fats).

2) **Modes of Operation**

a) The system shall be capable of operating independently in automatic, remote and manual modes.
b) Shielded Cable should be used instead of conduit and corner pulleys to connect the fusible link system.
c) If fitters are present in the ventilation hood, fusible link bracket and conduit should not be used.
d) The unit should be self-contained and shall be self-equipped with its own non-electric automatic detection system to detect the fire and wet chemical release into the hood to suppress the fire.

3) **Component:-**

a) Extinguishing Agent& Releasing Unit;-Aqueous Potassium Carbonate or Potassium Acetate based solution with non-electrical operated releasing unit.
b) Discharge Nozzles: -Specific Nozzle shall be used for specific appliances
c) Operating Devices: All operating devices like manual pull stations, break glass, gas shut off valve shall

be listed.

d) Piping, fittings, Tubing and Hose: Pipes and associated fittings shall be of non- combustible material having physical and chemical characteristics compatible with the wet chemical solution.
e) Detectors: The system shall comprise of fusible link type of detection unit. All fusible links should be installed with the help of shielded cable. Fusible link holder should be used to eliminate cut and crimp. The whole detection line shall be continuous.

7.0 Fire Signage:-

Various types of signage are proposed in the complex as per NBC 2016 Part -4. Material of signage shall be of acrylic/aluminum of required dimensions. At every floor near Lift landing diagram showing stairways shall be provided mentioning instructions - 'IN CASE OF FIRE USE STAIRS UNLESS INSTRUCTED OTHERWISE'.

The signage shall be above call push button in Lift Lobby. Floor Signage will be provided in each floor within the staircase & should easily readable. Each corridor of every floor will have directional signage indicating Fire Escape route. These Signage may be LED lit with UPS power backup or of photo Luminescent paint. So that they will be visible in dark in case of power failure.

8.0 Electrical Works related to Fire Fighting System:-

Firefighting panel of suitable size incomer & sufficient nos. of outgoing feeders for all pumps along with spares/spaces to be provided.

Power cabling of suitable size to be laid from LT panel to firefighting panel. Power cabling of suitable size from firefighting panel to fire pumps to be laid. Control cabling from fire pumps to firefighting panel &firefighting panel to pressure switch to be done. Suspenders and/or cable trays for laying cables to be used. For sprinkler system, fire annunciation panel needs to be considered.

Motor shall be TEFC squirrel cage AC induction type. The motor shall be suitable for continuous duty & rating necessary to drive the pump at 150% of its rated discharge with at least 65% rated head. Motor shall be with class F insulation & IE-2 class efficiency. DOL/star delta starter to be provided as per H.P rating of motors.

Adequate no. of NO/NC contacts for interlocks, indicating lamps, remote operation etc. shall be provided on starter/contactor.

Metallic body of all motors, medium voltage equipment etc. shall be connected by 2 separate & distinct earth conductors to the earth stations of the installations. Looping of such body earth conductors is acceptable from one equipment to another.

9.0 Design Calculation

9.1 PUMPING HEADCALCULATION: (Mentioned Below or as per site conditions)

Total height of the building – between 45.50 mtrs. (From average ground level around the building to the terrace floor).

A minimum of 3.5 kg / cm2 of pressure required to be provided at the farthest / last hydrant point. Plus a minimum of 10% of Hydraulic pressure loss is considered in the entire system.

Total Head = 35 Mtr + height of hydrant at Terrace Level from pump level + 6% length of pipe from pump to

terrace level hydrant

7.2 HYDRAULICCALCULATIONS

Sprinkler System shall be designed/calculate as per NBC-2016, local fire bye laws & IS: 15105.

H. DESIGN BASIS REPORT-SOLID WASTE GENERATION & MANAGEMENT

1.0 General

The EPC Contractor shall carry out Design, Engineering, Supply, Installation, Testing & Commissioning for Solid Waste Generation and Management System.

The Solid waste generated from the project will be collected and managed as per Solid Waste Management Rules, 2016. The project will adopt a systematic approach for solid waste collection and disposal. The domestic solid waste will be generated by the occupants of the Hostel, Visitors, Patients, and Staff; pertains to the two categories, Bio- degradable and Non-biodegradable. These solid wastes will be collected separately by putting different types of separate bins at the source of generation. It is estimated that maximum solid waste generation would be about 4,142.75 kg/day and 446.4 kg of sludge (wet basis).

1.1 Solid Waste during Construction Phase

The table below gives an estimate of the average composition of waste generated from the onsite construction activities.

Indicative Solid Waste Composition during Construction Phase

Sl.	Constituents	Percentage composition
1	Soil, Sand and Gravel	34.99
2	Brick and Masonry	29.95
3	Concrete	24.98
4	Metal	4.97
5	Bitumen	2.04
6	Wood	2.04
7	Other	1.02
	Total	**100**

Source: TIFAC Report ―Utilization of Waste from Construction Industry, 2001

1.2 Solid Waste during Operation Phase:

The table below gives an estimate of the average composition of waste generated from the onsite operation activities.

Proposed Solid Waste Generation Rate

SOLID WASTE CALCULATION				
S. No.	**Category of Solid Waste**	**Waste Generation**	**Total Population**	**Waste Generated (kg/day)**
A				
1	NEW OPD BLOCK Refuse	0.05 to 0.2	13400	2680.00
2	Bed	1.5 kg/bed	15	22.50
	Total			**2702.50**

*Source: Manual on Municipal Solid Waste Management, published by Central Public Health andEnvironmental Engineering Organization (CPHEEO), Ministry of Urban Development, Government of India. It is proposed that various types of solid waste generated shall be treated as under:-

1)For Bio Medical waste, Integrated Sterilized Shredder of optimum capacity (2 x 150 Liters tentatively) shall be provided to Minimize the volume of and sterilizing before disposing it off.

2) For Bio degradable solid waste like kitchen waste, paper, vegetation etc., the waste shall be collected & segregated at source in various designated bins. Total bio degradable waste collected shall be handed over to municipal authority for further disposal.

3) Non bio degradable solid waste like glass, e-wastes, bulbs etc. shall be collected at one place & handed over to the designated authorized vendor.

Solid Waste Generation mentioned as above is indicative only. During detailed designing, if required and found necessary, the capacity/rating of the equipment maybe upgraded/revised subject to concurrence of Engineer-In-Charge.

SUPER SPECIALITY OPD BLOCK

AT

AIIMS NEW DELHI.

DESIGN BASIS REPORT

ELECTRICAL

A. DESIGN BASIS REPORT OF ELECTRICAL AND LV WORKS:

1. GENERAL

a) The Electrical & ELV DBR given below shall be read in conjunction with the Detailed Electrical Specification and CPWD Specifications 2023 (Part I & Part II) of Electrical Works, List of Makes & overall other contract documents forming part of the turnkey contract. In case of any variance, electrical requirements given here in DBR or stringent among those shall supersede any other requirements mentioned in any other parts of EPC contract document & the instructions / directions of engineer-in-charge will be binding on the contractor.

b) The EPC Contractor shall carry out Design, Engineering, Supply, Installation, Testing & Commissioning of complete Internal & External Electrification works including Low Voltage (LV) and other works as required for smooth functioning of the proposed Super Speciality OPD Block at AIIMS New Delhi. All Electrical & LV works shall be designed and executed as per latest codes of practice for Electrical installations and meeting the requirements of Indian Electricity Rules/ Act, applicable I.S. Codes/ Rules and relevant I.S./ CPWD Specifications / NEC 2023 for electrical works, Special requirements of Electricity Board latest up to date.

c) Green building rating needs to implemented as mentioned in the contract as per GRIHA.

d) Ensure that all the Electrical equipments installed within the project (whichever applicable as per Green Building Rating) is either BEE star labelled or of equivalent performance as per Green Building Rating.

2. SCOPE OF WORK

The entire Design Basis Report, Specifications, List of Makes, Special Conditions of Contract etc. shall form Part of the Scope of Work.

Electrical & Allied Services' required for **Super Speciality OPD Block At AIIMS New Delhi.** covers Electric Sub Stations, Transformers, D.G Sets and synchronization panel Installation work, Internal Electrical Installations, HT/ LT Panels, Capacitor Panels, Active Harmonic Filters, Sub Distribution Panels, Distribution Boards, External Electrical Installations, HT and LT Cables, Rising main/ Busduct, Road/ Compound Lighting, External Lighting System, Centralized UPS system, Fire suppression system, Internal & External Electrical Distribution work. It shall also include Grid interactive Solar power System, IP based Telephones System (IPABX) with Telephone instruments , IP Based CCTV system, Addressable Fire detection and Alarm System, IP based Public Address System, Lighting management control, PIR sensor, DALI Control System, Boom Barrier System, IBMS System, Lighting Protection system, Surge protection, Earthing system, Two way counter communication system, , MRL Lifts, Escalators etc. Any other item missed out but essential for work will also be considered.

Suitable size shafts, cutouts, Niche, openings etc. shall be provided to facilitate installation of Rising mains, Cable Trays, DB's etc. in all floor slabs of building for various service areas, as required. All shafts, cutouts, Niche, openings etc. provided on floor slabs shall be suitably closed by fire proof material after laying of services lines as per fire safety norms/ as per NBC 2016 amended upto date. Doors shall be provided for all shafts at all floors as per fire safety norms as per NBC 2016 amended upto date. All the DB shall be installed in Niche / cabinet and shall be closed with lockable doors. The EPC Contractor shall provide a Tri-party agreement between Client, and the Original Equipment Manufacturer (OEM) for seven years of software and hardware support for healthy functioning of the equipment's of all low voltage systems (LV Systems). This includes CCTV system, IPABX System Nurse Call Bell system, Lighting Control System, Building Management System, Access control etc. The agreement stipulates that the EPC Contractor and OEM will provide ongoing support and updates to ensure these systems remain functional and upto date.

Detailed scope is as under.

2.1 ELECTRICAL POWER REQUIREMENT

The Electrical Load requirement has been calculated on the basis electrical load requirements for light, Power, Central Air Conditioning Plant, Medical Equipment's/Services, Lifts, Escalators, Pumps, External Lightning, STP, WTP etc.
Peak Electrical Connected load as under-

For ESS – Connected load works out to **10000.0 KW.** Considering overall diversity factor Peak Load Demand will be **6000.0 KW.**

2.2 SOURCE OF SUPPLY

Electricity supply on 11kV upto Metering room for meeting electrical load requirements shall be provided by **State Electricity Board.** RMU/Metering kiosk/battery charger and 11KV HT cable etc. as per state electricity norms within the complex shall be provided by of EPC contractor.

11 KV power shall be tapped through 11 KV HT cables from outgoing feeders of 11 KV HT Panel in Metering Room. 11kV HT power Supply to the proposed 11/0.433 KV Substation for the Complex. Digital Energy Meters shall be provided in 11 kV Incoming Feeders tapped from 11kV switchboards.

The EPC contractor shall coordinate with State Electricity Board for execution of above work.

2.3 ELECTRIC SUB-STATIONS

The rating and capacity of equipment indicated herein below are minimum to be provided. However, during detailed designing, if required and found necessary, the capacity / rating of the equipment may be increased by the EPC Contractor.

11/ 0.433 kV Electric Substation will be established by the EPC Contractor in **Super Speciality OPD Block At AIIMS New Delhi** to meet the Peak Electrical Load Demand for OPD Building.

ESS SUMMERY				
S. No.	**SUBSTATION**	**TRANSFORMER**	**DG SET**	**CAPACITOR &AHF PANEL**
1	ESS (11/.433KV)	4 x 2000 KVA	4 x 1000 KVA	4 Set (800 KVAR Capacitor 14% Detuned Reactor and 300 Amp Active Harmonic Filter)

2.3.1 ESS (Super Speciality OPD Block)

As per projected peak load demand on ESS, 4 Nos. Dry type Transformers with Automatic On Load Tap Changer of capacity 4 X 2000 KVA (3W+1S) are proposed with RTCC Panels. Maximum allowable transformer losses at 50% & 100% load shall comply to IS- 2026 for dry type transformer super ECBC building norms amended up to date. It will meet the electrical load requirement of OPD building and Common services etc.

The substation will have 11 KV HT Panel board with 2 Nos. Incoming + 1 Nos. Bus Coupler + 5 Nos Outgoing feeders with phase sequence relay. DG Set Capacity for back up supply in ESS will be 4 X 1000 KVA for OPD building Water Cooled Radiator Type/ cooling Tower Type.

2.3.2SUBSTATION GUIDELINES

Proposed Substation shall be complete with indoor type 11 KV VCB panel board, Outdoor type Transformers, outdoor DG Sets, Sandwich bus-ducts (Indoor type sandwich bus duct shall be IP-55, Outdoor type bus duct shall be IP-65 with canopy, IP-68 in trench/tunnel of GI/Aluminium as per OEM standards, Capacitor Panels with 14 % detuned reactor, Active Harmonic Filter to be installed at Main LT Panel and all other accessories as required. DG Sets shall have facility for auto & manual start/ stop, auto changeover, auto load management and auto synchronization. The transformers & DG Sets shall be connected to respective LT Panels through suitable size indoor/ outdoor sandwich bus ducts in the substation.

Central Air Conditioning Plant load is proposed adjacent to ESS & Main HVAC Load Panel shall be fed directly from Main LT Panel of the ESS through sandwich Bus ducts.

Main LT Panels, Main HVAC Panel, APFC Panel, AHF Panel shall be Design Verified Assembly (TTA) as per IEC 61439 and as per technical specifications. All Design Verified Assemblies (TTA) shall be smart type having switchgears (Incoming and Outgoing - ACB & MCCB) communicating their release data over Ethernet and BMS Compatible. All the ACB shall be EDO type. All the ACB/ MCCB of Main LT Panels will be four pole type.

Suitable BMS Integration Cards shall be provided to achieve BMS compatibility of HT & LT Panels. Trenches with suitable width & depth shall be provided for installation of HT/LT/APFC Panels, Active Filters etc. and for Laying of HT/LT Power cables & Control Cables. Substation shall comprise of all ancillary equipment like Battery Charger, DG axillary panels etc. Suitable size MS Chequered Plates, duly painted of minimum thickness 6 mm shall be provided for trenches inside the panel room as required. Closing of all cutouts with fire proof material as per norms shall be used. Hot Dip Galvanized Cable trays of suitable size shall be used as required.

All armored HT/LT power cables, control cables, telephone cables, signal cables etc. shall be laid underground preferably along the roads & pathways at suitable depth as per CPWD specifications of Electrical works. Adequate no. of Hume pipes/ DWC HDPE Pipes having suitable diameter with spare shall be laid across the roads/pathways etc.

Maximum allowable dry type transformer losses as per ECBC shall comply to Latest IS-2026 amended upto date.
Substation/HT/LT Panel Rooms/Floor panel Rooms shall be provided with safety equipment/items like suitable elastomeric mat (as per relevant IS codes), fire buckets, fire extinguishers, hand gloves, danger plates (HT/LT rating), safety charts, framed Schematic/SLD etc. Suitable civil foundation/ trenches etc. for all substation equipment shall be provided as per design load of respective equipment. All LT and MV Panels shall have 25% spare outgoing feeders for different rating of feeders.

All ACB shall be Ics=Icu=Icw=65kA for 1sec. depending on transformer rating. For 2.5MVA transformer LT Panel, APFC panel have 65 kA for 1 sec fault level and for 2MVA and below will be of 50kA
All MCCB shall have Ics=Icu=100%.

LT panel shall have Dual core CT in all Incomer feeders for APFC Panels.

LT panel shall have Intelligent Panel Meter for metering in all Incomer / Outgoing feeders. Intelligent Panel Meter: Flush mounting, 96X96 mm size class 1 accuracy and LCD display. Panel meter should be suitable for true RMS reading. Meter should measure line and phase voltage, current of all 3 phasees and neutral, HZ, PF, KW, KWH, KVAR, KVARH, KVA, KVAH, THD Voltage and current including one set of

CT. Meter should be EMI/ EMC complaint. Meter should be with RS 485 port for communication on Modbus protocol.

All Floor MV Panels, AHU Panels, UPS Panel , Fire Panel etc shall have digital meters with CT and selector switch. All incomer/ outgoing ACB shall be four pole EDO type and all Incomer/outgoing ACB & MCCB of Main LT panels will be four pole type. All panels shall be front openable type with top cable entry and top busbar entry. All Panels shall have separated busbar and Cable alley chambers.

All MCCB upto 200A & below will be thermal magnetic released with variable current setting with earth fault protection. 250A and above MCCB will be microprocessor based variable current setting.

All Panels above 630A incomer shall have 50% neutral and below 630A incomer 100%
neutral shall be provided.

Temperature rise calculation for busbar shall be as per IEC 61439 according bus bar will be provided. Room temperature to be taken max 40deg C and temperature rise as per IEC according busbar to be calculated. All bus bar upto 4000A will be of alluminium and above 4000A will be of copper. Neutral will be 100% for computer power distribution system.

Fire survival cable to be used in Lifts, ventilation fans, FDA system.

Fire suppression system to be provided in transformers, HT panels, ESS panels, HVAC Panel, LT Panel, Floor panels, UPS, Server room of OPD building as per Fire Norms/ NBC 2016/Fire safety norms/state electricity board

Surge protection device (SPD) to be provided in all Panels as per NBC/CPWD.

To prevent storm water entering the transformer and switch rooms through the soak-pits, the floor level of the substation/ switch room shall be at least 300 mm to 500mm above the highest flood water level that may be anticipated in the locality or as directed by Engineer in charge.

Safety equipment's like HT, MV Danger Plates, Shock Treatment Chart, anti-skid chequered type rubber mat. (HT , LT , MV panels), Hand Gloves, digital Earth Tester, telescopic ladder, cable route marker shall be provided as per Fire Norms/ NEC 2023/ CPWD specifications.

2.3.3 DG Set for Backup Supply

Diesel Generator sets are proposed to be provided for back up supply in case of electricity failure. Provision of DG Back up shall be as per Electrical load calculation.

DG Backup Supply shall be consider in OPD Building - Internal lighting & Fan load, Power, Computer Power, LV equipments, Lifts, Escalators, Ventilation Load, HVAC load (50%), Medical equipment load (50%), UPS, Gas manifold , Water supply panel,

Firefighting pumps/ Panel and other essential load will be on DG Backup.

All DG Sets shall be provided with suitable PLC and Synchronizing relay/ PCCM controller for achieving automatic start/stop, automatic load sharing and synchronization function. Additional provision for manual start/ stop of DG Sets shall also be provided. Transformer Incomer ACBs, DG Incomer ACBs and Bus Couplers shall be electro-mechanically interlocked with provision of auto and manual mode operation. Required control cabling/wiring in HT Panel, Transformers, DG Sets, and LT Panels etc. shall be provided as per requirement.

All D.G. Set shall be Water Cooled Radiator Type/ cooling Tower Type. All the DG Set shall have acoustic enclosure as per CPCB Norms.

Exhaust Stack of the DG Sets shall be as per CPCB-IV/ CPWD / Local Bye-Laws standards amended upto date and self-supporting MS Exhaust stack structure duly synthetic enamel paint of suitable height to support the exhaust pipes with expansion bellows at required location has to be provided.

All DG sets shall have individual Day Oil tank of 990 liter capacity. Diesel Buffer tank with DG Set at suitable height for gravity feeding of diesel supply to each DG day oil tank (Float valve arrangement for controlling) to be provided. Day oil tanks for the DG sets shall be incompliance with The Petroleum Act/ Petroleum& Explosives Safety Organization, Overflow tank with pumps and automation to be provided.

Reliable & Continuous Power Supply/ control supply to following Emergency & Life safety Systems shall be provided, as required: -

1. Fire Pumps
2. Pressurization and smoke venting; including its ancillary system such as dampers and actuators.
3. All lifts
4. Exit Signage Lighting
5. Emergency Lighting
6. Fire alarm system
7. Public Address system (relating to emergency voice evacuation and annunciation)
8. Magnetic door holds open devices
9. Lighting in Fire command center and security rooms.

10. IBMS System.

11. CCTV

12. All UPS systems

Power supply to above emergency & life safety equipment shall be through fire proof enclosures or circuit integrity cables or through alternate route in the adjoining fire compartments to ensure that supply of power is reliable.

2.3.4 Power Factor Improvement & Active Harmonics Suppression:

Real time Automatic power factor control panels with Heavy duty capacitors, IGBT switched with 14% copper wound detuned reactor and Active Harmonic Filter as per (IEEE519) are proposed to be provided in the substation to achieve overall power factor 0.99 (lagging) from existing Power Factor, as per ECBC with operation in both Auto and Manual mode. Power factor Correction Panel shall be BMS Compatible RS-485 port. Active Harmonic filters shall be provided in the substation to achieve THDi less than 5%.

Connection from Main LT Panel to Capacitor Panel is to be provided through Aluminium sandwich bus duct/cable. It should work on both Grid as well as DG Power. Panel should be totally type tested as per IS 16636:2017, IEC 61921, IEC 61439.

2.4 ELECTRICAL POWER DISTRIBUTION

The Electrical Power Distribution for electric supply shall be as detailed below.

a. Indoor/Outdoor type Aluminum Sandwich Bus Duct Totally Type Tested (TTA) as per IEC-61439 including adaptor box, Tap-offs and other plug-in system of suitable capacity shall be provided for the following panels.
   - Transformer to Main LT Panels for ESS
   - DG sets to DG Sync. LT Panel for ESS
   - DG Sync. Panel to Main LT Panel for ESS
   - Main LT Panel to Main HVAC Panel (AC Plant Room)
   - Main LT Panel to APFC Panels for ESS

b. Adequate runs of XLPE insulated armored Aluminium conductor cables /copper conductor Cable/ sandwich type Busduct shall be laid from Main LT Panel to Building Panels. For building panels rating 2000A or above single core Copper Cable/ Bus duct to be provided in cable trenches.

c. Bus bar size of MV/ Floor Panels shall be as per incomer rating of the panel. Capacity of aluminum busbars shall be considered as 0.8 Amp per sqmm. of cross sectional area of the busbar.

d. Cables used inside OPD Building shall be XLPE- type as per local fire norms.

e. Cable selection shall be done as per feeder rating of Panels.

f. OPD Building the separate distribution system shall be provided for Lighting load, Power, AHU & UPS load, Medical equipment panels, pressurization & Smoke Extraction Fans. Each distribution system shall be with Main Electrical Panels, Floor panels etc.

g. All MCB-DB shall be Double Door type and provided with loose wire box. RCCB to be provided in DBs. All the Lift Panels shall have two incomers. Power to each OT room will be fed by OT Isolation panel. Separate rising main shall be provided for Light Load, Power Load, AHU Load. Distribution system shall be Floor panels, Double door Type MCB DB's.etc.

h. OPD building shall have suitable rating of rising mains for catering to loads of Lighting, Power, HVAC equipment, etc.

i. Each rising main shall have Tap off at every floor, feeding the floor panels with incoming & outgoing MCCBs of required capacities and numbers feeding the double door DBs/VTPN DBs. All Floor Panel incoming shall have four pole ACB / MCCB. All outgoing shall be ACB 800 Amp & Above/ MCCB above 63 Amp and upto 630 Amp rating. MCB shall be provided for 63 Amp and below rating.

j. Sub mains from floor panel to DBs shall be connected with armored cable on surface/cable tray. Non false ceiling area submain from floor panel to DB shall be FRLSH copper wire in MS conduit in slab.

k. The power cabling shall be sized so that the distribution losses do not exceeds 3% of the total power uses in building. Voltage drop for feeders shall not exceed 2% at design load and for branch circuit; it shall not exceed 3% at design load.

l. 100% neutral shall be used for electronic equipment power distribution.

m. All panel shall have Mimic Diagrams.

2.5 EARTHING NETWORK

Earthing with Maintenance free Chemical earthing system, GI Plate Earthing and Copper Plate Earthing system, as required, shall be provided by the EPC Contractor for earthing of sub stations equipments, Electrical Panel boards, UPS and other Equipment /installations in building. Earthing shall be in conformity with provisions of rule 32,61, 67 & 68 of Indian Electricity Rules 1956 & as per IS-3043 as amended up to date. Copper/GI earth strips shall be used for connecting the Electrical equipments and Medical equipments with Earth pits as required. Earth Leakage circuit breakers shall be provided in the DBs for individual units. Separate and distinct earth stations with insulated electrode shall be provided for HT Panels, Main LT Panels & LT Distribution Panels,

UPS system – Body & Neutral, IPABX, Transformers - Neutral & Body, DG Sets - Neutral & Body, Medical equipment's. HVAC Equipment's, Operation Theater (if provided), Lifts , Escalators, IT Servers.IT Racks.LV Equipment's and any other

equipment as required.

All three phase electrical installations shall be provided with double Earth connection and single phase electrical installations with one Earth connection as per CPWD specifications of Electrical Works & NBC 2016.

2.6 LIGHTNING PROTECTION SYSTEM:

Lighting protection of OPD building shall be provided as per IS/ IEC62305-1:2010 (latest as amended), CPWD Specifications of electrical works and NBC 2016 norms. The main and most effective measure for protection of structures against physical damage is considered to be the lightning protection system (LPS). An external LPS which consists of air-termination system, down-conductor system and earthing system is intended to:

a) Intercept a lightning flash to the structure (with an air-termination system),

b) Conduct the lightning current safely towards earth (using a down-conductor system), and

c) Disperse the lightning current into the earth (using an earth-termination system).

Accordingly a standard lighting protection system will be provided in the building as per NBC 2016 Standards, using single prone finials, horizontal and down comer earthing strips of suitable size, terminating in the Earth Pits. Aviation Obstruction Light (AOL) shall be provided in OPD building as per Civil Aviation regulations, NBC norms & PWD Specifications as applicable.

All Aviation Obstruction Lights shall be fed with UPS supply only.

2.7 INTERNAL ELECTRIFICATION, LV & ALLIED WORKS:

a) Following works shall be carried out in coordination with the civil work within the building complete in all respects as per latest IS Codes, CPWD Specifications.

i) Wiring & Conduiting (MS Conduits) for internal electrification.

ii) Wiring & Conduiting (MS Conduits) for ,LV & Allied works, Cable .

i) LED Light fixtures, Fan (Ceiling & Wall) & Exhaust Fans.

ii) Antibacterial Switch in Clean area.

iv) 6A Light Point /UPS Modular Switch & Socket Outlets.

v) 16A/ 20A Power/25A Power /UPS Modular Switch & Socket Outlets

vi) L.T. Cables and Sub main wiring, circuit wiring.

vii) Hot dip GI perforated Cable Trays

viii) Hot dip GI Raceway.

ix) Sandwich Type Rising Mains / Sandwich type Bus Ducts

x) Floor Panels, MCB Distribution Boards (Double Door) & VTPN DBs..

xi) Earthing

xii) Extra Low Voltage system like Telephone/IPBAX, Lighting management system, Fire Detection & Alarm System, CCTV System, Public Address System, Boom Barriers etc.

xiii) Two -way counter communication system

xiv) Any other system as required.

b. Following points shall be generally followed for internal and external electrification of various areas:

i. Internal areas like rooms, corridors, lobbies, staircases, terraces, washrooms etc. of OPD block shall be adequately illuminated conforming to provisions stipulated in NBC 2016, and technical specifications maintaining the indicated Lux levels and Light Power Density.

ii. The Internal Electrification work shall be carried out in recessed/surface mounted MS conduits in accordance with CPWD Specifications for Electrical Works 4 with up-to-date amendments.

iii. MS Conduits shall be surface mounted or laid on GI angle/channels with suitable hanging GI supports in areas wherever there is false ceiling provision. In case there is no provision for false ceiling, MS Conduits shall be concealed in concrete during slab casting.

iv. FRLSH PVC insulated Copper conductor wires will be used for points, circuit & sub-main wiring conforming to relevant IS-Codes. Wiring shall be carried out with following sizes of PVC insulated FRLSH multiple stranded single core copper conductor wire/cable.

a. Light Point - 1.5 sq.mm

b. Ceiling /Cabin/Exhaust Fan Point - 1.5 sq.mm

c. Call Bell Point - 1.5 sq.mm

d. 6A Plug Point / UPS Computer outlets (up to 3 outlets on one ckt.) - 2.5 sq.mm

e. Light Circuit Wiring - 2.5 sq.mm

f. General Power Point – 4 sq.mm

g. Industrial Socket / Modular Socket with 20A MCB for Geysers – 4 Sq.mm

h. 20A Industrial / Modular Socket Outlet – 4 Sq.mm

i. Special Power Point – 6 Sqmm

j. A/C Industrial Socket with 32A DP MCB - 6 Sq.mm

k. For bed head panel provided in ICU, ICCU Pre- OT ,Post- OT, SICU, HDU, MICU, Post Labour etc. then only 3CX4 Sq mm wiring to be provided upto bed head panel from UPS power.

l. Sub Main wiring from VTPN DB/ Floor Panel to DB:- (In Non False Ceiling Area, sub main wire in recessed conduit shall be provided. And for False ceiling area, sub main wire in conduit or copper armored cable to be provided.) (All the Armoured cables shall be copper upto 16 sq.mm and above size shall be aluminium.)

i. For DB Incomer Size 25 A DP – 2RX6 Sq.mm + 1R X6 Sq.mm
ii. For DB Incomer Size 32/40 A DP – 2RX10 Sq.mm + 1R X10 Sq.mm
iii. For DB Incomer Size 63 A DP – 2RX16 Sq.mm + 1R X16 Sq.mm
iv. For DB Incomer Size 25 A 4 Pole – 4RX6 Sq.mm + 2R X6 Sq.mm
v. For DB Incomer Size 32/40 A 4 Pole – 4RX10 Sq.mm +2R X10 Sq.mm
vi. For DB Incomer Size 63 A 4 Pole – 4RX16 Sq.mm + 2R X16 Sq.mm

v. Agency shall execute the work after obtaining necessary approval of the layout for internal electrification of OPD building, common areas and staircases. The staircase lighting shall be in group control system.

Alternate wiring for light fixture in the Corridors, halls etc shall be provided with maximum 100 watt load per switch.

vi. Modular type switches, sockets and stepped type electronic fan regulators (2 Module), bell push button along with matching mounting boxes of same make shall be used.

vii. Colour coding of the Switches, sockets shall be provided for Normal & UPS power supply as per NBC 2016.

Color coding shall be provided for Switch / Sockets for different type of distribution system, such as UPS point ie Switch / Sockets shall be blue color/ Grey Color.

viii. TV Outlet point wiring shall be terminated in suitable size of G.I. box along with splitter boxes at every floor. The interconnections of all splitter boxes fixed at all floors shall be done properly with conduits to form proper distribution system with the prior approval of Engineer-in- charge.

ix. LED Type Lighting Fixtures with inbuilt harmonic suppression mechanism shall be provided and all Internal and External LED Light fixtures shall have THD less than 10%. LED Lamp shall be 5 star rated as per BEE rating

x. Suitable size & capacity Exhaust Fans shall be provided in OPD block as per requirement. Exhaust Fan in all electrical rooms , AHU Rooms to be provided.

xi. Suitable size & capacity Ceiling Fans / Wall Fans shall be provided in the rooms and areas of OPD building as required as indicated in the drawings. All fans of 5-star rating shall be provided as per BEE rating. Accordingly, Ceiling Fans/ Wall Fans shall be provided in all General Wards, All waiting area except Main entrance of OPD Building as per requirement.

xiii. Separate shafts shall be provided for laying of pipes for Electrical, ELV, Mechanical and Fire Services.

xiv. Laying of DWC /HDPE / Hume pipes for road crossing or in pucca portion & CC path etc. for electric / telephone / LAN/ street lighting cables complete with adequate number of cable chambers shall be provided by the agency.

xv. After completing the work, necessary test results as envisaged in latest CPWD & Indian Electricity Rules, shall be recorded and submitted. The results shall be within the permissible limits.

xvi. Aviation Lights (LED Type) shall be provided on building and structures as per prevalent norms & IS-Codes.

xvii. SS Raceways (SS 304) with all accessories shall be provided in OPD building as per requirements.

xviii. Suitable illumination with LED light fixture shall be provided on terraces.

xix. Power Points, UPS power points, Telephone Points shall be provided for all counters like registration, reception, nurse call station, Consultant Room, Office Rooms etc.

xx. Requisite size of raceways shall be provided in slabs with fillers, wherever required for drawing the wires and cables for the work stations etc.

xxi. For areas having grid type false ceiling, recessed type LED Light Fixtures of size 600 mm X 600 mm shall be provided as indicated in the drawings. For areas having false ceiling with Gypsum board, Down Lighter type fixtures of suitable size shall be provided as per as indicated in the drawings. Surface mounted Light Fixtures shall be provided in the areas without False Ceiling.

xxii. Industrial sockets (single phase and three phases) shall be provided in the kitchen on the corresponding walls / DG Area / Transformer area / CSSD etc. as required.

xxiii. 2 No UPS point shall be provided for each LV rack in OPD building as per load requirement considering.

xxiv. 1 No UPS point of 6A shall be provided for QMS TV display outside consultant room and Token dispenser in OPD building.

xxv. TV point with 2 no. 6A shall be provided for waiting area, common area, cafeteria etc. in OPD building as per load requirement considering.

xxvi. Two way Switch Control for Staircase, Ramp shall be provided as per directions of Engineer-In-Charge unless otherwise stated.

xxvii. Separate power DB to be provided for Lab.

xxviii. Two way counter communication system shall be provided to all OPD/ Registration counters.

xxix. Indicative minimum electrical points requirement is as under.

S. No.	Description
1	**Consultation Room-**
	Doctor- 6A UPS power points – 3 Nos. 6A Raw Power Point- 3 Nos. 6A Raw Power Points – 2 Nos.- X-Ray View Box 16A Raw Power Point - 1 Nos Data points- 1 Nos. Telephone Points – 1 Nos. **Assistant** 6A UPS power points – 3 Nos. 6A Raw Power Point- 1 Nos. Data points- 1 Nos. **Examination Bed** 6A Raw Power Point - 2 Nos 16A Raw Power Point - 1 Nos
2	**HOD & ASST PROFF ROOM**
	6A UPS power points – 3 Nos. 6A Raw power points – 1 Nos. 6/16 A Raw power points – 2 Nos. Data points- 1 Nos. Telephone Points – 1 Nos.
3	**Reception & Registration (Per Work Station)**
	6A UPS power points – 3 Nos. 6A Raw Power Point -1 No. 16A Raw Power Point - 1 Nos Data points- 1 Nos. Telephone Points – 1 Nos.
4	**Doctor's, Staff Room & Nurse Lounge**

	6A UPS power points – 3 Nos. 6A Raw power points – 1 Nos. 6/16 A Raw power points – 1 Nos. Data points- 1 Nos. Telephone Points – 1 Nos.
5	**General Work Station (Each Work Station)**
	6A UPS power points – 3 Nos. 6A Raw power points – 1 Nos. 6/16 A Raw power points – 1 Nos. Data points- 1 Nos. Telephone Points – 1 Nos.
6	**Conference, Demo, Meeting & Board Room**
	As per actual requirement for all the ELV, AV and MV system.
7	**Treatment Room-**
	6A UPS power points – 3 Nos. 6A Raw power points – 1 Nos. 6/16 A Raw power points – 2 Nos. Data points- 1 Nos. Telephone Points – 1 Nos.
8	**General Points:-**
8.1	Corridor / Lobby Area:-
a)	For each 10-15 meters 1 No. 6/16A Power Plug shall be provided.
b)	Illumination as per Architectural Drawing subject to compliance to the CPWD Specification & NBC 2016.
c)	IP CCTV Camera shall be provided with for all the Entry / exit of stair case, lift lobbies, main corridors, waiting area. Registration/ Reception etc. on all the floors.
d)	Mobile charging point in Waiting Area
e)	Colour coding of the Switches, sockets shall be provided for Normal & UPS power supply as per NBC 2016
8.2	**Staircase :-**
a)	Illumination as per Architectural Drawing subject to compliance to the CPWD Specification & NBC 2016
8.3	Toilet Area for all the building:-
a)	Illumination as per Architectural Drawing subject to compliance to the CPWD Specification & NBC 2016
b)	1 No. 6/16A Power point for Hand Drier shall be provided.
c)	1 No. 6/16A or 6A Power point for exhaust Fan shall be provided. (As per requirements)
8.4	For other area, the points shall be provided as per requirement and standards. Refer Electrical Tender drawings for detailed electrical Lighting, Power and LV Points.

2.7.1 Lighting Design/ & Lighting Fixture

LED lighting fixtures shall be provided with inbuilt Harmonic suppression system in all areas and building to achieve the illumination levels conforming to latest IS Code, NBC 2016, ECBC latest up to date. All LED lighting Fixture shall have luminous efficacy of more than 100 Lumens per watt. Lighting Power Density (LPD) shall be achieved for building/ areas as per lighting simulation requirements as per Green Building Rating/ ECBC norms.

Lighting Automation: Occupancy/ Movement sensors and light dimmers shall be provided for automatic lighting control in Office rooms/ Consultant rooms/ Common toilets, Stores room, day lighting peripheral areas like waiting hall, corridors etc. and other areas as required under NBC/ECBC /Green Building Rating..

Note:- The lux level of all the area shall be as per NBC-2016 / PWD specification / IS Code and guidance of Engineer-in-Charge. UGR rating of LED light fixtures(indoor) shall be less than 19.

2.7.2 Indicative Design Specification for Lighting Fixture

S. No.	DESCRIPTION	UNIT
1.0(a)	2X20 watt LED tube light batten made from CRCA sheet steel suitable for T-tube light , integral driver, 4000 lumen + solo tolerarrce system including tubes,with luman efficiacy of 100 Lm/ watt minimum expected life time of 25000 burning hours, CCT 5700 I(ANSI, CRI 80, driver efficiency >850/o, Life expectancy of driver rnin 30000 hrs. PF 0,95 at full load/ 230 volt AC.(Including tube light . LED Aluminium 2XT8 tube (LTT8) with in built driver and efficacy of 100 lm/W.).	Each
1.0 (b)	20 W LED tube light batten made from CRCA sheet steel suitable for T-8 tube light, integral driver, 2000 lumen + solo tolerarrce system including tubes luman efficiacy of 100 Lm/ watt minimum expected life time of 25000 burning hours, CCT 5700 I(ANSI, CRI 80, driver efficiency >850/o, Life expectancy of driver rnin 30000 hrs. PF 0,95 at full load/ 230 volt AC.(Including tube light . LED Aluminium 1XT8 tube (LTT8) with in built driver and efficacy of 100 lm/W.).	Each
2.0	Surface mounted Weather proof battens with IP 65 ratings for industrial and other applications in exposed climates requiring higher degree of ingress protection. Best in class LEDs, with Luminaire luminous flux 3600 lm, connected load 36 W, luminous efficiency of luminaire 100 lm/W. Light Colour neutral white, Colour temperature 6000 K, Colour rendering index Ra > 80. Operating Temperature range - 20 C to 50 C. IP 65, Impact Protection IK- 10, Service Life of 50,000 Hours shall be as per tender.	Each

S. No.	DESCRIPTION	UNIT
3.0	Surface Mounted LED Down light with cylindrical construction, Housing Dia 109 mm, height 75 mm, Luminaire luminous flux 1400 Lm, Nominal Input Power 18 W/20W, Luminous efficiency of 100 Lm/W. Colour rendering index > 80. Service life 50,000 Hrs.	Each
4.0	Recessed LED Down lighter in compliance of relevant standard & power consumption not more than 12W and lumen Output not less than 1200 lumen with luminous efficiency of 100lm/W & CRI >80 & CCT 5700K. The heat sink of the fixture is die cast aluminum for ceiling recessed applications etc. The fixture has an operating voltage range 220-240V AC 50 Hz, Constant Current, withstand 300Volt input for continuous Operation & driver designed to withstand casing temp. 85 degree C & 85% Driver efficiency. Driver Casing made of FR rated bay blend material to withstand 260 Degree C. Complete with all Accessories.	Each
5.0	Recessed LED Down lighter in compliance of relevant standard & power consumption not more than 18W and lumen Output not less than 1800 lumen with luminous efficiency of 100lm/W & CRI >80 & CCT 5700K. The heat sink of the fixture is die cast aluminum for ceiling recessed applications etc. The fixture has an operating voltage range 220-240V AC 50 Hz ,Constant Current ,withstand 300Volt input for continuous Operation & driver designed to withstand casing temp. 85 degree C & 85% Driver efficiency. Driver Casing made of FR rated bay blend material to withstand 260 Degree C. Complete with all Accessories.	Each
6.0	Bulkhead LED Wall/Surface mounted LED bulk head light of connected load 10W.	Each
7.0	Batten LED 600mm mirror light.	Each
8.0	PIR based occupancy cum day light standalone sensor as complete as required.	Each
9.0(i)	2'x2'/1X4 IP20 LED light fixture suitable for ceiling recessed for office purpose .The fixture has a power consumption of 36W and producing a system lumen output of minimum 3600 lumen in 5700K CCT. The fixture is designed for 50,000 hrs of operational life at L70, Construction of fixture is Housing made of Metallic CRCA powder coated body and Diffuser is a high efficiency Lumio Diffuser. Electronic Dali Dimming control gear having a PF > 0.95, and low THD. Low output current tolerance (<10%) ensuring uniform Light output .Withstands 400Volt fast transit & Surge	Each

S. No.	DESCRIPTION	UNIT
	Protection 3KV. The fixture has an operating voltage range 220-240V AC 50 Hz, Constant Current ,withstand 300Volt input for continuous operation & driver designed to withstand casing temp. 85 degree C & 85% Driver efficiency. Driver Casing made of FR rated bay blend material to withstand 260 Degree C. Complete with all accessories as per specification. Color Rendering Index Ra >80.	
ii)	2'x2'/1X4 IP20 LED light fixture suitable for ceiling recessed for office purpose .The fixture has a power consumption of 36W and producing a system lumen output of minimum 3600 lumen in 5700K CCT. The fixture is designed for 50,000 hrs of operational life at L70, Construction of fixture is Housing made of Metallic CRCA powder coated body and Diffuser is a high efficiency Lumio Diffuser having a PF > 0.95, and low THD. Low output current tolerance (<10%) ensuring uniform Light output .Withstands 400Volt fast transit & Surge Protection 3KV. The fixture has an operating voltage range 220-240V AC 50 Hz, Constant Current ,withstand 300Volt input for continuous operation & driver designed to withstand casing temp. 85 degree C & 85% Driver efficiency. Driver Casing made of FR rated bay blend material to withstand 260 Degree C. Complete with all accessories as per specification. Color Rendering Index Ra >80.	Each
10.0	LED wall Bed Side luminaire LED wall luminaire with indirect-direct light distribution. For direct wall fixing. With direct-indirect light distribution. With translucent PMMA cover. Harmonious light effect due to homogeneously illuminated light emission. With 2 LED systems. Luminaire luminous flux 2600 lm, luminaire efficiency 25 W, luminous efficiency of luminaire 104 lm/W. Light colour neutral white, correlated colour temperature (CCT) 4000 K, general colour rendering index (CRI) Ra > 80. Mean rated service life L80 (tq 25 °C) = 70,000 h, mean rated service life L85 (tq 25 °C) = 50,000 h. Luminaire body of aluminium, Upper cover of sheet steel. Colour white (RAL 9016). Dimensions (L x W): 190 mm x 700 mm, luminaire height 96 mm. Permissible ambient temperature (ta): -20 °C - +25 °C. Safety class (EN 61140): I, protection rating (DIN EN 60529): IP40, impact resistance level in accordance with IEC 62262: IK02/0, 2 J, testing temperature of wire glow test in accordance with IEC 60695-2-11: 650 °C. With two electronic control units, switchable. The luminaire complies with fundamental requirements of applicable EU regulations and product safety legislation and bears the CE symbol. The luminaire is also ENEC-certified by an independent testing authority. Weight 4, 4 **kg LED 2600-840.**	Each
11.0	40W LED Recessed Mounted Spot Downlighter made of pressure die cast aluminum housing with high gloss aluminum reflector, LED Used shall be COB fixture should have minimum efficacy at	Each

S. No.	DESCRIPTION	UNIT
	System level (Not Chip Level) >=100lumens/W, with type and mid beam optics & Life of fixture (Including Driver) : 50K Hrs. @ L70B50 Lumen maintenance, CCT up to 4000, CRI >80, PF >0.95 & THD<10%, an operating Voltage Range of 180 - 264 V. Minimum Internal Surge Protection 2.5 KV. The fixture design should comply with IS10322, EMC/EMI compliance maintaining driver leakage current as per as per IEC 60598, Minimum system Lumens 5000 etc.	
12.0	Indoor Ceiling Recessed Linear Profile Light mounting kit accessories etc	Each
13.0	LED based recessed 1200mm Luminaire with a nominal system lumen output of 3600 lumens with a minimum system efficacy of 100 lm/W. The luminaire shall have Extruded Aluminium body, P.F > 0.9, Operating Voltage range of 140-270 VAC, serviceability of Class B, life L70 @ 50,000 burning hours, a CCT upto 4000K and CRI>80. The luminaire shall meet IP20 Rating with THD<10% and surge protection of 2.5KV. The total Power Consumption should not exceed 26W (including Driver). Fixture and driver have to be BIS certified as per new govt rule. LM 79 and LM80 reports need to be submitted from a NABL/UL accredited lab to verify above parameters.	Each
14.	Integral driver LED Step light with a system lumen output of 35 lumens and a minimum system efficacy of 10 lm/W. The luminaire shall have a rated system lifetime of 25,000 burning hours at L70. The luminaire should have a CCT 3000K-5700K and CRI > 75. The luminaire shall meet IP67 rating with THD < 20% and PF > 0.9. The luminaire shall have polycarbonate diffuser. The total power consumption should not exceed 4W (including driver).	Each
15.	LED based surface/suspended 1200mm Luminaire with a nominal system lumen output of 3600 lumens with a minimum system efficacy of 100 lm/W. The luminaire shall have Extruded Aluminium body, P.F > 0.9, Operating Voltage range of 140-270 VAC, serviceability of Class B, life L70 @ 50,000 burning hours, a color temperature of 6500K and CRI>80. The luminaire shall meet IP20 Rating with THD<10% and surge protection of 2.5KV. The total Power Consumption should not exceed 26W (including Driver). Fixture and driver have to be BIS certified as per new govt rule. LM 79 and LM80 reports need to be submitted from a NABL/UL accredited lab to verify above parameters.	Each
16.	Supplying and erecting integrated LED Highbay Fitting 100W IP65 & IK08 class having die cast aluminium housing with polycarbonate diffuser with integrated optics, having system lumens output of Min. 15000 Lumens, min. efficacy of 140 lumen/W, CRI>70, CCT upto 6500K, THD<10%, p.f. >0.90, operating range of 140-240V, inbuilt surge protection of 4 kV, Life class of 50,000	Each

S. No.	DESCRIPTION	UNIT
	Hrs. at L50B50 , including driver complete	
17.	Supply of Recessed Mounted 4ft connecting LED Channel Linear Light fixture should have minimum efficacy at System level >=110 lumens/watt with Minimum system Lumens 4000, CCT of 6500K (SDCM<=5) , CRI >80, PF >0.90, Operating working temp range - 0°C < Ta < 50°C, an operating Voltage Range of 140 - 270 VAC.life time of more than 50000 burning hours.	Each
18	Supply of 7W Garden Spike, Aluminium Die cast ,Warm White,Floor Lamp, IP 65 waterproof , rustproof LED Graden lights, Green Area.	Each

Note –All recessed mounted light fixture have (600X600mm / 1200mmx 300mm/ heavy suspended light which is mounted on false ceiling shall be have clamps for hanging , and same shall be supplied with lacquered chain of suitable length for hanging with ceiling with hook with necessary shielded 3 core flexible copper wire1.5 sqmm cable.

Note: Building shall be generally well illuminated. Lux level shall be provided in various areas conforming to NBC-2016/ Health care guidelines.

2.8 IPABX System

IPBAX server based system with RJ-45 Telephone socket outlets, suitable IP Phones instruments (in consultant room, lab , office etc), Digital phone (Small rooms, Common aresa) , analog phone (Service areas, Stores, ESS, AC plant room etc), Communication gate way with remote license, IP resource card& accessories and 24 Port L2+ Managed PoE Switch etc. as per requirement shall be provided in building for proper functioning of system. CAT 6A wiring shall be provided in recessed/surface conduits / raceways from each telephone point up to the Rack panel (Patch Panel & Switch) at each floor or nearest Rack Panel of Blocks. The Maximum length of the CAT6A cable shall be 90 M.

IPABX with 1200 ports capacity Telephones & expandable type in shall be located at Server Room. This IPABX System shall be interconnected with the existing IPABX system of the Campus.

The system should be equipped with the following:

- 1100 Nos. IP User Licenses expandable up to 500 IP User without adding any HW/SW.
- 80 Nos. Analogue Extensions/ FXS Ports Expandable up to 128
- 4 PIR lines (120 Channel).
- The system should be IPv6 ready and tested IP EPABX system from day-one

All systems and accessories should be supplied with software/OS and other licenses included.

There should be provision of calling between IP and analog extension and vice versa, i.e., user should be able to dial to IP extension from analog extension and it should be possible to dial from analog extension to IP extension.

These should be on the same platform with dual redundant power supply as and when required in future.

Flexible numbering plan – Support up-to 2-4 Digit for an extension number and allow phone number assigned to a station to a station to be changed through software.

Gateway should support self-survival mechanism in case of failure of WAN/LAN Link.

Management platform inclusive of Management software as per following specifications:

- System should be able to be configured and administered using a GUI based application.
  - System should also support SNMP based network management
  - The proposed system should have centralized web-based NMS to configure, Monitor, Alert Server,IP Media Gateway & IP Phones

The Rack Panel (comprising of jack/Patch panels, Network switches Layer 3/ layer2 /Layer 1 patch cords, power supply units, Cooling Fans, Wire managers, LIUs, Trans receivers, Fiber patch cord etc.) of individual buildings/ Blocks) shall be connected to the main IPABX Server Rack with optical Fiber cables to be laid underground in DWC HDPE Pipe of suitable size.

Manholes with covers shall be provided in the underground DWC HDPE pipes at suitable lengths for easy pulling & maintenance of cables.
Minimum 10 years software & hardware support shall be provided by OEM after DLP.

2.9 Fire Detection / Alarm System

Addressable Intelligent fire detection and Alarm system of latest technology with Fire alarm panels, multi Sensor detectors, smoke detectors, heat detectors, beam detectors, response indicators, manual call point and hooters, light strobe etc. shall be provided. It shall meet the requirement of NBC 2016/CPWD Specifications/ State By laws. License/Approval of Local Fire Authorities shall be provided for the complex. Repeater panels shall be provided in OPD building as required.

There shall be Independent fire panel for OPD Building and all fire control panels shall be interconnected with each other. Zoning of Fire alarm System shall be as per Fire Zones of the building. The monitoring of building shall be in the Main Fire Control Room of OPD Building. For Central Monitoring of all the Fire Panels, necessary devices like PC, Printer, modules & Software etc. of latest technology with minimum 1 TB hard disk shall be provided in the Control room. Fire Alarm control Panel shall not have more than 159 devices and 159 detectors in one loop. The details of the system proposed shall be as follows:

a) Addressable intelligent dual type Fire Detectors is suggested.

b) Detectors should be automatic addressing. Detectors should be installed as per coverage defined in NFPA 72. It should include all rooms, halls, storage areas, basements, attics, lofts, and spaces above suspended ceilings including plenum areas utilized as part of the HVAC system. In addition, coverage should include all closets, elevator shafts, enclosed stairways, dumbwaiter shafts, chutes, and other subdivisions and accessible spaces.

c) Suitable numbers of input/ output (C/M) relay modules are suggested for connecting other equipment like Electrical Panels, lifts, firefighting system, AHUs etc.

d) Spacing between two detectors shall be as per IS 2189 amended upto date or it shall be as per relevant code & manufacture standerds.

e) Cabling shall be with Fire Survival Armoured copper cable or Fire survival Unarmoured cable in MS conduit wherever required due to non false celing.

f) Suitable addressable loop powered sounders/ hooters for 100db sound level are suggested. Directional sounder to be installed at Exit Point.

g) Addressable manual call boxes shall be provided near all exits, stair cases, lift lobbies etc. as per relevant Norms.

h) Fault isolator shall be provided with each detector / devices as per OEM.

i) The Response Indicators shall be used in the waiting areas, Corridors, Common Area, for each above false ceiling detector, conference Hall or in large room etc.

j) Microprocessor IP based fire alarm control panel for number of required loops with 24 hrs. Battery backup with LCD display, printer etc. shall be located in the fire control room.

k) Fire Alarm Panels shall be integrated with PA system and with BMS also.

l) Two Way communication Fire Fighters Telephone Jack & Handset with necessary accessories are to be provided in all the building as required.

m) Beam Detector as per Fire Norms / NBC 2016 Norms

2.10 Indoor & Outdoor Public Address System (PA System):

Digital PA System shall be provided IN OPD Building as required. Speakers in the Ceiling/Wall shall be provided in corridors, lift lobbies and other common areas as per NBC 2016/relevant IS codes.

a. Box type speaker shall be provided in the entrance lobby.

b. Horn type speaker are suggested in the basement.

c. Recessed speakers in the false ceiling areas.

d. Landscape Garden Speaker of high frequency to be installed in outdoor OPD area.

e. Proper zoning are to be done considering the user requirement, critical areas & floor etc.

f. Control console shall be located in the fire control room with pre amplifiers, amplifiers, CD, DVD/Pen-drive, FM Player & gooseneck microphone.

g. System shall have the facility to make announcement on all floors simultaneously or on individual floors.

h. Cabling shall be with Fire Survival Armoured copper cable or FRLS unarmoured cable in MS conduit wherever required due to non false ceiling.

i. The system shall be integratable with Fire alarm panel and with the BMS also.

2.11 Closed Circuit Television System (IB based CCTV System)

The IP Based CCTV and Surveillance System shall control and monitor OPD building in the Campus as per NBC 2016/ relevant IS codes/Local by laws. OPD building shall have IP Based Dome Cameras, Bullet Cameras and PTZ Cameras for surveillance. The types of cameras & locations of various Cameras indicated herein are minimum to be provided. However, during detailed designing if required and found necessary the type/ rating of the Cameras shall be upgraded.

a) IP based Dome (Indoor Type), 360 Deg Panoramic Camera in Waiting Area, Entry/ Exit - Bullet Cameras.

b) Entry/ Exit Gates- Bullet Cameras (Outdoor Type).

c) Substation/Plant Room/Pump Room Building/Parking etc. - Bullet Cameras (Outdoor Type) + Bullet/Dome camera (Indoor Type)/ PTZ Cameras on pole or Roof top (Outdoor).

d) PTZ Camera for external area

The indoor Dome Cameras and Bullet Cameras are proposed to be installed at all Entry & Exit Points, main corridors, Lift lobbies, staircase. In all Lifts & common areas of OPD Block at all floor including terrace.

All the outdoor cameras shall be in IP-66 Housing with Junction box, media converter etc. is proposed in weather proof housing. The Separate LAN network switches would be used for CCTV connectivity and will be connected to central CCTV server & cameras shall have POE connectivity ports.

The CCTV surveillance system shall also be provided to cover complete outdoor areas including complete boundary wall, Roads and controls for all external coverage shall be from security room in the main gate.

Network connectivity for outdoor cameras having distance more than 75 metres, shall be on optical fiber. The power supply to LAN switches and Monitors will be on UPS. The video recording shall be non-embedded based recording server with video management software. The CCTV surveillance system shall have minimum IP-66, IK-10 or better with UL & NDAA compliant. CCTV cameras should support minimum 100GB micro SD card auto varifocal Lense. **The complete LAN networking of the CCTV should be separate and exclusive.** camera tempering, motion detection, trip wire, intrusion detection minimum analytic require edge/software.

1. **Bullet/Dome camera:-** These cameras shall be Full HD 5MP IR Camera suitable for Day and night operations. All the cameras shall be operative on automotive manual & scheduled mode. The cameras shall be UL/FM Listed. RJ- 45 Cable connectors will be used for Network/POE connectivity.

2. **Panoramic camera** -2MP sensor Indoor panoramic camera with 1/2.3-inch CMOS, Video compression H.264 (MP); M- JPEG, The effective resolution for the 360° - 5MP; 1.6 mm fixed-focus lens; Electronic Day/Night, White Balance, Automatic Electronic Shutter, Backlight compensation, Intelligent Dynamic Noise Reduction (iDNR), Privacy Masking Eight independent areas , Pixel counter Integrated microphone, Signal-to-Noise Ratio, Full-duplex / half duplex Audio Streaming, Memory card slot (support upto 1TB, 10/100 Base-T, ONVIF Profile S, Edge dewarping,360° lens, PoE. Shop drawings shall be got approved.

2. **PTZ outdoor cameras(IP66):-** The true IP day and night viewing 2MP or better PTZ cameras proposed are 30 x optical zoom, IR 200M or better Auto iris & auto focus lens with focal length 4.7 mm to 129 mm or better. The PTZ camera shall automatically track the object to use its Pan/Tilt/Zoom feature and record 30 frames/ sec. The cameras shall be UL/FM Listed. RJ- 45 Cable connectors will be used for Network/POE connectivity.

3. **Central Core & Recording Server:-** The main servers will be Intel Xeon processor, minimum speed of 2.3 GHz with 6 Core, dual Gigabit Ethernet Port, USB port, Video port. The server memory will be 16 GB DDR4 RAM with operation and management Licenses to manage at least 15 Recording Servers and 700-800 Cameras.

4. **LED Display Monitor:-** The sufficient no. of Full HD LED Monitors with high resolutions screen size of **55**" (Diagonal) are to be provided for viewing all live/ recorded camera proceedings. The resolutions of 1920(H) x 1080(v) pixels with comfortable viewing angle is proposed for all monitors suitable for operation on 220-240V AC 50 Hz power for the display panel should be equipped with all standard features such as video in, Audio in, HDMI/DVI, RJ 45 Port etc.

CCTV Control Room shall be located in each OPD building. The wiring inside the building shall be with CAT 6A cable in conduit and for Outdoor connectivity Armoured fiber Optic Cable shall be used. Optical fiber cable shall be laid underground in HDPE pipes with suitable Manholes for easy pulling and proper Maintenance. PTZ cameras will be placed on roof top and on Street light Poles with necessary mounting arrangements in external areas. The video management server should have minimum 30 days storing capacity with minimum 25 fps at 2MP.

2.12 UPS:

UPS units for 3-phase power supply shall be provided.

UPS of **minimum 200KVA** (N+N) parallel redundancy mode bus. capacity for IT System (IT racks, QMS Token dispensers, TV display, Computer Printer) Emergency Lighting, Fire Alarm Panel, PA system, CCTV, BMS, labs equipments, Procedure rooms and other essential loads as required in the **OPD building**. Some Emergency Lighting shall be on UPS in all areas like wards, Corridors and all rooms etc. in OPD block as required to provide generally well illuminated in case of power failure.

Microprocessor Based True online Double conversion UPS with latest **IGBT technology** & inbuilt isolation transformer are to be provided for uninterrupted power supply for all Emergency requirements.

UPS with separate Power distribution system (comprising of distribution panels, mains, distribution boards etc.) shall be provided for OPD Block. The UPS System shall have minimum efficiency of 93.8 % as per ECBC. UPS for block shall be N+N parallel redundancy mode bus.

The UPS power Supply shall be with isolation transformers. All UPS System shall be for 30 Min Backup with Maintenance Free batteries and Bypass system in N+N configuration.

The system shall have the incoming and outgoing switchgear panel. The system shall include the interconnection of ` Input/output power supply Panels & UPS units, UPS & Batteries through flexible copper cables of suitable size. UPS shall be equipped with communication card /SNMP card for data monitoring remotely on IP Networks & BMS Compatable.

2.13 SOLAR PHOTOVOLTAIC POWER SYSTEM:

Direct Online Grid connected Solar Photo Voltaic Power system of suitable capacity shall be provided in the complex as per Green Building Rating. The generated power will be directly connected to the Power grid/Distribution Panel of respective Building/ Block for load sharing during day time. The average area requirement per KWp will be 10 sq. Mtr on roof Top. The total Capacity of Solar Power System to be as per Green Building Rating requirement.

2.14 BOOM BARRIERS:

Boom Barriers shall be provided at all Entry and Exit Gates of OPD building of the Complex. Push Button Type Control for open & Close the Boom Barrier through high Torque motors operated through 230 V AC Supply. In case of power failure, the barrier can be raised/lower manually. The Boom length shall be as per the requirement of the road Width. The Opening time varies from 3 sec. to 6 sec. The Control Unit shall be IP 54 protected against rough weather. Input power supply of Boom barrier shall be UPS power.

2.15 EXTERNAL/ STREET LIGHTING:

High efficiency LED lighting fixtures shall be provided for external road lighting, compound/landscape lighting. The lighting control /operation for external Lighting shall be automatically controlled with digital timer control switch through outdoor type Feeder Panels.

External Lighting proposed shall be the combination of conventional wired external lighting Poles/ High Mast Pole, Garden Spike for Garden/ Green Areas.
4M, 6M, 9M single and double arm octagonal Pole/ special poles, Post Top light to be provided on Gate. Ballard light to be provided in green area.

Road/ Compound Lighting shall be designed as per NBC & ECBC Codes. Road/ compound lighting shall be provided with outdoor type light fittings (IP-65).

All Street Light Poles shall be made out of Hot dip Galvanized Iron (GI) Octagonal tubes. Poles will be suitable for single/ double side arms or as required. Poles shall have a service window at the bottom comprising connector terminal & MCB. Poles can be mounted on foundation with Anchor bolts of suitable size & quantity. The height & spacing of the street light poles pole will be designed to achieve illumination Lux levels. The height & spacing of pole and illumination Lux level should be as per latest NBC 2016 and other relevant norms.

Suitable outdoor type feeder panel with digital time controlling shall be provided for power distribution of various circuits of Street Lighting Poles / Bollard/Façade light etc.
Indicative Specifications of Outdoor Light Fixtures as below-

2.16 Clean Fire suppression system for ESS panels & in Main electrical panels of OPD building:

Cleans agent gas (Fk5112) based ILP (Indirect Low Pressure) Flooding system for Transformers to be installed as per requirement /Fire safety norms/state electricity board.

Cleans agent gas (Fk5112) based DLP (Direct Low Pressure) Flooding system to be

installed in HT panels, ESS panels, Mains HVAC Panel, LT Panel, Floor panels, UPS, Server room of OPD building as per Fire Norms/ NBC 2016/Fire safety norms/state electricity board. The detection Tube shall be installed throughout the compartment of panels. The location and spacing of tube shall be above the hazard to be protected. Cylinder equipped with brass valve, pressure Gauge isolation valve will be fitted on the wall of the panel with suitable brackets and will be connected to the detection tube in case of fire the tube shall rupture at a point. The rupture Tube shall result in formation of discharge point and release Gas Agent in Uniform pattern.

2.17 MRL LIFTS & ESCALATORS

GENERAL

The EPC Contractor shall carry out Design, Engineering, Supply, Installation, and Testing & Commissioning of Lift and Escalators work.

MRL Lifts

MRL Passenger cum Bed lifts, MRL Passenger lift, shall be provided as per DBR in OPD Block. The voltage and frequency of the supply shall subject to variation permissible under Indian Electricity Act and Rules. Lift shall comply with CPWD Specification Passenger

MRL Lifts should have following features

SITC of **Electric Traction Passenger cum Stretcher/Hospital Lift** with

- Rated capacity :- As Mentioned
- Rated speed :- 1.0mps/1.5mps
- Doors type :-COPO/TOPO (Centre opening / Telescopic opening) Doors with frame made from **SS 304 grade sheet of 1.5mm, thick in hairline finish for car and all landing doors with SS door** architraves/frames.
- Lift car enclosure made from SS 304 grade sheet of 1.5mm, thick with hairline finish with frame made from MS girders, bracing of adequate size with minimum safety factor of 5, with Toe Guard Apron, with necessary false ceiling with adequate LED lights, blower/fan for ventilation & SS chequered plate flooring, handrails, mirror, emergency light etc.
- COP with SS face plate having metallic push buttons with Braille Code & luminous indicator around button with FPI, scrolling UP/DN LED indicator & with/without attendant key switch, OWD with audio-visual alarm, VAS in, Hindi & English with intercom system with telephone instrument in Lift car, LMR & FCC/ground floor.
- LOP with SS face plate having recess/surface push button box for all landings with scrolling UP/DN LED indicator having metallic push buttons with Braille Code & luminous indicator around button with CPI, Lift car arrival & next travel direction audio-visual indication at all landings**.**
- Lift controller based on microprocessor/ PLC with VVVF Drive having closed loop control system, with IBMS compatible having necessary port, control PANEL duly wired with proper size & strength copper wire for power & control circuit, with provision for addition of floor/control card & allied accessories control PANEL

having enclosure of 1.5mm CRCA sheet with powder coating with IP54 Protection class**.**

- ARD complete with necessary SMF VRLA batteries**.**
- Fireman controller having fireman switch at fire Landing**.**
- Full Collective control system.
- CCTV surveillance system comprises of 2 nos minimum 2.0MP FHD IP based vandal proof Dome camera in lift car & in LMR/inside lift shaft top aimed on Lift machinery & controller as directed by Engineer In Charge.
- Lift Machine of Gearless PMSM of suitable kW with Traction pulley, OSG, electromagnetic brakes, entire assembly mounted on adequate size girders duly fixed on LMR floor/ shaft walls complete with main/diverter traction sheaves, suspension wire ropes/belts of adequate size & strength**.**
- Other mechanical parts such as 'T' section adequate size guide rails for car & counter weight with brackets fasteners, counter weight frame with necessary block, buffers with necessary support arrangement, MS pit ladder etc. erected with necessary steel work**.**
- Minor civil work for alteration if any and erection of door frames and accessories, erection buffers, erection of lift machinery, adequate size core cuts if required & scaffolding for erecting guide rails fixing of girders for mounting lift machine etc. complete as per specification no. LFT.
- SS Plate finishing on all around the lift Jamb opening including over lapping of front facia all LOP (Local operating Panel) alarm , fire man switch, will be on landing frame the finishing of frame will be as that of door. To be provided by lift Manufacture

- Car Enclosure: stainless steel- Hairline Mat finish.

Note:
1)General: - Job includes entire procedure of obtaining all necessary erection permissions & "License to Work the Lift" from Electrical Inspector (Lifts) with submission to the Engineer In Charge.
2)Warrantee: - Fully Comprehensive AMC for one year from the date of commissioning.

ESCALATORS
Type – Public Service Commercial Heavy Duty Escalators

COMMON SPECIFICATIONS FOR ESCALATORS

SL. NO.	DESCRIPTION		TECHNICAL DETAIL
1	Standard		EN115
2	Step Width in MM		1000mm
3	Horizontal Steps		Four
4	Inclination		30 Degree

SL. NO.	DESCRIPTION		TECHNICAL DETAIL
5	Speed		0.5 MPS
6	Emergency Stop	:	Must be located on the Upper & Lower and close to the handrail entrance.
7	Operational Brake	:	Integrated within the Escalator driving machine and between the motor and reduction gearbox.
8	Motor Thermic Protection	:	The thermal protection switch should be located in the motor coil. The thermal protection sensor should shut down the Escalator if the motor temperature exceeds 1550C.
9	Step Broken Protection Device	:	The Broken Step Protection Device should be located at the machine section, if the step or its roller breaks the safety switch should automatically engage.
10	Comb Plate Contact	:	The Comb Panels protections switches are to be located on two sides of each comb plate. If any foreign matter comes between the comb and steps, the safety switch should operate and stop Escalator operation.
11	Floor plate Safety Contact	:	A Safety switch is to be installed under the floor plate to ensure proper floor plate positioning.
12	Safety Grounding	:	All Electrical Components on the Escalator should be safely earthed.
13	Handrail Entry Safety Guard	:	The Handrail Entry Safety Guard should be provided in the handrail entry box of the upper & lower landing.
14	Broken Chain Protection Device	:	The Safety switch is to be located on the tensioning carriage of the lower landing to stop the Escalator if the step chain breaks.
15	Safety Devices	:	All the Safety devices, Electrical safety devices, Structures and all their Components are Strictly in Accordance with EN-115.
16	Running Mode	:	a) The VF Running Mode (Continuous) should be provided for Escalator to slow down while no Passenger on it. b) The VF Running Mode (Auto – Start) should be provided for Escalator to slow down while no Passenger on it and moments later it will stop.
17	Power Supply		415V, 3phase, 4 wires, 50 Hz.
18	Machine		Located inside the truss –upper landing, integral operational brake
19	Skirt Guard Lighting		To be provided
20	Brushes for Dress Guard		To be provided
21	Automatic Lubrication System		The escalator shall comprise of an in-built automatic lubrication device, to lubricate the main

SL. NO.	DESCRIPTION		TECHNICAL DETAIL
			driving-chain and step-chain automatically, which can ensure their smooth-operation for a long period and thus shorten the maintenance downtime.
22	Control		Microprocessor VF controller located inside truss-upper landing
23	Balustrade: i) Vertical Interior Panels		Clear self-supporting safety glass panels 10 mm thick
	ii) Skirt Panels		Stainless steel 304
24	Handrail		Rubber in black colour
25	Steps		One-piece aluminium die cast with yellow demarcation lines inserts on all 3 sides
26	Main and Step Chain		The drive unit shall be connected to the main chain wheel (attached to the main shaft) with a duplex chain. The Main Shaft shall further drive the Step Chain Bands. The Step Chain Band shall be of endless roller type located on both sides of the moving steps and step chain strength value shall be as per EN-115. Each Step Chain shall be provided with an integrated Tension Device to ensure its proper tension under varying load conditions.
27	Combs		Natural aluminium
28	RS485 Port		BMS Integration
29	Safety Devices	:	All the Safety devices, Electrical safety devices, Structures and all their Components are Strictly in Accordance with EN-115.
			1) operational brake (machine brake)
			2) non-reversal device
			3) handrail entry device
			4) broken step chain device
			5) comb plate safety device (both landings)
			6) main circuit breaker (placed in the upper landing)
			7) circuit breaker lower landing
			8) ground contact
			9) motor thermic device
			10) step chain roller monitoring switch
			11) socket for manual inspection (one per landing)
			12) manual inspection control device
			13) asymmetric relay (inside controller)
			14) overspeed governor (at the machine)
			15) broken step and chain wheel control contact

SL. NO.	DESCRIPTION		TECHNICAL DETAIL
			16) deflector devices (skirt brush guards)

Passenger cum Bed lifts, Passenger lifts, service lifts and Escalators for AIIMS OPD Block shall be provided, as per details given below which is indicative:-

LIFTS / ESCALATORS DETAIL

Sl. No.	BUILDING	26 Passenger /Hospital Bed lift (MRL, Gearless)	Escalators (Heavy Duty Type 0.5 MPS
	MRL LIFTS		
1	OPD BLOCK	13 Nos	42 Nos (21 Pair)
	Total	**13 Nos.**	**42 Nos (21 Pair)**

Note:

1. Lift Well, Car Size, Lift Pit Depth, Overhead, and Clear Entrance Width & Height dimensions shall conform to NBC 2016 or OEM Standards/ recommendations. EPC contractor to ensure lift well sizes as per standard NBC-2016

2. Passenger Cum Bed Lift Speed– 0.75 MPS.
   Passenger Lift Speed – Building Height upto G+4 – 1.0 MPS
   Passenger Lift Speed – Building Height upto G+5 Floor & Above – 1.5 MPS

3. Doctors lift speed (Minimum 4No.)-1.75MPS

4. Fire lift in fire tower shall travel upto terrace floor as per fire norms.

2.18 IBMS

General

The EPC Contractor shall carry out Design, Engineering, Supply, Installation, and Testing & Commissioning of IBMS Works.

Complete system including HVAC Plant Manager shall be hooked on to BMS system in the building shall be controlled individually with additional central controller in plant room. The different building shall be inter connected on LAN infrastructure. Proposed BMS system shall be logically structured into three distinctive levels, which are Management Level, Automation Level and Field Level. Each level shall be autonomous from the other. Peer to peer communication shall be possible on all system levels and the system design shall be modular in structure to allow straight

forward extensions.

Main Electrical Panels, HVAC, Fire, WTP, ETP, STP, PA System, HSD storage pumping system & Lifts etc. will also be hooked on to BMS system. The wiring shall be with in conduit/ raceway

State of art Building Management System (BMS) will integrate multiple building functions including equipment supervision and control, alarm management, energy management, information management and historical data collection and archiving. The system shall be modular in nature and shall permit expansion of both capacity and functionality through the addition of field devices / programming. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices. 20% spare IOs to be provided.

2.18 Scope of Work for IBMS

The proposed BMS system will consist of the following:
RH control in OPD Building through Field Devices.

Central control station for monitoring, control and alarm through operator interface station (OIS). Software for building management system and energy management system. System integration unit consisting of gateways, interface units etc. Portable operator terminals, Sensors and field devices consisting of but not limited to the following:

- Stand-alone intelligent 32 bit Direct Digital Controller (DDC), Line/Field Devices etc. for but not limited to the following:
- HVAC system- with complete AC Plant room equipment control& Monitoring
- VRV/VRF system- control& Monitoring
- Hot water system- control& Monitoring
- Water supply system
- Water softening plant
- Fire Fighting system
- Fire alarm system
- Lifts & Dumbwaiters
- UPS
- VFD integration
- Fire alarm integration

- LT panels energy consumption parameters
- Solar PV system/Inverters
- Public Address System & CCTV System
- Immersion type temperature sensors.
- Duct type temperature sensors.
- Outside air and humidity sensors
- Water flow meter
- Differential pressure switch across the AHU
- Level switches for indicating water level in cooling towers, tanks etc.
- Water flow switches
- pH Sensor
- TDS Sensor
- Differential pressure transmitters
- Current transducers
- Voltage transducers

The plant will operate automatically as per programmed schedule the controllers will estimate the actual requirement on any particular day depending on outside temperature and accordingly decide the lead time required to achieve design inside conditions, in all areas, at the start of offices.

DDC to DDC networking shall be through network Cabling.
All standby pumps can be rotated to provide equal wear and tear and reduce fatigue.

The water supply system is controlled and operated as per requirement without any wastage. All other services are monitored as per requirement.

Comprehensive I/O summary with relevant A/I, A/O, D/I, D/O details for all equipment and systems covered under BMS shall be prepared during detailed engineering

INDICATIVE DATA POINT SUMMARY FOR BMS SYSTEM									
S.NO.	DESCRIPTION	Qty	DATA PIONT TYPE					DI - Digital Input; AI - Analog Input; DO -Digital Output; AO - Analog Output	
			DI	AI	DO	AO	SI	HVAC/ Electrical/ Plumbing Scope	BMS Scope
Chiller Plant									
1	**HVAC High-side**								
a	**Chiller plant Manager**	*						Integration	
	Water Cooled Chillers	*							
1	Water Cooled Chiller Enable / Disable Command				*			Provision for Potential Free Contact in Chiller Panel	Cabling from Chiller Panel to DDC Panel
2	Water Cooled Chiller ON/OFF Status		*					Provision for Potential Free Contact in Chiller Panel	Cabling from Chiller Panel to DDC Panel
3	Water Cooled Chiller Trip Status		*					Provision for Potential Free Contact in Chiller Panel	Cabling from Chiller Panel to DDC Panel
4	Water Cooled Chiller Auto / Manual switch Status		*					Provision for Potential Free Contact in Chiller Panel	Cabling from Chiller Panel to DDC Panel
5	Individual CHW Outlet temp.			*				Provision for sensor installation	Immersion Temperature sensor & cabling from Sensor to DDC Panel
6	Individual CDW Inlet temp.			*				Provision for sensor installation	Immersion Temperature sensor & cabling from Sensor to DDC Panel
7	Butterfly Valves at Chiller Outlet control/Status		*		*			Butterfly Valve with limit switch NO/NC contact output	Cabling from Butterfly Valve actuator to DDC Panel
8	Butterfly Valves at CONDENSER Outlet control/Status		*		*			Butterfly Valve with limit switch NO/NC contact output	Cabling from Butterfly Valve actuator to DDC Panel

9	Common Header CHW supply / return temp.	*		*				Provision for sensor installation	Immersion Temperature sensor & cabling from Sensor to DDC Panel
10	Diff.Pressure Sensor across common header	*		*				Provision for sensor installation	Immersion Temperature sensor & cabling from Sensor to DDC Panel
11	Ambient Temperature & Humidity monitoring	*		*				Provision for sensor installation	Immersion Temperature sensor & cabling from Sensor to DDC Panel
12	Outdoor CO2 monitoring	*		*				Provision for sensor installation	Immersion Temperature sensor & cabling from Sensor to DDC Panel
13	Chiller Soft integration						*	Chiller communicating on BACNet/ IP or Modbus RS-485	Cabling from Chiller Panel to BMS room
14	BTU Meter at main header & sub headers	*		*			*	BTU Meter integration on Modbus RS-485	Cabling from BTU Meter to BMS room
15	VFD integration	*					*	VFD integration to be considered on Modbus	Cabling from VFD
16	Active Harmonic Filter breaker on/ off status	*	*					Provision for potential Free Contact in VFD Panel	Cabling from VFD Panel to DDC Panel
17	Active Harmonic Filter breaker trip status	*	*					Provision for potential Free Contact in VFD Panel	Cabling from VFD Panel to DDC Panel
B	**primary Water Pumps**	*							
1	Pump ON/OFF Command				*			Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
2	Pump ON/OFF Status		*					Provision for switch installation	Water DP Switch & Cabling from switch to DDC Panel
3	Pump Trip Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
4	Pump AUTO/MANUAL Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
C	**Secondary Water Pumps (VSPS)**	*							
1	Pump ON/OFF Command				*			Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel

2	Pump ON/OFF Status		*					Provision for switch installation	Water DP Switch & Cabling from switch to DDC Panel
3	Pump Trip Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
4	Pump AUTO/MANUAL Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
5	VFD Speed Control & Feedback			*		*			Cabling from VFD to DDC Panel
6	VFD integration						*	VFD integration to be considered on Modbus	Cabling from VFD to BMS room
D	**CONDENSOR WATER PUMPS**	*****							
1	Pump ON/OFF Command				*			Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
2	Pump ON/OFF Status		*					Provision for switch installation	Water DP Switch & Cabling from switch to DDC Panel
3	Pump Trip Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
4	Pump AUTO/MANUAL Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
E	**Hot Water Pump**	*****							
1	Pump ON/OFF Command				*			Provision for Potential Free Contact in Pump Panel	
2	Pump ON/OFF Status		*					Provision for switch installation	
3	Pump Trip Status		*					Provision for Potential Free Contact in Pump Panel	
4	Pump AUTO/MANUAL Status		*					Provision for Potential Free Contact in Pump Panel	
F	**Hot Water Genertors**	*****							

1	HWG ON/OFF Command				*			Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
2	HWG ON/OFF Status		*					Provision for switch installation	Water DP Switch & Cabling from switch to DDC Panel
3	HWG Trip Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
4	HWG AUTO/MANUAL Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
5	individual Inlet temperature monitoring			*				Provision for installation of Immersion temperature sensor	Immersion temp. sensor & cabling from sensor to DDC Panel
6	Individual Outlet Temperature monitoring			*				Provision for installation of Immersion temperature sensor	Immersion temp. sensor & cabling from sensor to DDC Panel
G	**COOLING TOWER (2 Fans in each tower)**	*****							
1	Cooling Tower start / stop				*			Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
2	Cooling Tower Fan status		*					Provision for switch installation	Air DP Switch & Cabling from switch to DDC Panel
3	Cooling Tower Auto / Manual switch status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
4	Cooling Tower Trip Status		*					Provision for Potential Free Contact in Pump Panel	Cabling from Pump Panel to DDC Panel
5	Cooling Tower Sump Low / High level Monitoring		*					Provision for Level switch installation	Bi-Level Switch & Cabling from Switch to DDC Panel
6	Cooling Tower TDS monitoring			*				Provision for TDS Sensor installation	TDS sensor & Cabling from sensor to DDC Panel
7	Cooling Tower Inlet valve control/Status		*		*			On/Off Control Valve with control & feedback output	Cabling from valve to DDC Panel
8	VFD Control & Feedback			*		*			Cabling from VFD to DDC Panel
9	VFD integration	*****					*	VFD integration to be considered on Modbus	Cabling from VFD to BMS room

	Other Third Party Soft integration								
1	**LMS**	*					*	Access Control shall communicate on Open protocol such as BACNet I/P or Modbus or RS-485	
2	**CCTV System**	*					*	CCTV shall communicate on Open protocol such as BACNet I/P	
3	**Fire Alarm & Detection System**	*					*	FAS shall communicate on Open protocol such as BACNet I/P or Modbus or RS-485	
4	**Lift/ Elevators**	*					*	Lift uP shall communicate on Open protocol such as BACNet I/P or Modbus or RS-485	
5	**UPS**	*					*	UPS shall communicate on Open protocol such as BACNet I/P or Modbus or RS-485	
6	**MFM/KWH Meters**	*					*	MFM/KWH meters shall communicate on Open protocol such as BACNet I/P or Modbus or RS-485	
7	**STP/ETP**	*					*	STP shall communicate on Open protocol such as BACNet I/P or Modbus or RS-485	
8	**WTP**	*					*	VAV shall communicate on Bacnet I/P or Modbus over RS-485	
1	**HVAC Low-Side**								
A	**Air Handling Unit with VFD**	*							

1	AHU On/ Off Status		*					Suitable High Power Relay contact at AHU Starter Panel	Cabling from AHU Panel to DDC Panel
2	AHU On/ Off Command (Shall be done thru VFD)				*			Suitable High Power Relay contact at AHU Starter Panel	Cabling from AHU Panel to DDC Panel
3	AHU Trip status		*					All necessary provisions to insert Air DP Switch across the fan	Supply & Installation of Air DP Switch and cabling to DDC Panel
4	AHU Auto/ Manual Status		*					Auto Manual Switch with Potential free contact at AHU Starter Panel	Cabling from AHU Panel to DDC Panel
5	AHU filter Choke status		*					All necessary provisions to insert Air DP Switch across filter	Supply & Installation of Air DP Switch and cabling to DDC Panel
6	Supply Air Temp monitoring			*				All necessary provisions to insert Temperaure Sensor in HVAC Duct	Supply & Installation of Temperaure & RH Sensor and cabling to DDC Panel
7	Return Air Temp+Rh monitoring			*				All necessary provisions to insert Temperaure Sensor in HVAC Duct	Supply & Installation of Temperaure & RH Sensor and cabling to DDC Panel
8	RH Sensor		*					All necessary provisions to insert Temperaure Sensor in HVAC Duct	Supply & Installation of RH Sensor and cabling to DDC Panel
9	CHW Valve position modulation					*		Motoroized valve with 0-10V input	Cabling from control valve to DDC Panel
10	Suply Air duct static pressure monitoring			*				All necessary provisions to install DP Sensor in HVAC Duct	Supply & Installation of static pressure Sensor and cabling to DDC Panel
11	VFD Modulation & Feedback			*		*		HVAC Vendor to provide provision to give modulation signal to VFD & take modulation feedback from VFD	Cabling from VFD to DDC controller
12	VFD soft integration						*	Providing required data through MODBUS RS 485/ BACNET	Integration of VFD with necessary cabling to DDC Panel

								MSTP	
D	**Smoke Exhaust Fans**	*****							
2	Fan Run Status		*					All necessary provisions to install current relay in the fan panel	Supply & Installation of current relay and cabling to DDC Panel
3	Fans Auto Manual Status		*					Auto Manual Switch with Potential free contact at fan Starter Panel	Cabling to DDC Panel
G	**Staircase/Lifwell/Lobby Pressurisation Fans**	*****							
1	Fan ON/ OFF comand				*			Suitable High Power Relay contact at Starter Panel	Cabling to DDC Panel
2	Fan Run Status		*					All necessary provisions to install current relay in fan panel	Supply & Installation of current relay and cabling to DDC Panel
3	Fans Auto Manual Status		*					Auto Manual Switch with Potential free contact at Starter Panel	Cabling to DDC Panel

ESS

4	**Electrical**								
A	**HT Panel**	*****							
1	HT Panel Status		*					Provision for Potential Free contact in Pump Panel	Cabling from HT Panel to DDC Panel
2	Breaker Status		*					Provision for Potential Free contact in Pump Panel	Cabling from HT Panel to DDC Panel
B	**Transformer**	*****							
1	Winding Temperature Alarm		*****					Provision for Potential Free contact in Pump Panel	Cabling from Transformer Panel to DDC Panel
2	Winding Temperature Trip		*****					Provision for Potential Free contact in Pump Panel	Cabling from Transformer Panel to DDC Panel

3	Oil Temperature Alarm		*					Provision for Potential Free contact in Pump Panel	Cabling from Transformer Panel to DDC Panel
4	Oil Temperature Trip		*					Provision for Potential Free contact in Pump Panel	Cabling from Transformer Panel to DDC Panel
A	**LT Panel/Building Main Panel**	*							
1	LT Breaker On / Off		*					Provision for Potential Free contact in Pump Panel	Cabling from Panel to DDC Panel
2	LT Breaker Trip		*					Provision for Potential Free contact in Pump Panel	Cabling from Panel to DDC Panel
3	LT Electrical Parameter monitoring						*	MFM/ KWH Meter shall be provided in panel that can communicate over Open protocol such as Modbus RS-485	Cabling from Panel to BMS Room
A	**Main Distribution Board Panel**	*							
1	Breaker On / Off		*					Provision for Potential Free contact in Pump Panel	Cabling from Panel to DDC Panel
2	Breaker Trip		*					Provision for Potential Free contact in Pump Panel	Cabling from Panel to DDC Panel
3	Electrical Parameter monitoring						*	MFM/ KWH Meter shall be provided in panel that can communicate over Open protocol such as Modbus RS-485	Cabling from Panel to BMS Room
D	**DG Sets**	*							
1	LT Breaker On / Off		*					Provision for Potential Free contact in DG Panel	Cabling from DG Panel to DDC Panel
2	LT Breaker Trip		*					Provision for Potential Free contact in Pump Panel	Cabling from DG Panel to DDC Panel
3	LT Electrical Parameter monitoring						*	MFM/ KWH Meter shall be provided in panel that can communicate over Open protocol	Cabling from DG Panel to BMS Room

								such as Modbus RS-485	
2	DG Battery Bank status			*				All necessary provision for Voltage transducer in DG Panel	Installation of Voltage Transducer & Cabling from DG Panel to DDC Panel
2	DG Bulk oil Tank level status		*					All necessary provision for flameproof level switch in DG Panel	Installation of Flameproof level switch in oil tank
4	DG day oil Tank level status		*					All necessary provision for flameproof level switch in DG Panel	Installation of Flameproof level switch in oil tank
5	DG Raw Water Pump Status		*					Provision for Potential Free contact in Pump Panel	Cabling from pump Panel to DDC Panel
6	DG Cooling Tower run status		*					Provision for Potential Free contact in CT Panel	Cabling from CT Panel to DDC Panel
7	Soft integration of DG Panel						*	DG sets shall be communicating on open protocol such as Modbus/ RS-485 etc.	Cabling from DG Panel to BMS room
A	**Lifts**	*							
1	Lift Fault Status		*					Provision for Potential Free contact in Lift Panel	Cabling from Panel to DDC Panel
2	Lift alarm status		*					Provision for Potential Free contact in Lift Panel	Cabling from Panel to DDC Panel

Plumbing and Fire Fighting

3	**Fire Fighitng & Plumbing**								
A	**UG/OH Tank level monitoring**								
1	Fire OH Tank Hi/Lo level monitoring	*	*					Provision for Level switch intallation	Bi-Level Switch & Cabling from switch to DDC Panel
2	Potable Water OH Tank Hi/Lo	*	*					Provision for Level switch	Bi-Level Switch & Cabling from

	level monitoring							intallation	switch to DDC Panel
3	Non Potable Water OH Tank Hi/Lo level monitoring	*	*					Provision for Level switch intallation	Bi-Level Switch & Cabling from switch to DDC Panel
4	Fire UG Tank Hi/Lo level monitoring	*	*					Provision for Level switch intallation	Bi-Level Switch & Cabling from switch to DDC Panel
5	Raw Water UG Tank Hi/Lo level monitoring	*	*					Provision for Level switch intallation	Bi-Level Switch & Cabling from switch to DDC Panel
6	Treated UG Tank Hi/Lo level monitoring	*	*					Provision for Level switch intallation	Bi-Level Switch & Cabling from switch to DDC Panel
B	**Water Pumps**								
1	Domestic Water Pumps on/off status	*	*					Provision for Current Relay installation in Pump Panel	Current Relay & Cabling from switch to DDC Panel
2	Domestic Water Pump trip status	*	*					Provision for Potential Free contact in Pump Panel	Cabling from Pump Panel to DDC Panel
3	Flush Water Pump on/off status	*	*					Provision for Current Relay installation in Pump Panel	Current Relay & Cabling from switch to DDC Panel
4	Flush Water Pump trip status	*	*					Provision for Potential Free contact in Pump Panel	Cabling from Pump Panel to DDC Panel
5	Irrigation Water Pump on/off status	*	*					Provision for Current Relay installation in Pump Panel	Current Relay & Cabling from switch to DDC Panel
6	Irrigation Water Pump trip status	*	*					Provision for Potential Free contact in Pump Panel	Cabling from Pump Panel to DDC Panel
7	Sewage Water Pump on/off status	*	*					Provision for Current Relay installation in Pump Panel	Current Relay & Cabling from switch to DDC Panel
8	Sewage Water Pump trip status	*	*					Provision for Potential Free contact in Pump Panel	Cabling from Pump Panel to DDC Panel
C	**Fire Fighting**								
1	Fire Fighting Pumps on/off status	*	*					Provision for Current Relay installation in Pump Panel	Current Relay & Cabling from switch to DDC Panel

2	Fire Fighting Water Pump trip status	*	*					Provision for Potential Free contact in Pump Panel	Cabling from Pump Panel to DDC Panel
3	DG Pump on/off status	*	*					Provision for Current Relay installation in Pump Panel	Current Relay & Cabling from switch to DDC Panel
4	DG Water Pump trip status	*	*					Provision for Potential Free contact in Pump Panel	Cabling from Pump Panel to DDC Panel
5	Jockey Pump on/off status	*	*					Provision for Current Relay installation in Pump Panel	Current Relay & Cabling from switch to DDC Panel
6	Jockey Pump Pump trip status	*	*					Provision for Potential Free contact in Pump Panel	Cabling from Pump Panel to DDC Panel
7	Fire Hydrant Pressure monitoring	*		*				Provision for sensor installation in Fire Water pipe line	Wet Pressure sensor & Cabling from sensor to DDC Panel
8	Water Flow status	*	*					Provision for flow switch installation in Fire Water pipe line	flow switch & Cabling from switch to DDC Panel

END OF ELECTRICAL DBR

HVAC SYSTEM DBR

FOR

SUPER SPECIALTY OPD BUILDING

AT

MASJID MOTH

AIIMS-NEW DELHI

1 HVAC DBR

1.0 General

The HVAC DBR given below shall be read in conjunction with the Detailed HVAC Technical Specifications, List of Makes & overall other contract documents forming part of the EPC contract. In case of any variance, HVAC requirements given here in DBR or stringent among those shall supersede any other requirements mentioned in any other parts of EPC contract document & the instructions / directions of engineer-in-charge will be binding on the contractor.

1.1 Design Standards:

The following design standards shall be followed in HVAC (Latest with amendments):-

National Building Code 2016

CPWD HVAC Specification – 2017

NABH Standard

GRIHA Star Rating System

Energy Conservation Building Code 2017

ISHRAE

ASHRAE Standard 170-Ventilation of Health Care Facilities

ASHRAE 62.1– Indoor Air Quality

ASHRAE 52.2– Filter Selection & Efficiency

ASHRAE 90.1– Energy Standards for Building

SMACNA – Sheet Metal & Air-conditioning Contractors National Association – For Air Distribution

Latest BIS codes for Motors, Cabling, Wiring and accessories

National Electric Codes 2023 (NEC) latest version

1.2 Scope of Work

The scope of HVAC work shall include complete design engineering calculation and approval from statutory authority wherever required, approval

from the Engineer-in-charge / architect / consultant, supply, installation, testing, commissioning, Testing, Adjusting and balancing & handing over in satisfactory working conditions. Specifications & list of makes given in the tender shall be followed. The HVAC part of MEP design objective is to achieve sustainable buildings that are energy and resource efficient and promote a healthier environment for building occupants & also to achieve required GRIHA/IGBC certification.

The entire Design Basis Report, Technical Specifications, List of makes, Special Conditions of Contract etc. shall form Part of the Scope of Work.

Tender for this project shall have following buildings as under:-

a) New Super Specialty OPD Building

The detailed scope of HVAC work shall be as under:-

1.2.1 Type of Air Conditioning System

A) New OPD Building complete including circulation areas connected with Centralized water cooled chilled water plant system.

1.3 Basis of Design

A centralized HVAC system shall be designed, installed & commissioned on EPC contact basis to provide thermally controlled environment for the proposed complex. The HVAC systems shall be designed for automated round the clock year round operation to provide for the Inside environmental conditions as specified below.

Air conditioning system shall be designed as per following design parameters:-

1.3.1 Geographical Data

Site Location	Masjid moth, AIIMS-New Delhi
Latitude & Longitude	28.57° N, 77.21° E

1.3.2 Outside Design Conditions

Based on outdoor design data specified in 'ASHRAE Climatic Design Condition 2017', the outdoor design conditions have been considered as follows.

Season	**DBT °F**	**WBT °F**

SUMMER:	110 deg F DB	75 deg F WB
MONSOON:	95 deg F DB	83 deg F WB
WINTER:	45 deg F DB	41 deg F WB

Climate Zone as per ECBC: Composite

1.3.3 Inside Design Conditions

Centralized heating, ventilation & air conditioning system shall be provided to maintain the specified inside design conditions during summer, monsoon and winter for the proposed buildings.

Classification of various spaces in terms of temperature, humidity control, Occupancy, air filtration, air changes & pressurization requirements in various rooms / areas / departments shall be As per ASHRAE 170 & NABH design standard (Latest).

1.3.4 Other Design Parameters

Lighting Load – As per ECBC / NBC-2016 /at actual

Equipment Load – As per actual

Acceptable Indoor noise level for Hospital – 35-40 dBA (Table 4.1 of NBC Part 8 Section 4)

Fibrous acoustic insulation material shall not be used as duct lining for critical spaces unless downstream terminal filters are provided. Non critical spaces not having downstream filters will have internal non-fibrous acoustic lining till initial 5 meters of duct & Duct plenum.

1.3.5 Building Construction Data

HVAC system shall be designed according to latest GREEN BUILDING ratings & ECBC 2017 compliances. Fire and smoke partitions shall be used to limit the spread of smoke in the event of fire. Smoke and fire management shall be done in accordance of NBC 2016 and Delhi fire service.

All U values, SHGC, VLT of glass, roof & wall insulation shall confirm latest super ECBC building /GREEN BUILDING norms.

1.3.6 Mechanical Ventilation

- For mechanical ventilation designing, NBC 2016 (National Building Code of India) guidelines shall be followed.
- Labs shall be ventilated as per ASHRAE guidelines.

- Areas where patients cannot move themselves and areas with high population density such as OPD, waiting hall, multipurpose hall etc., will have fresh air supply & exhaust through long casing tube/vane axial fans, for smoke extraction purpose in case of fire and fans to be interlocked with FDA panel.

- All the escape route / passage / waiting / open space merging with corridor will have supply & exhaust air axial fans to operate in case of fire for smoke ventilation. Fresh air supply at floor level & smoke extraction at ceiling level will be provided as per NBC & DFS.

- All the smoke extraction axial fans shall be fire rated as per NBC 2016 & Fire department. Smoke extraction & zoning of areas must comply with approved fire plans from the fire department and their recommendations.

- Box type acoustically insulated inline fan shall be used for toilet ventilation of larger toilet area. For smaller toilet / toilet on external facade / toilet with single WC / private toilet, circular inline fan /propeller fan shall be used.

- All fire mode fans shall be interlocked with fire control panel for automatic run in case of fire as per NBC 2016.

- Pressurization of Lift Lobby, Lift Well, Staircase & Staircase Lobby
  - All the staircases shall be pressurized to maintain 50 Pa pressure.
  - All the staircases lobbies shall be pressurized to maintain 25 Pa pressure.
  - All the lift well shall be pressurized through multi-level air injection to maintain 50 Pa pressure.
  - All the lift lobby shall be pressurized through multi-level air injection to maintain 25 Pa pressure.
  - Latest NBC norms prevailing at the time of approval & execution to be followed.

- Kitchen exhaust shall be through dry Scrubber based on exhaust air quantity as per kitchen hood requirements. Fresh air supply to the kitchen shall be through air washer. Spot cooling shall be provided for workers working in cooking area.

- Dampers shall be installed at each exhaust air grill from toilet to ensure the required quantity of exhaust.

- Separate exhaust duct shall be provided for toilets, pantries, and dirty utility areas. These shall not be combined with each other or with any other exhaust ducts of AC System.

- Exhaust outlets shall be located at a minimum height of 3 m away from ground level and away from doors, occupied areas and operable windows.

1.3.7 HVAC Design Principles

- Objective of HVAC system design is to ensure proper thermal comfort & Indoor Air Quality as per design standards mentioned above along with Energy Efficiency, Flexibility of Operation, Cost Optimization, BMS Compatibility and ECBC/GRIHA/ IGBC Rating Compliances.

- The ratings and capacities of various equipments are indicative and subject to up gradation/revision during detailed design & engineering stage. However chillers and capacities of major equipments specified in the tender shall be minimum & any enhancement in the capacities of chillers & other equipments if required shall be done as per the engineer in charge without any extra cost.

- Equipment sizing of HVAC system shall take into account factors such as geographical location, climatic conditions, water availability & quality etc.

- The cooling requirements shall be achieved through efficient air-conditioning system having AHRI Certified Water-cooled centrifugal Chillers (having 6.7 COP, IPLV 9.1& NPLV< 0.4) with Variable Frequency Drive & Active Harmonic Filters having THDi less than 5% at equipment level as per IEER519.

- Winter heating / Monsoon reheat (RH control) shall be provided through Hot water generators for OPD block in all areas. 4-pipe system shall be provided in all AHUs.

- The central air conditioning system shall consist of Water Cooled centrifugal Chillers with VFD and active harmonic filters, fixed speed Primary Pumps, Variable Speed Secondary chilled water pumping system, fixed speed Condenser water pumps, Hot water generators for RH control / winter heating, Hot Water Pumps, Cooling Towers with VFD, Pressurized Expansion Tank, Vacuum Degasser, Electrochemical Water Treatment & Disinfection System, HVAC Plant room manager from chiller manufacturer.

- One number standby (n+1 configuration) shall be considered for all types of Chillers, all type of Pumps, Cooling Towers, Hot water generators, Hot water pumps etc. & also provision of space shall be kept for installing one number additional future chiller & accessories in AC Plant Room.

- HVAC Plant Room shall be provided with safety equipments / items like suitable elastomeric mat (as per relevant IS codes), fire buckets, fire extinguishers, fire suppression system for main HVAC panel, hand gloves, safety charts, framed Schematic / SLD etc.

- Suitable size shafts, cutouts, niche, openings etc. shall be provided to facilitate installation of pipelines, ducts etc. in all floor slabs of various

buildings for various service areas, as required. All shafts, cutouts, niche, openings etc. provided on floor slabs shall be suitably closed with fire grade mortar after laying of services lines as per fire safety norms as per NBC 2016. Doors shall be provided for all shafts at all floors as per fire safety norms as per NBC 2016.

- All Services as required like raw/ soft/ hot water supply, drainage, plumbing, HVAC provisions, ducting etc. shall be adequately provided by the EPC Contractor for all Medical Equipments.

- Air Handling Units shall be floor mounted & shall be installed in AHU Rooms of sufficient size with service space all around. AHU shall be stacked one above other with vertical shaft in AHU Room for running chilled / hot / drain water / fresh air duct etc. Insulated drain piping shall be separate from any other pipe and shall not be connected to toilet /sluice or any other building services.

- Fresh air supply & smoke extraction in case of fire from passage / fire escape route / patient ward / waiting area /any high occupancy area or others shall be provided. Smoke extraction to be done by installing the fan at terrace level & preferably using internal/external shafts in the building. Fresh air supply shall be from shafts. Fresh air grills shall be provided at floor level in individual area & smoke extraction grills at ceiling level. Shall be as per NBC2016. All the fans shall be AMCA certified and 250 degree C and 2 hours fire rating.

- In case of VRV / VRF system (If used) the Outdoor Unit shall be air cooled, variable refrigerant flow / volume air conditioner and indoor units shall be combination of VRF ductable / FCU / Cassette type to suit the interior layout. The system shall cool in summer and heat in winter (i.e. dual mode). The outdoor unit shall have all inverter multiple scroll compressors and shall be able to operate even in case of breakdown of one of compressor (COP 3.5). The system shall be provided with a central controller, which will control and monitor all the units from one location and central controller shall be connected with the BMS system. Treated ducted fresh air shall be provided to each indoor unit. Provision of user controls for temperature shall be made zone wise other than the central controller.

- In case of Air Cooled (If used) Package / Ductable / Precision Units the Outdoor Unit shall be air cooled. This system shall have cooling facility & not heating. Locally ducted treated fresh air shall be provided to each indoor unit.

- Split type AC of variable speed inverter technology having ISEER minimum 5.00 suitable to operate on 250V, 50 Hz, A.C.

1.3.8 Special Consideration

The air-conditioning design shall take into consideration the following aspects:-

- Areas shall be designed on air recirculation and outside air intake system as per standards specified in ASHRAE, ISHRAE and NABH etc., except areas as mentioned in ASHRAE 170 to be on 100% fresh air with suitable heat recovery system.

- All critical areas shall be designed for inside temperature and RH as per ASHRAE 170.The system shall be designed with RH control mechanics compatible with BMS.

- Laboratories shall be designed as per ASHRAE170 and ASHRAE Hospital guidelines.

- Compartmentalizing and Zoning of Areas in Hospitals to restrict air movement and prevent cross contamination.

- Ventilation Design and Air Filtration to dilute and remove contamination in the form of odor, airborne microorganisms and viruses, hazardous chemical and radioactive substance. Differential pressure between zones and critical areas shall be maintained as per ASHRAE-170.

- High Efficiency Filtration system to prevent bacterial contamination whether it is from Outdoor Air or from re-circulated air within space as per ASHRAE.

- Two Stage Filtration comprising of Air Filtration System (equivalent to MERV-14) and three stages HEPA Filtration (equivalent to MERV 17) for Critical Areas shall be as per ASHRAE.

- The fine and HEPA filters shall be installed in the air handling units after the chilled water coils and fan section and are always backed by pre-filters provided on the suction side of the AHU.

- ART (Anti Retroviral Therapy) department shall be provided with HEPA filtered exhaust system and shall have separate HVAC system. The area shall be maintained with negative relative pressure to the adjoining areas. Exhaust from the area shall be HEPA filtered.

- DOTS centre shall be designed as per hospital guidelines for TB areas and shall have separate HVAC system. The area shall be provided with more than 12 ACPH and directional air flow. The AHU shall be once through type (100% fresh air). The exhaust system shall be provided with HEPA filters and UVGI.

- The diagnostic areas such as X- ray labs, Ultra sound lab, CT scan etc. shall be designed on conventional air recirculation principle with high air circulation rate to remove the sensible heat generated by the equipment room.

- UVGI shall be provided because it is effective in reducing the transmission of airborne bacterial and viral infections in hospitals, UVGI is also recommended in air handling units to prevent or limit the growth of vegetative bacteria and fungi.

1.3.9 Indoor Air Quality

- Emphasis on maintaining desirable Indoor Air Quality by setting and controlling parameters of Temperature, Air Flow, Humidity Levels and Air Changes per Hour (Total & Fresh Air) for each room / zone / area.

- Conformity of Indoor Quality parameters by providing single stage / two stage / three stage filtration with ISHRAE, ASHRAE and NABH Standards.

- Pre filters of MERV 8 rating shall be installed in all the AHU / FCU as detailed above.

- Fine filters of MERV 14 Rating shall be installed in the entire AHUs of all the OPD blocks as per ASHRAE Standard 170 Health Care Facilities.

- HEPA filters of MERV 17 Rating shall be installed with the selected AHUs as per ASHRAE Standard 170-2021-Health Care Facilities. AHU fan shall be selected with required static accordingly.

- All AHU shall be provided with one set of commissioning Pre Filters which shall be replaced with actual pre filter after testing and commissioning. .

- For DX Indoor Unit (Air Cooled VRV / VRF Unit or Air Cooled Hi CFM Packaged Unit or Air Cooled Precision Packaged Unit etc.) shall have standard filter supplied by manufacturer.

- DX Type Air Cooled Precision Units shall be a floor mounted unit designed specifically for high sensible heat ratio applications such as Server, Computer rooms and UPS room etc.

- Filter frame shall be made of anodized aluminum.

1.3.10 Chilled / Hot Water Piping & Condenser Piping Loop

- Primary & Secondary and chilled water and hot water pumping system shall be installed in AC plant room.

- OPD building shall have 4-pipe systems and all AHUs shall have cooling and heating coils and provision of RH control through BMS.

- Pressurised expansion tank and air separator shall be considered in chilled water and hot water circuit in AC plant room.

- Condenser water circuit shall have fixed / constant flow water pumping system.

- Chilled Water Circuit comprising of MS pipes ("C" Class heavy duty) with aluminium cladded expanded polystyrene (EPS) insulation in case of Centralized Chilled Water System and hard drawn copper tubes with suitable Insulation in case of VRV/VRF System.

- GI pipes (Class B) for drain pipe with suitable insulation for chilled water system.

- u-PVC Pipe for VRV/VRF/DX Split drain pipe to be provided with insulation.

- All the valves & fittings must be PN16 rated and suitable for Chilled Water and Hot Water applications. Insulation of valves shall be the same as that of pipe or pre insulated valves shall be preferred as per availability.

1.3.11 Zoning of area in Central Plant

- Zoning of area depending upon the uses and working flow pattern & also as per ASHRAE Standard 170-Health Care Facilities shall be done for selection of AHU. All AHUs shall be floor mounted type.

- For AHU butterfly valve at ends, PIBCV modulating valve, pressure gauge & thermometer at both ends.

- Outdoor AHU shall be with 50 mm thick panel and shall be with thermal break profile with canopy and roofing arrangement for protection from Sun & Rain.

- AHU cooling coil shall be 6/8 rows deep & 2 row of heating coil. FCU with 4 pipe system shall have 3 row cooling coil & 1 row heating coil (if used).

- AHU stack shall be created one above other with AC shaft for running CHW, HW & Drain pipe along with fresh air riser etc. Floor mounted AHU shall have treated fresh air provision.

- For guest room/ private room- FCU / VAV boxes with room thermostat for temperature control shall be planned, dedicated floor mounted TFA with 6 row or 8 row cooling coil with pre & fine filter will be provided

- Dehumidified CFM shall not be less than ACPH mentioned in ASHRAE 170 for all hospital areas.

1.3.12 Variable Frequency Drive for AC Equipments

- Chiller –VFD with active harmonic filter by chiller manufacturer same as per factory testing with THDi less than 5% as per IEEE519.

- Cooling Tower Fan - VFD with IP 55 enclosure from factory with heat sink with harmonic filters IP 55 controller. Operation of VFD system shall be based on approach of cooling tower.

- AHU Fan Motor - VFD with IP 54 enclosure from factory. RPM to be modulated with return air temperature sensor for the AHU without VAV Boxes. Each VFD will have 04 PID loops. Constant volume areas shall be provided with DOL/ Star delta starter with FDA interlocking provisions.

- Secondary Chilled Water Pumps - Dedicated VFD with IP-54 enclosure from factory & dedicated microprocessor based pump logic controller of IP-54 rating shall be from the manufacturer.

1.3.13 Thermostat & Humidistat

- The temperature / RH control in all the areas will be done through BMS.

1.3.14 Air Distribution

- CT scan, MRI etc. shall have supply and return both ducted with Aluminium Ducting. Ducting, damper, vanes etc all shall be of Aluminium. No GI / MS shall be used through-out the supply and return path. Inside space air-conditioning of CT and MRI system shall be in the scope of equipment suppliers.

- Rest all ducting shall be of GSS / GI construction or as per guidelines.

- All the air conditioned space in OPD Block fed by AHU shall have ducted supply & ducted return with GSS / GI construction duct.

- Air distribution duct system shall have duct damper, splitter damper, collars / volume control dampers at terminals etc for control and balancing of designed CFM.

- CBRI approved Fire damper on the AHU rooms' walls at supply and return path of the air shall be installed.

- Where ever working and standby air distribution equipment is connected with same plenum then at equipment mouth, motorised duct damper shall be installed which will open and close as per the running condition of equipment.

- All Grilles double / single louvers, Continuous Linear Grills, Square Diffusers, Slot Diffusers, Round Diffusers, Helical Diffusers, Displacement Diffuser, Long Throw Jet Nozzles, Ventilation Supply /

Exhaust Air Valves, Air Volume Controllers etc. shall be in aluminium anodised construction in powder coated finish & type of grills / diffusers / nozzles / air valves / volume control dampers shall be selected as per interior design / Engineer in Charge / Consultant / Architect.

1.3.15 HVAC Equipments & Materials

The HVAC System shall comprise of following Equipments & Materials but not limited to & in compliance with detailed specification given in tender:-

- **AHRI certified water cooled centrifugal chiller** (COP 6.7, IPLV 9.1 and NPLV<0.4) with VFD & Active Harmonic Filters with THDI less than 5% as per IEEE519.

  The chilled water inlet/outlet temperature shall be 54 deg F/42 deg F respectively with chilled water circulation rate at 2 GPM/TR.

  The Condenser water inlet/outlet temperature shall be 90 deg F/ 100 deg F respectively with circulation rate at 3 GPM/TR.

  Noise at 1m shall be 85 dBA at all loads 100% to 25%. Chiller should operate without hot gas bypass /envelop stability control.

  VFD shall be the same make and model which will be used for the testing at manufacturer's works for the AHRI certification.

  ASME stamped matching shell and tube water cooled condenser of M.S. shell and integrally finned copper tubes with marine boxes. Maximum head loss 8 m water head.

  ASME stamped matching shell and tube flooded type chiller of M.S. shell and integrally finned copper tubes with marine boxes. Maximum head loss 5 m water head.

  Victaulic coupling at the inlet and outlet piping connections of evaporator and condenser of chillers with vibration isolations.

  Necessary spring isolators with 25 mm deflection from OEM for the chilling unit.

  Microprocessor based control panel complete with accessories as per specifications and BMS compatible BACNET/MODBUS Protocol with BMS cards.

  One randomly selected chiller shall be tested as per conditions stipulated in tender for points 25%, 50%, 75% and 100%.

  Automatic tube cleaning system designed for automatic continuous cleaning of heat exchangers with injector, ball trap, drain valves, injection valves, manual ball valves, check valve, drain valve etc.

Chiller Fouling Factor: 0.0005 (FPS Unit)

Condenser Fouling Factor: 0.001 (FPS Unit)

- **AC Plant Room Manager-** Plant Room Manager shall be provided for sequencing, remote monitoring, and controlling and report generation of all equipments in AC plant room/high side. Plant room manager shall be of the same make as chiller. Selected controller shall have capability to meet all the equipments of AC plant room. Supervisory controller for management level interface in MS Enclosure SWG thickness, powder coated Siemens grey for Supervisory Controller, IO Cards (with accessories like Transformer, MCBs, internal wiring and Relays with bases). Workstation PC i7 with graphic card computer 3000 MHz with 1 TB hard disk, 32" TFT monitor, 104 windows key board, mouse, serial and parallel ports with laser color printer. This must have software integration on chillers with 3rd party interface available on BACNET including cabling & conduit work as required with card. Chiller plant manager shall essentially be able to perform the following functions :
  - Chillers start and stop operation.
  - Chillers auto sequencing.
  - Optimizing chillers operation with optimization software and logic.
  - Auto start and stop of condenser water pumps.
  - Auto start and stop of cooling towers.
  - Auto start and stop of primary chilled water pumps.
  - On and off operation of motorized butterfly valves at chiller outlet, at condenser outlet and at cooling tower inlet.
  - Having capability for Software integration with secondary chilled water pumps panel.
  - Having capability to interface with 3rd party BMS system over Bacnet / IP.
  - Having capability to monitor, operate and generate reports from remote location.

  Chiller plant manager shall be suitable to manage:
  - Chillers
  - Condenser water pumps.
  - Primary, secondary chilled water pumps.
  - Motorized Cooling towers Fans.
  - Motorized Chilled water valves.
  - Motorized Condenser water valves.
  - Cooling tower valves.

- **Air Cooled VRV / VRF (latest version)** Air Conditioning shall be all inverter type.

- CTI Certified extra low noise Induced Draft cross flow **Cooling Towers**

- All the **electrical work** related to HVAC system shall be in accordance with Electrical DBR.

Water Circulation Pumping System: Pump casing shall be cast iron, impeller shall be bronze/gunmetal, and shaft shall be of Stainless steel with S.S mechanical seal and rigid coupling. The pump shall be designed for PN-16 rating. Pump shall be complete with all accessories like pressure gauge, butterfly valves at pump suction and discharge, suction guide, reducers (if reqd.) etc. All the valves and fittings shall be PN-16 at 50 Deg C and suction guide has to be sourced from pump manufacturer only. Suitable Foundation (PCC/RCC) or as per OEM standards needs to be constructed for mounting of these pumps along with anti-vibration mountings. The thermal insulation of Chilled/hot Water Pumps shall be with same material & thickness as that of pipe. Pumps shall consist of following types of pumps:-

Primary Chilled Water & Hot water pumps – Split casing end suction back pull out /vertical in-line with pump efficiency more than 80% for Chilled water pumps and more than 70% for Hot water pumps with IP 55 TEFC induction motor with class F insulation, IE-3 efficiency class and suitable continuous duty (S1). Pumps shall include channel base with vibration isolators, coupling, coupling guard etc along with cladded insulation and anti corrosive coating inside and outside casing etc. for the water pump.

Condenser Water Pumps- Split casing end suction back pull out /vertical in-line with pump efficiency more than 80% with IP 55 TEFC induction motor with class F insulation, IE-3 efficiency class and suitable continuous duty (S1). Pumps shall include channel base with vibration isolators, coupling, coupling guard etc along with cladded insulation and anti corrosive coating inside and outside casing etc. for the water pump.

Secondary Pumps & Variable Speed Pumping System Split casing end suction back pull out /vertical in-line with pump efficiency more than 80% having IP 55 TEFC induction motor with class F insulation, IE-3 efficiency class and variable load duty for continuous operation. Pumps shall include channel base with vibration isolators, coupling, coupling guard etc along with cladded insulation and anti corrosive coating inside and outside casing etc. of chilled water pump. Pumps must also consists of 1 No. dedicated microprocessor based pump logic controller for each set of pumps with parallel pumping software duly down loaded and capable of controlling up to 5 pumps in parallel / accepting 2 analog input from zone sensor and should be capable of communicating with Building Management System by both hardware and software integration. Control software and networking hardware and software for integration and compatibility with BMS (BACNET Protocol) from the pump supplier. All pumps to be provided with separate VFD's (variable frequency drives). Separate control panel for each zone/set. The variable pumps shall have an independent/ standalone IP-55 controller and should not be an integral part of any of the pump VFD's. Panel should also consist of cooling fan. Suitable no. electronic Differential Pressure Transmitters and separate PLCs for each set.

Hot water Generator for monsoon reheat / winter heating in complete OPD building- Hot water generators shall be complete with controls, sensors, control cabling ,piping and fittings, thermal insulation, base frame etc. as per specifications. HWG shall be BMS compatible with RS 485 communication port and BMS Card.

Suitable Capacity **pressurized expansion tank** with dosing pumps & vacuum degasser for Chilled and Hot water circuits - Supply, installation, testing and commissioning of pressurized closed type Expansion tank with air separator and dosing pumps (1w+1s) separately for chilled water and hot water circuits along with controller. Expansion tank shall be designed & constructed as per ASME- Section-VIII. The expansion tank shall be complete with all necessary valves, PRV and air vent connection. Quoted price shall include of 50 mm thick 32 kg/mt cu density TF quality Expanded polystyrene insulation and cladded with 24 gauge aluminum sheet for chilled water tank and glass wool insulation as per specifications with aluminium sheet cladding for Hot water tank. Tank shall be equipped with 15 mm dia vent, 450 mm dia manhole with cover, 40 mm dia make up with overflow connection (ball valve should be provided at the makeup line), 50 mm dia drain and over flow with necessary valves and 50 mm dia insulated pipe connection to nearest chilled water return line. Tank shall be selected for PN-16 rating as per technical site/ designer requirements.

Air and Dirt Separators as per the specifications on the return water line located at the pump suction or a suitable location as suggested and suitable for water flow as required. The separator should be complete with air vent, service valve, flanges, drain valve etc. The separator should be capable of removing dirt particles upto 5 micron size

Double skinned air handling units(AHU) with AHRI / Eurovent certified coils- Supply, installation, testing & commissioning of double skin, floor mounted, sectionalized construction, draw through type, thermal break profile design air handling units (AHU) with (0.8 mm) pre coated GSS from outside & (1 mm) aluminium on inside with PUF Insulation of casing thickness (min. 40 mm) and density (min. 45+ kg/cum) between them. AHUs shall be floor mounted & should be of sufficient tonnage, CFM & static pressure as per the requirement. All the inner frames, supports, etc shall be of aluminium.

The air handling units shall consists of mixing box with return air & fresh air duct connection flanges and low leakage dampers. Fresh air port will have a volume control damper. Return air duct connection will have a fire retardant flexible connection and a motorized damper.

Controls for AHUs comprising of a set of PN-16 rating 2 Way pressure independent dynamic balancing cum control valve of required size fitted with modulating actuators having manual override facility on each AHU along with wiring for interconnections with 1.5 sq. mm Cu Conductor multicore armored complete as required. The actuator shall have required shut off capability of minimum 4 bar rating. The actuator shall be

compatible with BMS. The valve actuator shall be capable of accepting 2-10 volt DC, 4-20 mA electric signals and shall provide similar transduced feedback output signal to control system.

Each AHU shall comprise of minimum 2 stage filtration system for all the areas and 3-stage filtration for areas as required by guidelines. Accordingly pre-filter section with MERV-8 filters. (Synthetic Fiber Pre-filter) (90% down to 10 micron), fine filter section with MERV-14 filters. (99% down to 3 micron) and HEPA Filters with MERV-17 filters (99.97% down to 0.3 micron) shall be provided. Wherever fine/ HEPA filters are required, item shall include factory fabricated double skin plenum of same specifications as AHU panels and complete with filter frameworks. Fine/ HEPA filter section along with discharge plenum shall be part of AHU.

Cooling coil section with 6/8 Row deep copper tubes & aluminum fins AHRI/ Eurovent certified cooling coil and additional 2 row deep heating coil. Minimum 2 bend GSS/PVC eliminators.

The AHU shall also consists of fan section with AMCA certified, low noise, high efficiency, backward curved, aerofoil design, direct/belt driven centrifugal fans. Each AHU shall have high efficiency 'IE3', continuous duty (S1), IP55 squirrel cage induction motor suitable. Motor shall be suitable for VFD operation. AHUs shall be complete with V-Belt drive/direct drive package. Fan & motor shall be mounted on a common base frame with motor sliding rails & complete base frame mounted on the AHU casing with vibration isolator/spring isolators. Necessary vibration isolators & supporting arrangement shall be provided.

Fresh air intake arrangement, necessary water drain & air purge valves wherever required etc.

The unit shall be provided with water resistance marine light and limit switch with power cabling.

Each AHU shall be with fire retardant canvass connections, necessary foundations, 2 nos pressure gauge, 2 nos thermometer etc. Insulated drain pan of SS 304 and drain connections. Insulated drain pipe from drain Pan shall be separate from any other service and drain should not be connected with toilet or sink etc. pipes.

The unit shall be BMS compatible. Ports shall be provided across fine & HEPA filters for BMS integration.

Variable air volume (VAV) boxes with digital display type thermostat for individual room temperature control. The controllers used in the VAV terminals shall necessarily be a DDC with 32-bit micro-processor. The Noise level for the VAVs shall be less than 30 dB for office areas.

Low noise Fan Coil Units with valves & fittings in selected areas only with temperature control and valve accessories set.

Toilet ventilation suction Grills, **acoustically enclosed inline fans** etc as required.

DX Type Air Cooled Precision Units shall be a floor discharge unit designed specifically for high sensible heat ratio applications such as Server, Computer rooms and UPS room etc

VFDs of AHUs wherever used shall be with IP-54 rating & with 04 loop PID.

Ultra Violet Germicidal Irradiations, (UVGI) System for Improvement of Indoor Air Quality and Energy Saving on AHU's Coil shall be provided for OT's, ICUs, triage, recovery and critical areas for infection control having intensity of 6000 µW sec/cm2 for achieving 90% kill rate. The Average Life of UV lamps shall be 9000 hrs. Accordingly AHU shall be provided with additional section for UVGI. The UVGI System shall consist of UV lamps, reflector with its mounting assembly and control panel. The Control Panel shall be mounted outside the AHU and should consist of ballast, hour meter, MCB, Indicating Light. The ballast and UV lamps shall be of instant start type. Including inter connected wiring between the UVGI lamps and panel. Alternatively the ballast may also be installed inside the reflector assembly itself depending on manufacturer's design.

Complete Mechanical ventilation system with **Air-washer & Dry Scrubber** for Kitchen with grease trap and MS ducting with fire paint.

Centrifugal / Vane axial / Propeller / Inline Fans for basement ventilation, upper floors smoke extraction, toilet ventilation, Lift well/ staircase well pressurization, Lift lobby/staircase lobby pressurization as per Fire guidelines of NBC 2016.

Complete **Parking Ventilation** system as per NBC 2016 for normal as well as in case of fire. Ventilation ducts shall be open cell fire rated class 'O' acoustic insulation upto 8 meter from fan.

Automatic Controls & Instruments for complete functioning of HVAC system and compatible with BMS functioning.

Complete Building Management System (BMS) with controls and monitoring.

All **Electrical Motors** min IE-3 efficiency ratings

Motor Control Centre, Sub Panel, Power & control cabling and earthing etc. as per IS standards

Air Distribution – GSS Ducting, Aluminium Ducting for OT & MRI, MS Ducting for Kitchen Exhaust, Aluminium Construction Grilles Double / Single Louvers, Continuous Linear Grills, Square Diffusers, Slot Diffusers,

Round Diffusers, Helical Diffusers, swirl diffusers, plaque diffusers, Displacement Diffuser, Long Throw Jet Nozzles, Ventilation Supply / Exhaust Air Valves, Air Volume Controllers etc. GSS Ducting can be rectangular, circular, elliptical, spiral.

VCDs to be provided in ducts at all suitable places.

Motorized Fire & Smoke Dampers shall be CBRI approved (250deg, 2hrs). Fire Dampers with actuators to be considered for floor mounted AHUs at supply/return duct.

Chilled, condenser, hot & drain water **piping with insulation,** valves & fittings, HVAC system controls etc.

Insulation / Lining – Duct Insulation & Duct Acoustic Lining, Plant Room, DG Room Acoustic Lining, Chilled / Hot / Drain Water Pipe & Fittings Insulation with aluminum cladding, Factory Insulated Valves in Chilled / Hot Water Pipes or Site Insulation with aluminum cladding etc.

Duct Insulation: Nitrile rubber class 'O' (19/25 mm) as per BS476.

Chilled water pipe Insulation: TF quality Expanded Polystyrene (EPS) with aluminium cladding.

Underdeck Insulation of exposed roof: TF quality Expanded Polystyrene (EPS) board.

Mechanical ventilation system:-

Long casing tube/ vane axial fans: AMCA certified for air, sound and efficiency. Axial fans for basement normal ventilation and smoke extraction purpose must be fire rated (H class), able to withstand a temperature of 250 degree Celsius for a period of 2 hours. Fan-motor assembly (as whole) shall be statically & dynamically balanced, conforming to ISO and AMCA Standards.
The speed of Fan shall not exceed 1500 RPM for Fans with impeller diameter above 450mm and 2900 RPM for fans with impeller diameter of 450mm and less.
Noise Level of Fan (in decibel) should conform to NBC 2016/ASHRAE/ ISHRAE/ CPWD and relevant IS Codes.
The plenum of the fans must be lined with acoustic lining to ensure proper sound absorption. Each fan shall be supplied with spring isolators suitable for floor mount or hanging type arrangement from manufacturer.

In-line fans: Acoustically insulated factory assembled statically and dynamically balanced, conforming to ISO and AMCA standards. Noise Level of Fan (in decibel) should conform to latest NBC 2016/ ASHRAE/ ISHRAE/CPWD and relevant IS Codes.

Air washer and Scrubber: For kitchen ventilation. Air washer for supply and scrubber for exhaust air. Air Washer shall be of double skin construction with suitable thickness impregnated cellulose paper media (Celdek pads) of minimum 90% efficiency, factory assembled, distribution header, GI 'B' class piping, makeup, quick fill and drain connections, Butterfly/Gate valves for Pumps, make up, drain & quick fill connections of Sump, 2 Nos. pumps of suitable capacity (1W +1 S), Y strainers and necessary fittings, GI frame and supporting structure for Celdek pads, washable synthetic fiber filters (of 90% efficiency down to 10 micron) and SS(18 gauge) sump, TEFC Motor (IP:55) Control panel complete with necessary Switchgear, Starters, metering, power and control wiring between control panel and motor/pump etc. & drive unit complete with pulley, belts, fresh air louvers with bird screen (GI Construction) etc as per specification & as directed by Engineer-in-charge.

Scrubber shall comprise of extract air intake section, electrostatic precipitation technology, dry type air cleaner to remove oil, smoke and fumes from exhaust air, washable type aluminum mesh filters, stainless steel spiked ionizers to create high voltage DC field, aluminum collector plates which should be alternatively charged positive and negative with large collecting area to work as magnet for charged smoke and oil particles. The system should allow connection to a fan section to achieve 500 FPM velocity across the air cleaner.

Suitable PCC/RCC foundation with plaster, anti-vibration mountings made up of (mixed cellular polyurethane) etc. shall be provided.

Ventilation duct: GSS duct construction standards must conform to SMACNA / IS 655 standards. The ducting shall be complete with all relevant accessories. Fireproof double canvass connection of suitable thickness and required length shall be provided at the outlet of the indoor equipment connecting it with the plenum. Kitchen exhaust duct shall be of MS material with fire retardant pain. All the ducts used for smoke venting shall be coated with fire resistant paint.

Air distribution products (ADP): Louvers/grilles with or without dampers. Sizing of ventilation louvers should be done considering the capacity of fans. The ventilation louver for fresh air shall have manually operated dampers along with bird screen wire mesh and ventilation louver for exhaust air shall only have bird screen wire mesh. Material of construction of louvers shall be preferably extruded aluminum with powder coated finish or as per OEM complying codes & standards.
Grills with dampers for supply/fresh air & grills without dampers to be considered exhaust/return air. MOC of grills shall be preferably extruded aluminum with powder coated finish or as per OEM complying codes & standards.

Testing- commissioning & Balancing of Water & Air System complete.

1.3.16 Green Building Considerations

- Minimize ozone -depleting substances:
- Employ 100% zero ODP (ozone depletion potential) refrigerant (CFC & HCFC free).
- HCFC and CFC free insulation in complete HVAC system.
- Acceptable outdoor and indoor noise levels.
- Indoor air quality.
- To optimize use of energy systems in buildings:
- Mandatory compliance measures as recommended in the ECBC 2017.
- All the material used in HVAC system shall be with
- Refrigerant used shall be eco-friendly and zero ODP refrigerant such as R-134a / R-410 A / R-32 in compliance with green building ratings.

1.3.17 Energy Efficiency considerations

Following have been considered in the HVAC system:-

- Energy efficient chillers.
- Insulation of exposed roofs for reducing heat ingress.
- Airtight windows and doors for reducing leakage.
- Double glazing of windows.
- All heating, ventilation and air conditioning equipments and system will comply with the mandatory provisions of ECBC-2017.
- Natural ventilation has been considered as per National Building Code of India 2016.
- Minimum equipment efficiencies will meet or exceed the minimum efficiency requirements as per ECBC-2017 and ASHRAE-90.1.
- Performance rating as per ARI-550/590 certification for water chilling machines.
- All mechanical cooling and heating systems will be controlled by time clock.
- Wherever possible, HRU will be used for heat extraction from exhaust air.

1.3.18 Fire safety considerations

For fire safety, fire dampers shall be provided in supply and return air ducts which shall automatically shut off in case of detection of fire. Also the air conditioning system shall be electrically interlocked with the central fire alarm

system of the building such that in case of detection of fire the complete air conditioning system shall stop automatically except very critical areas which will remain operational unless the smoke is detected in itself.

- All the materials used for ducting and insulation shall be fire retardant type and CFC and HCFC free.
- Combination smoke cum fire dampers will maintain the integrity of firewalls and also prevent the spread of smoke.
- AHU operation under fire conditions: - AHU's will be configured to operate in the following manner under fire conditions:
- Supply and return fan off
- Smoke extract fan on
- Recirculation dampers closed
- Exhaust dampers fully open
- Fresh air dampers fully open
- Each lift well and staircase shall be pressurised during fire condition with necessary ventilation as per the statutory requirement (NBC).

1.3.19 Design and Layout Considerations

- The Design and Layout Considerations for HVAC System in a Building must strictly conform to the provisions stated in NBC, ECBC and CPWD.

- **Plant Room Layout :-**

a) Plant Room slab & its terrace shall be structurally designed to take loads of various equipments. Also, dimensions of plant room shall conform to CPWD norms & other relevant codes so as to have proper distance between chillers/pumps/other equipment.

b) The HVAC Plant Room Layout must be planned in such a manner so that it enables easy movement of personnel to conduct daily routine and maintenance procedures. Additional space for circulation shall be considered as per relevant codes. Provision shall also be kept for anticipated future requirements. Minimum clear height of plant room (approx. 5 m) shall be maintained as per relevant codes. The entrance to A.C plant room shall be preferably through rolling shutters having minimum width as per relevant codes to facilitate easy entry and exit. Space planning shall be done for 01 no of each set of AC plant room equipments for future.

c) Proper spacing must be ensured as per manufacturer's recommendations between the foundations of AC plant room equipments like Pumps, Chillers and other equipments to enable repairs and easy replacement of parts.

d) The AC Plant room must be adequately ventilated with ventilation Fans maintaining required air flow and ACPH levels. The design and sizing of Fan must be in conformity with the CPWD & NBC 2016 norms for the same.

e) Floor loading shall be designed for approx. 2000 kg/sqm for HVAC Plant room. The Plant room should have a fresh water connection & drain trap.

f) The floor shall have Kota stone finish and shall be provided with suitable drain with grating.

g) Adequate level of illumination must be ensured to enable smooth maintenance and repair procedures.

- **HVAC Shaft:-**

a) Sufficient number of shafts shall be provided so that piping length is optimized. Horizontal run of chilled water piping shall not be done and also no chilled/ hot water piping shall pass through any critical area.

b) The HVAC Shaft must be adequately sized to enable smooth passage of pipes and ducts with insulation along with its supporting arrangement through it.

c) The walls of the HVAC shafts must be lined with Fire Rated Material capable of withstanding 250 degree Celsius for a period of 2 hours. All types of HVAC shafts shall be sealed on each floor levels by fire rated sealing materials as per NBC.

d) Inspection doors must be provided in HVAC shafts wherever necessary. The door must be Fire rated capable of withstanding 250 degree Celsius for a period of 2 hours.

- **AHU Rooms:-**

a) Air Handling Units shall be floor mounted & shall be installed in AHU Rooms of sufficient size with service space all around. AHU shall be stacked one above other with vertical shaft in AHU Room for running chilled / hot / drain water / fresh air duct etc. All shafts shall be sealed at each floor level with fire rated materials as per NBC.

b) AHU Room / mechanical room slab shall be structurally designed to take loads of various equipments.

c) The AHU Room Layout must be planned in such a manner so that it allows easy movement of personnel to conduct daily routine and maintenance procedures.

d) AHU foundation shall be proper in conformance to manufacturer's standards. All measures shall be taken including providing vibration isolation pads etc., to dampen noise generated at source itself.

e) AHU Room shall be acoustically insulated with suitable material (density, K value) as per CPWD/ GRIHA provisions wherever required.

f) Floor loading of approx. 800 kg/sqm shall be considered for AHU Room. AHU Room should have a fresh air opening, water connection & drain trap. AHU condensate drain shall not be clubbed with any other drain to avoid condensation.

1.3.20 Painting & Identification of Services

Painting & identification of services shall be done as per details given in the NIT. All equipment and ancillary items such as pipes, supports etc., will be painted in an Approved manner, using standard primer & paints as approved by HSCC / Engineer-in- charge. The original colour of all equipments like water chilling machines, air-handling units, cooling towers & all other HVAC equipments which if get damaged during transportation or during installation shall be painted in original shade with the two coat of paint to give a final finish.

A wall mounted, glass covered plan to the endorsement of the Client / Consultant shall be provided and displayed in each plant room showing the plant layout with pipe work, valve diagram and valve schedule indicating size, service, duty, etc.

All AC equipments shall be provided with permanent mounted identification labels and unique tagging numbers. The shop drawings shall also include these tagging numbers for easy identification on site. It should be co-ordinated with BMS also to ensure consistent equipment tagging among drawings, BMS display and site installation.

The labels shall be made from 3 ply (black / white/ black) material showing white letters and figures on a black background. Labels to be tied to each valve with chromium plated linked chain. The labels shall be suitable for minimum 40 characters with font size of 24 minimum. Labeling scheme of each equipment to be submitted for approval from Client / Consultant.

Pipe work and duct work shall be identified by colour bands 150 mm. wide or colour triangles of at least 150 mm. / side. The bands of triangles shall be applied at termination points, junctions, entries and exits of plant rooms, walls, in ceiling spaces, ducts and control points to readily identify the service, but spacing shall not exceed 8.0 meters.

Each valve shall be provided with a label indicating the service being controlled, together with a reference number corresponding with that shown on the Valve Charts and " as fitted" drawings.

1.3.21 Safe Custody and Storage

The contractor shall be responsible for safe custody of all machinery and equipment supplied and installed till the final taking over by the CLIENT.

1.3.22 Training of Personnel

The Contractor shall arrange to train the CLIENT's/Equipment staff on the following aspects prior to provisional takeover of the plant:

a) Operation of plant
b) Gas charging and pumping down of the system
c) Adjustments of settings for controls and protective devices
d) Preventive maintenance
e) Disassembling and assembling of compressor including identification and replacement.
f) Complete BMS system

1.3.23 Maintaining of Entire System

The contractor shall arrange for maintaining of entire HVAC system for a minimum period of one year after satisfactory completion of installation including testing & commissioning of work as desired by Engineer-in-charge.

1.3.24 Maintenance during Defect Liability Period

HVAC Works: The Agency shall maintain all HVAC assets created through this agreement:-

Scope of work shall include the following but not limited to:-

a) Weekly/ monthly maintenance services as per the manufacturer's Guidelines / maintenance Manuals shall be provided. In Emergency breakdown, troubleshooting to be provided and breakdown to be attended immediately & submit service report to Engineer in charge.

b) Required spare parts, consumables shall be made available immediately. Adequate stock of all spare part, consumables are to be kept at Hospital premises.

c) Comprehensive Maintenance shall be inclusive of following but not limited to:-

   i. All Equipment and electrical panels of the AC Plant must be running at the design efficiency without any interruption during 24 hours of operation.
   ii. The contractor has to check at regular interval for filter clogging and clean, replace same as per the filtration requirement.
   iii. The contractor shall carry out routine maintenance and shall attend any break down immediately.
   iv. Particle Count (twice in a year) and DOP test in all Operation Theatres

and Critical Care areas shall be carried out once in a year.

1.3.25 Minimum Suggested Manpower for Maintenance during DLP

For HVAC System: 03 mechanic cum operator, 03 Electrician and helper.

1.4 Design Engineering & Calculation

All required detail calculations shall be done by the EPC Contractor's appointed team and it shall be submitted to EPC Consultant for approval before starting the execution of the project. Calculations shall be prepared by a qualified Engineer. Furnish following engineering calculations showing the design criteria, including, but not limited to, as asked by Client & Main Consultant:-

a) Room wise heat load calculation for summer, monsoon & winter
b) Pump head calculation
c) Cooling Tower make up water calculation
d) Pressurized Expansion Tank Capacity
e) Pressurization calculation
f) AHU & Vent Fan pressure drop calculation (One for each type of AHU & Vent Fan)

1.4.1 Tender Drawings

The drawings issued with the tender documents are only for guidance of the tenderer. The actual & final AC GFC & Shop Drawings shall be prepared by the successful EPC & AC Contractor after due co-ordination with other services & shall be approved by the Engineer-in-Charge / AC Consultant / Architect before commencement of site work. The tenderer has to ensure that their proposal will meet with all the current rules & regulations pertaining to the relevant local / national statutory & NBC 2016.

1.4.2 GFC Drawings, Shop Drawings & Technical Submittal

On the award of the work, the Contractor shall prepare & submit the detailed technical submittal of equipments & materials along with Services Space Planning Drawings indicating services rooms & cutouts along with shafts in architectural & structural drawings clearing defined with numberings, GFC drawings for approval of Engineer-in-Charge / AC Consultant / Architect. Based on GFC drawings contractor shall submit shop drawings for approval before commencement of HVAC execution work at site.

To achieve the desired parameters/requirements as specified in Design Basis Report/Technical Specifications/Tender Drawings etc., the Contractor shall prepare detailed Heat Load Sheets of all rooms/occupancies of Air conditioned areas, CFM sizing of Fans (ventilation/pressurization) & submit to Engineer-in-charge for approval.

Subsequent to approval of the scheme as above, the Contractor shall prepare and submit to the Engineer-in-charge for approval, requisite sets of detailed shop drawings/layouts of various rooms/floors, Plant Room, External Layout.GA drawing of various equipment like Chillers/Cooling Towers /pumps /AHUs /FCUs /Panels along with foundation & other relevant details etc., equipment characteristics, pump curves and capacity details of all equipment, accessories and devices etc. as per specifications shall be submitted well in advance or as required for approval of Engineer-in-charge. The structure works should not be affected due to delay on this account. No claims for extension of time shall be entertained because of any delay in the work due to failure on part of the contractor to produce shop drawings in time.

If the Engineer-in-charge makes any amendment in the above drawings, the contractor shall supply requisite sets of fresh drawings with the amendments duly incorporated, along with the drawings on which corrections were made. After final approval has been obtained from the Engineer - in- Charge, the Contractor shall submit further requisite sets of shop drawings for the exclusive use of and retention by the Engineer-in-charge.

Approval of shop drawings shall not be considered as a guarantee of measurement or of building condition. It will in no way relieve the contractor from his responsibility of furnishing materials or performing work as required by the contract.

The EPC Contractor shall also fix in the AHU & Other Equipment Room / Operating Room / Maintenance Room, neatly typed and framed, instructions in details, for the starting and running of the plant.

The EPC Contractor shall prepare the following shop drawings:-

a) HVAC Plant Room Equipment Layout along with sectional drawings of each installed equipment.

b) Schematic water piping layout, pipe support details drawing showing the level of pipes.

c) HVAC layout plans of all floors with sections, support details, position of controlling, insulation, lining item etc.

d) HVAC equipments foundation layout plans and load data.

e) The Electrical Panel, Sub Panel / Starter Panel, power & control wiring drawings & schedule.

f) BMS Schematic & floor plan drawings in detailed with logics of operations.

g) Electrical power requirements of all HVAC Equipments on Layout Plans along with Summary in Excel Format.

h) Individual equipment drawings from equipment manufacturer along with technical data sheets for Engineer-in-Charge / Consultant’s Approval.

i) Any other shop drawings necessary for the project and required by client team such as Architects / Consultant.

1.4.3 Completion Drawings (As Built Drawings)

The EPC Contractor shall submit three sets (or as required by the engineer in charge) of paper prints of the as-built drawings & one soft copy, showing accurate record of the work as installed to the Client for his reference.

Following "AS BUILT" drawings shall be submitted by the Contractor on completion of the work:

a) Plant Room/ AHU Room installation drawings giving complete details of the entire equipment including Chillers, Cooling Towers, Pumps, Hot Water Generators, AHU's and their foundations.

b) Ducting drawings showing all sizes, damper (Fire/VCD) locations and sizes of all air outlets and intakes, for all floors.

c) Electrical drawings showing sizes, equipment capacities, control components and control wiring.

d) Schematic control drawings giving detailed sequence of operation and notes to explain the operation of the control circuit.

e) Piping drawings showing all pipe sizes, valves and fittings etc.

f) IBMS architecture, control logic details, conduits, and connection drawings.

g) Any other drawings to be supplied as per instructions of the Engineer-in-charge.

1.4.4 Operation and Service Manuals

The contractor shall also submit three copies (or as required by the engineer in charge) of an Operating Manuals in ring binder describing the brief write up on the system installed, operating instruction for all equipments, catalogues, maintenance of equipments etc.

The Contractor shall submit requisite sets of operation and service manuals in respect of the air-conditioning plant including salient details of plant including internal circuit diagrams. Following minimum details shall be furnished:

i. Detailed equipment data as approved by the Engineer-in-charge.
ii. Manufacturer's maintenance and operating instruction.
iii. Approved test readings.

The Contractor shall also submit requisite sets of technical literature on all automatic controls and complete technical literature on all equipment and materials. The Contractor shall frame under glass, in the Air conditioning

plant room all consolidated control diagrams and all piping diagrams.

Coloured Layouts of all electrical lines in A-1 size properly laminated to be fixed at various locations at the time of handing over of building.

1.4.5 Technical Submittals

The Contractor shall submit Technical Submittals for all materials, equipment and machinery for approval in writing of the Engineer-in-charge before placing orders.
The material submittals shall comprise of at least the following:

a) Manufacturer's technical catalogues and brochures, pump curves, Certifications etc. giving technical data about performance and other parameters.

b) Manufacturers drawings / sketches showing construction, dimensional and installation details.

c) Rating charts and performance curves clarifying rating of equipment proposed.

1.4.6 Samples and Prototypes

The Contractor shall submit samples of items such as grilles/ diffusers, controls and/ or any other parts or equipment as required by the Engineer-in-charge for prior approval in writing before placing the order. The Contractor shall also construct prototype or samples of work as laid down in the Contract or as instructed by the Engineer-in-charge.

1.4.7 Inspection at Work / Contractor's Premises

The CLIENT, HSCC, Consultant, Architect or their representatives shall at all reasonable time have free access to the Contractor's premises/works. The Contractor shall give every facility to them and necessary help for inspection and examinations and test of the materials and workmanship.

These representatives shall have full powers to inspect drawings of any portion of the work or examine the materials and workmanship of the plant at the contractor's works or at any other place from where the material or equipment is to be obtained. Acceptance of any material or equipment shall in no way, relieve the Contractor of his responsibility for meeting the requirement of the specifications.

1.5 Testing, Commissioning & Handing Over

1.5.1 Testing

Tests on equipment as called for in the specifications shall be carried out by the Contractor in accordance with the specifications, the relevant Bureau of Indian Standard Codes (BIS) and International Standards.

The Contractor shall pay for and arrange without any cost, all necessary balancing and testing equipment, instruments, materials, accessories, power, water, fuel and the requisite labour for testing. Any defects in materials and/or in workmanship detected in the course of testing shall be rectified by the Contractor entirely at his own cost, to the satisfaction of the Engineer-in-charge. The installation shall be tested again after removal of defects if any and shall be commissioned only after approval by the Engineer-in-charge. All tests shall be carried out in the presence of the Engineer-in-charge or his representative.

All types of specified & routine tests of the equipments shall be carried out at the works of the EPC Contractor or the manufacturers of the components. The Department shall be free to witness any or all tests, if they so desired. The EPC Contractor has to inform to the department before dispatch of any material / equipment.

On the completion of the installation, the EPC Contractor shall arrange to carry out various initial tests as detailed below:-,

a) To operate and check proper functioning of all electrically operated components viz. Compressor motor, pumps, fan of air handling units etc. as well as other electrical motors.
b) To test and check the proper functioning of electrical gears, safety and other controls to ensure their proper functioning.
c) To check the air distribution system and to provide designed airflow in all areas by adjusting the grills, diffusers and dampers for air-conditioning.
d) To check & balance / adjust the refrigerant / water in the circuit for smooth and noiseless flow.
e) To check the systems against leaks in different circuits, alignment of motor, 'V' belt adjustments, control setting and all such other tests which are essential for smooth functioning of the plant.
f) EPC Contractor shall have to submit the capacity test of all equipment at site.

1.5.2 HVAC System Balancing

The EPC contractor shall leave the system operating in complete balance with water and air quantities as shown on approved drawings. Set stops on all balancing valves and lock all damper quadrants in proper position. Secure all automatic damper and valve linkage in proper positions to provide correct operating ranges. Proper damper positions shall be marked on ducts with permanent indication.

1.5.3 Final Performance and Capacity Test

In addition to the above testing, final performance and capacity tests shall be carried out on the equipment as per the "Testing Schedules" during the defects liability period as follows:-

a) Peak summer / monsoon test during the dates decided by HSCC/ CLIENT. The installations should be able to maintain the specified inside temperature/conditions within the tolerance limits prescribed in the Contract and the duration of the test shall be 72 hours.

b) Peak winter test during the dates decided by HSCC/ CLIENT. The installations should be able to maintain the specified inside temperature within the tolerance limits permitted in the Contract. The duration of the test shall be 72 hours.

c) All the arrangements required for making the entire system operational /running, for the performance test as above, including cost of manpower, and fuel (Gas etc.), electricity etc. will be borne by the Contractor.

d) The user shall have the right to operate all equipment, if these are in the operating condition if such equipment, have been accepted as complete and satisfactory. Repairs and alterations if required shall be carried out as and when directed by the CLIENT/HSCC. In special circumstances, CLIENT/ HSCC may request Air conditioning of some areas even before the completion of whole of HVAC work. The Contractor shall co-operate fully under such circumstances.

1.6 Guarantee and Defects Liability Period

The guarantee of HVAC works shall be valid for a period as mentioned in GCC/SCC from the date of completion and handover of the project as accepted by CLIENT /HSCC or as specified in the GCC/SCC. In case the contractor is not able to carry out the seasonal tests (summer/ monsoon & winter) within the stipulated period as mentioned above, the same can be carried out even after defects liability period. The Defect Liability period for HVAC shall be deemed to be extended till satisfactory completion of seasonal tests.

1.6.1 Performance Guarantee by contractor

The Contractor shall submit a performance guarantee certificate from the agency which executed the HVAC work, counter signed by the Contractor that the system shall maintain the desired parameters within tolerance limit of the specified parameters who shall also guarantee that the capacity of various components as well as the whole system covered under the scope of work, technical schedules and requirements etc., shall not be less than the specified capacities. The guarantee of the specific equipment supplied alone with regard to the performance of the system shall not be acceptable and overall responsibility of the Contractor for performance of HVAC work & its compliance with the Contract terms and conditions remains unchanged.

1.7 Refrigeration Load

Room wise detailed heat load estimation sheet shall be prepared by EPC Contractor during detailed engineering stage for all the seasons (Summer/ Monsoon/ Winter) in which, the specified conditions are to be maintained based on above design parameters.

The rating and capacity of equipments indicated herein below for AC plant room are minimum to be provided.

S.N.	Proposed Central Plant Capacity		Working + Standby (W+S)
1	Chiller capacity (COP 6.7 & IPLV 9.1, NPLV<0.4) Refrigerant R134a		5 x 800 TR (4W+1S)
2	Fixed Speed Primary Pumps (@ 2 GPM/TR)		(4W+1S)
3	Variable Speed Secondary Chilled Water pumps (@2 GPM/TR)		(4W+1S)
4	Fixed Speed Condenser Water Pumps (@3GPM/TR)		(4W+1S)
5	Cooling Tower (@ 3GPM/TR) CTI certified extra low noise.		5 x 1000 TR (4W+1S)
6	Hot Water generator		4x 500 KW (3W+ 1S)
7	Fixed Speed Primary Hot water Pumps (@ 0.7GPM/TR)		(3W+1S)
8	Secondary Hot water Pumps (@ 0.7GPM/TR)		(3W+1S)

1.8 Design Parameters for HVAC Equipment

A) Air-handlers

a) Maximum Face velocity across cooling coil MPM : 152

b) Maximum face velocity across filters MPM : 152

c) Maximum water pressure drop across the coil in Mt. : 4.6

d) Maximum water velocity through coil in MPS : 2.5

e)Maximum Fan outlet velocity MPS: 10.0

B) Ducting Work

a) Method of Duct Design	:	EFM
b) Maximum air velocity in supply duct (AC) MPM	:	450
c) Maximum air velocity in return duct (AC) MPM	:	400
d) Friction loss in duct (Maxm.) MM Wg in 100 Mt run.	:	8.33
e) Maximum Velocity at supply air grill outlet (AC) MPM	:	150.00

C) Piping Work

a) Friction loss (Maxm.) Mt / 100 Mt lengths	:	5.0
b) Flow velocity (Maxm.) Mt / Sec.	:	2.50

D) Air Washer

a) Maximum Face velocity across cooling media MPM	:	152.0
b) Maximum face velocity across filters MPM	:	152.0
c) Thickness of fill (in mm).	:	200.0
d) Efficiency of air-washer.	:	90 %
e) Fan Speed (Maximum) of air washer unit RPM.	:	960
f) Maximum Fan outlet velocity MPS	:	10.0

E) Axial Fan (Long Casing)

a) Fan Outlet Velocity (Maxim) in Meter / Sec.	: 12.0
b) Drive For Axial Fan.	: Direct
c) Fan Motor RPM, Maxm	: 1000

F) For Hot Water Generator

a) Temperature of hot water entering ºC	: 43.3
b) Temperature of hot water leaving ºC	: 51.6

For Air-cooled Outdoor Unit

a) Temperature of air to inlet of condenser ºC 0: 45.0

End of DBR

IT INFRASTRUCTURE

LAN & WI-FI

A. DESIGN BASIS REPORT OF IT INFRASTRUCTURE WORKS:

1. GENERAL

a) IT work shall be carried out by the specialized IT agency who shall herein be referred to as System Integrator (SI).

b) The SI shall carry out Design, Engineering, Supply, Installation, Testing & Commissioning of complete IT Infrastructure i.e. Network Infrastructure (LAN & Wi-Fi) and other works as described in the scope of DBR and as required for smooth functioning of the proposed Hospital. All LV works shall be designed and executed as per latest codes of practice for Low Voltage Services installations and meeting the requirements of Indian Electricity Rules/ Act, applicable I.S. Codes/ Rules and relevant I.S./ CPWD Specifications, Special requirements of Electricity Board latest up to date. All the related electrical works shall be done as per the electrical DBR with the specifications specified in the DBR.

c) The specification and requirements indicated herein are minimum to be provided. However, during detailed designing, if required and found necessary, the same shall be upgraded by the SI.

2. SCOPE OF WORK

Development of IT Infrastructure i.e. Network Infrastructure (LAN & Wi-Fi) for the proposed Hospital covers following: -

1. Establishment of Wired & Wireless Network Infrastructure for CII (Critical Information Infrastructure) and Non-CII as per requirement of AIIMS, New Delhi - Supply, Installation, Configuration, Testing and Commissioning of Local Area Network (LAN) & Wi-Fi (Indoor) as per the requirement.
2. Five years onsite comprehensive OEM support shall be provided for entire IT solution (Network Hardware and Software). Also 2 nos. Manpower to be deputed onsite for the period of 1 year for Maintenance support.
3. Any other work as per the requirement of the client.

3. Minimum Requirement of Network points for the block in scope for IT works:

There are minimum 2200 Network Data Points to be executed in the New OPD Block.

There shall be full strength 100% Wi-Fi coverage of the entire block which shall be achieved through indoor Wireless Access Points of Wi-Fi 6 standard or higher. Heat Map Survey to be submitted for approval through OEM.

Note- there should be 25% extra vacant ports in each switches for future provision.

Detailed Scope of Work:

I. Establishment of IT Infrastructure:

Each component of IT Infrastructure i.e. Network Infrastructure (LAN & Wi-Fi), implemented shall strictly comply with the technical and functional requirements mentioned in the technicalspecifications and the DBR. SI shall be solely responsible for any deviation from the requirements/specifications/scope mentioned herein and shall fix the same if noticed without any extra financial cost.

The scope of the SI shall also include:

- Providing on-going Maintenance and Support including software upgrades etc.
- Providing support and assistance for resolution of major technical problems or technical issues. Client shall deal with a single vendor who shall be a System Integrator Technology firm (hereinafter referred to as System Integrator (SI))
- Minimum 2 or more Network Engineers of L-2 Level as per the requirement should be deputed at site during the implementation period.
- SI should provide the internet connectivity at site during the implementation period of the project. Adequate speed of the internet should be (minimum 100 mbps or higher bandwidth) available as per the requirements of the project.

The Information Technology as defined in the scope of work shall be established in the following
stages

1. Requirements gathering
2. Customization
3. Integration
4. Implementation
5. Training
6. Post go-live/Handover Maintenance

II. Documentation

It is the responsibility of SI to provide at least the following documents to client & HSCC:

- Network Design & Overall Network Architecture Design Document
- As built diagram
- User Manuals
- Training Manuals

- Implementation Manuals
- Configuration files
- Escalation matrix
- Warranty certificates
- Data sheets
- User credentials
- Penta scanning reports
- OTDR reports
- Other system test reports

III. Warranty/Maintenance Support

- SI shall be fully responsible for the implementation of the LAN (Wired and Wireless).

- SI shall be solely responsible for all the maintenance with OEM Warranty of all the items supplied and installed for the period of 5 years from the date of commissioning and handing over of all the items to Client.

- Maintenance support shall include upgrades of applications and maintenance of the complete IT Infrastructure i.e. Network infrastructure. This would also include addressing and fixing any technical snags reported by the end user.

- SI shall be ready to make further customization / any changes as the need may arise from time to time during the above said maintenance period, without any extra financial cost.

For the maintenance support, following points shall be complied:

1. Up-gradation of Licenses for all networking devices (NMS, Wireless Access Points, Wireless Access Controller etc.).
2. At least 2 nos. Network engineers for support & maintenance of IT infrastructure(LAN & Wi-Fi) shall be deputed onsite for 1 year.

IV. Project and Technical Risk Management Plan and Procedures

SI shall be responsible for assisting for Identifying and assessing potential technical risks of the project as well as identifying and managing actions to avoid, mitigate or manage those risks. SI is responsible for providing appropriate methods, tools and techniques for active identification and assessment of project technical risk; development of risk avoidance, mitigation or management strategies and monitoring; and reporting of risk status throughout the life of the project.

V. Ownership of Data & Data Security

a. AIIMS/ its authorized representative will be the custodian of the data.

b. The SI shall ensure the provision of appropriate and adequate security levels, for protection of such data and other technology resources, which shall come intoits

custody during the implementation of the proposed solution.

c. The infrastructure for the proposed solution, at each of the sites, shall be strictly and exclusively used by the SI for processing data related to the AIIMS only. Under no circumstances shall the infrastructure be used for any other purpose by the SI.

d. The Hospital/ its authorized representative(s) shall conduct periodic/surprise security reviews and audits, to ensure the compliance by the SI to these control / access provisions.

e. The SI shall develop and implement an "IT Security Policy" for the proposed IT solution. This IT Security Policy shall be in line with international guidelines and standards. The SI shall also keep itself updated with the latest IT Security Policy of the Government.

VII Special Terms & Conditions – All IT Components:

1. The SI is required to prepare floor-wise network architectural layouts (For Data Points, Rack Locations etc.) zone-wise, detailed shop drawings, bill of material & bill of quantities as per the proposed network design and get approved by the Computer facility of the AIIMS, Delhi. The minimum requirement of Network points mentioned in this DBR shall be strictly complied and if there is additional requirement of Network points as per the infrastructure, the same shall also be catered.

2. The SI should take into consideration all the possible items which may be required for the completeness of the system including trenchless methods, ultrasonic surveys, hume pipe, HDPE pipe, conduits, FOC, CAT 6A, racks, I/Os, patch cords, switches, modules etc. to establish a state- of-the-art 40G based highly scalable & reliable network infrastructure (Wired & Wireless both). In case of additional hardware, software or any other work is required for completeness of the system, the same shall be provided by SI without any extra charges.

3. The SI shall ensure that there is full Wi-Fi coverage for the block is under scope for IT works. Wireless Access devices with latest technology shall be deployed in the locationsassessed using heat maps.

4. SI shall be responsible to provide UPS power supply (as per the requirement) for all the IT equipment i.e. Network Racks etc.

SI shall install the UPS as per the load requirement along with batteries and panels in a separate UPS room for IT services and the same shall be maintained for the entire period of DLP. A suitable grounding and associated work should be commissioned for every UPS system to ensure the proper functioning of UPS.

5. The SI is responsible to see that the equipment (Hardware and Software) used for all IT Infrastructure components i.e. LAN & Wi-Fi etc. are not out dated in technology or obsolete in the market.

VIII Additional terms of the contract

1. SI should provide tender specific authorizations from their respective OEM's for all the IT Infrastructure components (Hardware and Software).
2. The OEM's shall also undertake to provide support commitments during the 5 years warranty period and also take all warranty related responsibilities in the event.
3. Licensing – All the licenses of the software will be provided in the name of the client.
5. If any promotional scheme is launched by the manufacturer at the time of supply of the item, all the benefits of the scheme will be given to the client/consignee.
6. SI has to provide the plan, design and site preparation as per requirement and as directed to the satisfaction of engineer and as per terms of the technical specifications.
7. A detailed shop drawing, concept drawing, indicating line diagram, route diagram showing details of laying underground, overhead or under wall cables showing details of cable, switches, joint etc. complete in all respect to be submitted to AIIMS Computer Facility for approval before ordering any items & at the start of execution of work. The design if required will be revised as per direction of AIIMS/Engineer- in-charge before approval.
8. SI is responsible for all unpacking, assembling, wiring, installation, cabling between equipment and components and connection to power supplies. They will test all Systems operations and perform all the necessary setup, configuration and customization for successful operation of the Network at site.
9. Each IT Infrastructure component will be accepted only when authorized person from the Client / HSCC has given satisfactory performance report of the installation.

10. The Network Infrastructure is to be developed for providing the IT facilities with adequate speed and security as per the requirement.
11. Inspection – The inspection shall be carried out by authorized representative of HSCC/AIIMS.

    Client/Purchaser have the right to inspect and/or to test the material to confirm their conformity with the contract and in case any inspected/tested goods fail to perform to the specifications, the client may reject them and the supplier shall either replace

the rejected goods or make necessary arrangements to meet the specifications free of cost to the Client/purchaser.

12. SI should provide the standard technical literature (not photocopies) of the entire offered product.
13. SI is required to develop a high-performance system which is capable to handle the needs of the client.
14. The SI shall supply all the installation material/ accessories/ consumables (e.g. screws, clamps, fasteners, ties anchors, supports, grounding strips, wires, fiber connection kits etc.) necessary for the installation of the systems.
15. The SI shall be responsible for providing proper "Electrical ground" at all the required points as per the approved IEEE standards for Grounding of Sensitive Electronic Equipment and as per the OEM guidelines.
16. The SI shall install, wire the UPS power at required locations and provide proper electrical ground for the same before installation of the equipment. Civil works if any required for installation of the system will be the responsibility ofthe SI.
17. SI shall be fully responsible for providing & installation of electrical panels, cables, DB, cable tray, combined box, MCB, Module, switch, sockets etc. including all accessories for distribution of UPS power supply for all the IT equipment at all the floors of each of the blocks at Hospital.
18. All the work shall be done in a conscientious manner as per the OEM guidelines and best industry practices. The system shall be subjected to inspection at various stages. The SI shall follow all Safety Regulations and practices.
19. The SI shall configure quality of service parameters on network switching devices for end-to- end QoS for critical traffic over the network.
20. SI shall be responsible for integration of security components in the network to ensure a secured network access for users.
21. SI shall configure network management policies for managing all the network and security devices using network management systems.
22. SI shall prepare detailed acceptance testing plan (ATP) for each of the components i.e. Network (LAN & Wi-Fi system) etc. and submit the same to the client.
23. All the functionality, features and configuration shall be documented for all the equipment/components and shall be demonstrated with respect to the documentation prepared.
24. The SI shall be responsible for obtaining approvals (if any) for any Statutory &

Regulatory requirements from any of the authorities.

25. SI shall use his own sets of tools, tackles, etc. required for erection, testing and commissioning and warranty maintenance of the system.
26. The entire internal Conduit has to be done at site in sync with civil work during the construction stage. According to the requirement if any modification is needed during cabling, it will be done by the SI without any extra cost.
27. Network up time should be continuous throughout the warranty period covering 24x7 without fail and as per the requirement of the block.
30. The IT Infrastructure hardware & system software set up should be able to integrate with various software and system already running at existing blocks if any at Hospital.
31. The network set up should be capable of providing high bandwidth internet/network connectivity in all the desktops, laptops, tablets or any other device as per the requirement.
32. The Wi-Fi should connect with all the devices i.e. desktops, laptops, tablets etc. and offer high bandwidth connectivity.
33. The SI shall bear for any damage occurring during supply, installation, testing, commissioning & activation of network components. The same has to be rectified by agency at their own cost. In case agency fails to do rectification, the same shall be rectified by HSCC/client and involved cost will be recovered from the agency.
35. In case of additional hardware, software or any other work is required for completeness of the system, the same shall be provided by SI without any extra charges.
36. During the Maintenance period, if SI fails to deliver the services required for maintenance at any point of time, the same shall be done through other agency without giving any notice to the SI and the cost involved will be recovered from the SI.
37. Implementation Agency shall design the Business Continuity solution. System should be designed to remove all single point failures. Appropriate redundancy shall be built to all critical components to provide the ability to recover from failures. Any components in addition shall be provided by the Implementation Agency and cost for the same shall be included in the price bid.

    Implementation Agency is also expected to detail out in its technical proposal and provide a comprehensive BCP solution for all the entities.

LAN & Wi-Fi

Network Architecture Details:

Note-Network architecture must be strictly as below-

1. The entire Local Area Network shall be established on 40 Gigabit connectivity.
2. Cable (U/FTP Cat 6A & Optical Fiber Cable) based network shall be established.
3. There will be two zones of Network- CII i.e. Critical Information Infrastructure and non-CII.
4. The wired and wireless network of both CII and non- CII shall be separate from each other i.e. physical mediums will be separate for both CII and non-CII Network Zones.
5. In addition to the cable-based network, secured wireless network shall also be established for the blocks in scope.
6. Distribution switches should be in HA Mode.
7. **Both Distribution Switches of CII and Non-CII network of this new block should be connected to Server Room of Mother & Child block and Server Room of New OPD of AIIMS in redundant OFC connectivity of 12 Core Single Mode OS2 OFC via different route through trenchless method after ultrasonic survey after duly approved route from client. Connection should be 40G connectivity.**
8. **Configuration must be strictly done as per the requirement of client, AIIMS Delhi.**
9. **Configuration must be approved by AIIMS before execution of work.**
10. A zone-based network architecture has been recommended for simplifying the design, implementation and management operations:

a) Structured Cabling: The LAN Structured cabling should be of CAT 6A U/FTP. All user nodes should be on 10G networks with 25 years warranty certificate. Third party test should be done for certification of Copper and Fiber nodes. Optical Fiber cable should support 10G & 40G transmission.

b) Distribution Network: Four nos. of Distribution Switches will be placed in main server room in a high availability configuration (2 for CII network and 2 for Non-CII network). The Distribution network shall comprise of four Layer-3 Gigabit Ethernet switches that are configured and deployed via 40G uplink interconnectivity. These switches are high density 10G/40G port switches with a non-blocking architecture. The Core/Distribution layer forms the heart of the network and is responsible for all Layer-3 forwarding within the building network. Access Policies, Quality of Services to control and manage bandwidth, etc., all are applied at this Core/Distribution layer.

c) Access Network Zone: The access network consists of only 48 port switches POE/non-POE, which should be in stacking mode with each other up to 4 switches maximum and will give connectivity to the end- points in the building e.g. PC, laptops, network printers, access points etc.

d) Each IT access switch must have 4 nos.10G uplink ports which will be used to connect the switches to the Core/Distribution network.

e) Both CII and Non-CII Network on this new block will be connected to server rooms of Mother and Child Block and Existing New OPD Block through 12 core OFC Single Mode in redundant mode in 2 different physical route via HPDE pipe and must have 40G/100G connectivity.

f) Server for NMS should be provided.

g) Wireless Access Controller should be provided.

h) Network Monitoring Solution should be provided.

11. The Backbone connectivity will be on 40Gbps and 10Gbps optical links. For

Distribution Switches to Access switches there shall be redundant 10 G connectivity via 2 different physical route. Distribution switch to core switch there shall be 40G redundant connectivity via 2 different physical route.

12. For monitoring, troubleshooting & debugging, the network shall be managed centrally using a compatible Network Monitoring system. The Network Management (appliance based)shall centrally monitor the life-cycle of all the network devices.
13. Wireless Controller, used for centralized control, provisioning and management of the Wireless network shall be located in the Core layer and will be connected to the Distribution switches.
14. SM/MM OFC 12 core or as per the requirement for connectivity between core and access layer is to be laid taking care of all the other services like gas pipelines/HVAC ducts/ electrical service and proper distance is to be maintained between the services as per the standard. For outdoor laying, manholes at regular interval for future maintenance with logo for proper identification of cables are to be provided. Distribution switch to core switch in between blocks there shall have 2 no. 12 core single mode OFC in different physical route.
15. Inside the building Multimode OFC in redundant mode and through two different path/LV shaft from server room to each rack to be laid.
16. At least 2 no. IT rack in each floor to be installed. No more than 100 Data points in a single rack to be installed. (Or as per Client recommendation)
17. **Proposed Network architecture layout as mentioned at Annexure A.**
18. **Guidelines related to implementation of the above scope of work is mentioned at Annexure B to be strictly followed.**
19. **Minimum hardware and License requirement for the development of Network Architecture for the proposed block is mentioned at Annexure C.**

Computer / LAN Networking/ Wi-Fi Points- Terms & Conditions

1. RJ 45 data outlets points will be provided for Computers, Networking, Wi-Fi, Information Display system etc. as per requirement in rooms and other areas at various floors in all the blocks / buildings.
2. The Data Outlet points shall be connected to Jack Panel/Computer hub with 8 pair CAT-6A wiring in Raceways, recessed / surface conduit as required. UPS Power supply shall be provided to Network Rack, Servers & Computers wherever required by other agency.
3. The maximum length of the Cat 6A cable from end user point to the Hub or Edge switches shall not be more than 70 meters. Beyond 80 m length, Fiber Optic Cable shall be used. For Cat 6 A cable from Access switch to Wi-Fi device shall not be more than 40 meters.
4. Jack Panel/Patch Panel should be fully loaded.
5. The Rack shall comprise of Jack/Patch panels, Network switches, patch cords, power supply units, Cooling Fans, Wire managers, LIUs, Trans-receivers, Fiber patch cord etc. of individual floors.
6. Raceway/cable tray provision for cables running more than 20 nos. to be provided. PVC conduits should be used for laying CAT 6A cables.
7. For laying OFC, brick masonry manholes with covers shall be provided at suitable lengths to facilitate easy wire/cable pulling.
8. **Location/Room wise Tentative minimum Data point requirements as below-**

S.No.	Room Name	No of Data Points at each location
1	CRO Office	2 each
2	Recovery Room	2 each
3	Consultant Room/Doctor Room	3 per sitting (2 for Data & 1 for Display)
4	Reception/Registration/SW EC Counter/	2 per sitting (1 for Data & 1 for Display)
5	Back Office	1 per sitting/desk
7	DOT Centre	1 per sitting
8	Sample Process	1 per sitting
10	Sample Collection Room	4 each
11	Sample Collection Station	1 per sitting
12	Urology Collection	2 each
13	Incharge	2 each
14	Meeting Room	3-4 each
15	Minor Procedure Room	2 each
16	Workshop	2 each
17	Maintenance Room	1 each
18	Faculty Room	1 per desk/sitting
19	Jr. Resident/Sr. resident	1 per desk/sitting
20	Lab Services	2 each
21	Screening	1 per sitting
22	Refraction room	1 per sitting
23	Dilatation Room	1 per sitiing
24	Additional Usage space	6 each
25	Staff Breakout	2 each
26	Office Room	2 per sitting/desk
27	Work Stations	1 per sitting/desk
28	PA	1 per sitting
29	MultiPurpose Hall	4 each
30	Pulmonary Rehab	3 each
31	Exercise Room	2 each
32	Exercise Area	2 each
33	Pain Procedure Room	2 each
34	RTMS/EEG/EMG/Neuro Intervantion /ECG/ECG/WEEG/Pulse Drug Therapy/BOTOX/Neuro Psychology/PACE Exam Room	3 per sitting (2 for Data & 1 for Display)
35	Large Consultant Room	3 per sitting (2 for Data & 1 for Display)
36	ANS	2
37	Social Worker Room	2
38	Programming	1 each sitting
39	Observation Room/Liquid Biopsy	2 each

40	Nursing Staff	2
41	Exercise Lab	2
42	Console	2
43	Radiography Room	2
44	Angio Review/ Radiology Review	1 per sitting
45	Board Room	2
46	Sp. Test Lab/Technical Room	2
47	Sample Receiving Station	1 per sitting
48	Lab Supervisor	1 per sitting
49	Lab(9^{th} Floor)	12
50	Lab Supervisor	2
51	ICT	4
52	Server Room	4
53	Manager Room	2
54	Staff Cafeteria	As per site requirement
55	Office Cafeteria	As per site requirement
56	Resident Café Area	As per site requirement
57	Staff Lounge	As per site requirement
58	MRI/CT-Scan/X-ray/Cardio MRI/Cardio TW CT/TCPO 2/ Neuro CT	3 each
59	Mammography/ECG	2 each
60	Console Room/Control Room	2 each
61	USG/ Doppler	2
62	PACS Reading	2
63	Tech Work	**2**
64	Exam Room	2
65	PACS Reporting	6
66	Biometrics/Kiosks	10 points each on Ground and First Floor
67	Wi-Fi	as per full coverage

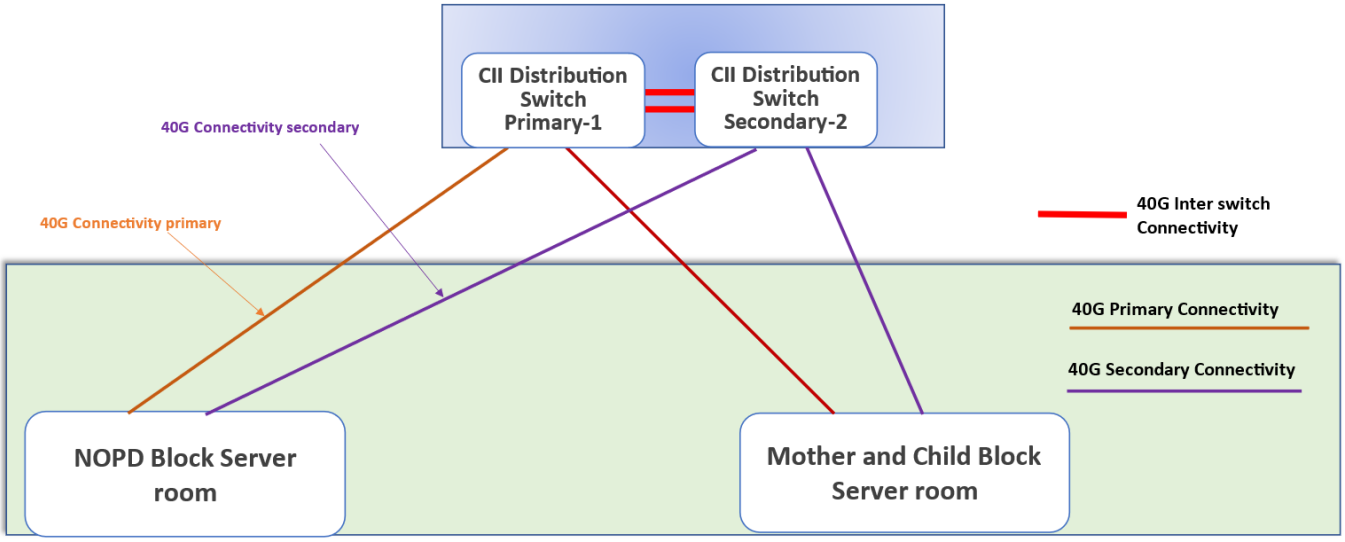
Annexure A

Proposed Network architecture-

Network connectivity DC to existing LAN– (CII NETWORK)

Notes-

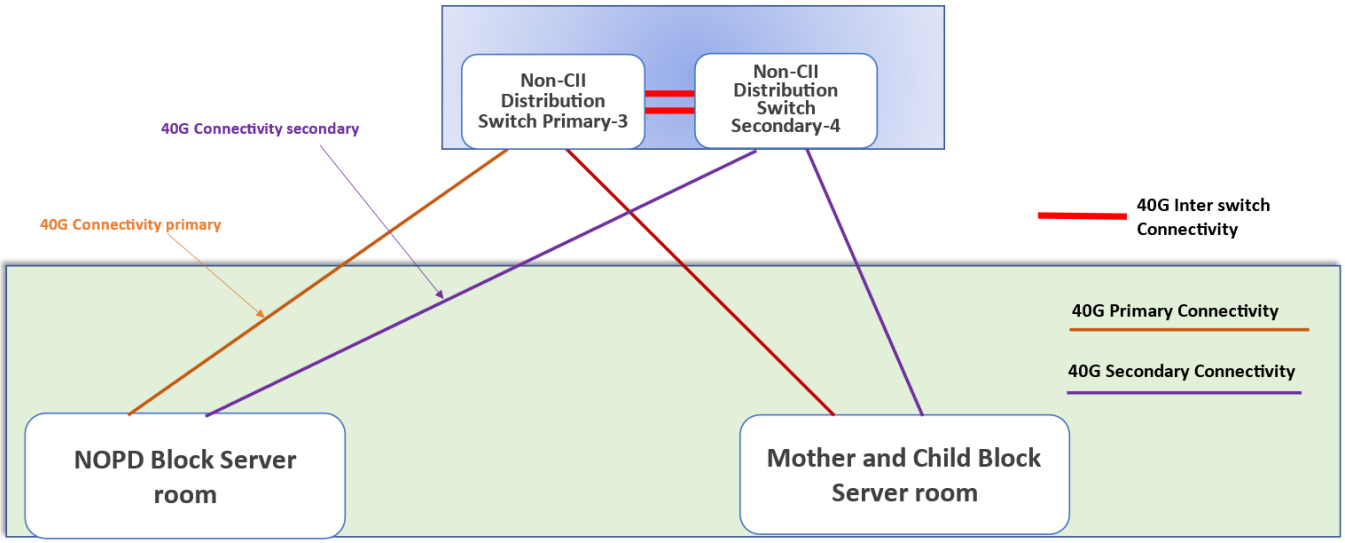
- 40 G Modules for both ends to be provided by SI
- OFC should be 12 core OS2 (laid in conduit)



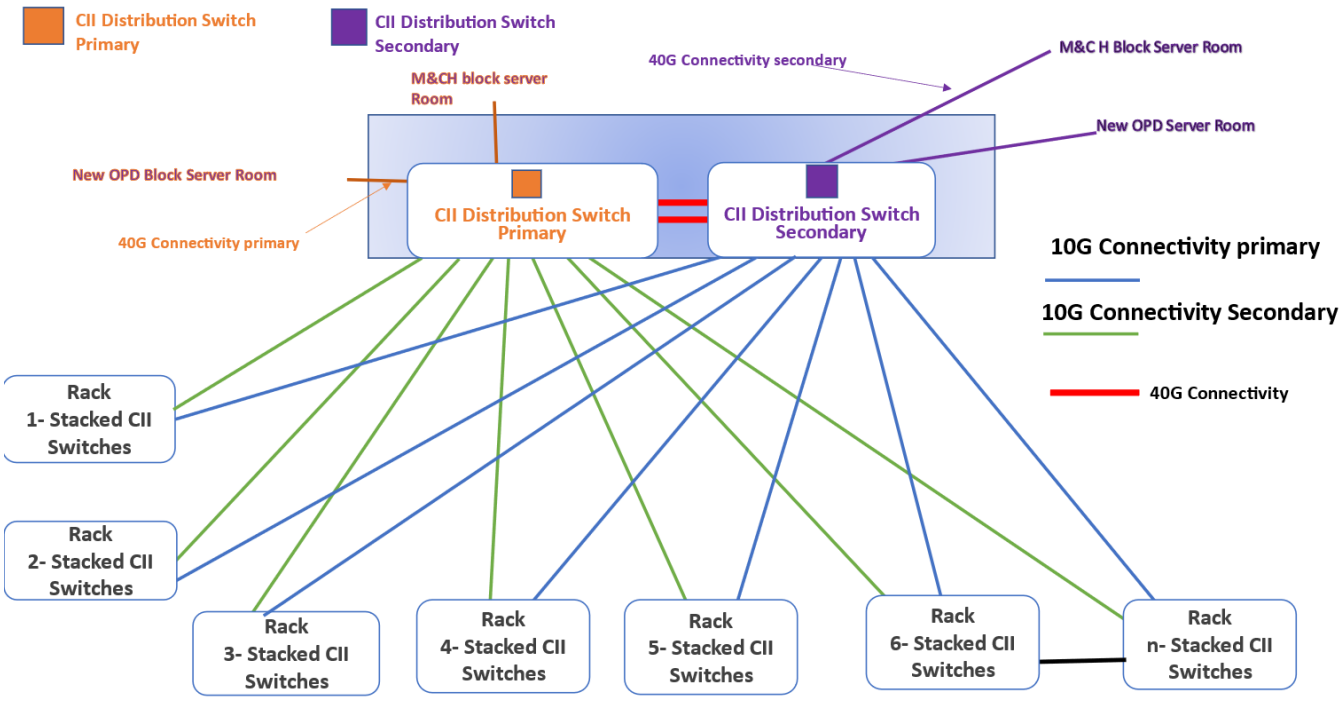
Network connectivity DC to existing LAN– (Non-CII NETWORK)

Notes-

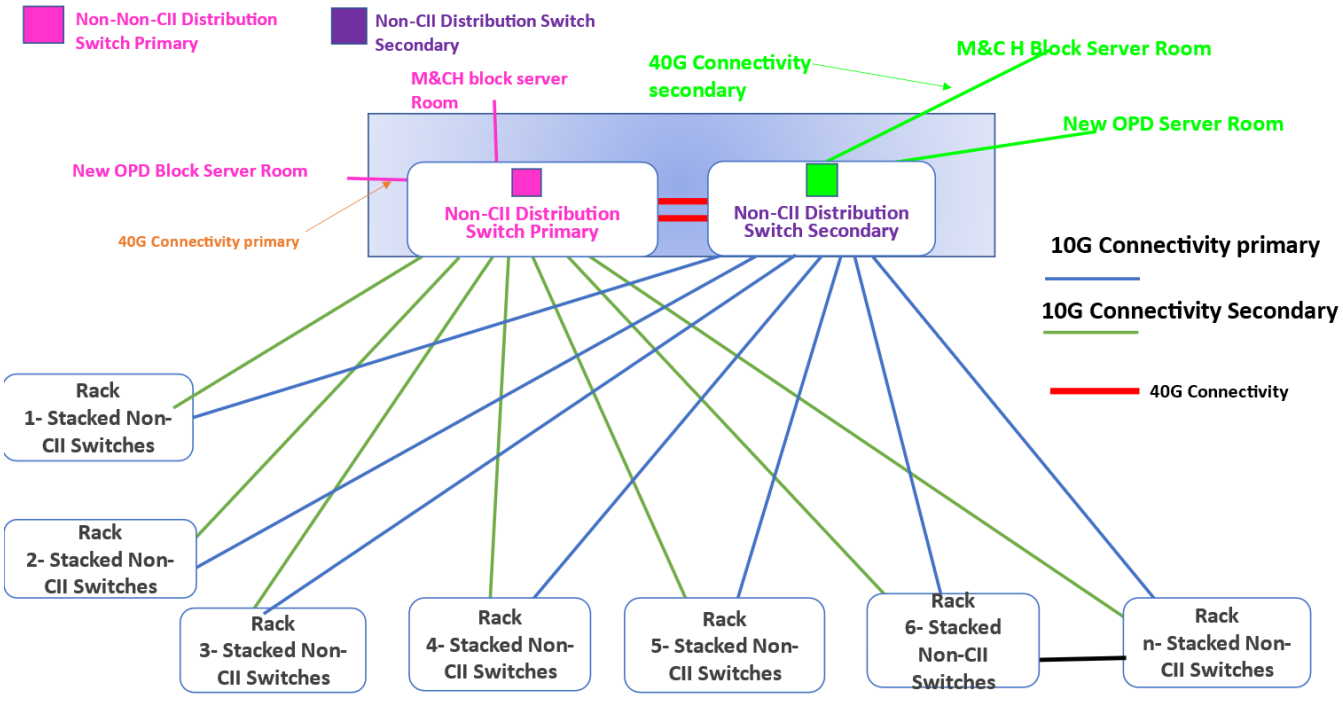
- 40 G Modules for both ends to be provided by SI
- OFC should be 12 core OS2 (laid in conduit)



Network connectivity Distribution Switch to Floor racks- (For CII Network)



Network connectivity Distribution Switch to Floor racks- (For Non-CII Network)



Annexure B

Note- OFC connectivity as below-

HSCC (INDIA) LIMITED
A Subsidiary of NBCC (India) Ltd.

- Primary and secondary OFC should be laid in physically separate route.
- 12 core Multimode OM4 OFC should be used for connectivity between Core/Distribution switch to each IT Rack/Access Switch.
- 12 core Singlemode OS2 OFC should be used for connectivity between Core/Distribution switch to Server room of different blocks.
- Primary and secondary OFC should be physically separate from each other.
- Trenchless method to be used for outdoor OFC laying in HDPE pipe.

Note- Floor Racks details-

HSCC (INDIA) LIMITED
A Subsidiary of NBCC (India) Ltd.

- Each floor should have minimum 2 racks of suitable size.
- Each IT rack should be divided into 2 physical network (CII and Non -CII).
- Each Rack should be connected to Distribution switches with 4 nos. of 12 core multimode OM4 OFC.
- Modules for both side should be provided from day 1
- NMS should monitor all the network switches, Aps, Wireless controllers from day 1 and should also have with 25% extra licences from day 1 for scalability.
- Wireless controller should come with Licences for all the AP's from Day 1 and should have 25% extra Licenses from Day 1 for scalability.
- All the equipments i.e. Access/edge Switches, Distribution Switches, Wireless Aps, Wireless Controller etc. should have 5 years support and Lifetime warranty.
- Only 48 port Access switches should be used.
- Each IT Rack should have minimum 1 no. 48 port POE switch for CII network and another 1 no. 48 port POE switch for non CII network.
- Wi-Fi network also should be separately divided into 2 different networks i.e. CII and Non –CII.
- Each IT rack should be connected to server room though 4 nos. 10G connectivity (all required modules to be provided from day 1.

Note- General instructions-

- IT racks should be installed in non public area, away from water and plumbing shafts.
- Rack location should be approved from Client before installation.
- CII switches should be stacked with each other via 10G stacking.
- Non-CII switches should be stacked with each other via 10G stacking.
- MAC Binding configuration to be established as per clients requirement.
- Fixed IP based network to be established as per clients requirement.
- Radius server deployment to be done as per clients requirement.
- SMS based OTP authentication system should be deployed as per clients requirement.
- IP management should be done through Computer Facility (AIIMS, NEW DELHI), planning should be done accordingly.
- All Switches should have Port locking and ACL feature.
- Aps should have rougue detection feature.

Note- General instructions-

- All It equipment must have lifetime warranty.
- On call based support to be given during 5 years support.
- All repairs , updates, upgrades etc. to be done on regular basis or as per requirement of the client during 5 years support period from the date of handing over to the client.
- ALL NETWORK LAYOUT/ARCHITECTURE MUST BE APPROVED FROM THE CLIENT AIIMS BEFORE DEPLOYMENT.

Annexure C

Below is the minimum quantity of the IT equipment required for the IT infrastructure, THIS IS TENTATIVE AND MAY VARY AS PER SITE REQUIREMENT

S.No	Item	Minimum Qty
1	Distribution Switch (48x10G, 6x40G)	4
2	48-port Access Switch (48x1G, 4x10G)	26 or more
3	48-port POE+ switch (48x1G, 4x10G)	44 or more
4	40G LR Modules	24 or more
5	10G BASE-SR	240 or more
6	Wireless Access Point (Indoor)	186 or more
7	Wireless Access Controller	1
8	Server in HA mode for Network Management Solution	1
9	Network Management Solution (licences for min 80-100 Switches, 200-250 Aps from day1)	1
10	Stacking Cable	As per design requirement
11	Cat 6A Cable, PVC Conduit, Faceplate 1 Port/2Port, Cat6A RJ45 Sheilded Jack, patch Chords 1 mtr/2 mtrs, gangbox, Cat 6A sheilded RJ45 connectors, Jack Panels, LIU 24/48 port-SM/MM, Pigtails SM/MM, LC-LC 50/125 OM4 Patchchord, LC-LC 50/125 OS2 patchchord, 12 Core OS2 OFC, 12 Core OM4 OFC, HDPE pipe	As per design requirement
12	42 U Floor Mount Rack	4 or more
13	Rack 15U Wall Mount Rack	22 or more
14	27U Wall/Floor Mount Rack	7 or more

Note- Above mentioned items and quantities are minimum requirement which must be provided by the agency, however as per the design quantity of any item/s may vary and to be designed/calculated by the agency as per the DBR requirement. Any items required for the completeness of the system to be supplied to cater the DBR requirement.

Note- Quantities of the items as per design should be duly approved by the client before execution of the work.

General Additional Terms & Conditions

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- **Approval of Materials**

  Technology (Hardware and Software) used on the Works shall be latest, new and of the best quality available, confirming to the relevant specifications and as per good Engineering practice. Prior approval shall be obtained in writing from the Engineer for all materials proposed and when necessary approved sample duly identified and labeled shall be deposited with the Engineer and shall be kept at site. List of approval make indicates make/manufacturer generally acceptable but final choice of make/manufacturer of material & models shall be with the engineer.

- **Guarantee/Warranty and Onsite Maintenance Support:Terms & Conditions:**
  - The project will be accepted when all the goods, components, software etc. of the project are supplied, successfully installed, tested and commissioned by the SI.
  - A comprehensive warranty applicable on all Equipment/Software under this contract shall be provided for 5 (five) years from the date of Handing over to AIIMS New Delhi.
  - The SI shall warrant that the Goods supplied under the Contract are new, non-refurbished, unused and recently manufactured; shall not be nearing end of sale / end of support; and shall be supported by the SI and respective OEM along with service and spares to ensure its efficient and effective onsite maintenance for the entire duration of the contract. The manufacturer should also submit guarantee/warranty that it will keep the client informed of any up-date of the equipment over the DLP period from the date of acceptance.
  - The SI should ensure that the manufacturer will supply regularly any items or spare parts for satisfactory operation of the equipment during the period of Guarantee/warranty and maintenance period
  - The SI hereby guarantee/warranty that the goods/stores/ articles supplied to the Purchaser under this contract shall be of the best quality and workmanship, strictly in accordance with the specifications and standards contained/mentioned in the tender and shall operate properly and safely. All recent design improvements in goods, unless provided otherwise in the Contract, shall also be made available. The purchaser will be entitled to reject the said goods/stores/ articles or such portion thereof as may be discovered not to conform to the said description and quality. The SI shall, if called upon to do so, replace goods/stores/articles within a period of fourteen days or such further period as may be extended from time to time by mutual discussion, on an application made thereof by the SI, the goods/stores/ articles or such portion thereof as rejected by the purchaser. In such an event, the penalty will be imposed as per penalty clause. On such rejection of goods/stores/articles will be at the SI's risks and all the provisions herein contained relating to rejection of goods, etc. shall apply. Otherwise the SI shall pay to the purchasers such damage as may arise by reason of breach of the conditions herein contained. Nothing herein contained shall prejudice any other right of the purchaser in that behalf. If the SI, having been notified, fails to remedy the defect(s) within the period so specifically specified by the Purchaser (keeping in view the urgency), or reasonable period as circumstances warrant but maximum of 45 days, the Purchaser may proceed to take such remedial action as may be necessary, at the SI's risk and expense and without prejudice to any other rights which the Purchaser may have against the SI under the Contract.
  - The SI further warrants that the Goods supplied under this Contract shall be free from all

encumbrances and defects/faults arising from design, material, manufacture or workmanship (except insofar as the design or material is required by the Purchaser's Specifications) or from any act or omission of the SI, that may develop during intended normal use of the supplied Goods in the conditions prevailing at the respective client Locations.

- The Purchaser shall notify the SI in writing of any claims arising under the warranty as per terms of Purchase Order from time to time as applicable.
- SI should categorically confirm that they will give "After sales services" during guarantee/ warranty period from the date of installation, satisfactory commissioning, acceptance and handing over of the respective phase of project. The firm must ensure that they will provide every calendar year, at least 4 number of preventive maintenances to all of the equipment and also any number of emergency visits during each year of Warranty/Guarantee and maintenance period. Preventive maintenance has to be done in consultation with client team.
- During the guarantee/warranty period and maintenance period the firm will be required to maintain the Hardware, Local Area Networking, Security Solution, UPS and other equipment/product supplied under this tender in good working condition so as to ensure fault free operation of the system for 24 hours on all the days of the year including holidays and Sundays.
- The SI should certify that they have fully trained technical staff for installation/ commissioning/ testing/maintenance during the entire period of Guarantee/Warranty and maintenance period. Any damage caused by SI's maintenance and technical support engineers, shall be made good by SI at their own cost within a reasonable time frame to be mutually decided by the client and SI.
- The engineers deputed should be able to handle problems related to their respective areas.
- The SI has to maintain adequate spares and inventory for client to ensure fault free operation of the system as per the required up time during the guarantee/warranty and maintenance period.
- The entire equipment/products are classified in three categories: i.e. **Category-A, Category-B, Category-C**
- Any type of software or accessories required to make the system operational in the Category-A or Category-B or Category-C items are also part of respective Category.

Uptime during Warranty/Guarantee and maintenance Period

- For Category -A items – minimum 99.8% uptime to be calculated on quarterlybasis.
- For Category -B items – minimum 99% uptime to be calculated on quarterly basis.

- For Category -C items – minimum 97% uptime to be calculated on quarterly basis for Equipment(s).
- Downtime is calculated on the basis of following
- Total Downtime (%) = Downtime* 100

  (Total time – Maintenance time)

  Uptime (%) = 100 - Total Downtime (%)

  Total Time (hour) = Number of Days in quarter * 24

- Downtime, Total Time & Maintenance time will be rounded off to hours. The Time >= 30 minutes will be counted as one hour.
- Downtime refers to a period of time span that a Equipment(s)/Service(s) is not functioning due to a result of some failure in the system.
- Maintenance time is time span resulted from planned maintenance, carried out with written permission of client.

a. For end-to-end availability of all the buildings, the SI has to ensure that all the components are working. If due to failure of any component the not available for use, then downtime will be considered as per Category-A.

b. No deduction of any kind on account of Sundays, half days on Saturdays, Public/Govt. holidays observed by the client shall be allowed from the total downtime permissible as defined.

c. Maintenance of during guarantee/Warranty & maintenance shall also include customized Update & upgrades of software patches, Removal of Bugs & Fine tuning. The Updates and upgrades of other software supplied in the project should also be provided free ofcost during the period of guarantee/Warranty & maintenance.

d. The responsibility of the SI shall not come to an end on the termination of the period of contract and the SI shall maintain /ensure that various components shall function even after the expiry of the period of agreement.

Penalty Clauses

For the purpose of Downtime calculation and Penalty the followings three categories are definedon the basis of Services/Equipment(s).

S No.	Devices	Category
1	Wi-fi controller, NMS software & Distribution Switch	A
2	Access Point, Access Switches	B
3	I/O points, other Passive Components	C

1. If due to failure of any equipment(s) or service(s) any other Equipment (s)/Service(s) are

down or affected, then penalty will be imposed for services/equipment having higher uptime requirement.

2. If some Equipment(s)/Service(s) or part of it is down but the Equipment(s)/Service(s) is working due to redundancy features of the Equipment (s)/Service(s) then down time of thatparticular Equipment(s)/Service(s) will be considered.
3. The Table below shows the calculation for down time on quarterly basis.

Category	**Minimum Uptime (%)**	**Total Hours**	**Leverage Hours per quarter**
A	99.5	2190	4
B	99.0	2190	22
C	98.0	2190	66

4. The leverage hours of quarter would lapse in the respective quarter and shall not be carried forward to the next quarter. The Penalty, measurable on quarterly basis, would be enforceable for degradation/deviation from the committed performance level as per the following table

Category	**Minimum Uptime (%)**	**Downtime Penalty per hour**
A	99.5	Rs. 10,000/-
B	99.0	Rs. 5,000/-
C	98.0	Rs. 3,000/-

SI should provide various services namely

i. System Administration and Management
ii. Network Administration and Management
iii. Security Administration and Management
iv. User Support and Management for the entire period of DLP.

Escalation Matrix

A suitable escalation matrix should also be incorporated based on the SLAs defined for each individual task within the entire process, according to the following parameters:

a. Importance/Urgency of the process defined
b. Time frame defined at the stage of the process c.

Level of escalation

It is envisaged that while designing the new automated processes as described above, the responsibility centers (for internal employees based on designation and roles / responsibilities assigned) as well as approximate time duration to carry out the tasks, and eventually to complete the entire process, will be clearly defined in the system. These will be used as inputs to display required information to the personal Dash boards of individual Users, and also used for auto escalations to seniors in case of inactivity by any staff without valid reason.

DBR for SES Works

DESIGN BASIS REPORT FOR SPECIAL SERVICES

The following Systems & Services play important roles in proper and efficient functioning of the Hospital.

A. Medical Gases Manifold System
B. Pneumatic Tube Transport System

The considerations for each of the above services are explained in the following sections.

A. MEDICAL GASES PIPELINE SYSTEM (MGPS)/ MEDICAL GASES MANIFOLD SYSTEM (MGMS)

MGPS works shall be carried out by the specialized agency which must be manufacturer or agent with valid manufacturer's authorization from the Principal/manufacturing company.

Scope of work- Supply, installation, testing, commissioning including turnkey work as per technical specification and handing over of Medical Gases Piping System to the client. Bidder should provide free spare parts and service during DLP.

The design & selection of items shall be of standard like NFPA 99c(latest version) standard and UL listed or DIN EN (latest version) ISO-7396-1and UL listed/CE marked/BIS or HTM 02 01 (latest version) standard/BIS guidelines and European CE marked/BIS. The imported products shall be of one standard only. All indigenous items shall be compatible to the main system.
Medical Gases Pipeline system for new OPD Superspeciality block shall be a centralized system for supply of medical gases like Oxygen, Medical air at 4bar pressure and Vacuum System of 19" Hg to various Minor procedure room, treatment room, diagnostic areas & other areas of a hospital. MGPS shall be installed in a well ventilated existing Manifold room, and existing Plant Room at existing OPD block .The Centralized system shall ensure un-interrupted supply of Oxygen to the patients. Instant availability of gas on taps. Source of Oxygen shall be from the existing LMO tank (13 KL) and existing Gas Bank Manifold (30+30 cylinders) & 15 Emergency cylinders in the existing Manifold Room at Masjid Morh Complex (for existing OPD, Mother & child Block).
The following shall be the key consideration and is taken into account in planning and design of the Medical Gas Pipeline System.

Medical Gas Manifold System for the OPD Superspeciality Block with the following advantages:

- Uninterrupted and uncontaminated supply
- Continuous flow of gases whenever and wherever required

- Instant availability of gas on taps
- Aseptic, therefore safe
- Saves space
- Economy on purchases of cylinders
- Easy purchase of gases in bulk quantities at favourable terms
- No distressing sight of oxygen cylinders near the bed.
- Elimination of irksome noise from the movement of cylinders around the hospitals.
- Clean, safe and reliable delivery of gases.
- Reduced manual labour.
- Minimal accident hazards due to mishandling of cylinders.
- Fewer breakages.
- Rationalisation in ordering, storing and transporting a wide variety and sizes of gas cylinders.
- Damage to buildings due to handling of cylinders minimized.

MGPS is intended to be a safe, convenient, and cost-effective alternative to the use of "portable" cylinders, compressors & suction units. It delivers Medical Gases, Medical Air, and other gases from the source of supply to the terminal unit by means of a pipeline distribution system. In MGPS, Pressure Monitoring and Alarm Systems are integrated to alert the medical staff. The Quality of Gas delivered by MGPS has to be as per various Pharmacopeial requirements and monographs specified by IP/ USP/ EP as these are considered as the Drugs and comes under the regulation of CDSCO accordingly. MGPS is an engineering subsystem as it dealt with the pressurized gases and also comes under the Static & Motion Pressure Vessel Rules under department of explosives. The guidelines provided under HTM, NFPA-99 and ISO- 7396 shall be followed while designing and installation of the MGPS system. Following Medical Gases shall be provisioned

- Medical Oxygen
- Medical Vacuum
- Medical Air for Procedure Room, MRI, CT, Recovery & observation Rooms

The provision of the MGPS points shall be provided in the Diagnostic areas, Minor Procedure rooms observation rooms and other relevant areas as per the guidelines. There is only intermittent use of medical gases in the OPD areas and there is no continuous flow of gases required.

Source of Oxygen shall be from the existing LMO tank (13 KL) as primary source and existing Gas Bank Manifold (30+30 cylinders) & 15 Emergency cylinders as

secondary source in the existing Manifold Room at Masjid Moth Complex (for existing OPD, Mother & child Block).

MGPS Manifold & Plant Room: MGPS manifold room is proposed to be provided at the existing manifold room of Masjid Moth campus. This existing manifold room comprises of 2 X 30-cylinder oxygen manifold & and 1 X 15-cylinder oxygen manifold as emergency source of supply. A vacuum system of 1000 LPM primary and 1000 LPM secondary supply to be provided and new vacuum plant is to be installed at the plant room located at basement of Raj Kumri Amrit kaur OPD. Required **Medical Gas supply to be taken from the existing Medical Air Compressor plant at Raj Kumari Amrit kaur OPD.**

Medicals Gases Manifold systems will be equipped with the following:

-**Oxygen System**

- Oxygen Manifold System (exising)
- Emergency Oxygen manifold System (existing)
- Fully Automatic Control Panel
- LMO (13 KL) existing
- Other Accessories required for interconnection to new OPD Superciality Block
- Interconnection of Oxygen from existing Manifold room to new OPD Superspeciality Block

Vacuum System (New to be installed at existing OPD Plant room)

- Vacuum Pumps
- Storage tank
- Bacteria Filtration system

-Compressed Medical Air System (existing OPD plant room)

- Air Compressor (existing) for Medical Air
- Compressed Air Filtration System to breathing quality (existing)
- Storage tank (existing)
- Medical air outlets

Pipeline Distribution System

- Copper Pipelines
- Isolation Valves

MGPS DESIGN MATRIX OPD Superspeciality Block								
Sr. No.	Location	ROOM	Beds	Other Areas	Procedure Room	Oxygen	Vacuum	Medical Air

- Valve Box

-
- HP tubing (Antistatic)

Outlets

Oxygen , Vacuum & Medical Air

Alarm System

- Main Alarm Panel
- Area Alarm Panels

-Horizontal Bed Head Panel

-Accessories :

- Flow Meter with Humidifier
- Ward Vacuum Unit

Electric Distributional Panel

MGPS Routing: OPD super speciality manifold room is envisaged at the existing manifold room of Masjid Moth campus with Oxygen Manifold , Medical Air and Vacuum systems. The pipeline will enter the common basement of Masjid Moth campus through a trench and thereafter to the proposed New OPD block through the connection at Basement 1 level.

Table 1. MGPS Design Matrix

MGPS DESIGN MATRIX OPD Superspeciality Block								
Sr. No.	Location	ROOM	Beds	Other Areas	Procedure Room	Oxygen	Vacuum	Medical Air
	Basement – 1							
1	MRI (1-4)	4		4		4	4	4
2	C.T Scan	4		4		4	4	4
3	X – Ray	4		4		4	4	

MGPS DESIGN MATRIX OPD Superspeciality Block								
Sr. No.	Location	ROOM	Beds	Other Areas	Procedure Room	Oxygen	Vacuum	Medical Air
4	Mammography	4		4		4	4	
5	Ultrasound	4		4		4	4	
6	ECG	4		4		4	4	
7	ECHO / Holter	1		1		1	1	
8	Cardio Interventional Ultrasound	1		1		1	1	
9	X Ray - Fluoroscopy	1		1		1	1	
10	USG	1		1		1	1	
11	Cardio CT	2		2		2	2	2
12	USG Doppler	2		2		2	2	
13	Neuro CT	3		3		3	3	3
14	X - Ray	4		4		4	4	
15	MRI (1-4)	4		4		4	4	4
16	MRI (Cardio)	2		2		2	2	2
16	Floor Isolation Valve							
	FIRST							
1	Minor Procedure	2			2	4	4	2
2	Floor Isolation Valve							
	SECOND							
1	Minor Procedure	2			2	4	4	2
2	Floor Isolation Valve							
	THIRD							
1	Minor Procedure	2			2	4	4	2
2	Floor Isolation Valve							
	FOURTH							
1	Pulmonary Rehab	1	5			5	5	
2	Cardio exercise	1				1	1	
3	Floor Isolation Valve							
	FIFTH							
1	Neuro Intervention Exam	2	2			2	2	
2	Liquid biopsy	1			1	2	2	
3	Minor Procedure Room	1			1	2	2	1
4	Minor Procedure Room	1			1	2	2	1
5	Observation Room	1	4			4	4	
6	Minor Procedure Room	1			1	2	2	1
7	Observation Room	1	3			3	3	
8	Minor Procedure	1			1	2	2	

MGPS DESIGN MATRIX OPD Superspeciality Block								
Sr. No.	Location	ROOM	Beds	Other Areas	Procedure Room	Oxygen	Vacuum	Medical Air
	Room							
9	Floor Isolation Valve							
	SIXTH							
1	Pain Procedure Room	1			2	4	4	2
2	Exercise Lab	2		2		2	2	
3	HUTT	1		1		1	1	
4	X Ray - Fluoroscopy	1		1		1	1	
5	X Ray - Radiography	1		1		1	1	
6	Floor Isolation Valve							
	SEVENTH							
1	Observation Room	1	4			4	4	
2	Minor Procedure Room	1			1	2	2	1
3	Pain Procedure Room	1			1	2	2	1
4	Observation Room	1	3			3	3	
5	Minor Procedure Room	1			1	2	2	1
6	Minor Procedure Room	1			1	2	2	1
7	Minor Procedure Room	1			1	2	2	1
8	Observation Room	1	4			4	4	
9	Minor Procedure Room	1			1	2	2	1
10	Minor Procedure Room	1			1	2	2	1
11	Observation Room	1	3			3	3	
12	Minor Procedure Room	1			1	2	2	1
13	Floor Isolation Valve							
	EIGHTH							
1	Minor Procedure Room	1			1	2	2	1
2	Observation Room	1	4			4	4	
3	Minor Procedure Room	1			1	2	2	1
4	Minor Procedure Room	1			1	2	2	1
5	Observation Room	1	3			3	3	
6	Minor Procedure Room	1			1	2	2	1
7	Minor Procedure Room	1			1	2	2	1

MGPS DESIGN MATRIX OPD Superspeciality Block								
Sr. No.	Location	ROOM	Beds	Other Areas	Procedure Room	Oxygen	Vacuum	Medical Air
8	Observation Room	1	4			4	4	
9	Minor Procedure Room	1			1	2	2	1
10	Minor Procedure Room	1			1	2	2	1
11	Observation Room	1	3			3	3	
12	Minor Procedure Room	1			1	2	2	1
13	Floor Isolation Valve							
	TOTAL	**92**	**42**	**50**	**29**	**151**	**151**	**46**

Medicals Gas Pipeline systems shall be equipped with the following items and equipment of adequate quantity and standby to meet entire load of MGPS of new OPD Super speciality Block in accordance with technical specification.

Copper pipe shall be installed above the false ceiling for better hygienic environment in the hospital and aesthetics. Valve Box shall be installed below false ceiling for ease of handling. Installation of piping shall be carried out with utmost cleanliness. Only pipes, fittings and valves that have been degreased and fittings shall be used at site. Pipe fixing clamps shall be of nonferrous or non-deteriorating plastic suitable for the diameter of the pipe.

-Alarm System

- Master Alarm Panel
- Area Alarm Panels

Alarm System shall be fitted exclusively with Procedure room, treatment area, observation room and in the Ward floors and diagnostic area. Alarm system shall be installed nearing to Valve box and below false ceiling.

-Horizontal Bed Head Panel to be fitted in, , Emergency, Observation room & Treatment Room . Bed Head Panel shall be fitted at the 1350 mm (Centre of the Bed Head Panel) from the FFL at the bed head side of the bed.

-Accessories :

- **Flow Meter with Humidifier** to be fitted with all Oxygen outlets
- **Ward Vacuum Unit** to be fitted with all Vacuum Outlets

Automatic Oxygen Control Panel shall be installed in the Manifold room. The Control panel with delivery of adequate flow capacity at the designated psig Panel shall be Fully Automatic microprocessor controlled and shall switch over from "Bank in Use" to 'Reserve Bank' without fluctuation in delivery line pressure and without the need of external electrical power. After the switch–over, the "Reserve Bank" shall become the "Bank in Use" and the "Bank in Use" shall become the "Reserve Bank". The Control Panel shall be equipped with valves, regulators. In case of no supply of Oxygen gas from LMO tank, the Control panel shall automatically switch over the Secondary gas bank in the Manifold room.

The **Vacuum system** shall have system capacity suitable to the requirement to be delivered to the hospital with necessary standby as per the requirement of relevant International Standard.

The system shall be of consisting of lubricated rotary vane vacuum pumps with Control Panel equipment and Receiver.

Medical Air Compressed System (existing) will be in scope of client and interconnection of pipeline to new OPD Block along with any accessories required to interconnect has to be done by bidder .as per the requirement of relevant International Standard.

Medical graded Copper pipe shall be solid drawn, tempered, seamless, phosphorous deoxidized, non-arsenic and degreased for oxygen service. Distribution Copper Pipe should be Cu-DHP grade half hard and manufactured as per BSEN:13348: 2008.Pipe jointing fittings should be end-feed capillary fittings to BS EN 1254-1. Fittings should be factory degreased and individually packed and certified by the manufacturer for medical use

Brazing Filler Metals – Manufacturing Standard: EN 1044: 1999

a. Brazing filler metal for Copper to Copper Brazing: CP 104 with 5% silver
b. Brazing filler metal for Copper to brass Brazing: AG203 with 43% silver content

Copper to Copper joints shall be made on site using silver-copper-phosphorous brazing alloy to BS-1044: 1999.

The **Alarm** shall be Master and Area Alarms as per required locations. Alarm shall be microprocessor based. Each area display module/sensor unit of alarm shall be gas specific. Two to six services can be accommodated per standard Alarm box.The medical gas area alarm shall fully comply with requirements of BSEN 60601-1 and BS EN 60601-1-2 and BS EN ISO 7396-1.An audible warning and LED display shall sound simultaneously with any failure indication.

All the pipes from manifold/plant upto the outlets should be painted with two coats of synthetic enamel paint and colour codification should be as per standards followed and with consultation with competent authorities of the Institute.

Horizontal Bed Head Panel (HBHP) shall be made of extruded Aluminium channel and equipped with Gas outlets, electrical switch and socket, RJ cable, Nurses Control and other fittings and accessories. HBHP shall be placed in the Emergency, Treatment Room, Private room and Pre-Op area. CE marked/US FDA /UL listed/BIS.

Valve Box shall be for 2 services, 3-services
Dedicated Valve Box and alarm should be fitted for Minor Procedure Room, Treatment Room, observation room and in each floor.

Turn Key –

- i. Bidder should be responsible for antistatic rubber flooring in the manifold room and thickness of flooring not less than 1 inch.
- ii. Bidder should be responsible for foundation of Plant Room (If required) for Vacuum Pant.
- iv. Bidder should co-ordinate with respective Institute/Authorities for the availability of Office Room for & Toilet for MGPS Operator into Manifold/Plant Room.

Note 1: General: Bidders are requested to make sure that they should attach the list of equipments for carrying out routine and preventive maintenance wherever asked for and should make sure that Electrical Safety Analyzer / Tester for Medical equipments to periodically check the electrical safety aspects as per BIS Safety Standards IS-13540 which is also equivalent to IEC electrical safety standard IEC-60601 is a part of the equipments. If the Electrical Safety Analyzer/Tester is not available they should provide a commitment to get the equipments checked for electrical safety compliance with Electronic Regional Test Labs /Electronics Test and Development Centres across the country on every preventive maintenance call.

Note 2: Adequate training of personnel and non-locked open software and standard interface interoperability conditions for networked equipment in hospital management information system (HMIS)The successful tenderer will be required to undertake to provide at his cost technical training for personnel involved in the use and handling of the equipment on site at the institute immediately after its installation. The company shall be required to train the institute personnel onsite for a minimum period of 1 month All software updates should be provided free of cost during warranty period and CMC period

Responsibility of bidder

Bidders are strongly advised to visit the site for assessment before the submission of tender offer

- Bidder shall be responsible for complete design, supply, installation, testing and commissioning including turnkey works, demolition and construction as applicable. The bidders are required to survey the site before furnishing the quotations.
- Bidder shall execute all required civil, electrical, plumbing, lighting, fire safety, exhaust systems and other works as maybe required for complete installation and trouble-free functioning as a part of the ‘turnkey work’.
- Hospital will provide one-point electrical supply with isolator in the plant. The wiring, peripheral lighting, fans, exhaust etc have to be done by the bidder.
- Bidder will be responsible for trenching or other associated work related to installation and commissioning of complete MGPS system.

- The bidder shall be responsible for the complete works including the submission of working drawings, and isometric views, detailed work schedule and materials. Bidder shall be responsible for design, supply, installation, testing and commissioning of medical gas supply system in coordination with respective institute authorities & HSCC.
- Bidder shall be responsible for free maintenance of all component of Gas pipeline system during warranty period including all filters & consumables.
- Bidder should provide factory test certificates for the materials used. Bidder should supply complete set of part manuals, service manuals and user manuals for all the systems and sub systems supplied. Final electrical safety test, system test, leakage and calibration should be done by authorized persons using calibrated test equipment as per standards.
- **Third party quality certification of the imported MGMS equipment from SGS/BUREAU VERITAS/Lloyds/TUV should be submitted as "Certifies that the MGMS equipment meets the technical specification of the tender document".**
- It should either have registration or import/manufacturing license from Central licensing Authority or State licensing authority of CDSCO for the product and shall be as per govt. guidelines and copy of same should be submitted, if applicable**.**

B. PNEUMATIC TUBE SYSTEM (PTS)

PTS works shall be carried out by the specialized agency which must be manufacturer or agent with valid manufacturer's authorization from the Principal/manufacturing company.

Scope of Work : Supply, Installation, Testing and Commissioning of PTS equipment on Turnkey basis as per technical specification and handover to the client in satisfactory condition and providing of free spares and labour for maintenance during defect liability period.

Pneumatic Tube System for transportation Clinical Samples, Blood bags and Pharmacies from various locations in a Hospital to OT complex, Procedure Room ,ICUs, Wards, Pathology department, Blood bank and Pharmacy as per requirement and vice versa through overhead UPVC pipes though suction (Pneumatic).

Pneumatic Tube system shall be equipped with following major items & equipment of adequate quantity with standby to meet entire load and network of facilities/services of the hospital:

MAIN CONTROLLER

ROTARY/LINEAR TRANSFER UNIT

FRONT LOAD PASS THROUGH STATIONS

END STATION

MULTI SEND & MULTI RECEIVE STATION
DIVERTER THREE WAY

SIDE CHANNEL BLOWER

TUBE (GREY) 160 MM

BENDS

SLEEVES

CARRIERS WITH RFID

RFID

TUBING MATERIAL & OTHER ACCESSORIES

PTTS station at each floor is taken that will be connected to **existing core lab at Raj Kumari Amrit Kaur OPD where 1 Multi Send & 1 Multi receive station to be installed** . A PTTS plant and control room is planned at basement-3 level, Floor wise allocation for the PTTS stations (tentative) for OPD block is as follows: However specialized agency has to design the PTTS as per standard and guideline.

FLOORWISE PTTS STATION ALLOCATION ***(Tentative)***

AIIMS OPD BLOCK PTTS		
S.NO.	FLOORS	STATIONS
1	Basement 3	
2	Basement 2	Plant room
3	Basement 1	2 Top load station
4	Ground Floor	1 Top load station
5	First Floor	2 Top load station & 1 Multi send station
6	Second Floor	2Top load station
7	Third Floor	2 Top load station
8	Fourth Floor	2 Top load station
9	Fifth Floor	1 Top load station
10	Sixth Floor	1 Top load station
11	Seventh Floor	2Top load station
12	Eighth Floor	2 Top load station
13	Ninth Floor	1 Top load station & 1 Multi send/receive Station
14	Lab (New RAK OPD)	1 Multi send/receive Station
15	Sample Collection Area New RAK OPD)	1 Top load station & 1 Multi send/receive Station

Total	19 Top Load Stations & (Multi Receive / Multi send station at each Lab as per requirement)

TURNKEY WORKS

The works includes all modifications/Patch work to the built up space provided at the hospital site including Installation of Equipment, civil works, electrical works, furniture and other related works of the PTS required for the smooth and efficient functioning of the centre. These works shall comply with all relevant safety and standards guidelines. The vendor is fully responsible for installation and commissioning of all equipment. The work includes demolition of unwanted walls. Supply of requisite materials and connection for electrical supply PTS.

In addition to the above mentioned equipment/appliances, if the contractor thinks it necessary to include any other equipment/appliances, accessories etc. for the PTS then that may be provided after approval from Engineer in-charge.
The sizes are approximate. Minor variations in sizes shall be acceptable subject to prior approval of the Engineer.

- The contractor shall be responsible for the complete works including submission of working drawing and walk through view.
- The contractor should provide complete Operation manual, Equipment manual, Service manual and manuals for all systems and subsystems.
- The contractor should provide Final electrical safety test, system test and calibration to be done by authorized person with test instruments.
- Engineer may instruct for any test this has to be got done by contractor at their own cost.
- All electrical accessories like cable wire, electrical outlets, switches etc supplied by the contractor should be fire proof of reputed make, certified for electrical safety.
- The contractor should provide test certificate for all materials and equipments used for PTS
- Training of personnel of the Institute should be 7 days by the contractor.
- The contractor should prepare and submit layout plan as well as As-Built drawing for Electrical Wiring, Electrical Distributional Panel, Piping, Fire Fighting System to HSCC for approval before beginning of supply and installation and As-Built drawing after installation.
- The contractor should provide test certificate for all materials along with manufacturer's test certificate and equipment used for PTS.
- Third party quality certification of the PTS equipment from SGS/TUV/Lloyds/Bureau Veritas should be submitted by the contractor as "Certifies that the PTS equipment to be supplied/supplied for installation meets the technical specification.

DBR for Furniture Works

DBR of Furniture Work for Super Specialty, OPD Block, AIIMS New Delhi.

1.**SCOPE OF WORK**

Supply, installation, testing, commissioning and handed over to client of all Furniture items for Super Specialty Block, AIIMS New Delhi

2.**Documentation.**

It is the responsibility of Bidder/OEM to provide the following documents to client & HSCC:

- All furniture working details layout drawing.
- User Manuals wherever desired.
- Escalation matrix.
- Warranty certificates.
- Technical Data sheets.
- Test reports from NABL accredited labs.
- To maintain standard quality products bidders/OEM must have following quality Certificates issued by reputed certification bodies recognized by the National Accreditation Board for Certification Bodies [NABCB] India (as mentioned in NABCB site)

i. ISO: 9001-2015 for quality management system
ii. ISO: 14001 for environmental management systems
iii. ISO: 45001 for occupational health and safety
iv. ISO 13485 for Medical Devices Quality Management System
v. ISO 50001 Energy management systems

2.1 Bidder/OEM must have BIFMAe3 Membership.
2.2 Bidder/OEM must have IGBC Membership Certificate.
2.3 Bidder/OEM must have AIOTA for office furniture.
2.4 Bidder/OEM must have Green Pro (CII) certificate for products.
2.5 Bidder/OEM submit the material testing report like Formaldehyde, Total volatile organic compounds, Total Aldehydes and 4-Phenylcyclehexene (4-PCH) issued by NABL accredited lab

3.**Warranty/Maintenance Support**

Seller shall be solely responsible for Warranty of all the items supplied and installed for the period of 5 years from the date of commissioning and handing over of all the items to Client.

4. Sample Clause: -

Seller shall have to get advance sample approval from buyer/client before bulk manufacturing/starting bulk supplies. Seller shall submit 1 samples of each item for Buyer's approval.

5. Third (III) party Inspection: -

Seller shall also arrange inspection of Goods at Consignee site by third (III) party Inspection agency i.e. LLOYDS/SGS /Bureau Veritas /or inspected by Consignee/HSCC or any other with same high status inspection agency as recommended by Consignee/ HSCC. The third (III) party Inspection shall inspect the Goods as per tender technical specification and working details layout drawing/sample (i.e. color code, design approved by client). After inspection of the goods the third (III) party Inspection agency also certified that "Inspected Goods is found of standard quality and complied all the tender technical specificatio*n.* All charges for III party inspection shall be borne by the supplier/seller. All pages of inspection report with photographs duly signed & stamped by inspector of Inspection agency and with conclusion report (Goods Accepted or rejected). HSCC/consignee/client also have full right to inspect the Goods.

6. Payment Schedule: -

A. 80% on delivery of Goods at consignee/duly certified by Site In charge/ Site Engineer/ Zonal In charge/ Engineer In Charge on submission of following documents

i. Inspection report of i.e. SGS/ Lloyd/ Bureau Veritas or inspected by Consignee/HSCC any other with same high status inspection agency recommended by consignee/HSCC.
ii. Manufacturer's own factory inspection report.
iii. Quality Certificate by manufacturer/supplier
iv. Manufacturer's/Supplier's warranty certificate.

B. 20 % on Acceptance 'Final Acceptance Certificate' issued by Consignee along with handing over certificate duly certified by Site In charge/ Site Engineer/ Zonal In charge/ Engineer In Charge

7) The following IS will be followed for the following items:
a) The grade IS: 513 will be followed in case of steel items. IS: 10748 the right classification Grade 1 shall be used. The steel tubes for furniture shall be as per IS: 7138.
b) IS 13871 (1993) FOR powder coating.
c) The rated IS/International Standard nos. under which the respective tests are to be performed shall be used. The requisite values against which the test results will be compared for conformity.
d) IS 12406 (2003) for Medium Density Fiber Boards , maximum water absorption after 2 hours soaking shall be 6% for grade I & II boards. All the required test as per IS code shall be carried out for MDF boards,
e) IS 2046: 1995 for decorative Laminated sheets.
f) IS 14587: 1998 for Pre-laminated Medium Density Fiber Board.
g) IS 303 (1989) for Commercial MR grade Plywood.

8. Material Test**:** Tests of all materials will be carried out as per BIS. In case it is not available in BIS the same shall be carried out as per decision given by engineer in-charge/client based on existing general practice which will be binding to the agency. The material which is not passing to BIS or any other test will be rejected. All charges for Material Testing shall be borne by the supplier/seller.

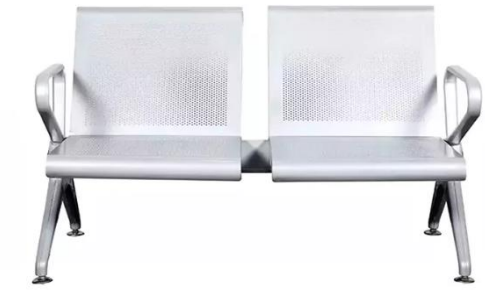
Note: All furniture quantity is tentative, however, during detailed designing, if required and found necessary, the quantity of furniture items may be increased by the EPC contractor.

1. 3-Seater waiting chair

Supply and Installation of 3-seater waiting chair, The seat shell shall be a welded assembly of seat, back and side frame. The seat and back shall be made of 0.12±0.013cm thk. CR steel sheet with oblong perforations. They shall be welded to side frame of size 32mm x 5mm thk. HR steel. The welded assembly shall be powder coated (DFT 60 microns). The seat shall have a front water fall edge to provide popliteal clearance for comfortable seating. It also shall have a buttock support curve that not only provides rear support but also prevents small children from falling through the gap between seat and back. Clean and flat surfaces of seat and back shall aid in easy maintenance. The dimensions of seat shall be 500mm (W) x 450mm (D) and of back shall be 500mm (W) x 450mm (H). Understructure assembly shall consist of connecting beam and leg assembly made of M.S.E.R.W. oblong tube of size 170 mm x 90 mm made of 2mm thick. The welded structure assembly shall be powder coated (DFT 60 microns). The leg assembly shall be fitted with shoes and levelers in Nylon. The shoes fitted to leg assembly shall help in aligning the structure for back-to-back arrangements. Levelers should take care of uneven flooring. Connecting beam shall be fitted with snap locking end cap. It also aids in side-by-side understructure alignment. Armrest assembly shall consist of armrest frame and armrest pad. The armrest frame shall be made up of size 40mm X 22mm thick. and it shall be powder coated (DFT 60 microns). Armrest pad shall be injection molded in Nylon and shall be fitted onto the armrest frame. There shall be 4 arm rests installed for each 3- seater bench, two armrests on both narrow edges and two armrests between the seats. Overall Dimensions shall be: Seat Height-450mm, Total Height-785mm, Width & Depth of Chair as measured from

pedestal: Width-1750mm and Depth-705mm. Cushions: The cushions for seat and back are made up of 20mm thick MOULDED PU on a flat MR grade ply 0.8±0.04cm thick. OR as per direction of Engineer In charge.3-seater waiting chair as approved by engineer in-charge/employer.

2. 2-Seater waiting chair



Supply and Installation of 2-seater waiting chair, the seat shell shall be a welded assembly of seat, back and side frame. The seat and back shall be made of 0.12±0.013cm thick. CR steel sheet with oblong perforations. They shall be welded to side frame of size 32mm x 5mm thick. HR steel. The welded assembly shall be powder coated (DFT 60 microns). The seat shall have a front water fall edge to provide popliteal clearance for comfortable seating. It also shall have a buttock support curve that not only provides rear support but also prevents small children from falling through the gap between seat and back. Clean and flat surfaces of seat and back shall aid in easy maintenance. The dimensions of seat shall be 500mm (W) x 450mm (D) and of back shall be 500mm (W) x 450mm (H). Understructure assembly shall consist of connecting beam and leg assembly made of M.S.E.R.W. oblong tube of size 170 mm x 90 mm made of 2mm thick. The welded structure assembly shall be powder coated (DFT 60 microns). The leg assembly shall be fitted with shoes and levelers in Nylon. The shoes fitted to leg assembly shall help in aligning the structure for back-to-back arrangements. Levelers should take care of uneven flooring. Connecting beam shall be fitted with snap locking end cap. It also aids in side-by-side understructure alignment. Armrest assembly shall consist of armrest frame and armrest pad. The armrest frame shall be made up of size 40mm X 22mm thick. and it shall be powder coated (DFT 60 microns). Armrest pad shall be injection molded in Nylon and shall be fitted onto the armrest frame. There shall be 2 arm rests installed for each 2- seater bench, two armrests on both narrow edges. Overall Dimensions shall be: Seat Height- 450mm, Total Height-785mm, Width & Depth of Chair as measured from pedestal: Width-1180mm and Depth-705mm. Cushions: The cushions for seat and back are made up of 20mm thick. MOULDED PU on a flat MR grade ply 0.8±0.04cm thick. OR as per direction of Engineer In charge. 2-seater waiting chair as approved by engineer in-charge/employer.

3. 3 Seater Sofa

Supply and Installation of Three-Seater Sofa • SEAT FOAM: The seat is made of PU foam with Density 28± 2 kg/cu. mtr having an additional top layer of super soft PU foam in Density 32 ± 2 kg/cu. upholstered with fabric or leatherette. Seat Cushion Thickness ±3 (mm): 150mm
• 2) BACK FOAM: The back is made of PU foam with Density 28 ± 2 kg/cu. mtr with two additional top layers of super soft foam of density 32±2 kg/cu. mtr, upholstered with fabric or leatherette. Backrest Cushion Thickness ±3 (mm): 175mm
• 3) UNDERSTRUCTRE: Understructure is made up of 1.2±0.1 cm. thick hot pressed plywood (moisture resistance & termite proof as per IS: 303) & pinewood of cross section devoid of major knots & surface defects 6 nos. per seat & 3.8 mm Dia zigzag spring assembly is mounted over understructure for cushioning purpose 6 nos. per seat & 3.8 mm Dia zigzag spring assembly is mounted over understructure for cushioning purpose.
• 4) LEG ASSEMBLY: It is a welded assembly made in Stainless steel (grade SS 202) tube & plate with plastic end cap. (W) 2060mm (D) 905mm(H) 855 mm seat (H) 450 mm, Sofa Leg Height ±2(mm): 150 mm, Sofa Leg Width / Diameter ±2 (mm): 40 mm, Arm Height ±5 (mm): 710mm, Arm Width ±5 (mm): 120mm Sofa: as approved by Engineer In Charge/employer.

4. 2 seater sofa

Supply and Installation of Two Seater Sofa SEAT FOAM: The seat is made of PU foam with Density 28± 2 kg/cu. meter having an additional top layer of super soft PU

foam in Density 32 ± 2 kg/cu. upholstered with fabric or leatherette. Seat Cushion Thickness ±3 (mm): 150mm

• 2) BACK FOAM: The back is made of PU foam with Density 28 ± 2 kg/cu. mtr with two additional top layer of super soft foam of density 32±2 kg/cu. mtr, upholstered with fabric or leatherette . Backrest Cushion Thickness ±3 (mm): 175mm

• 3) UNDERSTRUCTRE : Understructure is made up of 1.2±0.1 cm. thick hot pressed plywood (moisture resistance & termite proof as per IS: 303) & pinewood of cross section devoid of major knots & surface defects 6 nos. per seat & 3.8 mm Dia zigzag spring assembly is mounted over understructure for cushioning purpose 6 nos. per seat & 3.8 mm Dia zigzag spring assembly is mounted over understructure for cushioning purpose.

• 4) LEG ASSEMBLY: It is a welded assembly made in Stainless steel (grade SS 202) tube & plate with plastic end cap. (W) 1460mm (D) 905mm(H) 855 mm seat (H) 450 mm, Sofa Leg Height ±2(mm): 150 mm, Sofa Leg Width / Diameter ±2 (mm): 40 mm, Arm Height ±5 (mm): 710mm, Arm Width ±5 (mm): 120mm Sofa: as approved by Engineer In Charge/employer.

5. Center Table

Providing and supplying of center table of size: 1200mmW X600mmD X400mmH, top made of 25 mm thick Kit Ply Board with both side 1 mm thick laminate, E1 grade laminate with zero urea formaldehyde emissions (<or= 8mg/100 g oven dry board-perforated method) for better in-house quality. This should comply with (EN 120-1992) with all exposed edges sealed with 2mm thick PVC edge banding tape and unexposed edges sealed with 0.6mm thick PVC edge banding tape pressed at 200o C with hot melt glue on special machines. Frame and Leg material: Stainless steel (SS 304), size of Frame and Leg material 45mm X 45mm with 1.6 mm thickness, Center Table: as approved by Engineer In Charge/employer.

6. corner Table

Providing and supplying of center table of size: 500mmW X500mmD X400mmH, top made of 25 mm thick Kit Ply Board with both side 1 mm thick laminate veneer with PU finish having scratch resistance of 2H, E1 grade laminate with zero urea formaldehyde emissions (<or= 8mg/100 g oven dry board-perforated method) for better in-house quality. This should comply with (EN 120-1992) with all exposed edges sealed with 2mm thick PVC edge banding tape and unexposed edges sealed with 0.6mm thick PVC edge banding tape pressed at 200o C with hot melt glue on special machines. Frame and Leg material: Stainless steel (SS 304), size of Frame and Leg material 45mm X 45mm with 1.6 mm thickness, Corner Table: as approved by Engineer In Charge/employer.

7. Office Table with side unit

Providing & Fixing office Table with Combination of Main Table with Extended Return Unit with Pedestal Storage Unit and:-
MAIN TABLE of size 1800mmW x 750mmD x 750mmH with top made of 36mm thick, MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H. The gable end of 25mm thick. MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H, The table has provision with Aluminum Anodized Access Flap for better electrical provision.
The Gabel and Modesty panel is made of 18mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H, all exposed edges sealed with 2mm PVC edge banding tape and all unexposed edges sealed with 0.6mm edge banding tape pressed at 200o C with hot melt glue on special. Top, sides and bottoms (of each product) fixed up system: By using mini fix ,supporting bracket/corner and wooden dowel in (knock down) system for interconnecting (MDF board). Design / Shape of table **:** Rectangular and taper inside at both side ends

Extended Return Unit

Extended Return Unit size 1200mmL X 600mmD X 750mmH: The Side unit top is made up of 25mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H ,under structure is made up of 18mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H all exposed edges sealed with 2mm PVC edge banding tape and all unexposed edges sealed with 0.6mm edge banding tape pressed at 200o C with hot melt glue on special. The side unit is combination of 1 open able shutter storage with proper locking arrangement, two open shelves and 1CPU Storage Drawer/storage shutter pull up mechanism : Groove type, Table **as approved by engineer in-charge/employer.**

Mobile Pedestal

Mobile Pedestal Drawer Unit: Each Table should be provided with 3 drawer Wooden Mobile Pedestal having of 2 sliding Drawer and 1file Box mounted on 4 castors with front 2 castors lockable. The drawer top, and side panels including the drawer fascias is made out of 18mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H, the back of the drawer unit is made from 9mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H. all exposed edges sealed with 2mm PVC edge banding tape and all unexposed edges sealed with 0.6mm edge banding tape pressed at 200o C with hot melt glue on special. The units are assembled by knockdown fittings such as Mini fix & dowels. The drawer are mounted on rollers slides to enable smooth operation of the drawer. The pedestals shall have central locking mechanism. D/C type slim Handle for Drawer and Shutter. Size of lockable castors for pedestal storage unit ± 2 mm: Diameter 40 mm and height 55 mm, Mobile Pedestal size shall be 400mm W x 550mm D x 585mm H, All Hardware (Handles, Slides ,Hinges, locks, sliding channel etc) Hettich/Ebco Make. MDF Board/laminate Make: (Century/Action Tesa/Merino/Greenlam). Table as approved by engineer in-charge/employer.

8. High Back Chair

Providing and Placing in Position High Back Chair. The cushioned seats shall be made of injection moulded plastic outer and inner. Plastic inner shall be upholstered with synthetic leather/leatherite and moulded high resilience polyurethane foam of Density = 45±2 kg/m³, and hardness load 16±2 kgf as per IS:7888 for 25% of compression. Seat size shall be 47.6 cm W x 49.2 cm D. The back shall be cushioned and shall be made up of PU foam with insitu moulded MS ERW round tube of size 1.9±0.03 cm x 0.16±0.0128 cm, upholstered with synthetic leather/leatherite. Back size shall be 47.5 cm W x 77 cm D. The armrest top shall be moulded from polyurethane, and shall be upholstered with synthetic leather/leatherite and mounted on ot a drop lift adjustable type tubular armrest support made up of Ø3.81±0.03 cm x 0.2±0.01 cm thick MS ERW tube having chrome plated finish. The armrest height shall be adjustable up to 6.5±0.5 cm in 5 steps. The adjustable tilting mechanism shall be designed with the following features : 360° revolving type, front-pivot for tilt with feet resting on ground and continuous lumbar support ensuring more comfort, Tilt tension adjustment can be operated in seating position, 5-position tilt limiter giving options of variable tilt angle to the chair, seat/back tilting ratio 1:2, the mechanism housing is made up of HPDC aluminum black powder coated. Seat depth adjustment shall be integrated in the seat through a sliding mechanism. Seat depth adjustment range shall be 6.0±0.5 cm. Back frame shall be connected to the up/down mechanism housed in plastic T spine. It can be adjusted in the range of 7.42±0.5 cm for the comfortable back support to suit individual need. the pneumatic height adjustment shall have an adjustment stroke of 10±0.3 cm. The pedestal shall be high pressure die cast polished aluminum and fitted with 5 nos. of twin wheel castors. The pedestal shall be 65.0±0.5 cm pitch centre dia. 5 nos. of twin wheel castors shall be injection moulded in plastic having 6.0±0.1 cm wheel diameter and assembled to pedestal, Company should have ISO-9001, 14001, 45001, AIOTA and Green guard certificate. Chair **as approved by engineer in-charge/employer.**

9. Mid Back Chair

Providing and Placing in Position Mid Back Chair. The overall dimensions shall be 76.1cm x 76.1cm x 96.5-114cm. Seat height shall be 44.5cm - 54.5cm. The cushioned seats shall be made of injection moulded plastic outer and inner. Plastic inner shall be upholstered with synthetic leather/leatherite and moulded high resilience polyurethane foam of Density = 45±2 kg/m³, and hardness load 16±2 kgf as per IS:7888 for 25% of compression. Seat size shall be 47.6 cm W x 49.2 cm D. The back shall be cushioned and shall be made up of PU foam
with in situ moulded MS ERW round tube of size 1.9±0.03 cm x 0.16±0.0128 cm, upholstered with synthetic leather/leatherite. The armrest top shall be moulded from polyurethane, and shall be upholstered with synthetic leather/leatherite and mounted on ot a drop lift adjustable type tubular armrest support made up of Ø3.81±0.03 cm x 0.2±0.01 cm thick MS ERW tube having chrome plated finish. The armrest height shall be adjustable up to 6.5±0.5 cm in 5 steps. The adjustable tilting mechanism shall be designed with the following features:
360° revolving type, front-pivot for tilt with feet resting on ground and continuous lumbar support ensuring more comfort, Tilt tension adjustment can be operated in seating position, 5-position tilt limiter giving options of variable tilt angle to the chair, seat/back tilting ratio 1:2, the mechanism housing is made up of HPDC aluminum black powder coated. Seat depth adjustment shall be integrated in the seat through a sliding mechanism. Seat depth adjustment range shall be 6.0±0.5 cm. Back frame shall be connected to the up/down mechanism housed in plastic T spine. It can be adjusted in the range of 7.42±0.5 cm for the comfortable back support to suit individual need. the pneumatic height adjustment shall have an adjustment stroke of 10±0.3 cm. The pedestal shall be high pressure die cast polished aluminum and fitted with 5 nos. of twin wheel castors. The pedestal shall be 65.0±0.5 cm pitch center dia. 5 nos. of twin wheel castors shall be injection molded in plastic having 6.0±0.1 cm wheel diameter and assembled to

pedestal. chair as approved by engineer in-charge/employer. chair **as approved by engineer in-charge/employer.**

10. Patient Chair

Supply and Installation of four leg stainless steel Stool with comfort backrest and hand rest as per image, The seat shall be made up of 1.2+/-0.1cm thick hot pressed plywood upholstered with fabric or synthetic leather and moulded polyurethane foam. The back shall be made up 1.2+/-0.1cm thick moulded hot pressed plywood upholstered with replaceable fabric or synthetic leather upholstery covers and moulded polyurethane foam. The moulded polyurethane foam shall be of density 45+/-2kg/m ^{3}, and hardness load 16+/-2kgf as per IS:7888 for 25% compression. The dimensions of seat shall be-51.0cm(W) x 48.0cm (D) and seat shall be 50 mm thick fitted with 25.4 mmx1.6 mm diameter pipe, the back shall be in rounded shape with thickness of 50 mm with height of 400 mm-480mm, the back support shall be made of stainless steel 304 grade 25.4 mm diameter ring with 1.6 mm thickness, The under structure should consist of 4 legs made up of stainless steel 304 grade tube of diameter 25.4 mm with 1.6 mm thickness,. The press formed pipe leg should give a round & clean look. All the legs should be provided with 4 nos of Nylon-6 bush. A good quality leatherite shall be provided on seat & back in attractive color/shade. Stool as approved by engineer in-charge/employer

11. Examination Couch

Supply and Installation of examination couch, Overall dimension 1975 mm (L) x 560 mm (W) x 805 mm (H). Examination couches with three drawers with three cabinets, inbuilt step stool and BP tray holder. the base frame is made of 30 mm x 30 mm X 1.6 thick ERW tube.
The cabinets is made of 1 mm thick CRCA sheet with recessed plastic handles and with lock and plastic door latch. the hinges of the cabinet are made of sheet metal and pin arrangement. The internal dimension of the two side cabinets are 422 mm (W) x 455 mm (D) x 540 mm (H).
The storage cabinet unit is mount tubular base frame.
The head rest is adjustable on gas spring which is actuated with C shaped handle lever .
The drawers is made of 1 mm thick CRCA sheet with recessed plastic handles and work on double extension ball slides for smooth glide. the internal dimension of the drawer are 330 mm (W) x 427 mm (D) x 92 mm (H)
The mattress platform is 65 mm thick which is made of 12 mm thick ply and PU foam and covered with Leatherite cover. the cover is water resistant, fire retardant, anti microbial . The end of the top mattress surface is tapered end edge for ergonomic benefit.
There is ss304 made tissue roll holder present on the lower side of the back rest.
There is 1 mm thick CRCA made step stool with leveler.
There is 1 mm thick CRCA made BP apparatus holder which has adjustable in height on a SS made height adjustable rod. Total load bearing capacity of 135 kg.
The examination couch should be Provision with six numbers levelers made of metal & plastic for adjustment on the uneven floor.

All the metal parts should be pre treated and powder coated with epoxy polyester powder coating. The product is ISO 13485:2016, ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 Certified. Examination couch **as approved by engineer in-charge/employer.**

12. Reception/Registration Chair

The seat shall be made up of 1.2+/-0.1cm thick hot pressed plywood measured as per QA method described in OCP-QLTA-P14-18 and upholstered with fabric or synthetic leather and moulded polyurethane foam. The back shall be made up 1.2+/-0.1cm thick hot pressed plywood upholstered with replaceable fabric or synthetic leather upholstery covers and moulded polyurethane foam. The moulded polyurethane foam shall be of density 45+/-2kg/m ^{3}, and hardness load 16+/-2kgf as per IS:7888 for 25% compression. The dimensions of seat shall be- 51.0cm(W) x 48.0cm(D) and of back shall be 48.0cm(W) x 64.5Cm(H). The armrest top shall be made of moulded polyurethane and mounted on to a drop lift height adjustable type M.S tubular armrest support chrome plated. The armrest height shall be adjustable up to 6.5+/-0.5cm in 5 steps. The mechanism of the chair shall have following features : 360º revolving type, Knee tilt synchro mechanism, Tilt tension adjustment, Single point control, 4 position locking with anti shock feature, Seat/Back tilting ratio of 1:2. Seat depth adjustment of 6.0+/-0.5cm should be locked in 6 positions. The backrest shall consists of a sliding up down mechanism, Which can be adjusted in the range of 7.5+/-0.5cm and should be locked in 4 positions for correct position of lumber support.The chair shall be provided with pneumatic height adjustment which shall have stroke of 9.0 +/- 0.3 cm. The pedestial shall be fabricated from 0.2+/-0.02cm thick HR sheet, chrome plated and assembled with injection moulded black polypropylene hub cap. The size of the pedestal shall be 66.0+/- 0.5 cm pitch-centre-dia (76.0 +/- 1.0 cm with castors). The twin wheel castors

shall be made black nylon. Overall dimensions of Chair shall be, Width of Chair - 76.0cm, Depth of Chair - 76.0cm as measured from pedestal below. Height from ground - min 89.0 to max 105.0cm. Seat height - min 46.9 to max 55.9cm. Dimensions tolerance / variations shall be within +/- 1 cm.

13. Steel Almirah

Providing and placing of Steel Almirha overall size: 916mm(W)x486mm(D)x1980mm(H) with welded construction. Almirah shall be made of CRCA 'D' grade high yield strength, CRCA sheets conforming to grade as per CRI of IS 513 (part-1):2016, It should have 4 Nos. shelves with thickness of 1.0 mm, Back thickness of 1.0 mm, Door thickness of 1.0 mm (high yield strength) and stiffener shall be provided in door up to full height, Width of stiffener : 115 mm, Stiffener sheet thickness: 0.8 mm and all other components shall have thickness of 1.0 mm. The Steel Almirah should have a Mazak handle and Three way locking mechanism with Shooting Bolts. It should have a height wise adjustable shelves mounting which shall have a Uniformly distributed load (UDL) for shelves: 80 Kg. Almirah also have a M10 Screw type Leveler with Hex plastic base, Number of hinges (for each door): 03 Nos. Hinges sheet thickness: 2 mm, Pedestal height (± 5 mm): 125 mm, The finishing shall include Epoxy powder coated with thickness of 50 microns (+/- 10%). Powder coating : Conforming to IS: 13871. It should sustain Salt Spray test to withstand more than 1000 hours as per IS-101, Pencil scratch hardness more than 2H, Adhesion as per DIN 53152 Standards. Steel Make: TATA Steel/Sail Steel/JINDAL Steel/Equivalent or As approved by engineer in-charge/employer**, Steel Almirah as approved by engineer in-charge/employer.**

14. 12 Seter Meeting Table

Supply and Installation of 12 Seter Conference Table size: 3600mmLx1200mmWx750mmHeight, Work surface : Made of 32 mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003, E1 grade laminate with zero urea formaldehyde emissions (<or= 8mg/100 g oven dry board-perforated method) for better in-house quality. This should comply with (EN 120-1992). All Exposed edges of MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on Non-exposed edges with the help of hot-melt glue through fit edge-banding machines, The Edge-banding of exposed area to be done in the way that there should not be any sharp edge or corner left after processing , All the exposed edges should have buffing radius of 1.5 to 2mm without affecting aesthetic value of the panel.

Understructure: It consist of 25 mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003,). All Exposed edges of MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on non-exposed edges with the help of hot-melt glue through fit edge-banding machines, The Edge-banding of exposed area to be done in the way that there should not be any sharp edge or corner left after processing. Aluminum alloy 63400 –

WP profile is used for connecting panels together. The product has a knock-down construction. Plastic ABS access flap is provided for easy access to wires and cables. Work top is available in various shapes as shown above.
Modesty Panel : Made of 25 mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003,). All Exposed edges of pre laminated MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on non-exposed edges with the help of hot-melt glue through fit edge-banding machines. Powder coated accent metal strip provided below work surface to enhance aesthetics. It is made of 0.8mm CRCA as per IS 513, epoxy polyester powder coated (DFT 40-60 microns)
Wire Management: An array of panels made of 0.8mm CRCA MS IS:513, epoxy polyester powder coated (DFT 40-60 microns) is used for flow of wires and cables. Provision o mount Anchor Roma 6 module plate is provided below worktop. Cutout on top with two-piece injection moulded plastic part polymer component is fitted to pull out audio, video cables onto worktop and connect devices charger to power socket below worktop. All, Hardware (Handles, Slides, Hinges, locks, sliding channel etc) Hettich/Ebco Make. Pre laminated MDF Board and Laminate Make: (Century/Action Tesa/Merino/Greenlam), table **as approved by engineer in-charge/employer.**

15. **Dining Table 6 seater**

Providing and Placing in place 6 Seater PU Coated dining table size shall be 1800mm Width mm x 1175 Depth mm x 750 Height mm. Top shall be made up of 25 mm thick MDF board with top PU painting of minimum 2H hardness with 75% glass as per colour chart. Combination colour graphics on the centre. Brown Laminate on bottom specially profiled edges for comfort . The Under structure of MS powder coated size 38mmx38mm with 2 mm thickness and it shall be fitted with top by SS machine screws. Legs shall be of MS powder coated with size: 50mmx50mm with 2 mm thickness, legs are fixed with under structure and table top. Glide shall be of Plastic fixed at the under structure to prevent the damage of table top during stacking. All Hardware Make (Handles, Slides, Hinges, locks, sliding channel, screw etc) Hettich/Ebco/equivalent or As approved by engineer in-charge/employer. MDF Board Make: (Century/Action Tesa/Merino/Greenlam/equivalent or As approved by engineer in-charge/employer.

Dining Table: As approved by engineer in-charge/employer, Company should be ISO-9001, 14001, 45001, AIOTA and Green pro certified. Dining table as **approved by engineer in-charge/employer.**

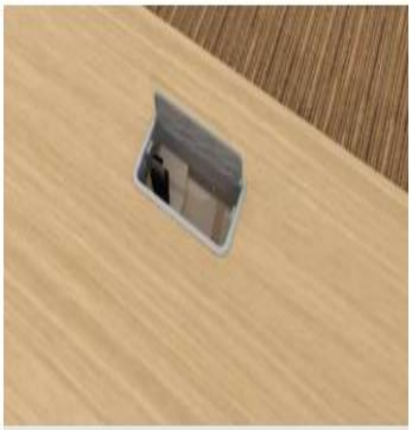
16. Dining Chair

Supply and Installation of dining chair, The seat and back are made up injection molded high impact strength polypropylene polymer compound with indoor grade UV Resistance. The Powder coated (DFT50+ microns) welded tubular frame is made from 2.22 + 0.03 cm x 0.16+/- 0.0128cm and 3.5+/- 0.03 cmx1.5+/-0.03 cm x 0.16 +/- 0.0128 cm M.S.E.R.W tube The Shoes are made of high impact strength polypropylene polymer compound with indoor grad UV Resistance and pressed fitted with tubular frame. SIZE : (W)52.5cm*(D)55.8cm*(H)84.5cm*(seat H) 45.0 cm Seat Size 52.5cm(W)*53.2 cm(D), Back Size 51.6 cm(W)*40.5 cm (H), Chair as approved by engineer in-charge/employer.

17. Modular Conference Table 18 Seater

Scope: Supply, assembly and installation in-situ of 18 seater Modular Conference Tableas per technical specification.

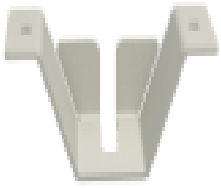
Features



Cable holder for easy access of cable and keeping cables tangle free

Clutter free top with provision of Power Module at bottom

Unique module designed to give ample leg space



HDMI Holder

HDMI Wire Cover

Document Shelf

Two Way Name Plate

Supply and installation of 18 Seater Modular Meeting Table

Modular 2 Seater Main Table: 1350mmx600mmx730mm+ Modular 2 Seater Shared Table: 1350mmx600mmx730mm + Modular 2 Seater End Left Hand Side: 1350mmx 600mmx730mm+ Modular 2 Seater End Right Hand Side: 1350mmx600mmx730mm+Modular 2350mm W St2350mm X 850mm X 730mm+Desk 2 Way Name Plate +Desk Mod Doc Shelf +Desk Hdmi Wire Manger.

Work surface : Made of 36mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003, laminate shall be 1.0 mm thick E1 grade with zero urea formaldehyde emissions (<or= 8mg/100 g oven dry board-perforated method) for better in-house quality. This should comply with (EN 120-1992). All Exposed edges of MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on Non-exposed edges with the help of hot-melt glue through fit edge-banding machines, The Edge-banding of exposed area to be done in the way that there should not be any sharp edge or corner left after processing , All the exposed edges should have buffing radius of 1.5 to 2mm without affecting aesthetic value of the panel.

Understructure : It consist of 25 mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003,). All Exposed edges of MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on Non-exposed edges with the help of hot-melt glue through fit edge-banding machines, The Edge-banding of exposed area to be done in the way that there should not be any sharp edge or corner left after processing. Aluminum alloy 63400 - WP profile is used for connecting panels together. The product has a knock-down construction. Plastic ABS access flap is provided for easy access to wires and cables. Work top is available in various shapes as shown above.
Modesty Panel : Made of 25 mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003,). All Exposed edges of pre laminated MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on Non-exposed edges with the help of hot-melt glue

through fit edge-banding machines. Powder coated accent metal strip provided below work surface to enhance aesthetics. It is made of 0.8mm CRCA as per IS 513,epoxy polyester powder coated (DFT 40-60 microns)

Wire Management : An array of panels made of 0.8mm CRCA MS IS:513, epoxy polyester powder coated (DFT 40-60 microns) is used for flow of wires and cables. Provision o mount Anchor Roma 6 module plate is provided below worktop. Cutout on top with two piece injection moulded plastic part polymer component is fitted to pull out audio, video cables onto worktop and connect devices charger to power socket below worktop. All, Hardware (Handles, Slides ,Hinges, locks, sliding channel etc) Hettich/Ebco Make. Pre laminated MDF Board and Laminate Make: (Century/Action Tesa/Merino/Greenlam), Conference table Stool **as approved by engineer in-charge/employer.**

18. High End Table with Side Unit, Back Unit

Providing & Fixing Table with mentioned below items :-
MAIN TABLE of size 2100mmW x 1080 mmD x 750mmH with top made of 36mm thick, MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H, table finished with approved shade. The gable end of 25mm thick. MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H, The table has provision with Aluminum Anodized Access Flap for better electrical provision.
The Gabel and Modesty panel is made of 25 mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H, all exposed edges sealed with 2mm PVC edge banding tape and all unexposed edges sealed with 0.6mm edge banding tape pressed at 200o C with hot melt glue on special. Top, sides and bottoms (of each product) fixed up system: By using mini fix ,supporting bracket/corner and wooden

dowel in (knock down) system for interconnecting (MDF board). Design / Shape of table : Rectangular and taper inside at both side ends
Extended Return Unit size 1200mmL X 600mmD X 750mmH: The Side unit top is made up of 25mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H ,under structure is made up of 18mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H all exposed edges sealed with 2mm PVC edge banding tape and all unexposed edges sealed with 0.6mm edge banding tape pressed at 200o C with hot melt glue on special. The side unit is combination of 1 open able shutter storage with proper locking arrangement, two open shelves and 1CPU Storage Drawer/storage shutter pull up mechanism : Groove type,
Back Unit Of size 2100mmL X 480mmD X 2050mm H: The top is made up of 25mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H & under structure is made up of 18mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H, all exposed edges sealed with 2mm thick PVC edge banding tape and all unexposed edges sealed with 0.6mm edge banding tape pressed at 200o C with hot melt glue on special. The Back unit is combination of openable shutter (with 5 mm thick Glass) with proper locking arrangement & open shelf storage, All Hardware Make (Handles, Slides ,Hinges) Hettich/Ebco.

Mobile Pedestal Drawer Unit: Each Table should be provided with 3 drawer Wooden Mobile Pedestal having of 2 sliding Drawer and 1file Box mounted on 4 castors with front 2 castors lockable. The drawer top, and side panels including the drawer fascias is made out of 18mm thick Pre-laminated MDF board as per IS 14587(1998), the back of the drawer unit is made from 9mm thick Pre-laminated MDF board as per IS 14587(1998). The units are assembled by knockdown fittings such as Mini fix & dowels. The drawer are mounted on rollers slides to enable smooth operation of the drawer. The pedestals shall have central locking mechanism. D/C type slim Handle for Drawer and Shutter. Size of lockable castors for pedestal storage unit ± 2 mm: Diameter 40 mm and height 55 mm, Mobile Pedestal size shall be 400mm W x 550mm D x 585mm H, All Hardware (Handles, Slides ,Hinges, locks, sliding channel etc) Hettich/Ebco Make. MDF Board/laminate Make: (Century/Action Tesa/Merino/Greenlam)., High end table **as approved by engineer in-charge/employer.**

19. High end Office Chair

Supply and Installation of high back chair, The seat shall be made up of 1.2 +/- 0.1 cm thick hot pressed moulded reconstituted wood & upholstered with leather and moulded polyurethane foam. Size of back shall be (W)-46.0cm, (H)-57.0cm & size of seat shall be (W)-49.0cm x (D)-49.5cm. High Resilience (HR) foam should be used in making seat & back which shall be moulded with density 45 +/- 2 kg/m ^{3} and hardness load 16+/- 2 kgf as per IS: 7888 for 25% compression. The back rest should be connected to the mechanism with a drop-lift mechanism which can be adjusted in the range of 7.0+/- 0.5cm for the comfortable back support to suitable individual need. Armrests should be pressure die casted in polished aluminum with PP arm tops. The mechanism of chair shall have following features:360 degree revolving type, Seat/Back tilt ratio of 1:3, Synchronized tilt, Back tilt with 4 position locking and Side tilt tension adjustment knob should be operated while taking back support for better adjustment of comfort. The chair shall be provided with pneumatic height adjustment which shall have stroke of 10.0 +/- 0.3 cm. The pedestal shall be made of die-cast polished aluminium. it shall be fitted with 5 nos twin wheel castor. The size of head rest shall be (W)26.0cm x 12.0cm(L). The size of the pedestal shall be 65.0 +/- 0.5 cm pitch-centre-dia (75.0 +/- 1.0 cm with castors). The twin wheel castors shall be injection moulded in black polypropylene. Overall dimensions of Chair shall be, Width of Chair - 75.0cm, Depth of Chair - 75.0 cm as measured from pedestal below. Height from ground - min 113.5 to max 138.0 cms. Seat height - min 41.0cm to max 51.0 cm. Dimensions tolerance / variations shall be within +/- 1 cm. chair **as approved by engineer in-charge/employer.**

20. High End Office Visitor Chair

Supply and Installation of mid back chair , The seat shall be made up of 1.2 +/- 0.1 cm thick hot pressed moulded reconstituted wood & upholstered with leather and moulded polyurethane foam. The back shall be designed with contoured lumber support for extra comfort. Size of back shall be (W)-45.0cm, (H)-49.0cm & size of seat shall be (W)-49.0cm x (D)-49.5cm. High Resilience (HR) foam should be used in making seat & back which shall be moulded with density 45 +/- 2 kg/m ^{3} and hardness load 16+/- 2 kgf as per IS: 7888 for 25% compression. The back rest should be connected to the mechanism with a drop-lift mechanism which can be adjusted in the range of 7.0+/-0.5cm for the comfortable back support to suitable individual need. Armrests should be pressure die casted in polished aluminium with PP arm tops. The mechanism of chair shall have following features:360 degree revolving type, Seat/Back tilt ratio of 1:3, Synchronized tilt, Back tilt with 4 position locking and Side tilt tension adjustment knob should be operated while taking back support for better adjustment of comfort. The chair shall be provided with pneumatic height adjustment which shall have stroke of 10.0 +/-0.3 cm. The pedestal shall be made of die-cast polished aluminum. it shall be fitted with 5 nos. twin wheel castor. The size of the pedestal shall be 65.0 +/- 0.5 cm pitch-centre-dia (75.0 +/- 1.0 cm with castors). The twin wheel castors shall be injection moulded in black polypropylene. Overall dimensions of Chair shall be, Width of Chair - 75.0cm, Depth of Chair - 75.0 cm as measured from pedestal below. Height from ground - min 93.5 to max 110.5 cm. Seat height - min 41.0cm to max 51.0 cm. Dimensions tolerance / variations shall be within +/- 1 cm. chair as approved by engineer in-charge/employer.

21. Three-seater sofa for staff Lounge

Supplying and Placing in place of 3 seater sofa. The overall dimensions of the sofa shall be 2060 mmW x 905mmD x 855mmH, Sofa structure made from 18mm MR Grade Mr grad plywood supported with Maranti Solid wood, back side and curved part Covered with 3mm flexi ply, sofa arm made from 12mm thick MR Grade Mr grad plywood supported with maranti solid wood. Elastic Belt, 75mm board & 2.25 mm thick elastic webbing stapling in seat frame at 100 mm centre to centre distance, belt fastern in X and Y axies of seat, elastic belt elongation 45% tensile strength 350 kg. Foam 100 mm X 40 density Premium Quality foam covered with 25mm X 32 density super soft Premium Quality Foam for soft touch filling in seat. 50 mm X 40 density Premium Quality foam covered with 25mm X 32 density super soft Premium Quality foam for soft touch filling in back. Stitching work done with well known german brand (Aman / Gutermann) Thread. Nylon & Polyester thread used as per application. Stainless steel U shaped frame, size 2 inch wide and 8 mm thick SS 202 Grade plate used in sofa for legs. 3 Seater sofa **as approved by engineer in-charge/employer.**

22. Center Table

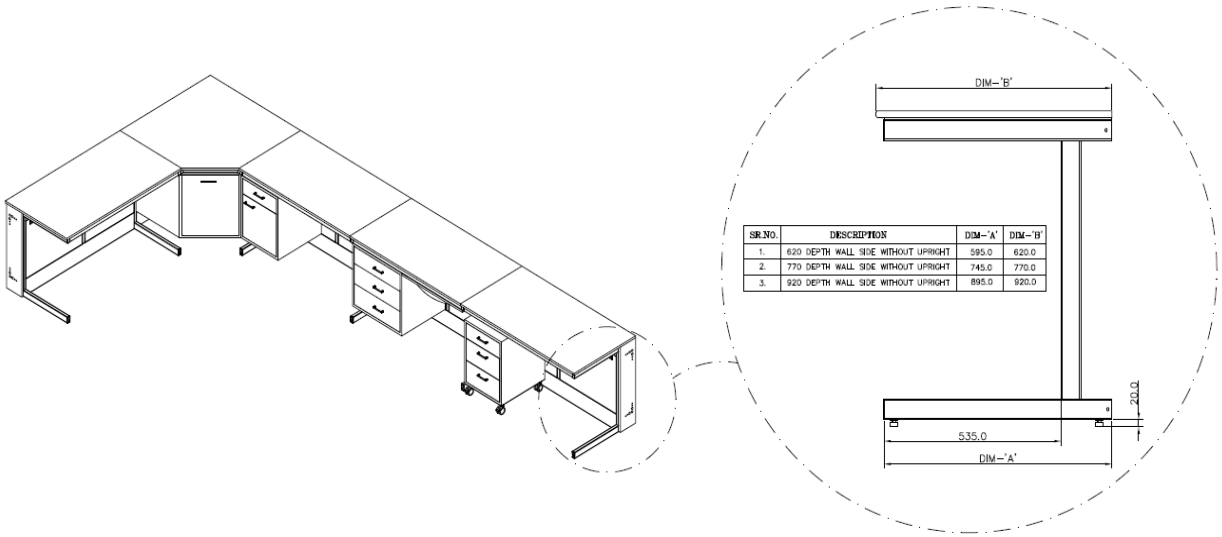
supplying and Installation of center table of size: 1200mmW X600mmD X400mmH, top made of 36mm thick MDF board as per IS 12406 and veneer with PU finish having scratch resistance of 2H, table finished with approved shade. with all exposed edges sealed with 2mm thick PVC edge banding tape and unexposed edges sealed with 0.6mm thick PVC edge banding tape pressed at 200o C with hot melt glue on special machines. Frame and Leg material: Stainless steel (SS 304), size of Frame and Leg material 60mm X 45mm with 1.6 mm thickness, Center Table: as approved by Engineer In Charge/employer.

23. corner Table

Supplying and Installation of corner table of size: 500mmW X500mmD X400mmH, top made of 36mm thick MDF board as per IS 12406 and veneer with PU finish having

scratch resistance of 2H, table finished with approved shade. with all exposed edges sealed with 2mm thick PVC edge banding tape and unexposed edges sealed with 0.6mm thick PVC edge banding tape pressed at 200o C with hot melt glue on special machines. Frame and Leg material: Stainless steel (SS 304), size of Frame and Leg material 60mm X 45mm with 1.6 mm thickness, Corner Table: as approved by Engineer In Charge/employer.

24. Wall side laboratory bench



SR.NO.	DESCRIPTION	DIM–'A'	DIM–'B'
1.	620 DEPTH WALL SIDE WITHOUT UPRIGHT	595.0	620.0
2.	770 DEPTH WALL SIDE WITHOUT UPRIGHT	745.0	770.0
3.	920 DEPTH WALL SIDE WITHOUT UPRIGHT	895.0	920.0

C-FRAME SYSTEM

All C-Frames assemblies should be manufactured from standard hollow metal sections;

confirming to I.S. Code 7138:1973 (Indian Standard specification for steel tubes for furniture) and all sheet metal components should be of CRCA confirming to IS Code 513:1994. The suspended under-bench welded units should be supported on heavy-duty steel frames fully carrying the load of worktops. Its superior strength combined with aesthetically appealing end caps shall give maximum flexibility and modularity while making a layout. C-frame should be constructed from a rectangular pipe with a cross section of 60mm x 30mm and should be 2 mm thick and should be without a vertical front leg to give a clean look. This shall provide more knee space or leg space and would facilitate uninterrupted lateral movement of the under-bench units within the bench run. The C-frame legs should be supplied with adjustable feet (tolerance from -5mm to +20mm) to correct the unevenness of flooring. The tubular enclosed type construction shall discourage dust accumulation and unwanted development of bacteria & fungus.

Drainage gradient should be well adjusted throughout the length of table and should have
horizontal supports for drainage systems. The structure should have a removable back panel to provide access for maintenance throughout the length of table. The C-frame shall also have skirting at back bottom side. It should be suitable for sitting and standing nominal heights of 750-900mm . (± 10% Engineering Variation) The nominal table depths should 750 mm to 850 mm (± 10% Engineering Variation) for wall side tables. Length of table 750 to 900 mm, (± 10% Engineering Variation)All frame-work is should be pre-treated with superior pure epoxy powder coated finish. The C-Frames should be for suspended storage cabinets or for cabinets that can slide through-and-through from one end of the workbench to the other through C-Frames (configuration depends upon the Schedule of Quantities)

HORIZONTAL MEMBERS
These should be made from rectangular pipes of 2mm thickness. Cross-sectional dimensions of the pipe should be 60mmx30mmx2 mm. (± 10% Engineering Variation) They should be made of CRCA MS and coated with pure epoxy powder. These connect two C-Frames together as shown using C-clamps/Unclamps. Together with the C-Frames and Horizontal Members connected together, the skeletal structure of the work-bench is formed on which the worktop can be placed and the hanging-type storage cabinets can be suspended. Horizontal Members determine the width of the lab workbench as they form the member (distance) between two adjacent C-Frames. The widths : 750-800 mm Approx (± 10% Engineering Variation).

Removable Back Panels
These cover panels cover the service lines that run behind them. These should be easily removable (unclipped) and the service line be accessed for maintenance. This allows the equipment on workbench to remain undisturbed They should be made of CRCA MS with pure epoxy powder coating and are of 1mm thickness

COVER PANELS
All side cover panels and back panels, filler panels should be made from CRCA MS panels of

1.0 mm thickness with pure epoxy powder coating
MASTER UPRIGHT
Master Upright should be of the dimensions: 300 x 150 x 1.2 mm. (± 10% Engineering Variation) It should be made from
1.2mm thick CRCA MS with pure epoxy powder coating. It should have an open-able door for easy service maintenance and should extend till the false ceiling
VERTICAL UPRIGHT
The Upright system will form the back-bone for internal distribution of GDS, Electrical supply systems Shelves and Top Units and should be constructed from 16 gauge CRCA formed steel panels with removable covers. Shelf height should be adjusted with an increment of 1inch / 25mm. Upright should also provide support to Top Units for hanging thus eliminating the danger of fixing the Top Units on non-rigid partition wall / panels. Uprights should be supplied with adjustable feet from -5mm to +20mm.

WELDED UNDER-BENCH STORAGE CABINETS
Welded cabinet body should be of flush face construction with intersection of vertical and
horizontal members like LH and RH side panel along with front horizontal channel, back panel and bottom panel. It should be relocated anywhere easily as it is an independent unit. Cabinet should be of square non-sharp edge construction. Doors should be assembled with SS-304 hinge assembly. Removable back panel should be provided to easily access the service lines running behind the cabinet benches. Intermediate horizontal channels should be provided between door and drawer. Shelf should be eight bend panel with 20mm height. Drawer tray should be of single piece construction. Drawer should be well supported on LH and RH ball slide suspension system. Steel door and drawer front is of double wall construction with sound dampening material filled inside. Doors should be easily removable and hinges should be easily replaceable. Knee space panel should be in 22 gauge construction. Storage Units to be of the Suspended Type
Dimensions: W=600 mm, D = 530mm, H = 635 mm. (± 10% Engineering Variation)
Configurations:
2 Shutters 1 Drawer MOC: MS CRCA: IS – 513 (1994), Thickness: LH/RH side panels, shutter front, Bottom panel, Top front, Drawer separator, shelf, Alignment channel should be of 1.2mm thickk. Removable Back panel, Shutter cover, Fr. Rack strip, Top cover panel should be of 1.0 mm thick. Finish: Powder coating pure epoxy, thickness 40-50 microns.

Handle:
Anodized Aluminum Recessed-Type, CTC: 160.0mm. Lock: Units have a locking facility with 180° and 10 lever cam lock mechanism (except for sink and corner unit). Hinge: Knuckle-butt type SS Hinge. Screw: SS 304. Shutter should be of twin-type construction with sound dampening effect using pro feel. Shutter cover should be equipped with Bump on for sound dampening. Ball Slide: 500mm Length (required only for drawer unit). Shutter should have provision of roller catch
SERVICE FITTINGS AND ACCESSORIES

Service fittings should be laboratory grade, and water faucets and valve bodies should be cast red brass alloy or bronze forgings, all fittings should be powder plated unless specified
otherwise. Service Indexes: Fittings should be identified with service indexes in the color
coding as per DIN 12920.

ELECTRICAL TRUNKING Used for housing electrical switches and sockets, data and voice points, its top panel, bottom panel of the trunking should be made from 1.0 mm thick CRCA MS panel. It should be available in both, single sided and double sided configurations. It should be made from CRCA MS with pure epoxy powder coating. The front surface that houses the electrical points should have a slope

LABORATORY SINK AND ACCESSORIES

Ceramic Sinks: Made up of 5 mm thick high density and elastic poly propylene with good
resistance to organic solvents. Standard bowl size (L x W x D) is 500mm x 400mm x 350 mm. Faucet should be 3-way type faucet of approved make.

Reagent shelf:- Regent Shelves of Height 750 mm with complete modular design consists of horizontal 2 stage storage shelves. The end vertical support and horizontal shelves are made up of 2 mm thick CRCA MS Sheet with screwed, riveted, welded including all cross link members, with adequate stiffeners for designed capacity of 100 kg per reagent shelves per tier with zinc phosphate and epoxy powder coated to 60 to 80 micron's thickness to pass the required ASTM standard complete as per technical specification. reagent shelves shall have suitable arrangement to be attached with vertical uprights with adequate height adjustment hook systems with groves available

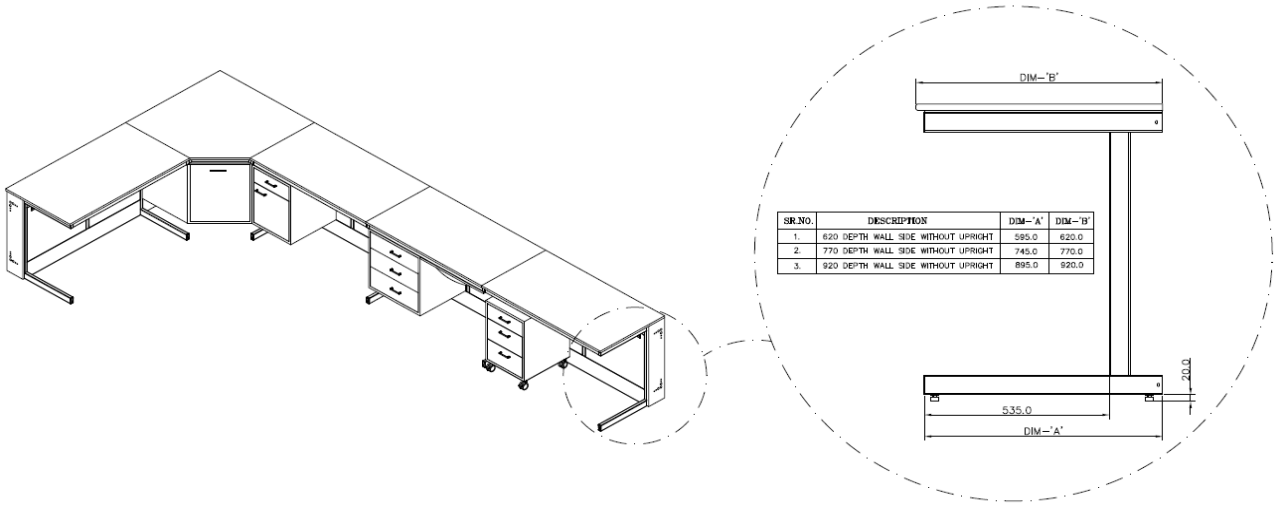
on the uprights. The horizontal shelf have a provision for fixing the service panel to it. The service panels carry electrical switches and socket cut-outs. T. The structure of the unit is epoxy powder coated with powder coating thickness as 60-80 microns. Regent shelf size: 750mmW x415mm(D) x 750mmH.

Granite work : It should be 19mm (+/- 2mm) thick Jet Black Granite worktop. The exposed edges of the worktop should be chamfered and smoothened. The bottom of the worktop should be polished and there should be a V-groove throughout the length of the exposed edges to protect the cabinets from coming in contact with the spillages. The overhang on the storage cabinet is 25 mm at the front side and 30 mm at the sides. The backing material used is a neoprene mat of 6 mm thickness.

Scope of Work
-Supply and Installation of Laboratory Workbenches, Storage units, Sink Unit Corner unit, including granite worktops and other supporting structures/hardware's based on the specified Make List.- Supply & Installation of all utility service outlets and accessory fittings, electrical receptacles, plumbing and electrical switches & fittings identified on drawings as mounted on the laboratory furniture.
- Supply & Installation of all laboratory sinks, bottle traps, drain troughs etc.
- Supply & Installation of service structures where specified and setting in place reagent shelves of the type shown in the drawings.
- Removal of debris, dirt and rubbish accumulated as a result of installation/commissioning
of the laboratory furniture and accessories and leaving the premises broom clean and orderly.

List of approve makes:-
Steel: TATA Steel, JINDAL Steel/Equivalent or better or As approved by engineer in-charge/employer.
Powder Coating Kansai Nerolac, Berger Paints, Asian Paints/ Equivalent or better or As approved by engineer in-charge/employer.
Water Faucets and Gas Valves: As approved by engineer in-charge/employer.
Switches and Sockets, Data and LAN points: As approved by engineer in-charge.

25. Island type laboratory bench



SR.NO.	DISCRIPTION	DIM–'A'	DIM–'B'
1.	620 DEPTH WALL SIDE WITHOUT UPRIGHT	595.0	620.0
2.	770 DEPTH WALL SIDE WITHOUT UPRIGHT	745.0	770.0
3.	920 DEPTH WALL SIDE WITHOUT UPRIGHT	895.0	920.0

C-FRAME SYSTEM

All C-Frames assemblies should be manufactured from standard hollow metal sections; confirming to I.S. Code 7138:1973 (Indian Standard specification for steel tubes for furniture) and all sheet metal components should be of CRCA confirming to IS Code 513:1994. The suspended under-bench welded units should be supported on heavy-duty steel frames fully carrying the load of worktops. Its superior strength combined with aesthetically appealing end caps shall give maximum flexibility and modularity while making a layout. C-frame should be constructed from a rectangular pipe with a cross section of 60mm x 30mm and should be 2 mm thick and should be without a vertical

front leg to give a clean look. This shall provide more knee space or leg space and would facilitate uninterrupted lateral movement of the under-bench units within the bench run. The C-frame legs should be supplied with adjustable feet (tolerance from -5mm to +20mm) to correct the unevenness of flooring. The tubular enclosed type construction shall discourage dust accumulation and unwanted development of bacteria & fungus.

Drainage gradient should be well adjusted throughout the length of table and should have
horizontal supports for drainage systems. The structure should have a removable back panel to provide access for maintenance throughout the length of table. The C-frame shall also have skirting at back bottom side. It should be suitable for sitting and standing nominal heights of 750-900mm . (± 10% Engineering Variation) The nominal table depths should 750 mm to 850 mm (± 10% Engineering Variation) for Island Type. Length of table 1500 to 1800 mm, (± 10% Engineering Variation) All frame-work is should be pre-treated with superior pure epoxy powder coated finish. The C-Frames should be for suspended storage cabinets or for cabinets that can slide through-and-through from one end of the workbench to the other through C-Frames (configuration depends upon the Schedule of Quantities)

HORIZONTAL MEMBERS

These should be made from rectangular pipes of 2mm thickness. Cross-sectional dimensions of the pipe should be 60mmx30mmx2 mm. (± 10% Engineering Variation) They should be made of CRCA MS and coated with pure epoxy powder. These connect two C-Frames together as shown using C-clamps/Unclamps. Together with the C-Frames and Horizontal Members connected together, the skeletal structure of the work-bench is formed on which the worktop can be placed and the hanging-type storage cabinets can be suspended. Horizontal Members determine the width of the lab workbench as they form the member (distance) between two adjacent C-Frames. The widths : 750-800 mm Approx (± 10% Engineering Variation).

Removable Back Panels
These cover panels cover the service lines that run behind them. These should be easily removable (unclipped) and the service line be accessed for maintenance. This allows the equipment on workbench to remain undisturbed They should be made of CRCA MS with pure epoxy powder coating and are of 1mm thickness

COVER PANELS
All side cover panels and back panels, filler panels should be made from CRCA MS panels of
1.0 mm thickness with pure epoxy powder coating
MASTER UPRIGHT
Master Upright should be of the dimensions: 300 x 150 x 1.2 mm. (± 10% Engineering Variation) It should be made from
1.2mm thick CRCA MS with pure epoxy powder coating. It should have an open-able door for easy service maintenance and should extend till the false ceiling

VERTICAL UPRIGHT

The Upright system will form the back-bone for internal distribution of GDS, Electrical supply systems Shelves and Top Units and should be constructed from 16 gauge CRCA formed steel panels with removable covers. Shelf height should be adjusted with an increment of 1inch / 25mm. Upright should also provide support to Top Units for hanging thus eliminating the danger of fixing the Top Units on non-rigid partition wall / panels. Uprights should be supplied with adjustable feet from -5mm to +20mm.

WELDED UNDER-BENCH STORAGE CABINETS

Welded cabinet body should be of flush face construction with intersection of vertical and
horizontal members like LH and RH side panel along with front horizontal channel, back panel and bottom panel. It should be relocated anywhere easily as it is an independent unit. Cabinet should be of square non-sharp edge construction. Doors should be assembled with SS-304 hinge assembly. Removable back panel should be provided to easily access the service lines running behind the cabinet benches. Intermediate horizontal channels should be provided between door and drawer. Shelf should be eight bend panel with 20mm height. Drawer tray should be of single piece construction. Drawer should be well supported on LH and RH ball slide suspension system. Steel door and drawer front is of double wall construction with sound dampening material filled inside. Doors should be easily removable and hinges should be easily replaceable. Knee space panel should be in 22 gauge construction. Storage Units to be of the Suspended Type
Dimensions: W=600 mm, D = 530mm, H = 635 mm. (± 10% Engineering Variation)
Configurations:
2 Shutters 1 Drawer MOC: MS CRCA: IS – 513 (1994), Thickness: LH/RH side panels, shutter front, Bottom panel, Top front, Drawer separator, shelf, Alignment channel should be of 1.2mm thickk. Removable Back panel, Shutter cover, Fr. Rack strip, Top cover panel should be of 1.0 mm thick. Finish: Powder coating pure epoxy, thickness 40-50 microns.

Handle:
Anodized Aluminum Recessed-Type, CTC: 160.0mm. Lock: Units have a locking facility with 180° and 10 lever cam lock mechanism (except for sink and corner unit). Hinge: Knuckle-butt type SS Hinge. Screw: SS 304. Shutter should be of twin-type construction with sound dampening effect using pro feel. Shutter cover should be equipped with Bump on for sound dampening. Ball Slide: 500mm Length (required only for drawer unit). Shutter should have provision of roller catch

SERVICE FITTINGS AND ACCESSORIES

Service fittings should be laboratory grade, and water faucets and valve bodies should be cast red brass alloy or bronze forgings, all fittings should be powder plated unless specified
otherwise. Service Indexes: Fittings should be identified with service indexes in the color
coding as per DIN 12920.

ELECTRICAL TRUNKING Used for housing electrical switches and sockets, data and voice points, its top panel, bottom panel of the trunking should be made from 1.0 mm thick CRCA MS panel. It should be available in both, single sided and double sided configurations. It should be made from CRCA MS with pure epoxy powder coating. The front surface that houses the electrical points should have a slope

LABORATORY SINK AND ACCESSORIES
Ceramic Sinks: Made up of 5 mm thick high density and elastic poly propylene with good
resistance to organic solvents. Standard bowl size (L x W x D) is 500mm x 400mm x 350 mm. Faucet should be 3-way type faucet of approved make.

Reagent shelf:- Regent Shelves of Height 750 mm with complete modular design consists of horizontal 2 stage storage shelves. The end vertical support and horizontal shelves are made up of 2 mm thick CRCA MS Sheet with screwed, riveted, welded including all cross link members, with adequate stiffeners for designed capacity of 100 kg per reagent shelves per tier with zinc phosphate and epoxy powder coated to 60 to 80 micron's thickness to pass the required ASTM standard complete as per technical

specification. reagent shelves shall have suitable arrangement to be attached with vertical uprights with adequate height adjustment hook systems with groves available on the uprights. The horizontal shelf have a provision for fixing the service panel to it. The service panels carry electrical switches and socket cut-outs. T. The structure of the unit is epoxy powder coated with powder coating thickness as 60-80 microns. Regent shelf size: 750mmW x415mm(D) x 750mmH.

Granite work : It should be 19mm (+/- 2mm) thick Jet Black Granite worktop. The exposed edges of the worktop should be chamfered and smoothened. The bottom of the worktop should be polished and there should be a V-groove throughout the length of the exposed edges to protect the cabinets from coming in contact with the spillages. The overhang on the storage cabinet is 25 mm at the front side and 30 mm at the sides. The backing material used is a neoprene mat of 6 mm thickness.

Scope of Work
-Supply and Installation of Laboratory Workbenches, Storage units, Sink Unit Corner unit, including granite worktops and other supporting structures/hardware's based on the specified Make List.- Supply & Installation of all utility service outlets and accessory fittings, electrical receptacles, plumbing and electrical switches & fittings identified on drawings as mounted on the laboratory furniture.
- Supply & Installation of all laboratory sinks, bottle traps, drain troughs etc.
- Supply & Installation of service structures where specified and setting in place reagent shelves of the type shown in the drawings.
- Removal of debris, dirt and rubbish accumulated as a result of installation/commissioning
of the laboratory furniture and accessories and leaving the premises broom clean and orderly.

List of approve makes:-
Steel: TATA Steel, JINDAL Steel/Equivalent or better or As approved by engineer in-charge/employer.
Powder Coating Kansai Nerolac, Berger Paints, Asian Paints/ Equivalent or better or As approved by engineer in-charge/employer.
Water Faucets and Gas Valves: As approved by engineer in-charge/employer.
Switches and Sockets, Data and LAN points: As approved by engineer in-charge.

26. Lab stool.

Supply and Installation of Stool with backrest Seat size shall be 400 mm diameter on 1.0 mm thick Mild Steel with 60 mm thick 40 density moulded PU foam, Covering material of cushion: leatherite, Back rest height shall be 300 mm with 12 mm thick moulded comm. ply with 50 mm thick 32 density moulded PU foam covered with leatherite. The back rest shall be provided with lifting arrangement on flat iron & helical spring. The base stand should be made up of 5 prongs duly pressed welded together centrally with a pedestal bush with good quality twin wheel castors. The pedestal shall be fabricated from 0.2+/-0.02cm thick HR sheet, chrome plated and assembled with injection molded black polypropylene hub cap. The size of the pedestal diameter with castors shall be 65.0+/- 0.5 cm the twin wheel castors shall be made black nylon, The stand and other metal parts excluding central spindle shall be power coated complete steel structure shall be pre-treated and power coated with minimum thickness of 60 microns coating. A Central spindle of 25 mm dia rod without threads shall be provided with revolving arrangement. The stool shall be provided with pneumatic height adjustment from 450mm to 650 mm. A good quality leatherite shall be provided on seat & back in attractive color/shade. Stool **as approved by engineer in-charge/employer.**

27. Roller blind Curtain

Scope of Supply: Providing & Fixing up of Window curtain (Roller blind curtain) Black out/translucent type in required sizes having the following specification:

Mounting Bracket: Mounting hardware brackets, universal brackets including end plug bracket should come with lock down retainer device. Metal brackets provided should come in powder coated finish. All installation brackets made of stamped and hardened steel allowing a 46mm projection from the wall, ceiling and side fitting with screws and end cap covers.

Cassette: It is a cover for blinds installed outside the window frame to hide tube brackets and mechanism. This is aluminum extruded rail made up of high strength aluminum alloy, which is covered with matching fabric. For 38 mm grooved roller tube cassette size should be 100mm (Width)*100mm (Height) and having weight =1200gm/running meter (±5%).

Cassette Ceiling Bracket: This is made up of carbon Steel, DIN Standard Steel, Thickness: 1.0mm, Powder Coating Thickness: 0.15mm to 0.20mm. This provides near invisible fixing of the cassette.
Cassette system end caps: It should have minimum 2.5mm thickness plastic end cap and should be in coordination with the blind fabric color.

Roller Tube: This is made up of High Strength Aluminum alloy Extruded grooved tube having outer diameter 38mm(+/-1mm) & thickness 1.25mm (+/-5%) as per AA6063 Alloy. Tubes must come in natural anodized finish. To achieve greater reinforcement anodized tubes must have at least six internal ribs so that additional tensile strength can be achieved and allowing provision for secured placements of clutch and end plug.

Roller tube brackets: Spring steel metal brackets powder coated in matching finish to be used on both ends to support the roller system. Brackets can be top or face fixed.

Control Unit: Blinds mechanism must have the control clutch drive unit with engineered heavy duty chain drive pulley operating system consisting of gear clutch housing and locking plug containing at least 6 ribs and inserted into a minimum of 38mm dia. roller tube. Clutch has to be self-lubricating with safety pins for secure bracket installation and unlocking pin for quick manual removal. Provided clutch system must allow convenience in operation for large windows to the smallest windows. The control unit should be made up of polypropylene material using injection moulding method. Gearing Ratio: 1.75:1 to reduce operating force for larger blinds. 24nos Sprocket for 38mm diameter roller tube. Control unit is operated directionally by the use of beaded endless chain to raise and lower the blind smoothly.

Idler: Tube bearing plug idler should have the properties of self-lubricating spring loaded plastic bearing end plug with positive locking wheel that allows for adjustment and provides a secure installation and removal of blinds. Tube bearing plug should contain at least 6 ribs and inserted a tube not less than 38mm roller tube. Idler is of high strength reinforced plastic, consisting of an outside sleeve and center shaft. Sleeve provide bearing surface for center shaft and rotate freely, providing smooth, quiet and long wearing operation. It is a Part of Control Unit Assembly.

Bottom Rail: This is made up of extruded aluminum bottom bar having powder coating of 55 microns and wall thickness of ±1.2mm (±0.1) and width of 26.5mm(±1mm) and height of 33.5mm(±1mm) and weight: 380gm/meter (±5%). All bottom rails should come with powder coated finish with an end cover perfectly in matching with the fabric. Bottom bar also includes concealed bottom bar rod to allow fabric to roll as per duplex guidelines and dimensions of concealed bottom bar rod specified as inner diameter: 10.8mm, outer diameter: 14.8mm, Weight: 219gm/meter, Thickness: 1mm (±5%) should be provided with matching cover.

Concealed bottom bar rod: Bottom bar includes concealed bottom bar rod to allow fabric to roll as per duplex guidelines. Aluminum bottom bar rod made up of AA6063alloy having Rod I/D: 10.8mm, O/D:14.8mm, Weight: 219gm/mtr, Thickness: 1mm (±5%) with the covered matching.

Bottom bar end caps: End caps of bottom bar should be made up of ABS material using Injection moulding method having perfect push fit with the bottom bar. The dimensions of end caps of bottom bar specified as length: 18mm, width: 27.5mm, height: 34.5mm, thickness 2mm and end caps of bottom bar should also have polyurethane bush to fit in bottom tube for smooth operation of blinds.

Operating chain: Blinds set is to be driven by a ball chain pulley and ball chain and can be positioned at Right hand or Left hand side of the blinds set. This is made of 4.5 mm plastic beads molded on 2.0 mm thick polyester cord. The chain drives the sprocket fixed in the end control unit to close and open the blind. The pitch of the chain corresponds to the sprocket in perfect match for trouble free operation. Average number of balls on chain should be 50 per foot length. Plastic chain should provide ease in

operation with chain connector and polycarbonate stopper of O/D:6mm & I/D: 4mm to avoid reverse rolling of fabric over tube and protecting damages to blind fabric.

Cord Weight: It should have suitable acrylic clear cord weight to suit the operating chain. Thickness: 14mm, width: 30mm and height: 80mm.

Note: The control unit & cassettes shall be made with matching colour of blind with aesthetically pleasing matching look of room.

The fabric shall be selected from best quality fabric. The fabric shall have properties such as acoustic control, anti-fungal and anti-microbial. Sheer fabrics shall allow in maximum amount of light (20-100% light transmission), whilst still preserving privacy and Dim out (Privacy fabrics) (1 – 19% light transmission) allow in restricted amount of light, whilst ensuring complete privacy, even in the evening. Blackout fabric shall completely blocks out sunlight, for complete privacy, room darkening and temperature regulation (0% light transmission).
The fabric color as approved by employer, The weighted composition of fabric shall be made of 100% Polyester woven fabric with a openness factor of 3%. The fabric shall have a weight of 168 GSM (±5 GSM). The solid depth of fabric shall be 75mm and sheer depth shall be 50mm. Light fastness shall be 4-5 Grade tested in accordance with BS EN ISO 105-B01:1999, Roller Blind Curtain as approved by engineer in-charge/employer.

28. Work table for PA

Supply and Installation of Work table with size: 1200mm Width x 600mm Depth x 750mm Height, The table top shall be made from 25 mm thick Pre-laminated MDF Board conforming to Grade SBG II of IS 12406/2003, side panel made from 25 mm thick Pre-laminated MDF Board conforming to Grade SBG II of IS 12406/2003, the side panels have 2 glide screws each for leveling of the desk and Modesty panel shall be made from 18 mm thick Pre-laminated MDF Board conforming to Grade SBG II of IS 12406/2003 with thickness of laminate is 1 mm thick, E1 grade Pre-laminated MDF Board and laminate with zero urea formaldehyde emissions (<or= 8mg/100 g oven dry

board-perforated method) for better in-house quality. This should comply with (EN 120-1992). All Exposed edges of pre-laminated MDF board to be sealed with 2mm thick PVC edge banding on the user side and 0.8mm thick PVC edge-banding tape pressed on top and bottom side at 200o C to be applied with the help of hot-melt glue through fit edge-banding machines. The Edge-banding of exposed area to be done in the way that there should not be any sharp edge or corner left after processing. All the exposed edges should have buffing radius of 1.5 to 2mm without affecting aesthetic value of the panel.
Mobile Pedestal Drawer Unit: Each Table should be provided with 3 drawer Wooden Mobile Pedestal having of 2 sliding Drawer and 1file Box mounted on 4 castors with front 2 castors lockable. The drawer top, and side panels including the drawer fascias is made out of 18mm thick Pre-laminated MDF board as per IS 14587(1998), the back of the drawer unit is made from 9mm thick Pre-laminated MDF board as per IS 14587(1998). The units are assembled by

knockdown fittings such as Mini fix & dowels. The drawer are mounted on rollers slides to enable smooth operation of the drawer. The pedestals shall have central locking mechanism. D/C type slim Handle for Drawer and Shutter. Size of lockable castors for pedestal storage unit ± 2 mm: Diameter 40 mm and height 55 mm, Mobile Pedestal size shall be 400mm W x 550mm D x 585mm H, All Hardware (Handles, Slides ,Hinges, locks, sliding channel etc) Hettich/Ebco Make or As approved by engineer in-charge/employer. Pre laminated MDF Board and laminate Make: (Century/Action Tesa/Merino/Greenlam/equivalent or As approved by engineer in-charge/employer. Table as approved by engineer in-charge/employer.

29. Work Table/Work Station Chair

Providing and Placing High Back Chair with overall size of 76.1 cm W x 76.1 cm D x 96.5 – 114 cm H x 43.1 – 53.1 cm Seat Height. The seat is cushioned seat made of injection molded plastic outer & inner. Plastic inner is upholstered with leatherette and

molded high resilience polyurethane foam of density 45±2 kg/m³, & hardness load of 16±2 kgf as per IS:7888 for 25% compression. Seat Size is 47.0 W cm x 48.0 D cm. The back is cushioned made of PU foam with in situ molded M.S. ERW round tube of size 1.9±0.03cm x 0.16±0.0128cm, upholstered with leatherette. The back size is 47.7 W cm x 76.4 D cm. The armrest top is molded from polyurethane and mounted on to a drop lift adjustable type tubular armrest support made of Ø3.81±0.03cm x 0.2±0.01cm thick M.S. ERW tube having chrome plated finish. The armrest is height adjustable up to 6.5±0.5 cm in 5 steps. The adjustable tilting mechanism is designed with following features : 360° revolving type, front-pivot for tilt with feet resting on ground and continuous lumbar support ensuring more comfort, tilt tension adjustment can be operated in seating position, 5-position tilt limiter giving option of variable tilt angle to the chair, Seat/back tilt ratio 1:2, The mechanism housing is made up of HPDC aluminium black powder coated. Seat depth adjustment is integrated in the seat through a sliding mechanism. Seat depth adjustment range is of 6.0±0.5cm. Back frame is connected to the up/down mechanism in plastic T spine. It can be adjusted in the range of 7.42±0.5 comfort the comfortable back support to suit individual need. The pneumatic height adjustment has an adjustment stroke of 10.0±0.3cm. The pedestal is high pressure die cast polished aluminum & fitted with 5 nos. of twin wheel castors. The pedestal is 65.0±0.5cm pitch centre dia. (75.0±1.0cm with castors). 5 nos. of twin wheel castors are injection molded in plastic having 6.0±0.1cm wheel diameter and assembled to pedestal. Stool **as approved by engineer in-charge/employer.**

30. Work station Visitor Chair.

The overall dimensions of the chair shall be 60.9cm x 64.3cm x 99.6cm. The seat height shall be 44.8cm. The cushioned seat and back is made of injection moulded Plastic outer and Inner. Plaster inner is upholstered with stitched cover and moulded high Resilience Polyurethane foam of density 45kg per meter cube. The stitched cover is made from spacer fabric and leatherette. Seat size shall be 47cm x 48cm. The Back size shall be 45cm x 60.5cm. The armrests top is moulded from PU and mounted on to a drop lift adjustment type tubular armrest support made of 3.8cm diameter x 0.2cm thick MS ERW tube. The tubular frame shall be powder coated DFT 40-60 microns and is cantilever type and made of 2.54cm X 0.2cm thick MS ERW tube. The back is connect

to frame through powder coated high pressure die cast connector piece. Chair as approved by engineer in-charge/employer.

31. Stainless steel Dustbin

Supply Installation of Stainless steel Dustbin with Lid and Handel- Dimension of dustbin shall be 10 Inch X 14 Inch, capacity of dustbin: 15 Liter. Material Non Magnetic stainless steel 202 Grade, Thickness of wall is 1.0 mm, Dustbin shall be Leg operated, Dustbin as approved by Engineer In-charge/Employer.

32. Almirah With Glass Shutter

Supply Installation of Steel storage with Glass Shutter of size: Almirah 910mmWx 486mmDx 2150mmH (± 5% Engineering variation) – Having 4 shelves making 5 compartments for full Height, Whole body, doors frame and shelf made of 0.8mm

CRCA sheet, 8 mm thick Clear glass fitted in door frame, Shelves and doors should have stiffener for better strength and load bearing capacity. Auto closing CED Coated "HETTICH"/ "HAEFFLE" / equivalent Hinges for better adjustment of doors. Chrome plated three way Recess type spring loaded rectangular snap shut handle cum lock with duplicate keys Highly durable – Made of 100% virgin Epoxy Powder Coated CRCA confirming to IS : 513 CR2 (Cold Reduced Carbon Steel Sheets & Strips (Part 1), 2016, procured from TATA/Jindal Steel (Test Certificate available on request). Furthermore, Complete material passes through 7 stage, ultra-modern NANO-TECHNOLOGY based Pre-treatment plant prior to powder coating, making it highly corrosive resistant. Superior Finish – Powder coating done on Fully Automatic Powder Coating Plant with world leader GEMA™ spray booth and World Leader AkzoNobel Powder ensures smooth, uniform and highest quality levels of Powder Coating Modern Technology - Rigid Know Down Construction done out of complete 0.8 mm thick CRCA sheet. Each Compartment Shelf has uniformly distributed load capacity per shelf is 35 kg. The rigid construction gives extra strength and durability, whereas the epoxy-polyester adds the finishing touch to the unit. Logistic Friendly – 100% Knock Down product makes transportation a very easy and SAFE, product gets assembled at site only. Design Simplicity -Simplistic Design with "PEDESTAL" at bottom makes for an aesthetic look and seamless finish, apart from offers large storage capacity that makes sure you have enough space for storage steel Make : TATA Steel/ Sail Steel/Jindal Steel. Almirah a**s approved by engineer in-charge/employer**

33. Work Station for office staff.

Supply Installation of linier workstation size 1200mmWX600mmDx1200-1250mmH Providing and placing of modular partitions system coated aluminum trims and supported on Legs for better air circulation and helps in keeping floor clean. Panels Construction - Each panel consists of Vertical extrusions 2Nos and Horizontal

extrusions made of 1.2mm thick aluminum with duly powder coated at every division of tile/block. Each panel have Bottom frame fabricated for 52.4mm panel comprises of L-channels made of 2mm thick CRCA steel (IS: 513), formed plates of 3mm thick HR steel (IS: 2062) & ERW steel tube of size 35x15x1.6mm thick in oval cross section (IS: 7138) welded together. The complete bottom frame shall be powder coated with an average of 50-60 microns thickness of epoxy powder coating. The Bottom Frame is bolted with the Upright verticals. Each Panel is provided with 2 Nos Legs of height 120mm are fixed at the bottom frame of the panel. Legs are fabricated by CO2 welded MS Tube of section 38mm x 25mm (IS: 7138 ERW Tube, 38mm x 25mm x 16bg) with the base plate of the MS plate of 35x22x5mm (IS: 2062, 5mm HR) over which an M8 Leveller is fitted which allows for adjustment of the height by 50mm. It will be coated with 45-50micron thickness of epoxy powder coating. Each Panel consists of 2Nos Intermediate blocks. In a 52.4mm Thick panel intermediate block shall comprise of 38mm thick paper honeycomb with 3mm MDF on each sides and 0.6mm decorative laminate on both sides. Particle board framing shall be used on outer boundary of these blocks as well as intermediately at certain locations forming conduit for passing cables. These blocks will be located in the middle bands of the panels made out of a composite construction of MDF and paper honeycomb. Each Panel consist of TOP TILES/SPLIT TILES. These tiles shall be slide in to the panels from top before fixing the top horizontal. These tiles shall be supported from top & bottom side with clips made from PP co polymer fitted in horizontal extrusion. In case of split tiles it shall be offered in Fabric magnetic tiles, Whiteboard tiles. Each Panel consists a BOTTOM TILE. These bottom tiles shall be press fitted on to the assembly frame of the panel with the help of snap on clips made of nylon-66 and support clips made from Polypropylene(PP). All partitions and side panels have levelling screws for adjustment in case of Uneven floor to take care of +/- 40 mm of uneven flooring.

Tile Finishes :

a FABRIC MAGNETIC TILES: Fabric magnetic tiles shall be fabric upholstered metal tiles in 0.6 mm thick G.I. Grade O as per IS: 277. The fabrics shall be upholstered with adhesives.

• FABRIC TACK TILES: Fabric tackable tiles shall be upholstered metal tiles in 0.6mm thick G.I. grade O as per IS: 277, with Polyurethane foam in the tile for tackability. The fabric shall be upholstered with adhesives.

• WHITE BOARD TILES : White board tiles shall be made of 8.0 mm thick particle board conforming to IS: 12823 laminated with 0.8 mm thick white glossy high pressure laminate on outer side & 0.8 mm backing laminate on inner surface and will be having all its edges with minimum 0.5 mm thick PVC edging. Aluminium Trims : The top trims and end trims for 52.4 mm shall be made from aluminum extrusion. All kinds of extrusions for 52.4mm shall have average wall thickness of 1.2 mm & having finish of powder coating.

Top trim in 52.4mm thick panel shall be press fitted on the horizontal extrusion, it shall be slide fitted with the help of top trim connector made from PP copolymer 3530 grade. End trim for 52.4mm thick panel shall be slide fitted with the help of end trim connector made from 2.0mm thick M.S. CRCA Grade D as per IS: 513.Wire Management - Wires shall be taken into the system through cable ducts from the junction boxes and it is carried upto the panels through concealed conduits inside the blocks. Wires runs through

the system from Bottom tile and extended to the top at various locations by the help of 2 nos. vertical Cable Ducts in each panels.
Cable duct shall be made from 0.8 mm thick M.S. CRCA Grade D as per IS: 513 - 1994. It is constructed with two parts, one is body & another is cover. It holds the cables & gives aesthetic appearance by covering all cables entry, which are moving upward to the panels. Size of Cable duct is 107mm W X 154 mm H X 21 mm D. Legs - System shall also have 120 mm high powder coated welded metal legs to give the system an elevated look. Single side legs are fabricated by CO2 welded MS Tube of section 38 mm x 25 mm (IS: 7138 ERW Tube, 38 mm x 25 mm x 16bg) with the base plate of the MS plate of 35mm x 22mm x 5mm (IS: 2062, 5 mm HR) over which an M8 Leveler is fitted. End/Intermediate separator : partitions of 22.8mm thick including powder coated aluminum trims and supported on Legs for better air circulation and helps in keeping floor clean. The 22.8 mm panels are only to be used as Separator/End panels to provide additional privacy. These panels have various finishes and no cable management ability. Panel Construction : The 22.8mm End/Separator panels shall be made of horizontal and vertical uprights. These uprights and horizontals shall be made of aluminum extrusion having material AL96063-T6 & have average wall thickness of 1.2mm & powder coated with epoxy-polyester powder. The Blocks for the End/Separator panels shall be of 16mm to 18mm thickness in the selected finish. The top most block in the panel shall be the top block of the panel. It shall be available in fabric, laminate, whiteboard, fabric metal, tackable and clear glass finishes. The 2Nos blocks in the intermediate bands shall be available in fabric or laminate finish and the lowermost block in the panel shall be the bottom block which shall be in fabric, metal or laminate finish. Tiles : Tile Finishes in End/Separator Partitions to be provided as per the site and layout approval. Finishes in these panels shall be

• LAMINATE FINISH BLOCKS:

Laminate finish blocks shall be made from 18mm thick particle board, cladded with 1mm thick laminate of approved shade.

• FABRIC FINISH BLOCKS:

These shall be made from 18mm thick Pre-Laminated Particle Board upholstered with 1mm thick approved shade of fabric using adhesives.

• WHITEBOARD BLOCKS:

These shall be made of 16mm thick particle board laminated with 0.8mm thick white glossy high pressure laminate on both sides and having all its edges with minimum 0.6 mm thick PVC edging.

• GLASS BLOCKS:

These shall be made of 4mm thick toughened plain glass having diamond polish edge finish.

• FABRIC TACKABLE BLOCKS:

These shall be made from 18mm thick Pre-Laminated Board battens which hold 3mm MDF in between. 6mm thick Polyurethane foam shall be pasted on 3mm thick MDF and this assembly shall be upholstered with approved shade of fabric on both sides using adhesive.

• METAL FINISH BLOCKS:

Metal finish blocks shall be made from two components of 0.8mm thick M.S. CRCA Grade D as per IS: 513 powder coated with epoxy polyester finish. Aluminum Trims : The top trims and end trims for 22.8mm partition shall be made from aluminum extrusion having material AL96063-T6. Top trim in 22.8mm thick panel shall be slide fitted with the help of top trim connector made from PP copolymer 3530 grade. End trim for 52.4mm thick panel shall be slide fitted with the help of end trim connector made from 2.0mm thick M.S. CRCA Grade D as per IS: 513. End trim for 22.8 mm thick panel shall slide with the help of end trim connector made from nylon-66.Workstation Worktop as per the approved shape and site requirement made out of 25mm thick pre laminated particle board. All the open edges of work surface shall be provided with machine pressed 2 mm thick PVC lipping glued with hot melt EVA glue. The work surface shall be provided with circular cut out of Dia.65mm as per the requirement, for passing of wires. These cut outs shall be provided with ABS covers. Work surfaces are fitted to the panels by work surface brackets. Brackets are made of 2.0mm thick CRCA grade D steel as per IS : 513-19. Brackets are slide in between end trim and vertical extrusions. computer key board tray of 480mm (L) X 280mm (D) X 40mm(H) made out of CRCA steel as per IS : 513I made of 0.9mm thick powder coated with sliding channels and other fixtures/fittings. It should also have a sliding system for accomodating mouse. CPU Trolley of Size - 345mm(W) x 226(D) x 180mm(H) is made of 1.0 mm thick MS CRCA Sheet and Side support is made of 0.8 mm thick MS CRCA Sheet. It consists of 4Nos Non-lockable twin wheel castors are injection moulded in Black Nylon. Mobile Pedestal having 3 Drawers Unit having flat metal front and top with Central locking. The Drawer Unit consists of 2Box and 1File Drawers. The Overall size of the Drawer Units is 450mm(W) X 435mm(D) X 646mm(H). Construction & Material of Drawer Unit : Welded Assembled of 0.8 thick CRCA for Body Shell, Drawer Front & tray, Front Side Stiffener, Rear Side Stiffener & Bottom, 1.2mm thick CRCA Top Stiffener & Bottom stiffener. Drawer Fronts & Metal Front Straight Edge. All Drawers with Double extension precision ball slide shall be provided. For Drawer pulling, side wise tapered recess provided in shell behind Drawer Fronts. Locking:10 lever Cam Lock & Central RH locking with actuator & lock channel mechanism. Top Panel : 0.8mm thick Metal Straight Edge Top. Castors : Swiveling non-lockable 4Nos Castors mounted below the body shell. The Total drawer unit is finished with Epoxy Polyester Powder coated to the thickness of 50 microns (+/-10). **Work station as approved by engineer in-charge/employer.**

34. Fully Motorized ICU Bed with mattress

Supply and Installation of Fully Motorized ICU Bed with mattress, Overall dimensions: (L)2241 mm X (W)1050 mm X (H) Adjustable from 440 mm to 770 mm. Five function Electric operated features are Backrest, Leg rest , High-Low, Trendelenburg, Reverse Trendelenburg (Only one handset will be Provided).
Min ht: 440 mm; Max ht: 770 mm without mattress.
Back rest angular movement: 65 deg; Knee rest angular movement: 30 deg.
Trendelenburg 13.5 degree and Reverse Trendelenburg 13.5 degree.
Safe working load should be 200 kg Patient load bearing capacity: 135 kg.
All edges in contact with patient to be rounded safely. The bed has Manual CPR lever on both sides in case of emergencies. Head & Foot board should be made of blow molded Poly polypropylene. Head board and foot board should be with metal inserts to mount it on bed frame. Removable PP head board and foot board should have cut out , for better gripping.
Bed frame should be made of MS ERW tube of size 50mmx25mm of 2 mm thick supported with ERW square tube with 25 mm x 25 mm and 1.2 mm thick.

All corners of bed frame are Provided with bumper mounting holders and it should have Provision for iv pole holders. Base frame made of MS ERW tube of size 30mmx60mm of 2mm thick. Base frame have ground clearance of greater than 150 mm to avoid any obstruction during bed movement. Base frame have Provision to mount oxygen cylinder cage as optional accessory. It has Trendelenburg indicator guide
Bed lying surface be made of PP injection mould . These lying surface has sections for bed profiling i.e. back adjustment, fixed pelvic section, upper and lower leg adjustment. Lower leg rest section is Provided with Ratchet for leg rest adjustment with a single hand operation to achieve the position. Backrest is X-Ray permeable with cassette holder.
Mattress platform is strengthened by frame of size 25 mm x 25 mm and 1.2 mm thick. Under bed clearance should be greater than 150 mm.4 TPE rotating bumpers of diameter 92mm height 69mm with 40-50 shore hardness are Provided at four corners to protect the bed and patient from impact and avoid damages to wall.
The bed is provided with 125mm diameter, twin wheel ,plastic polymer with metal insert castors. Out of 4 castors two with brake, mounted at diagonally opposite position. The bed should be provided with PP molded side boards of 4 no's providing full coverage to bed. These side boards should be integrated with drop down mechanism for easy operation. The side boards should be provided with angle indicators
The bed has powder coated urine bag holder on both side of the bed for ease of accessibility.. All metal components are pre treated with zinc phosphating in 7 tank process and then powder coated with epoxy polyester powder coating.
Electrical details: Supply Voltage : 100-240VAC +/- 10%; Current: 2.5A max, Electric Shock Protection: Class I, Type B, Liquid Ingress protection IPx4, Four Electric operated features are Backrest, Leg rest , High-Low, Trendelenburg/Reverse-Trendelenburg (Only one handset will be Provisioned).
The bed has Provision for front loading medium sized ms made oxygen cylinder cage as optional accessory. The bed has provision of Telescopic IV pole made of Stainless steel to mount saline bags. Mattress: Overall dimension (L)1950mm*(W)853mm*(H)100 mm. The mattress is provided with 40 density 100 mm thick PU foam mattress with ridges for easy bending. It is covered by heavy helium material which is water proof, flame retardant, vapor & X-Ray permeable with Bacteriostatic properties. The zip & stitches for the mattress cover is concealed. the bed is designed as per following standards.
IEC 60601-2-52 Medical Electrical Equipment: Particular requirements for safety and essential performance of medical beds.
IEC 60601-1-4 General Requirements for Safety: Programmable electrical medical systems. the bidder has following certificates like
ISO 9001, ISO 14001, ISO 45001 and ISO 13485:2016 Medical Devices: Quality Management Systems - Requirements for regulatory purposes. , **fully motorized ICU Bed with mattress as approved by engineer in-charge/employer**

35. Bed side Locker

Supply and Installation of bedside locker has two drawer and cabinet with lock and with plastic molded handle. Cabinet is Provided with lock to keep the valuable items for the safety.

overall dimensions is 490mmW x 410mm D x 941mm H, Corner tube made of ERW round tube with section 25.4 mm diameter of 1.2 mm thickness

Cabinet made of CRCA sheet of 0.8 mm thick Provisioned with lock.(470 mm x 410 mm x 382 mm), Top made of ABS of 2.2 mm thick. Top has recessed and contoured shape for better aesthetic and usability. Plastic molded knob is Provisioned with Matt finish and dome shaped for better grip. Plastic molded castors with 50 mm diameter placed in diagonal locking arrangement.

RAL white, plastic parts in Grey. 5 kg UDL on both the tops and 20 kg in the cabinet.

All metal components are pre treated with zinc phosphating in 7 tank process and then powder coated with anti microbial epoxy polyester powder coating to fulfill the requirements for bacterial protection against at least 2 commonly found bacteria in Hospital environment [Gram positive and Gram Negative].

goods are supplied in knocked down construction to reduce carbon emission. The product is ISO 13485:2016, ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 Certified, **Locker as approved by engineer in-charge/employer**

36. Wheel Chair

Supply and Installation of wheel chair with Over all dimension is (L) 790mm x (W) 600mm x (H) 870mm
foldable frame structure is made of section 22x1.2mm A3 carbon steel with chrome finish. Cross bar made of A3 carbon steel with section 25.4 x 1.2mm.
The Rear wheel is made of 24 inch Solid mug wheels with alloy in the rim .
Integrated hand rim is Provided to drive the wheel chair of section 16x1.2mm A3 carbon steel with chrome finish
the front wheel is of 8 inch HUB made of PA polymer and outer with solid rubber
PU molded arm rest & base made of ABS for better arm support there is Leatherite strap for calf rest & Leatherite cushion for seat the foot rest is Adjustable aluminum die cast foot rest with up down & swivel type mechanism
Push Handles is made of molded rubber grip to push the wheelchair
Hand brakes is Provided to lock the wheelchair at desired location.
structure is made of MS with Anti rust chrome finish, safe working load is 150 kg. The product is ISO 13485:2016, BIS/European CE, ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 Certified, wheel chair **as approved by engineer in-charge/employer.**

37. U pattern Fast track curtain

Providing and fixing/Installation of hospital cubicle track system with following specification: Track material shall in general be aluminum alloy 6063-T-6 having tensile strength 195 Mpa, shear tensile Strength 195 MPa, Shear Strength 150 Mpa. All materials shall be Corrosion resistance and shall have minimum 50 micron polyester powder coating of approved shade. The curtain track system shall have following components.

Support units consisting of ceiling suspender system and wall support unit. Ceiling suspender system shall consist of upper aluminum plates of diameter 50.4 mm and thickness 1.8 mm. Each plate shall be fixed to ceiling with 3 No. raw plugs and screws. Ceiling suspenders shall be made of Aluminum pipe of minimum dia 12.7 mm and of variable height in conformity with the ceiling height and curtain height. Minimum three suspenders shall be provided for each cubical. Wall support unit shall be made of aluminum and shall be fixed with the wall with raw plug and screws.

Curtains track shall be made of aluminum alloy of minimum size 20.4 mm x 25 mm of thickness side 1.6 mm and top 3.3 mm. it will have curtain removable point made of galvanized steel for simple loading and unloading of curtains.

7mm diameter wheel type Teflon coated plastic roller and provided with 1.8 mm dia. stainless steel (302 grade) 30mm hooks.

Bends: Track shall be bendable to a radius of 300 mm at 90 degree to cover the length and width of bed. The bend shall be joint less.

Hospital cubical curtains (Overall Height: 7.5 Feet) consisting of polyester blended fabric with 450 mm nylon mesh (net) on the top of curtain. The fabric shall be wrinkle free, shrink proof, anti-odor, stain retardant and water-repellent. Curtains shall be fitted

with stainless steel grommets at 150 mm centre to centre. Sliding curtain facility for patient in "U" pattern
Curtain:- anti microbial & flame resistant 100 % polyester fabric. White nylon mesh at top. Fabric length to be equal to track length plus 20 % added fullness. Fabric height equals floor to ceiling height minus a 10 inch gap at bottom. Fabric is hemmed at all sides and bottom. Install tracks level and plumb, according to manufacturer's written instructions. All MS parts should be Pre-treated & powder coated. Sliding curtain facility for patient in "U" pattern as approved by engineer in-charge/employer.

38. 6 seater Meeting Table

Supply and Installation of 6 Seter Conference Table size: 2100 mmLx1200mmWx750mmHeight, Work surface : Made of 32 mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003, E1 grade laminate with zero urea formaldehyde emissions (<or= 8mg/100 g oven dry board-perforated method) for better in-house quality. This should comply with (EN 120-1992). All Exposed edges of MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on Non-exposed edges with the help of hot-melt glue through fit edge-banding machines, The Edge-banding of exposed area to be done in the way that there should not be any sharp edge or corner left after processing , All the exposed edges should have buffing radius of 1.5 to 2mm without affecting aesthetic value of the panel.

Understructure : It consist of 25 mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003,). All Exposed edges of MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on Non-exposed edges with the help of hot-melt glue through fit edge-banding machines, The Edge-banding of exposed area to be done in the way that there should not be any sharp edge or corner left after processing. Aluminum alloy 63400 - WP profile is used for connecting panels together. The product has a knock-down

construction. Plastic ABS access flap is provided for easy access to wires and cables. Work top is available in various shapes as shown above.
Modesty Panel : Made of 25 mm thick Pre-laminated MDF Board conforming to IS 14587: 1998, Grade II corresponding to IS 12406:2003,). All Exposed edges of pre laminated MDF board to be sealed with 2mm thick PVC edge band and 0.8mm thick PVC edge-band to be applied on Non-exposed edges with the help of hot-melt glue through fit edge-banding machines. Powder coated accent metal strip provided below work surface to enhance aesthetics. It is made of 0.8mm CRCA as per IS 513,epoxy polyester powder coated (DFT 40-60 microns)
Wire Management : An array of panels made of 0.8mm CRCA MS IS:513, epoxy polyester powder coated (DFT 40-60 microns) is used for flow of wires and cables. Provision o mount Anchor Roma 6 module plate is provided below worktop. Cutout on top with two piece injection moulded plastic part polymer component is fitted to pull out audio, video cables onto worktop and connect devices charger to power socket below worktop. All, Hardware (Handles, Slides, Hinges, locks, sliding channel etc) Hettich/Ebco Make. Pre laminated MDF Board and Laminate Make: (Century/Action Tesa/Merino/Greenlam), Meeting table **as approved by engineer in-charge/employer.**

39. Chair for **Meeting Table**

Supply and Installation of chair, The seat shall be made up of 1.2+/-0.1cm thick hot pressed plywood measured as per QA method described in OCP-QLTA-P14-18 and

upholstered with fabric or synthetic leather and molded polyurethane foam. The back shall be made up 1.2+/-0.1cm thick hot pressed plywood upholstered with replaceable fabric or synthetic leather upholstery covers and molded polyurethane foam. The molded polyurethane foam shall be of density 45+/-2kg/m ^{3}, and hardness load 16+/-2kgf as per IS:7888 for 25% compression. The dimensions of seat shall be- 51.0cm(W) x 48.0cm(D) and of back shall be 48.0cm(W) x 76.0cm(H). The armrest top shall be made of molded polyurethane and mounted on to a drop lift height adjustable type M.S tubular armrest support chrome plated. The armrest height shall be adjustable up to 6.5+/-0.5cm in 5 steps and also has swivel adjustment of 22 degree+/-2 on both sides. The mechanism of the chair shall have following features : 360^0 revolving type, Knee tilt synchro mechanism, Tilt tension adjustment, Single point control, 4 position locking with anti shock feature, Seat depth adjustment of 6.0+/-0.5cm should be locked in 6 positions. The backrest shall consists of a sliding up down mechanism, Which can be adjusted in the range of 7.5+/-0.5cm and should be locked in 4 positions for correct position of lumber support. The chair shall be provided with pneumatic height adjustment which shall have stroke of 9.0 +/- 0.3 cm. The pedestal shall be fabricated from 0.2+/-0.02cm thick HR sheet, chrome plated and assembled with injection molded black polypropylene hub cap. The size of the pedestal shall be 66.0+/- 0.5 cm pitch-centre-dia (76.0 +/- 1.0 cm with castors). The twin wheel castors shall be made black nylon. Overall dimensions of Chair shall be, Width of Chair - 76.0cm, Depth of Chair - 76.0cm as measured from pedestal below. Height from ground - min 101.5 to max 117.5cm. Seat height - min 46.9 to max 55.9cm. Dimensions tolerance / variations shall be within +/- 1 cm. Chair as approved by engineer in-charge/employer.

40. 8 seater Dining Table for resident cafeteria

Providing, supplying/ fabricating and placing/ Installation in position 8 SEATER dining table of Size: 2400mmLx 1200mmWx 750mmH with Table top and side shall be 32 mm Prelam ply veneer made of Scratch Resistance 0000 Steel Wool – 25 Double Rub, Pencil Hardness Test ISO 15184, Chemical Resistance DIN 68861, Stain Resistance DIN 68861, Antibacterial Properties JIS Z 2801:2010, Fire Retardant Properties BS476-Part 7, 100% Solid VOC free, Low Formaldehyde free, UV COATED with veneer edge banding. SHEESHAM Solid Wood legs to be made out of 100mm x 100mm, Under structure: 75mmx75mm. Table as approved by engineer in-charge/employer

41. Dining Chair for resident/office cafeteria.

Providing, supplying/ fabricating and placing/ Installation in position Dining chair. Size of Dining Chair-Length: 45cm, Width: 45cm, Height: 95cm
Cushion Seat: Length: 45cm Width : 45cm, Height : 50cm. Frame work , seat and back rest to be made up of solid and well-seasoned teak wood with fixed wooden joinery . Seat made up of 12 mm thick ply with high density 60 mm thick cushion pasted on it upholstered with good quality fabric, anti-skid nylon buffers to be fitted at the bottom of the leg. Material: SHEESHAM SOLID Wood, Chair as approved by engineer in-charge/employer.

42. 8-seater Dining Table for Staff Cafeteria

Providing and placing in place 8 Seater PU Coated dining table size shall be 2400mm Width mm x 1200 Depth mm x 750 Height mm. Top shall be made up of 25 mm thick MDF board with top PU painting of minimum 2H hardness with 75% glass as per colour chart. Combination color graphics on the center. Brown Laminate on bottom specially profiled edges for comfort. The Under structure of MS powder coated size 38mmx38mm with 2 mm thickness and it shall be fitted with top by SS machine screws. Legs shall be of MS powder coated with size: 50mmx50mm with 2 mm thickness, legs are fixed with under structure and table top. Glide shall be of Plastic fixed at the under structure to prevent the damage of table top during stacking. All Hardware Make (Nut, Bolt and screw etc) Hettich/Ebco/equivalent or As approved by engineer in-charge/employer. MDF Board Make: (Century/Action Tesa/Merino/Greenlam/equivalent or As approved by engineer in-charge/employer. Dining Table: As approved by engineer in-charge/employer, Company should have ISO-9001, 14001, 45001. Dining table **as approved by engineer in-charge/employer.**

Tentative Bill of Quantity for Super Specialty, OPD Block, AIIMS New Delhi			
Bill of Quantity			
S. No.	**Name of Item**	**Unit**	**Tentative Quantity**
1	3-Seater waiting chair	Each	1991
2	2-Seater waiting chair	Each	90
3	3-Seater Sofa	Each	7
4	2-seater sofa	Each	84
5	Center Table	Each	4
6	Corner Table	Each	59
7	Consultant/Office Table with side unit	Each	394
8	High Back Chair	Each	394
9	Mid Back Chair	Each	788
10	Patient chair	Each	309
11	Examination Couch	Each	298
12	Reception/Registration chair	Each	242

13	Steel Almirah	Each	180
14	Meeting Table 12-Seater	Each	2
15	Dining Table 6-Seater	Each	24
16	Dining Chair	Each	264
17	Conference Hall Table 18-Seater meeting table	Each	1
18	In-charge Room High End Table (2100mm) with Side Unit, Back Unit	Each	5
19	High end Office Chair	Each	5
20	High End Office Visitor Chair	Each	10
21	Three-seater sofa	Each	42
22	Center Table	Each	16
23	corner Table	Each	30
24	Wall side laboratory bench	Each	70
25	Island type laboratory bench	Each	50

26	Lab stool	Each	100
27	Roller blind Curtain	Sqmt.	2000
28	Work/PA table 1200x600	Each	19
29	Work Table/Work station Chair	Each	89
30	Work Table Visitor Chair		38
31	Stainless steel Dustbin	Each	399
32	Almirah With Glass Shutter	Each	50
33	Work Station	Each	70
34	Fully Motorized ICU Bed with mattress	Each	10
35	Bed side Locker	Each	10
36	Wheel Chair	Each	10
37	U pattern Fast track curtain	Sqmt.	4404
38	6-seater Meeting Table	Each	6
39	Meeting Table Chair	Each	54

40	8-seater Dining Table for resident/Office cafeteria	Each	20
41	Dining Chair for resident/office cafeteria	Each	160
42	8-seater Dining Table for Staff Cafeteria	Each	15

HSCC(India) Limited

As Executing Agency of
AIIMS, New Delhi

EPC Contract

Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis

Volume VI

Amended Tender Drawings

OCTOBER' 2024

Executing Agency

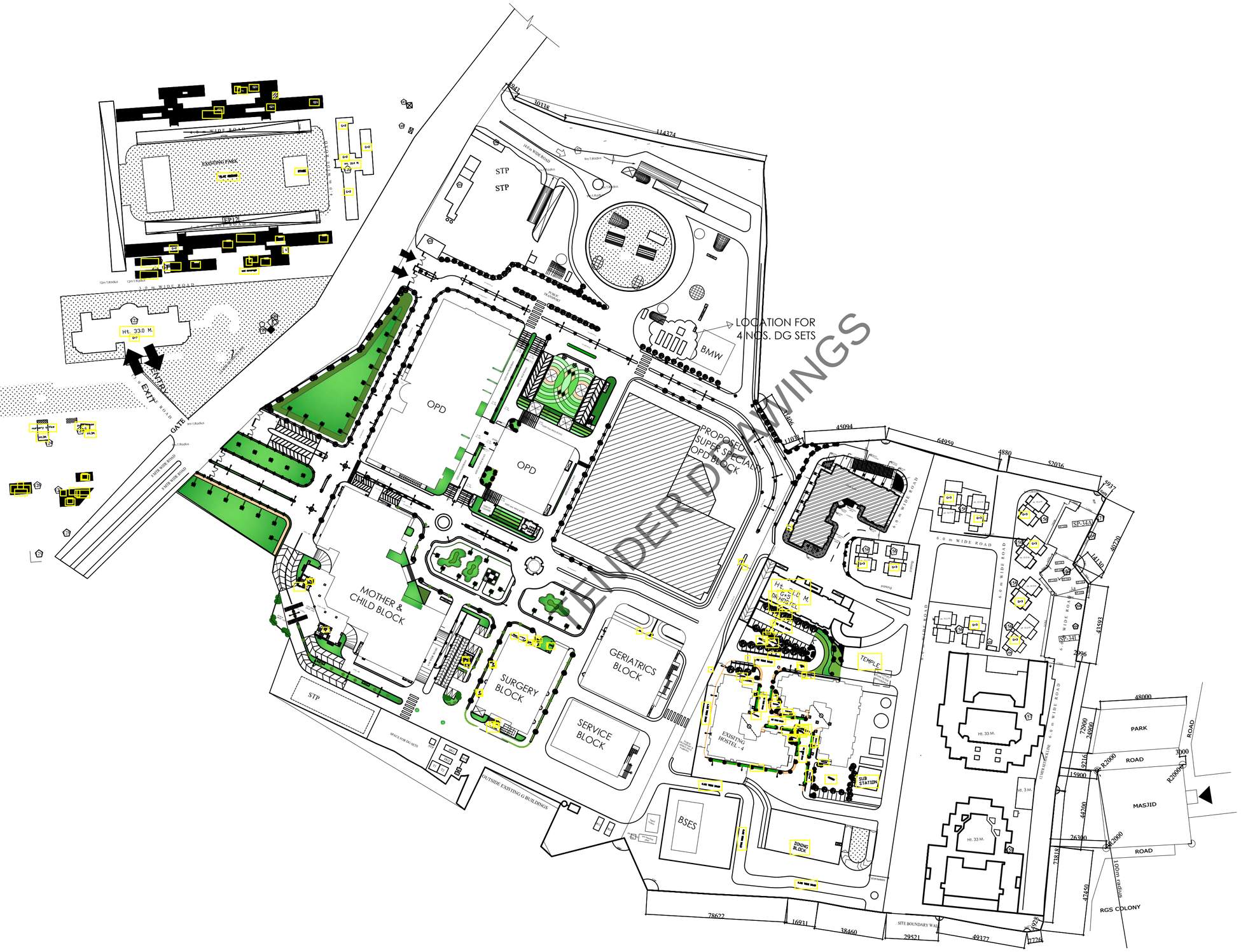
HSCC (INDIA) LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
E-6A, Sector-01, Noida-201301

Tender No. HSCC/AIIMS/OPD -AIIMS/EPC/2024/75

INDEX

Sl. No.	Description
1	Architecture tender drawings
2	PHE tender drawings
3	Firefighting tender drawings
4	Electrical tender drawings
5	HVAC tender drawings

Architecture Tender Drawings



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NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SITE PLAN

HSCC/AIIMS/TD/OPD/001
Drawing No.

Job No.	1:100 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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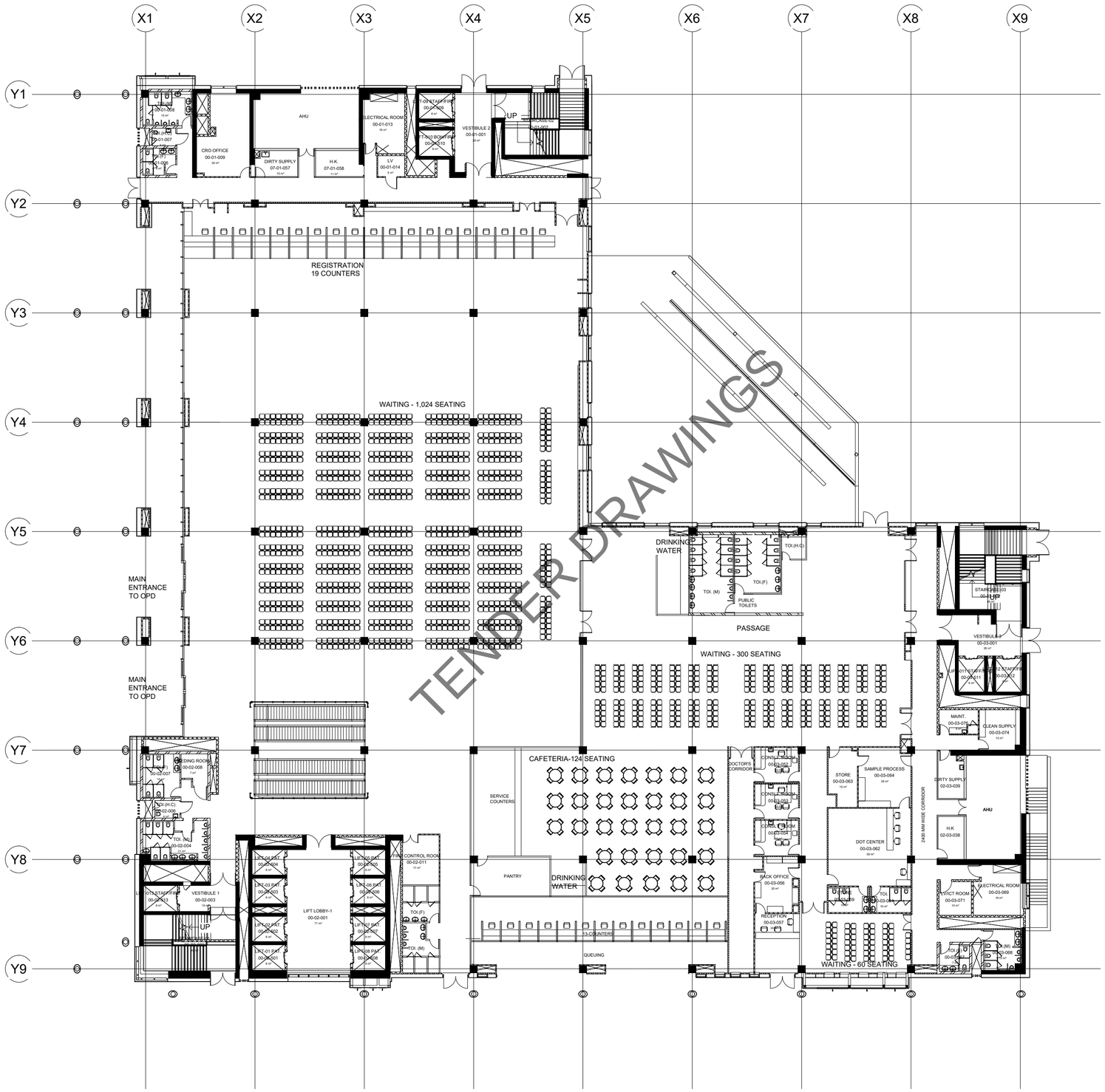
NEW DELHI INDIA



TENDER DRAWINGS

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REV	DATE	DESCRIPTION
R1	14-06-24	SCREENING OPD IS REPLACED WITH WAITING & CAFETERIA

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

GROUND FLOOR

HSCC/AIIMS/TD/OPD/002
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
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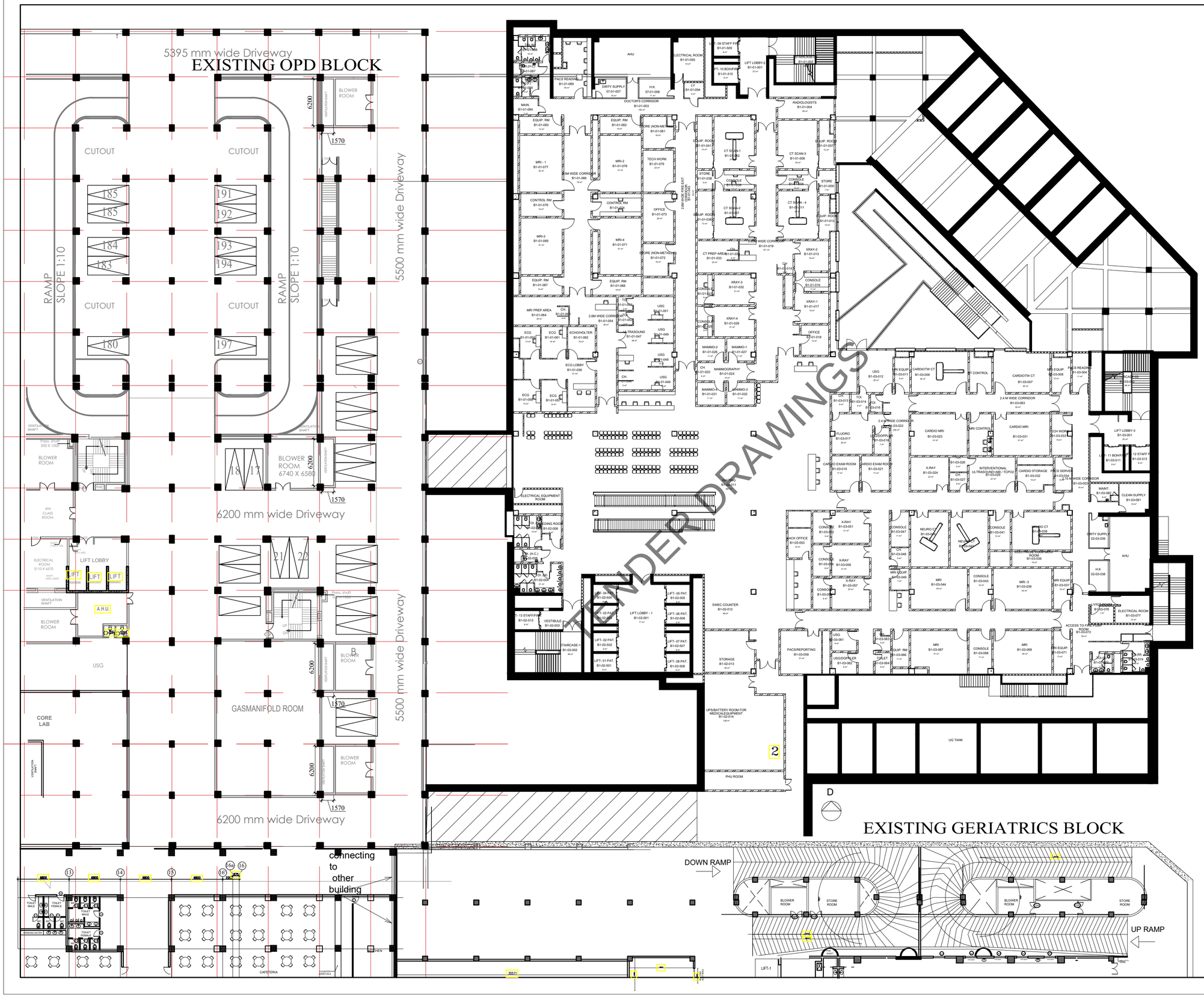

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT – 1

HSCC/AIIMS/TD/OPD/003
Drawing No.

Job No.	1:225 Scale	AUG'24 Date
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EXISTING OPD BLOCK

EXISTING GERIATRICS BLOCK

5500 mm wide Driveway

6200 mm wide Driveway

RAMP SLOPE 1:10

AC PLANT ROOM

ELECTRICAL SUBSTATION(ESS) B2-01-007 820 m²

MEP SERVICES B2-01-006

ENTRANCE LOBBY OF ESS B2-01-016

WAITING

HYDROTHERAPY

OFFICE

RECEPTION

MEP SERVICES B2-03-003

CORRIDOR B2-03-009

UPS/BATTERY ROOM FOR MEDICAL EQUIPMENT B2-03-021

PHU ROOM B2-03-022

UG TANK

2.4M CONNECTING CORRIDOR B2-03-023

DOWN RAMP

UP RAMP

TENDER DRAWINGS

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REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT – 2

HSCC/AIIMS/TD/OPD/003
Drawing No.

Job No.	1:225 Scale	AUG'24 Date
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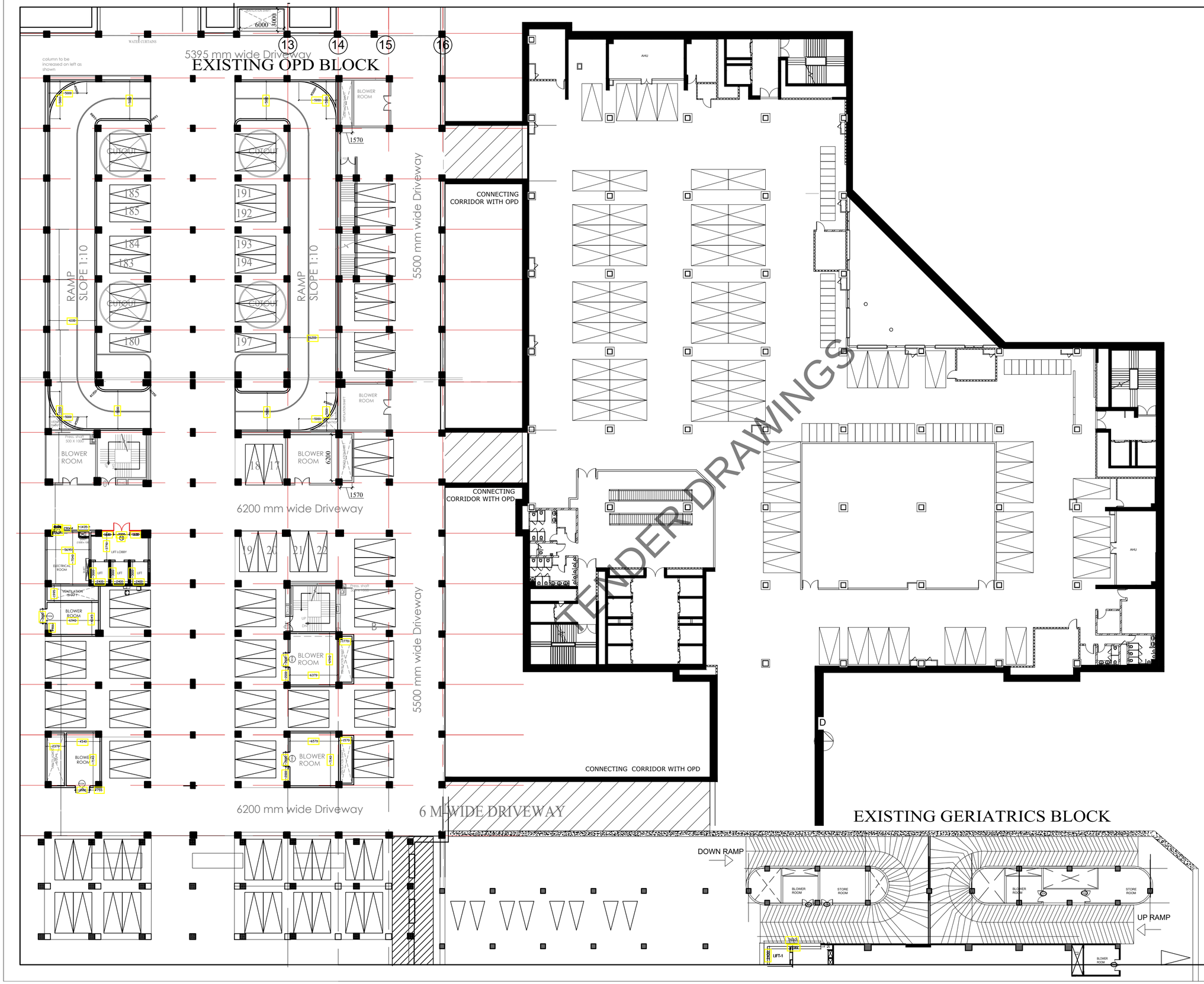

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT–3

HSCC/AIIMS/TD/OPD/003
Drawing No.

Job No.	1:225 Scale	AUG'24 Date
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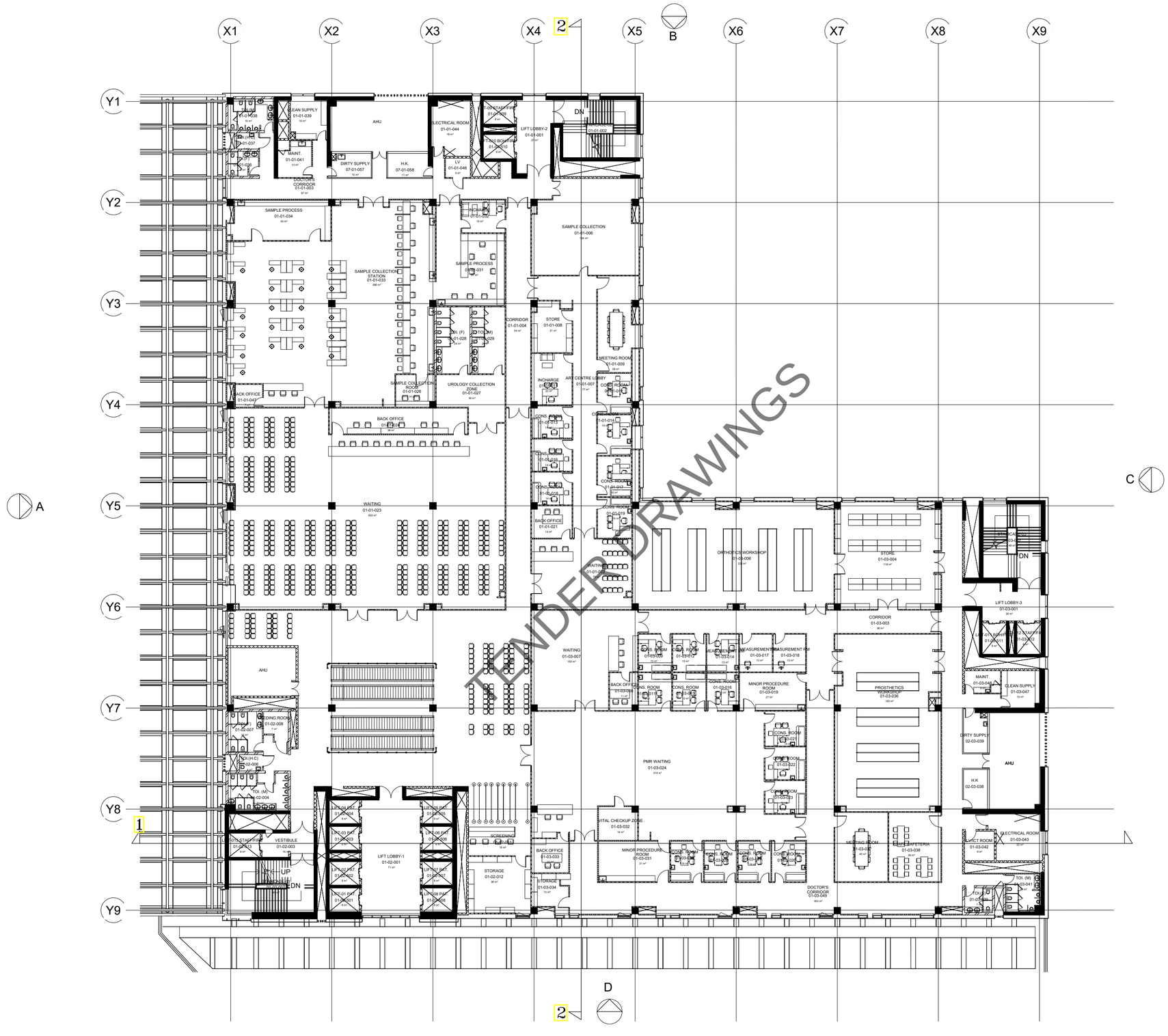

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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

FIRST FLOOR

HSCC/AIIMS/TD/OPD/006
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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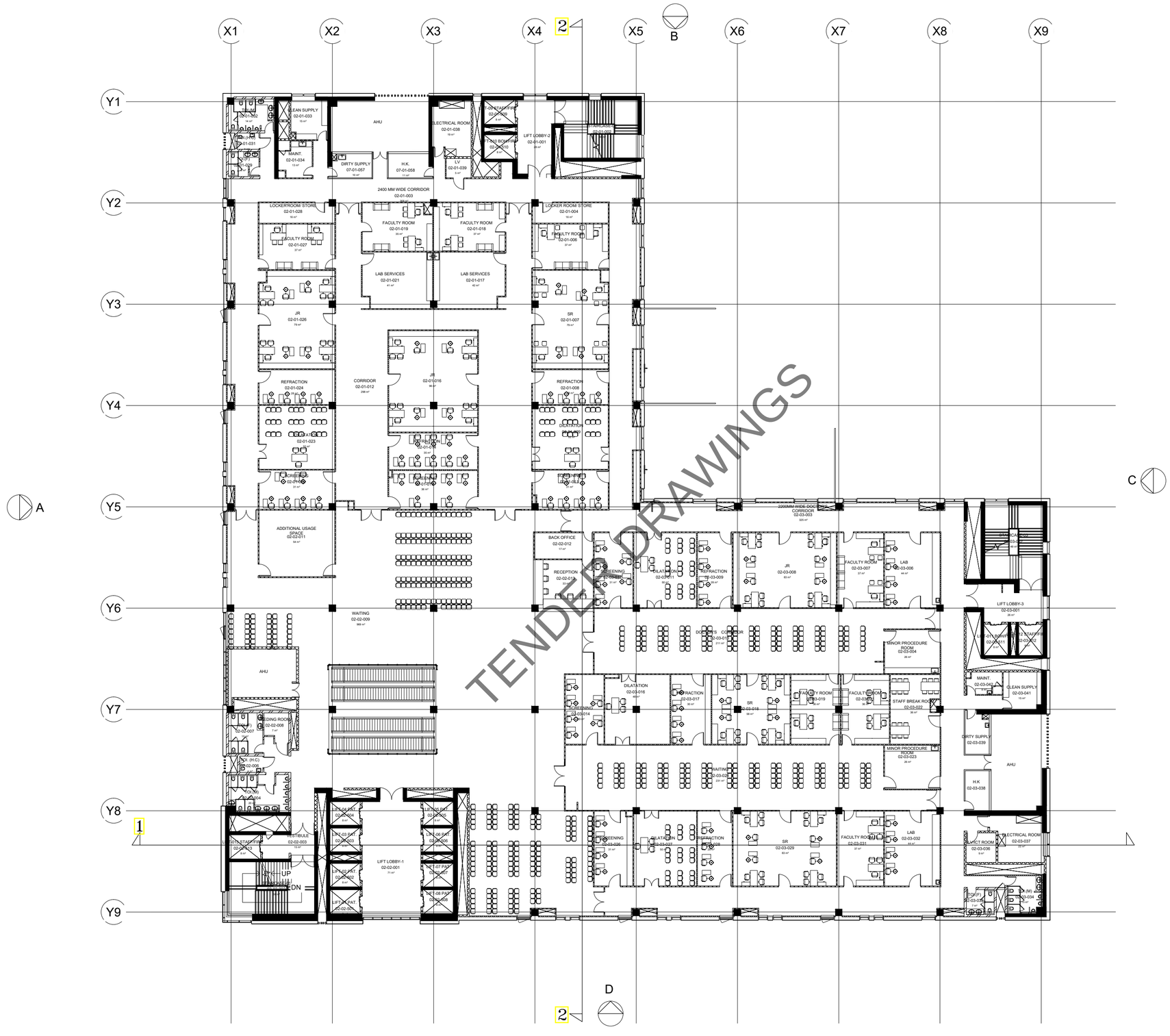
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Y7
Y8
Y9
A
B
C
D
1
2
AHU
CLEAN SUPPLY 02-01-033
ELECTRICAL ROOM 02-01-038
MAINT. 02-01-034
DIRTY SUPPLY 07-01-057
H.K. 07-01-058
LV 02-01-039
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2400 MM WIDE CORRIDOR 02-01-003
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FACULTY ROOM 02-01-006
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LAB SERVICES 02-01-017
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SR 02-01-007
CORRIDOR 02-01-012
JR 02-01-016
REFRACTION 02-01-024
REFRACTION 02-01-008
DILATATION 02-01-023
DILATATION 02-01-009
ADDITIONAL USAGE SPACE 02-02-011
BACK OFFICE 02-02-012
RECEPTION 02-02-013
SCREENING 02-02-014
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H.K 02-03-038
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LAB 02-03-032
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SR 02-03-018
FACULTY ROOM 02-03-019
FACULTY ROOM 02-03-020
SCREENING 02-03-014
REFRACTION 02-03-009
JR 02-03-008
FACULTY ROOM 02-03-007
LAB 02-03-006
DILATATION 02-03-011
RECEPTION 02-02-010
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VESTIBULE 02-02-003
LIFT-01 PAT. 02-02-004
LIFT-02 PAT. 02-02-005
LIFT-03 PAT. 02-02-006
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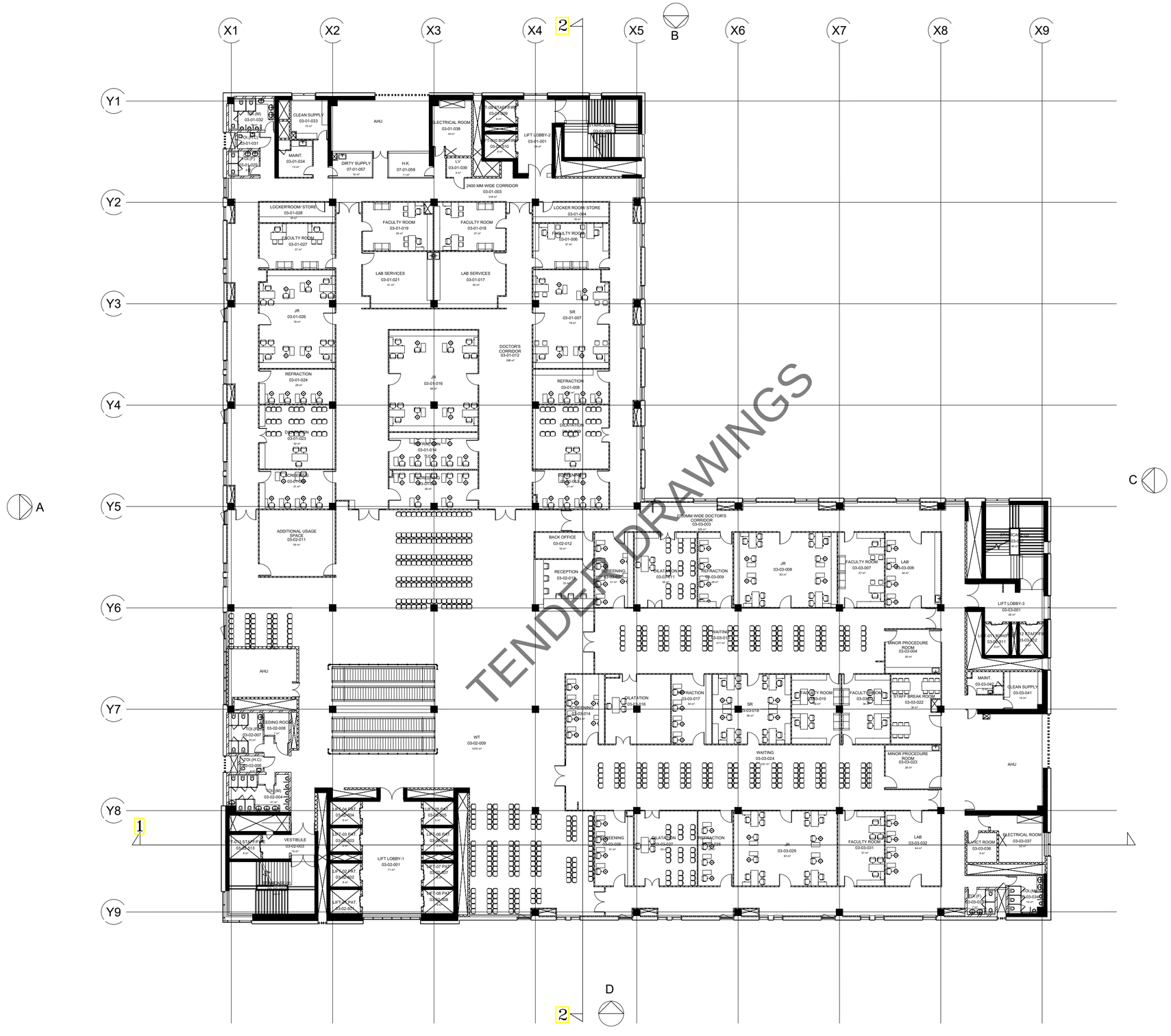
LIFT-13 PAT.



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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

THIRD FLOOR

HSCC/AIIMS/TD/OPD/008
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
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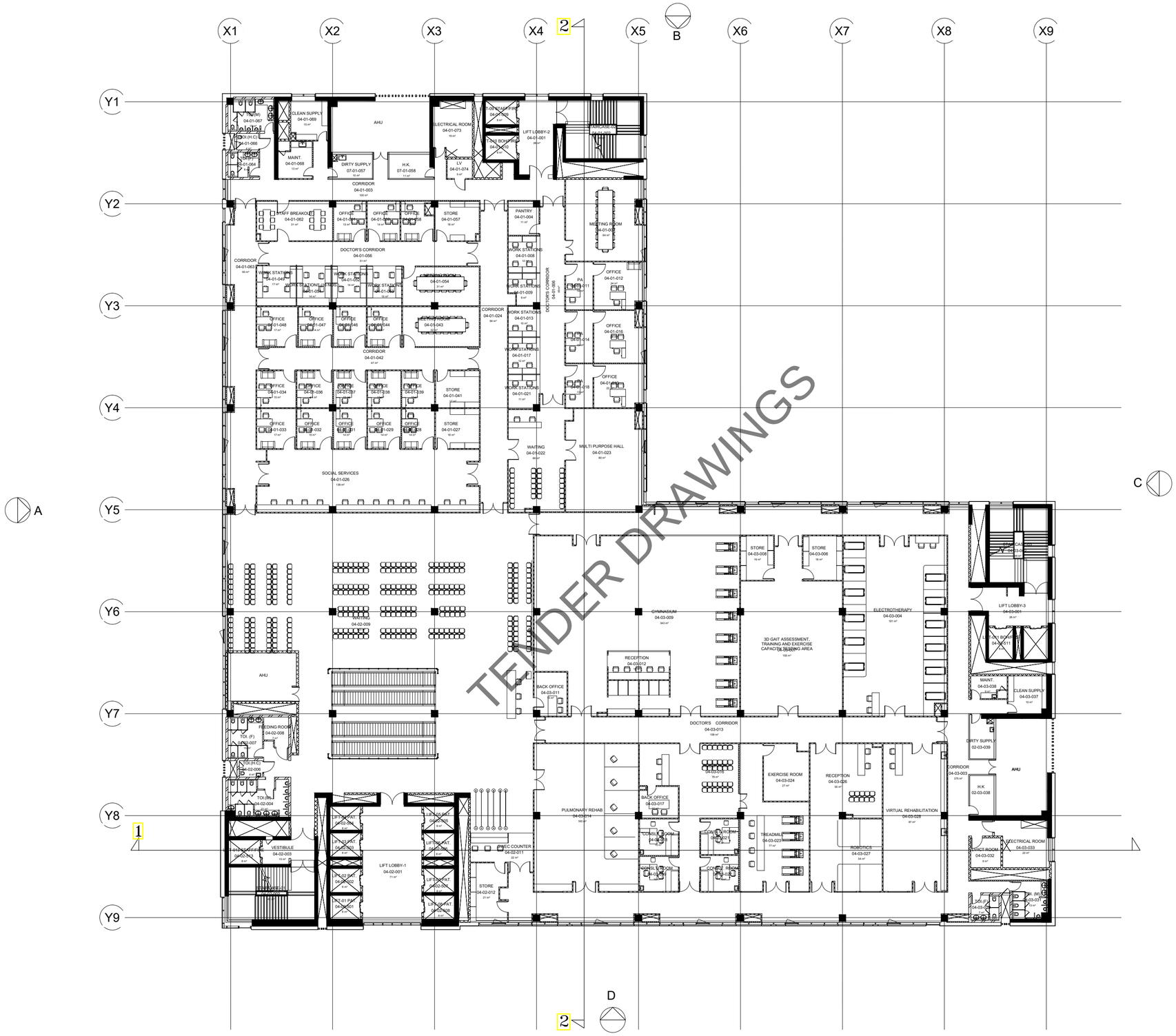

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

FOURTH FLOOR

HSCC/AIIMS/TD/OPD/009
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
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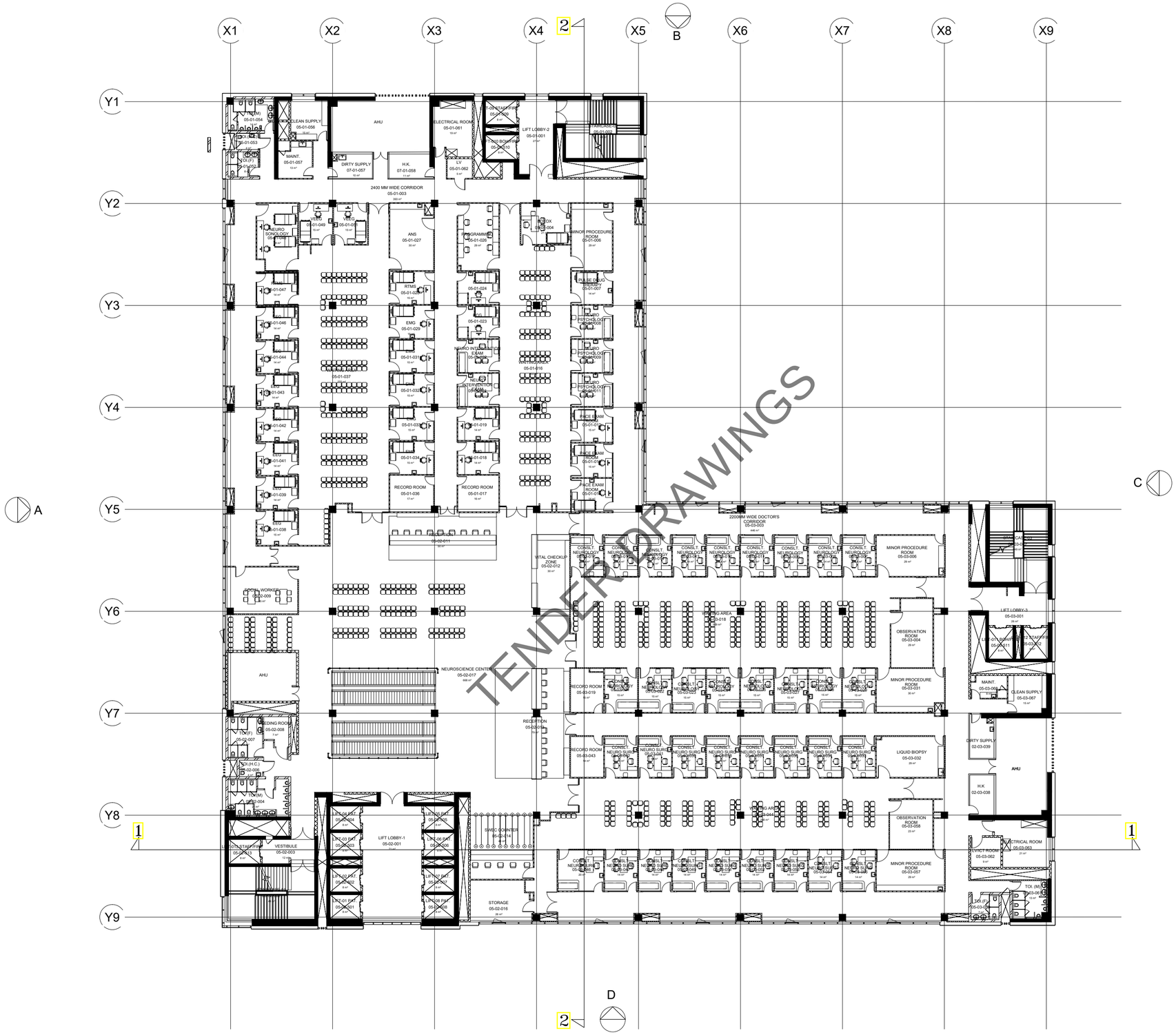
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Y7
Y8
Y9
A
B
C
D
1
2
TENDER DRAWINGS
2400 MM WIDE CORRIDOR 05-01-003
2200MM WIDE DOCTOR'S CORRIDOR 05-03-003
AHU
ELECTRICAL ROOM 05-01-061
LIFT LOBBY-2 05-01-001
LIFT LOBBY-1 05-02-001
LIFT LOBBY-3 05-03-001
DIRTY SUPPLY 07-01-057
CLEAN SUPPLY 05-01-056
MAINT. 05-01-057
H.K. 07-01-058
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RECORD ROOM 05-01-036
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RECEPTION 05-02-013
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PROGRAMMING 05-01-026
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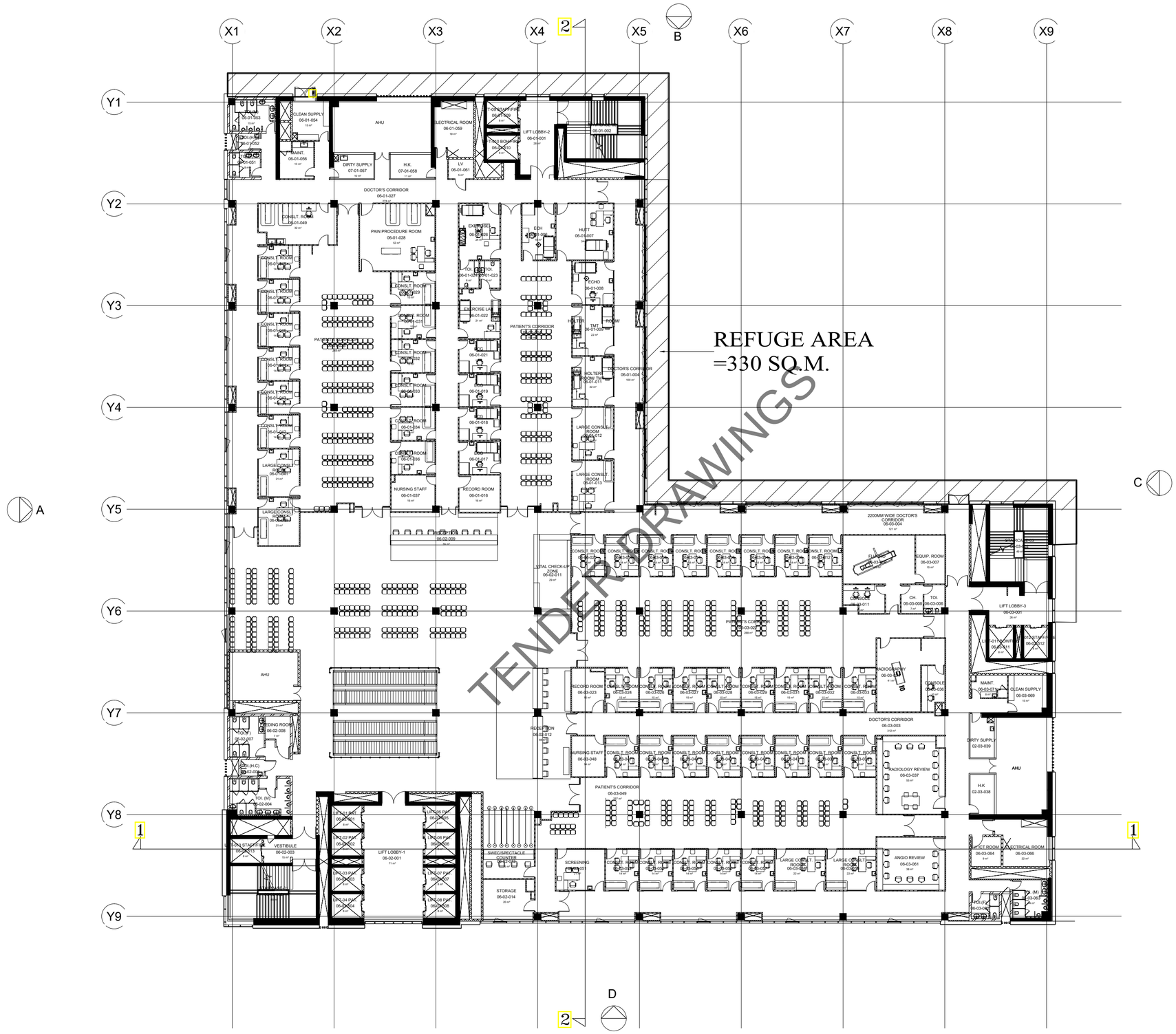

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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SIXTH FLOOR

HSCC/AIIMS/TD/OPD/011
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
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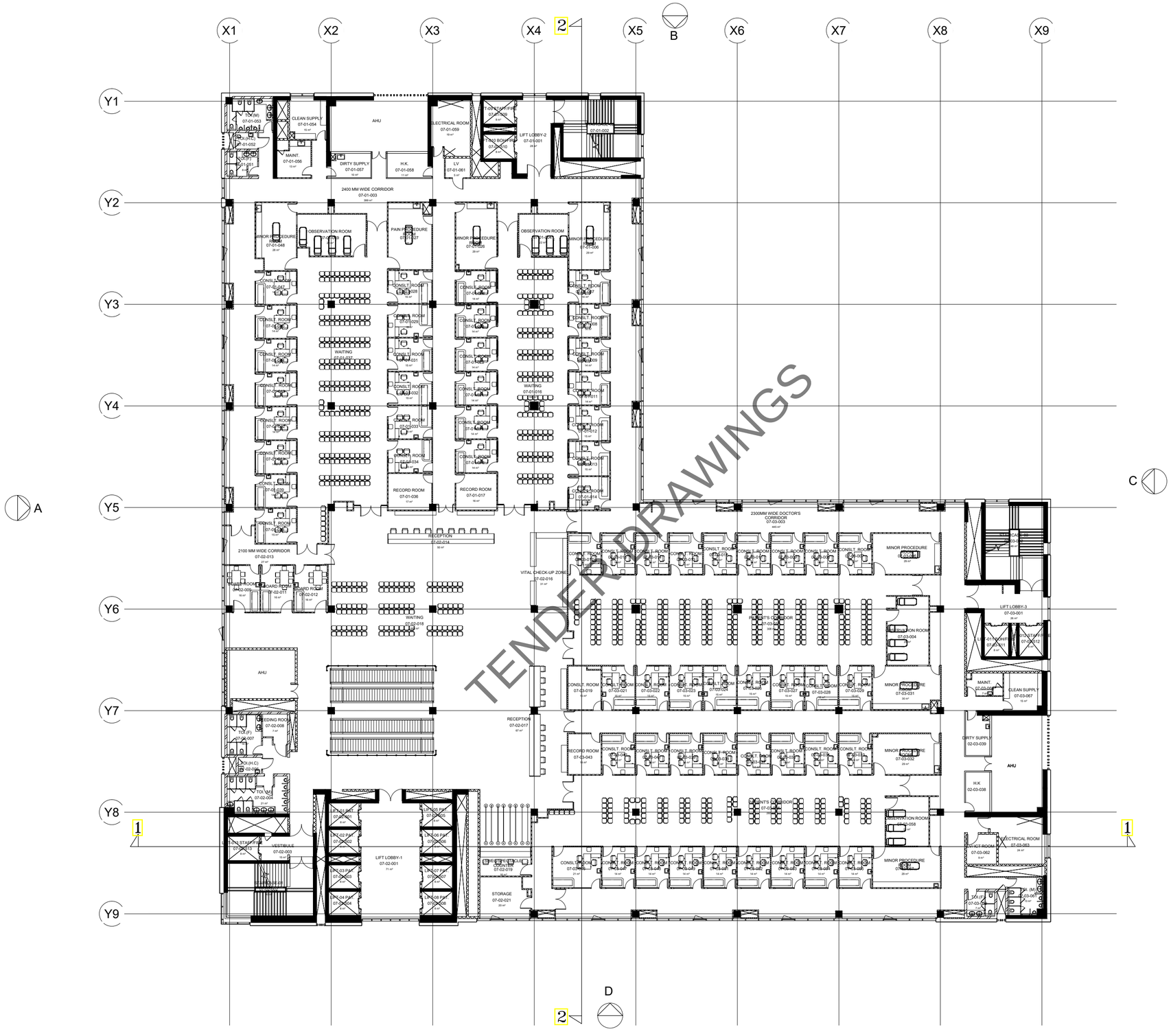

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SEVENTH FLOOR

HSCC/AIIMS/TD/OPD/012
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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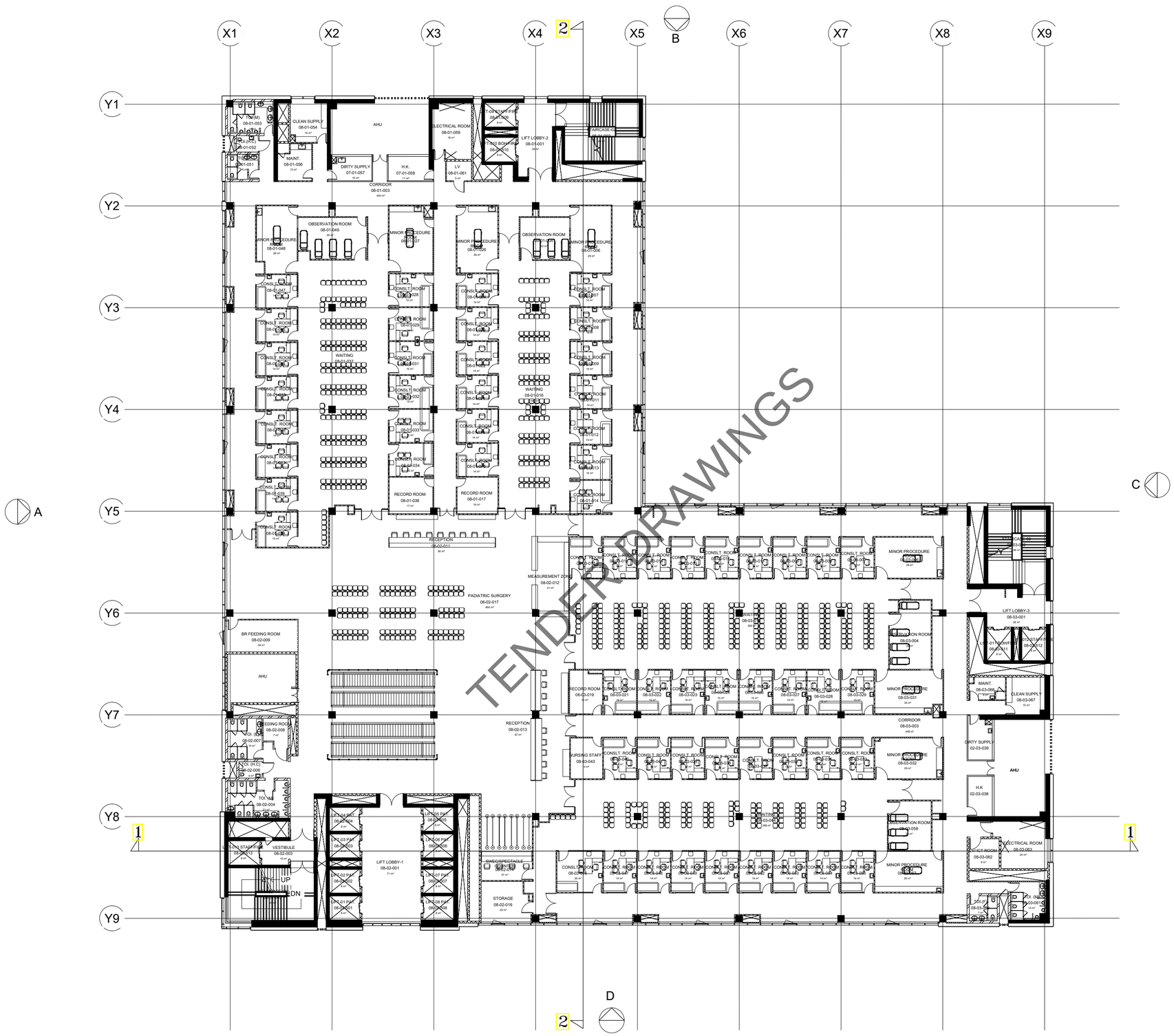
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Y7
Y8
Y9
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B
C
D
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2
OBSERVATION ROOM 08-01-049
MINOR PROCEDURE ROOM 08-01-048
MINOR PROCEDURE ROOM 08-01-047
MINOR PROCEDURE ROOM 08-01-046
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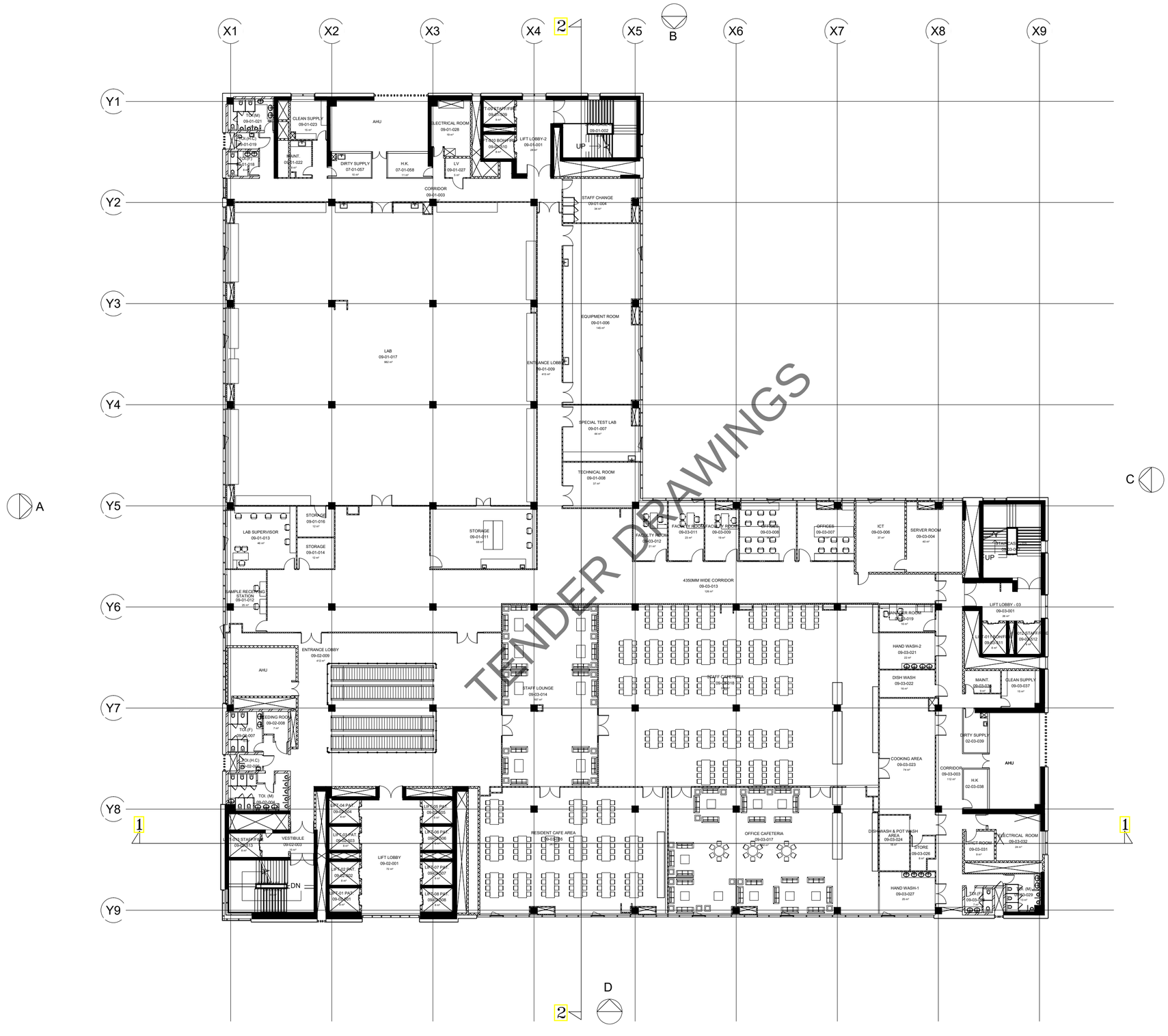
CONSLT. ROOM



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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

NINTH FLOOR

HSCC/AIIMS/TD/OPD/014
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

TERRACE PLAN

HSCC/AIIMS/TD/OPD/015
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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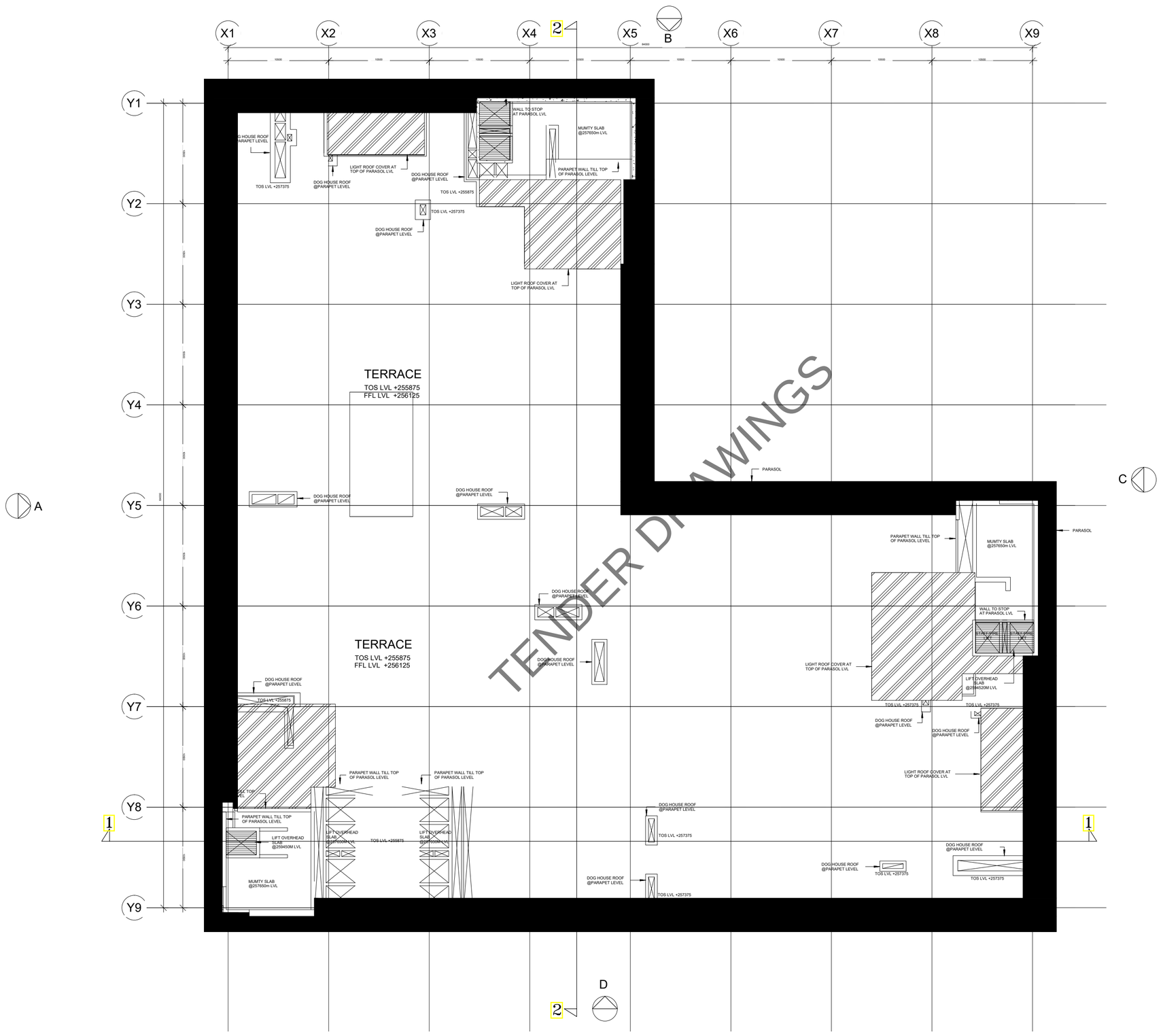

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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

ROOF PLAN

HSCC/AIIMS/TD/OPD/016
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
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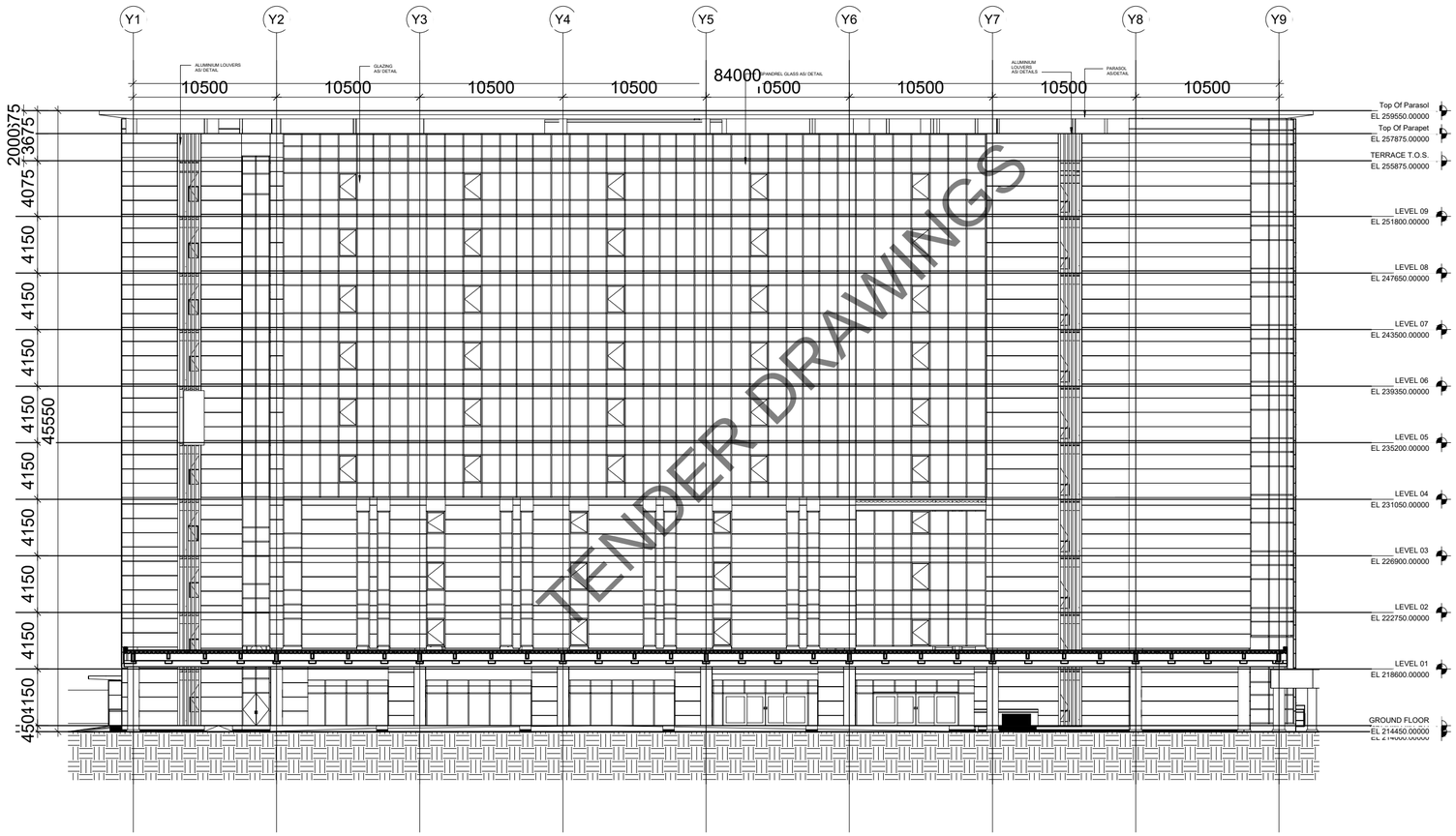

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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

ELEVATION A

HSCC/AIIMS/TD/OPD/017
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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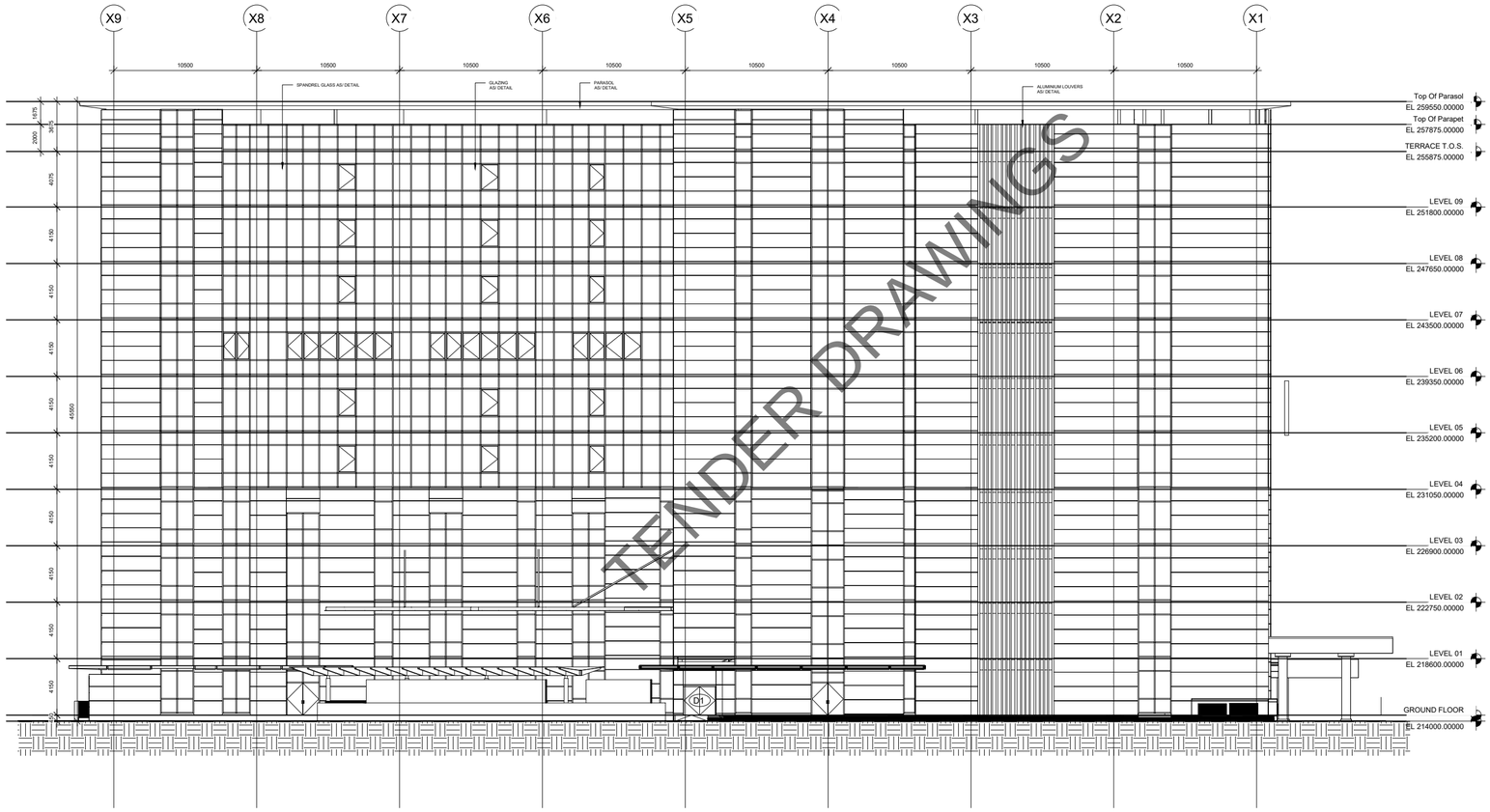

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REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

ELEVATION B

HSCC/AIIMS/TD/OPD/018
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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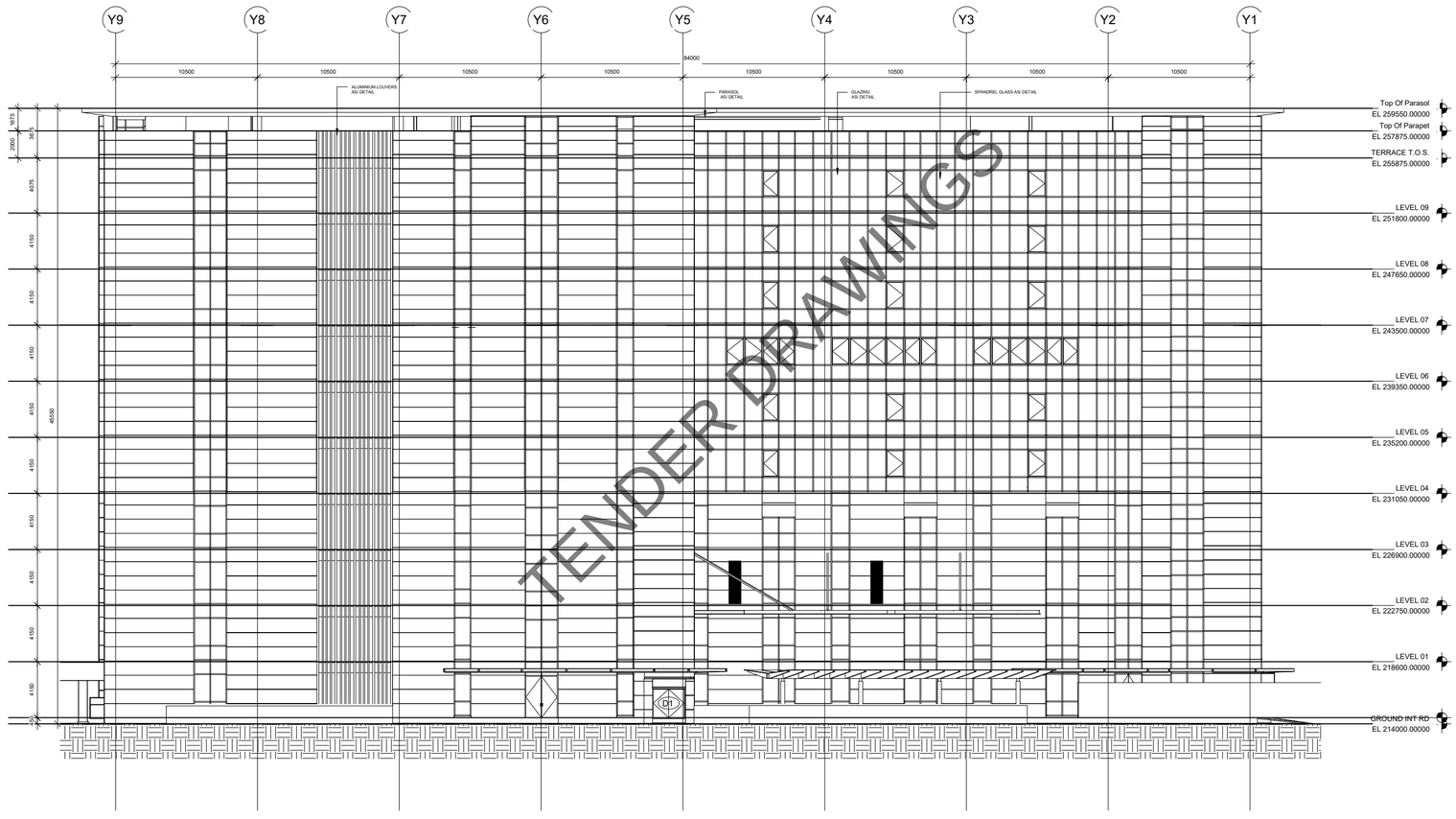

DRAWINGS
TENDER DRAWINGS

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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

ELEVATION C

HSCC/AIIMS/TD/OPD/019
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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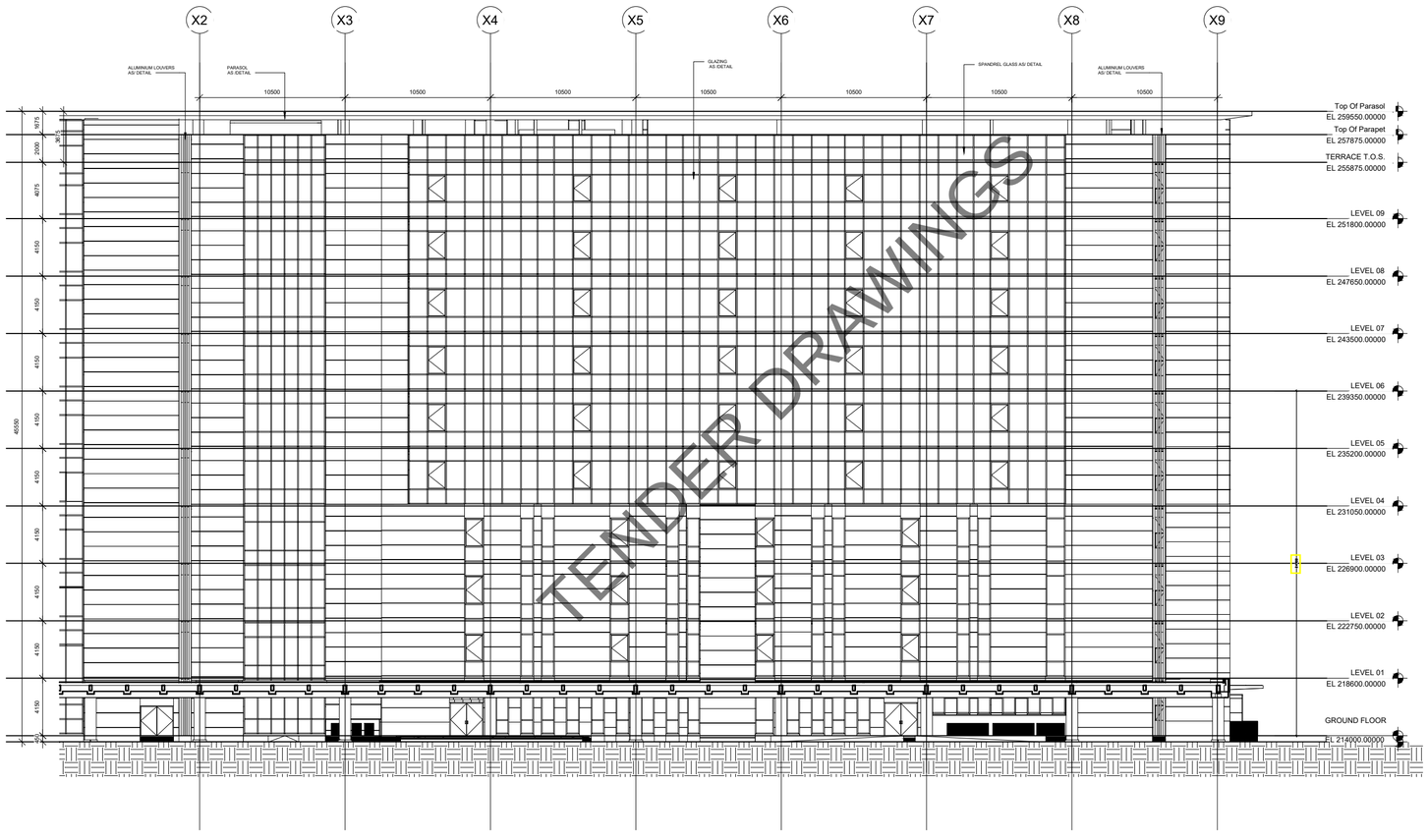
HSCC
NEW DELHI INDIA



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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

ELEVATION D

HSCC/AIIMS/TD/OPD/020
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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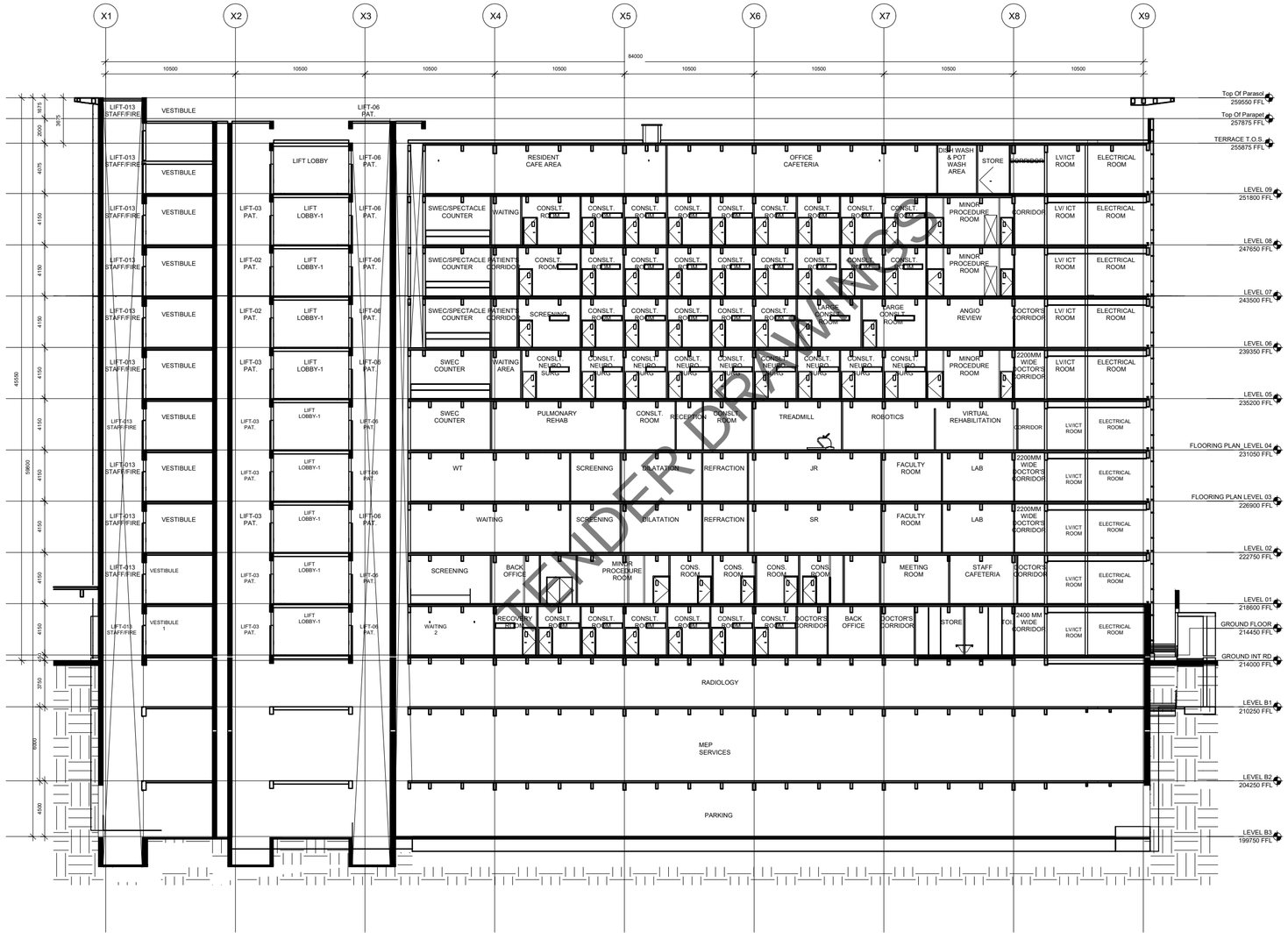

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SECTION 1-1

HSCC/AIIMS/TD/OPD/021
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
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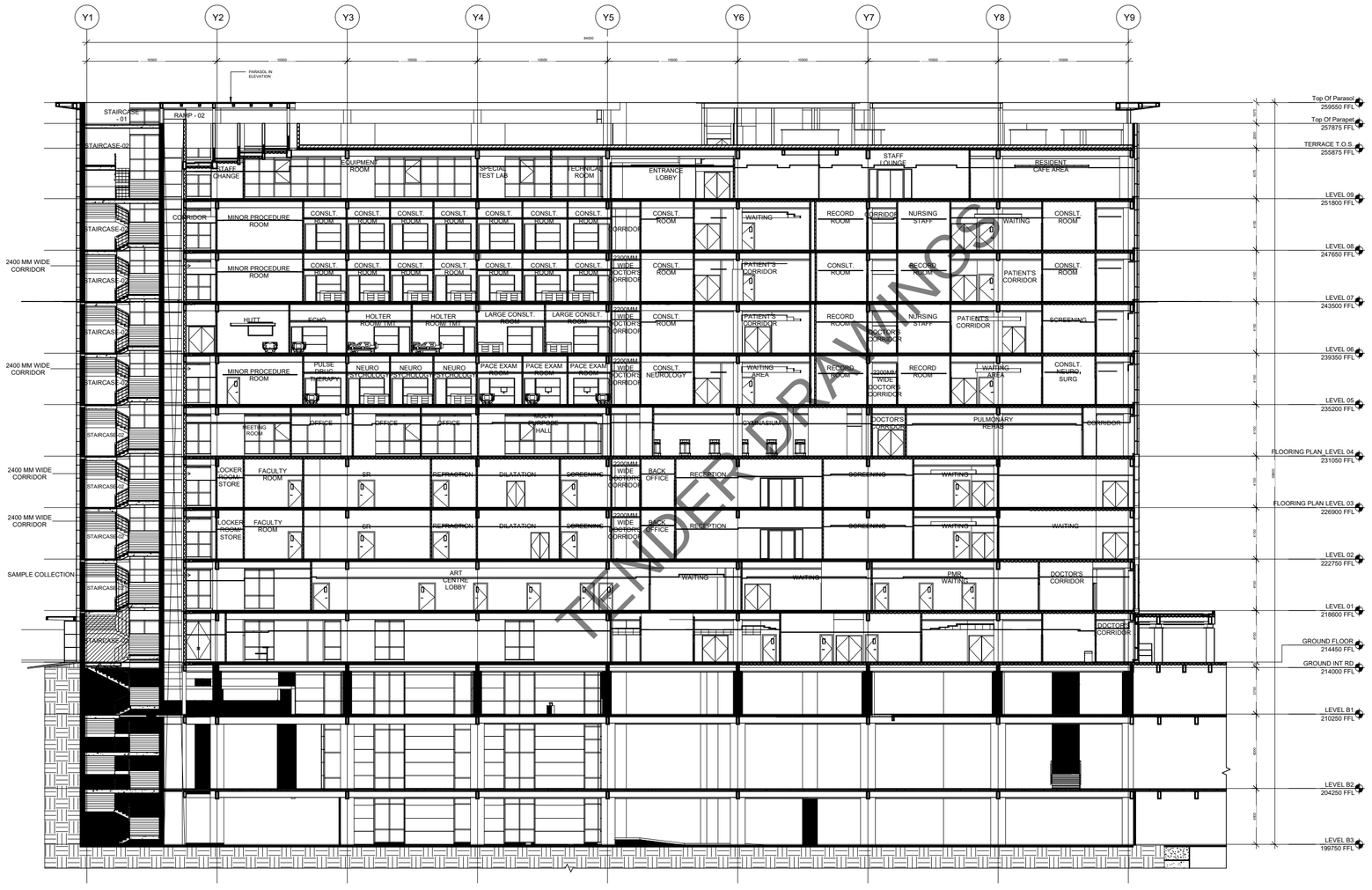

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PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SECTION 2-2

HSCC/AIIMS/TD/OPD/022
Drawing No.

Job No.	1:200 Scale	AUG'24 Date
App by	Rev. by	Prep. by

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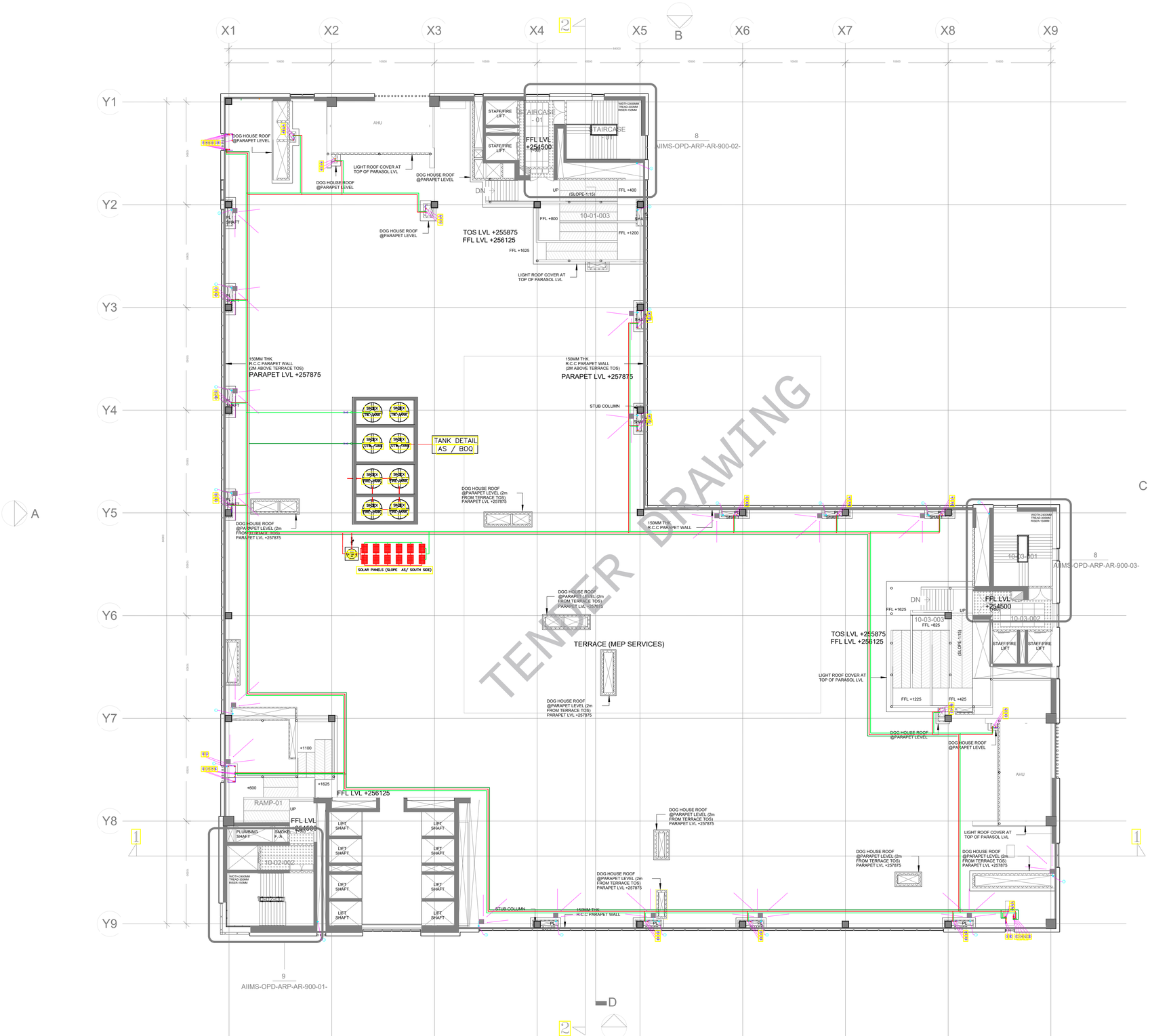
PHE Tender Drawings



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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)	
2	110ø/160ø WASTE & VENT PIPE (uPVC)	
2a	110ø/150ø LAB SINK WASTE PIPE (uPVC)	
3	100ø/150ø R.W. PIPE (uPVC)	
4	DWS DN / TAKE	
5	FWS DN / TAKE	
6	HWS DN / TAKE	
7	32ø WASTE PIPE (uPVC)	
8	50ø WASTE PIPE (uPVC)	
9	40ø SOIL PIPE (uPVC)	
	110ø/160ø SOIL PIPE (uPVC)	
	110ø/160ø WASTE PIPE (uPVC)	
	DOMESTIC WATER SUPPLY PIPE (cPVC)	
	FLUSHING WATER SUPPLY PIPE (cPVC)	
	HOT WATER SUPPLY PIPE (cPVC)	
	GEYSER (25Ltr.& 35Ltr. CAPACITY)	
F.T	FLOOR TRAP 100x100	
F.D	FLOOR DRAIN 50ø	
COP	CLEAN OUT PLUG	
FCO	FLOOR CLEAN OUT	
GT	GULLY TRAP(300X300)mm	
MH	MANHOLE (900x800)mm	
MH	MANHOLE (900ø)	
CB	CATCH BASIN(450X450)	
	SLUICE VALVE	
	NON- RETURN VALVE	
KH	KHURRA(450X450)	

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

TERRACE PLAN

HSCC/AIIMS/TD/OPD/PL-10
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)
2	110ø/160ø WASTE & VENT PIPE (uPVC)
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)
3	100ø/150ø R.W. PIPE (uPVC)
4	DWS DN / TAKE
5	FWS DN / TAKE
6	HWS DN / TAKE
7	32ø WASTE PIPE (uPVC)
8	50ø WASTE PIPE (uPVC)
9	40ø SOIL PIPE (uPVC)
	110ø/160ø SOIL PIPE (uPVC)
	110ø/160ø WASTE PIPE (uPVC)
	DOMESTIC WATER SUPPLY PIPE (cPVC)
	FLUSHING WATER SUPPLY PIPE (cPVC)
	HOT WATER SUPPLY PIPE (cPVC)
	GEYSER (25Ltr.& 35Ltr. CAPACITY)
F.T	FLOOR TRAP 100x100
F.D	FLOOR DRAIN 50ø
COP	CLEAN OUT PLUG
FCO	FLOOR CLEAN OUT
GT	GULLY TRAP(300X300)mm
MH	MANHOLE (900x800)mm
MH	MANHOLE (900ø)
CB	CATCH BASIN(450X450)
	SLUICE VALVE
	NON– RETURN VALVE
KH	KHURRA(450X450)

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

NINTH FLOOR

HSCC/AIIMS/TD/OPD/PL-09
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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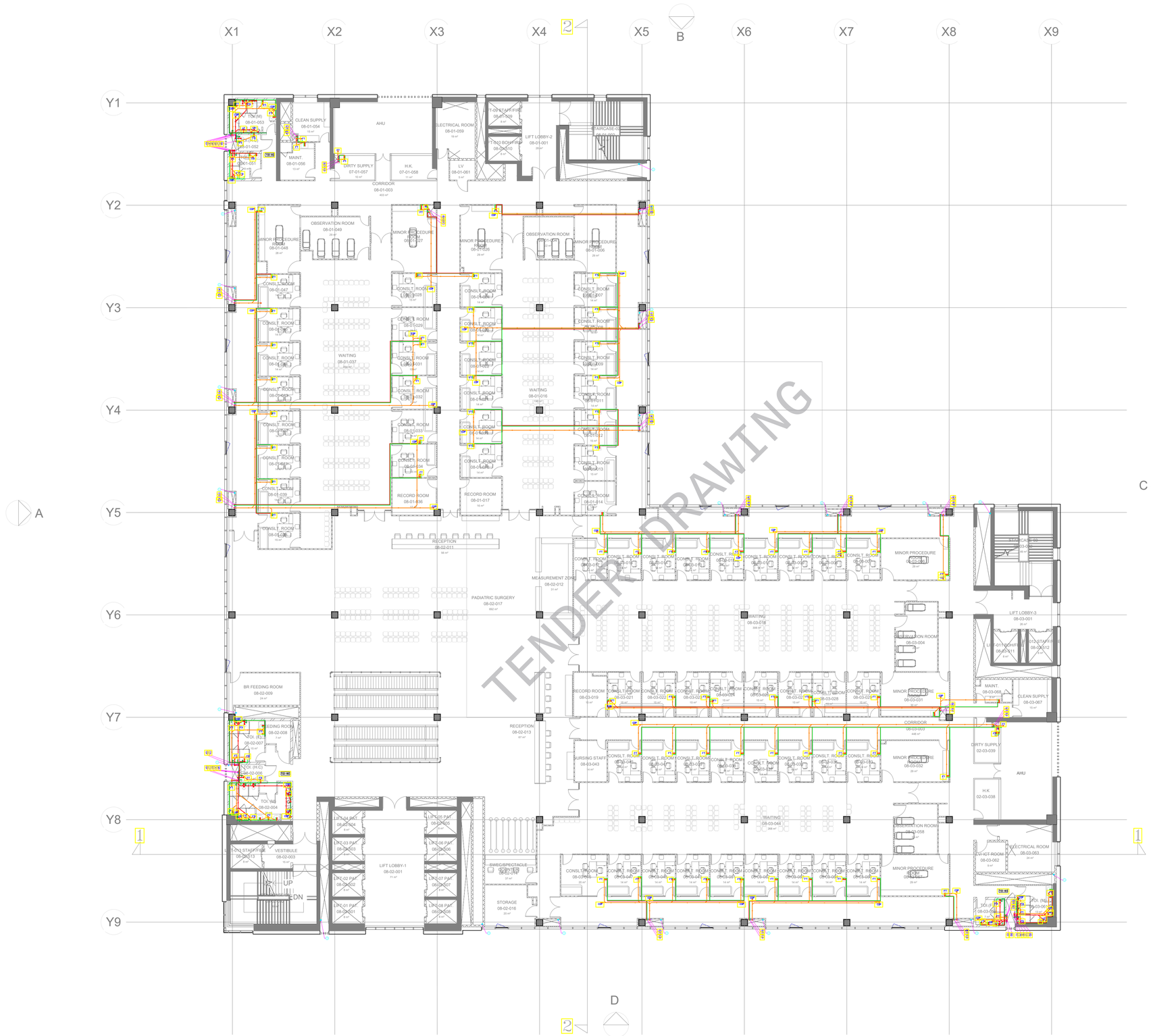

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)
2	110ø/160ø WASTE & VENT PIPE (uPVC)
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)
3	100ø/150ø R.W. PIPE (uPVC)
4	DWS DN / TAKE
5	FWS DN / TAKE
6	HWS DN / TAKE
7	32ø WASTE PIPE (uPVC)
8	50ø WASTE PIPE (uPVC)
9	40ø SOIL PIPE (uPVC)
	110ø/160ø SOIL PIPE (uPVC)
	110ø/160ø WASTE PIPE (uPVC)
	DOMESTIC WATER SUPPLY PIPE (cPVC)
	FLUSHING WATER SUPPLY PIPE (cPVC)
	HOT WATER SUPPLY PIPE (cPVC)
	GEYSER (25Ltr.& 35Ltr. CAPACITY)
F.T	FLOOR TRAP 100x100
F.D	FLOOR DRAIN 50ø
COP	CLEAN OUT PLUG
FCO	FLOOR CLEAN OUT
GT	GULLY TRAP(300X300)mm
MH	MANHOLE (900x800)mm
MH	MANHOLE (900ø)
CB	CATCH BASIN(450X450)
	SLUICE VALVE
	NON- RETURN VALVE
KH	KHURRA(450X450)

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

EIGHTH FLOOR

HSCC/AIIMS/TD/OPD/PL-08
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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HSCC
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X1
X2
X3
X4
X5
X6
X7
X8
X9
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
A
B
C
D
1
2
2400 MM WIDE CORRIDOR 07-01-003
2300MM WIDE DOCTOR'S CORRIDOR 07-03-003
2100 MM WIDE CORRIDOR 07-02-013
PATIENT'S CORRIDOR 07-03-018
PATIENT'S CORRIDOR 07-03-044
OBSERVATION ROOM 07-01-045
OBSERVATION ROOM 07-01-046
PAIN PROCEDURE ROOM 07-01-027
MINOR PROCEDURE ROOM 07-01-048
MINOR PROCEDURE ROOM 07-01-026
MINOR PROCEDURE ROOM 07-01-006
MINOR PROCEDURE 07-03-030
MINOR PROCEDURE 07-03-031
MINOR PROCEDURE 07-03-032
MINOR PROCEDURE 07-03-057
OBSERVATION ROOM 07-03-004
OBSERVATION ROOM 07-03-058
CONSULT. ROOM 07-01-047
CONSULT. ROOM 07-01-028
CONSULT. ROOM 07-01-038
CONSULT. ROOM 07-01-027
CONSULT. ROOM 07-01-009
CONSULT. ROOM 07-01-031
CONSULT. ROOM 07-01-032
CONSULT. ROOM 07-01-033
CONSULT. ROOM 07-01-034
CONSULT. ROOM 07-01-035
CONSULT. ROOM 07-01-036
CONSULT. ROOM 07-01-037
CONSULT. ROOM 07-01-029
CONSULT. ROOM 07-01-030
CONSULT. ROOM 07-01-010
CONSULT. ROOM 07-01-011
CONSULT. ROOM 07-01-012
CONSULT. ROOM 07-01-013
CONSULT. ROOM 07-01-014
CONSULT. ROOM 07-01-039
CONSULT. ROOM 07-01-040
CONSULT. ROOM 07-01-041
CONSULT. ROOM 07-01-042
CONSULT. ROOM 07-03-019
CONSULT. ROOM 07-03-021
CONSULT. ROOM 07-03-022
CONSULT. ROOM 07-03-023
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CONSULT. ROOM 07-03-037
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CONSULT. ROOM 07-03-040
CONSULT. ROOM 07-03-041
CONSULT. ROOM 07-03-042
CONSULT. ROOM 07-03-043
CONSULT. ROOM 07-03-045
CONSULT. ROOM 07-03-046
CONSULT. ROOM 07-03-047
CONSULT. ROOM 07-03-048
CONSULT. ROOM 07-03-049
CONSULT. ROOM 07-03-050
CONSULT. ROOM 07-03-051
CONSULT. ROOM 07-03-052
CONSULT. ROOM 07-03-053
CONSULT. ROOM 07-03-054
CONSULT. ROOM 07-03-055
CONSULT. ROOM 07-03-056
WAITING 07-01-037
WAITING 07-01-016
WAITING 07-02-018
RECEPTION 07-02-014
RECEPTION 07-02-017
VITAL CHECK-UP ZONE 07-02-016
RECORD ROOM 07-01-036
RECORD ROOM 07-01-017
RECORD ROOM 07-01-014
RECORD ROOM 07-02-009
RECORD ROOM 07-03-043
BOARD ROOM 07-02-011
BOARD ROOM 07-02-012
SWEET/REFRESHMENT COUNTER 07-02-019
STORAGE 07-02-021
LIFT LOBBY-1 07-02-001
LIFT LOBBY-2 07-01-001
LIFT LOBBY-3 07-03-001
LIFT-01 PAT 07-02-001
LIFT-02 PAT 07-02-002
LIFT-03 PAT 07-02-003
LIFT-04 PAT 07-02-004
LIFT-05 PAT 07-02-005
LIFT-06 PAT 07-02-006
LIFT-07 PAT 07-02-007
LIFT-08 PAT 07-02-008
LIFT-01 MACHINE 07-03-011
LIFT-01 STAFF FIRE 07-03-012
LIFT-02 MACHINE 07-03-013
LIFT-02 STAFF FIRE 07-03-014
T-03 STAFF FIRE 07-01-009
T-02 BOX FIRE 07-01-010
T-01 STAFF FIRE 07-02-013
T-01 BOX FIRE 07-02-010
ELECTRICAL ROOM 07-01-059
ELECTRICAL ROOM 07-03-063
LV ROOM 07-01-061
LV ROOM 07-03-062
H.K. 07-01-058
H.K. 02-03-038
DIRTY SUPPLY 07-01-057
DIRTY SUPPLY 02-03-039
CLEAN SUPPLY 07-01-054
CLEAN SUPPLY 07-03-067
MAINT. 07-01-056
MAINT. 07-03-066
AHU
SHAFT 07-01-052
SHAFT 07-01-051
SHAFT 07-01-053
SHAFT 07-02-007
SHAFT 07-02-008
SHAFT 07-03-007
SHAFT 07-03-008
SHAFT 07-03-009
SHAFT 07-03-010
SHAFT 07-03-060
SHAFT 07-03-061
SHAFT 07-03-064
SHAFT 07-03-065
SHAFT 07-03-068
SHAFT 07-03-069
SHAFT 07-03-070
SHAFT 07-03-071
SHAFT 07-03-072
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SHAFT 07-03-078
SHAFT 07-03-079
SHAFT 07-03-080
SHAFT 07-03-081
SHAFT 07-03-082
SHAFT 07-03-083
SHAFT 07-03-084
SHAFT 07-03-085
SHAFT 07-03-086
SHAFT 07-03-087
SHAFT

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)
2	110ø/160ø WASTE & VENT PIPE (uPVC)
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)
3	100ø/150ø R.W. PIPE (uPVC)
4	DWS DN / TAKE
5	FWS DN / TAKE
6	HWS DN / TAKE
7	32ø WASTE PIPE (uPVC)

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)
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8	50ø WASTE PIPE (uPVC)
9	40ø SOIL PIPE (uPVC)
	110ø/160ø SOIL PIPE (uPVC)
	110ø/160ø WASTE PIPE (uPVC)
	DOMESTIC WATER SUPPLY PIPE (cPVC)
	FLUSHING WATER SUPPLY PIPE (cPVC)
	HOT WATER SUPPLY PIPE (cPVC)
G	GEYSER (25Ltr.& 35Ltr. CAPACITY)
F.T	FLOOR TRAP 100x100
F.D	FLOOR DRAIN 50ø
COP	CLEAN OUT PLUG
FCO	FLOOR CLEAN OUT
GT	GULLY TRAP(300X300)mm
MH	MANHOLE (900x800)mm
MH	MANHOLE (900ø)
CB	CATCH BASIN(450X450)
	SLUICE VALVE
	NON- RETURN VALVE
KH	KHURRA(450X450)

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

FIFTH FLOOR

HSCC/AIIMS/TD/OPD/PL-06
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)
2	110ø/160ø WASTE & VENT PIPE (uPVC)
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)
3	100ø/150ø R.W. PIPE (uPVC)
4	DWS DN / TAKE
5	FWS DN / TAKE
6	HWS DN / TAKE
7	32ø WASTE PIPE (uPVC)
8	50ø WASTE PIPE (uPVC)
9	40ø SOIL PIPE (uPVC)
	110ø/160ø SOIL PIPE (uPVC)
	110ø/160ø WASTE PIPE (uPVC)
	DOMESTIC WATER SUPPLY PIPE (cPVC)
	FLUSHING WATER SUPPLY PIPE (cPVC)
	HOT WATER SUPPLY PIPE (cPVC)
	GEYSER (25Ltr.& 35Ltr. CAPACITY)
F.T	FLOOR TRAP 100x100
F.D	FLOOR DRAIN 50ø
COP	CLEAN OUT PLUG
FCO	FLOOR CLEAN OUT
GT	GULLY TRAP(300X300)mm
MH	MANHOLE (900x800)mm
MH	MANHOLE (900ø)
CB	CATCH BASIN(450X450)
	SLUICE VALVE
	NON- RETURN VALVE
KH	KHURRA(450X450)

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

FOURTH FLOOR

HSCC/AIIMS/TD/OPD/PL-05
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)	
2	110ø/160ø WASTE & VENT PIPE (uPVC)	
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)	
3	100ø/150ø R.W. PIPE (uPVC)	
4	DWS DN / TAKE	
5	FWS DN / TAKE	
6	HWS DN / TAKE	
7	32ø WASTE PIPE (uPVC)	
8	50ø WASTE PIPE (uPVC)	
9	40ø SOIL PIPE (uPVC)	
	110ø/160ø SOIL PIPE (uPVC)	
	110ø/160ø WASTE PIPE (uPVC)	
	DOMESTIC WATER SUPPLY PIPE (cPVC)	
	FLUSHING WATER SUPPLY PIPE (cPVC)	
	HOT WATER SUPPLY PIPE (cPVC)	
	GEYSER (25Ltr.& 35Ltr. CAPACITY)	
F.T	FLOOR TRAP 100x100	
F.D	FLOOR DRAIN 50ø	
COP	CLEAN OUT PLUG	
FCO	FLOOR CLEAN OUT	
GT	GULLY TRAP(300X300)mm	
MH	MANHOLE (900x800)mm	
MH	MANHOLE (900ø)	
CB	CATCH BASIN(450X450)	
	SLUICE VALVE	
	NON- RETURN VALVE	
KH	KHURRA(450X450)	

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

THIRD FLOOR

HSCC/AIIMS/TD/OPD/PL-04
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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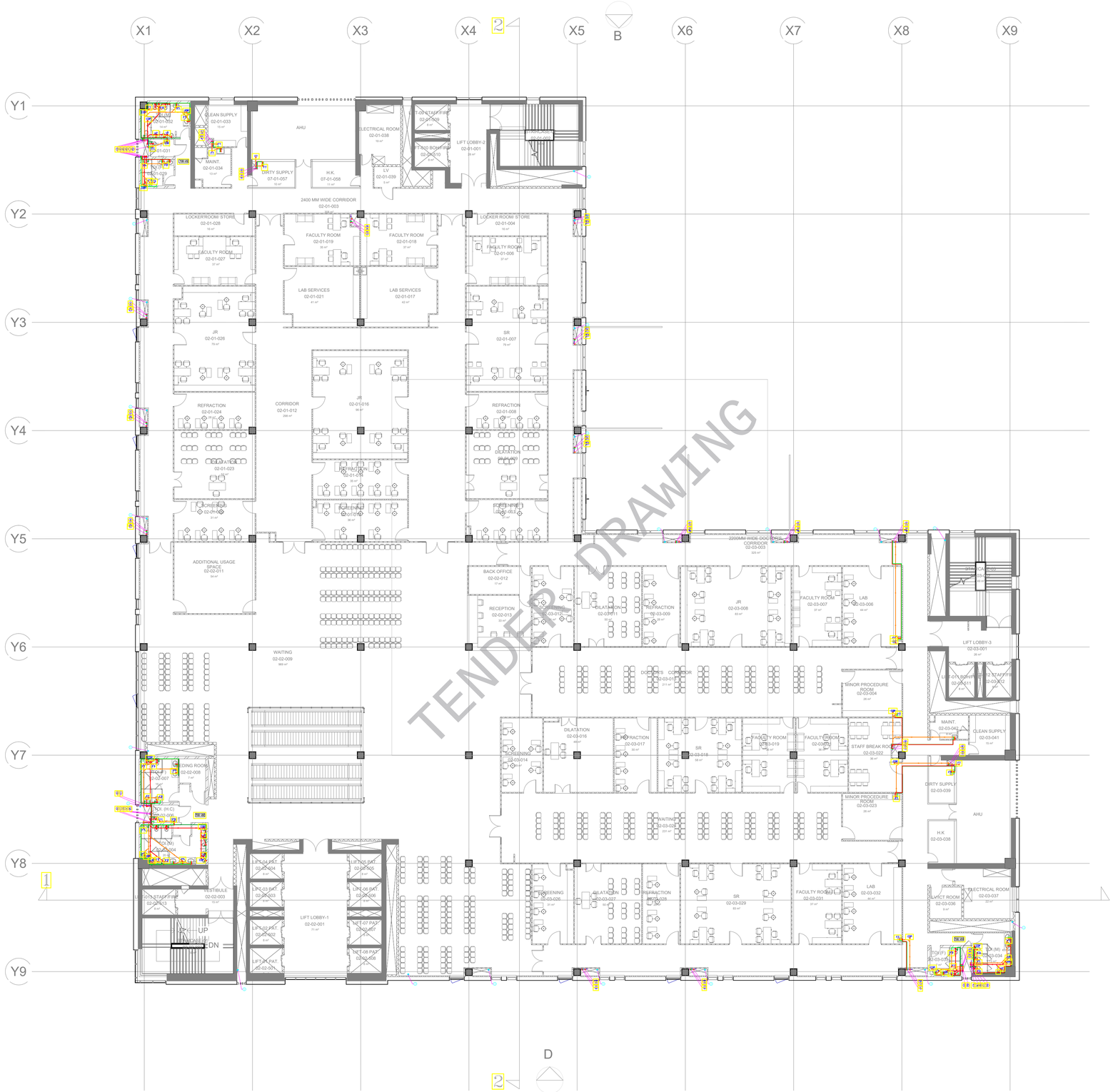

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)	
2	110ø/160ø WASTE & VENT PIPE (uPVC)	
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)	
3	100ø/150ø R.W. PIPE (uPVC)	
4	DWS DN / TAKE	
5	FWS DN / TAKE	
6	HWS DN / TAKE	
7	32ø WASTE PIPE (uPVC)	
8	50ø WASTE PIPE (uPVC)	
9	40ø SOIL PIPE (uPVC)	
	110ø/160ø SOIL PIPE (uPVC)	
	110ø/160ø WASTE PIPE (uPVC)	
	DOMESTIC WATER SUPPLY PIPE (cPVC)	
	FLUSHING WATER SUPPLY PIPE (cPVC)	
	HOT WATER SUPPLY PIPE (cPVC)	
G	GEYSER (25Ltr.& 35Ltr. CAPACITY)	
F.T	FLOOR TRAP 100x100	
F.D	FLOOR DRAIN 50ø	
COP	CLEAN OUT PLUG	
FCO	FLOOR CLEAN OUT	
GT	GULLY TRAP(300X300)mm	
MH	MANHOLE (900x800)mm	
MH	MANHOLE (900ø)	
CB	CATCH BASIN(450X450)	
M	SLUICE VALVE	
N	NON– RETURN VALVE	
KH	KHURRA(450X450)	

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

SECOND FLOOR

HSCC/AIIMS/TD/OPD/PL-03
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)
2	110ø/160ø WASTE & VENT PIPE (uPVC)
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)
3	100ø/150ø R.W. PIPE (uPVC)
4	DWS DN / TAKE
5	FWS DN / TAKE
6	HWS DN / TAKE
7	32ø WASTE PIPE (uPVC)
8	50ø WASTE PIPE (uPVC)
9	40ø SOIL PIPE (uPVC)
	110ø/160ø SOIL PIPE (uPVC)
	110ø/160ø WASTE PIPE (uPVC)
	DOMESTIC WATER SUPPLY PIPE (cPVC)
	FLUSHING WATER SUPPLY PIPE (cPVC)
	HOT WATER SUPPLY PIPE (cPVC)
	GEYSER (25Ltr.& 35Ltr. CAPACITY)
F.T	FLOOR TRAP 100x100
F.D	FLOOR DRAIN 50ø
COP	CLEAN OUT PLUG
FCO	FLOOR CLEAN OUT
GT	GULLY TRAP(300X300)mm
MH	MANHOLE (900x800)mm
MH	MANHOLE (900ø)
CB	CATCH BASIN(450X450)
	SLUICE VALVE
	NON- RETURN VALVE
KH	KHURRA(450X450)

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

FIRST FLOOR

HSCC/AIIMS/TD/OPD/PL-02
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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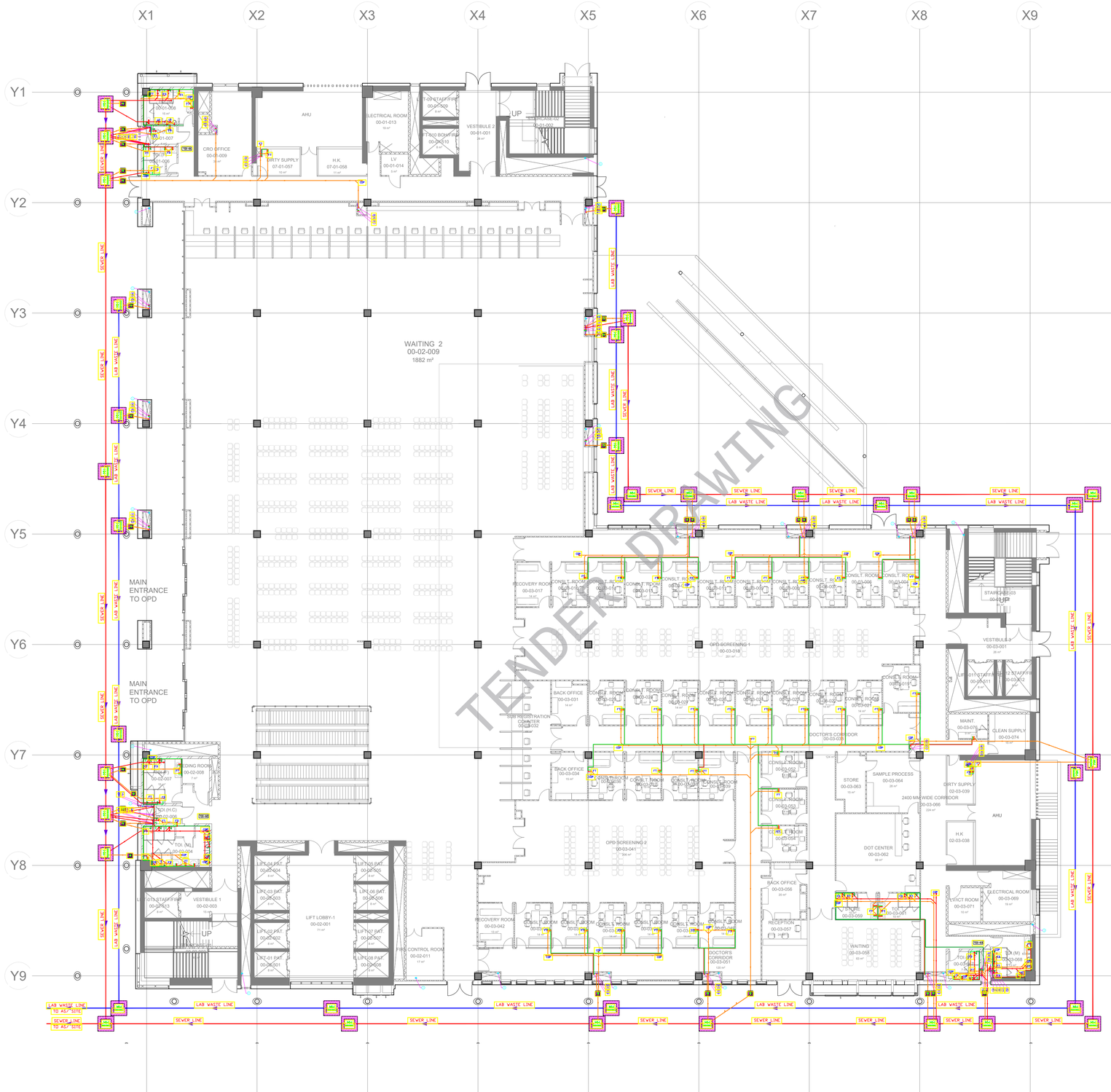

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)
2	110ø/160ø WASTE & VENT PIPE (uPVC)
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)
3	100ø/150ø R.W. PIPE (uPVC)
4	DWS DN / TAKE
5	FWS DN / TAKE
6	HWS DN / TAKE
7	32ø WASTE PIPE (uPVC)
8	50ø WASTE PIPE (uPVC)
9	40ø SOIL PIPE (uPVC)
	110ø/160ø SOIL PIPE (uPVC)
	110ø/160ø WASTE PIPE (uPVC)
	DOMESTIC WATER SUPPLY PIPE (cPVC)
	FLUSHING WATER SUPPLY PIPE (cPVC)
	HOT WATER SUPPLY PIPE (cPVC)
	GEYSER (25Ltr.& 35Ltr. CAPACITY)
F.T	FLOOR TRAP 100x100
F.D	FLOOR DRAIN 50ø
COP	CLEAN OUT PLUG
FCO	FLOOR CLEAN OUT
GT	GULLY TRAP(300X300)mm
MH	MANHOLE (900x800)mm
MH	MANHOLE (900ø)
CB	CATCH BASIN(450X450)
	SLUICE VALVE
	NON– RETURN VALVE
KH	KHURRA(450X450)

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

GROUND FLOOR

HSCC/AIIMS/TD/OPD/PL-01
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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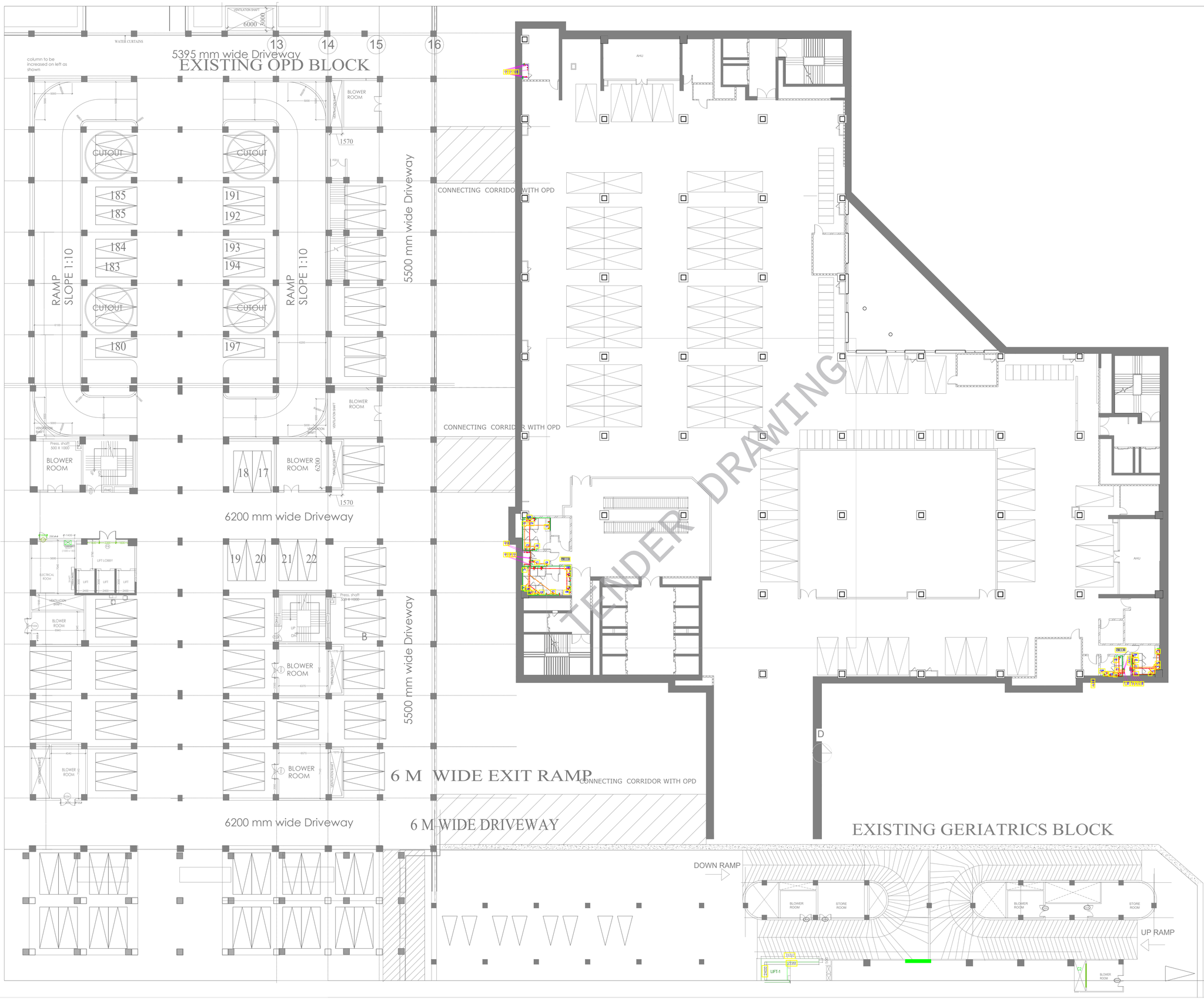

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)	
2	110ø/160ø WASTE & VENT PIPE (uPVC)	
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)	
3	100ø/150ø R.W. PIPE (uPVC)	
4	DWS DN / TAKE	
5	FWS DN / TAKE	
6	HWS DN / TAKE	
7	32ø WASTE PIPE (uPVC)	
8	50ø WASTE PIPE (uPVC)	
9	40ø SOIL PIPE (uPVC)	
	110ø/160ø SOIL PIPE (uPVC)	
	110ø/160ø WASTE PIPE (uPVC)	
	DOMESTIC WATER SUPPLY PIPE (cPVC)	
	FLUSHING WATER SUPPLY PIPE (cPVC)	
	HOT WATER SUPPLY PIPE (cPVC)	
	GEYSER (25Ltr.& 35Ltr. CAPACITY)	
F.T	FLOOR TRAP 100x100	
F.D	FLOOR DRAIN 50ø	
COP	CLEAN OUT PLUG	
FCO	FLOOR CLEAN OUT	
GT	GULLY TRAP(300X300)mm	
MH	MANHOLE (900x800)mm	
MH	MANHOLE (900ø)	
CB	CATCH BASIN(450X450)	
	SLUICE VALVE	
	NON– RETURN VALVE	
KH	KHURRA(450X450)	

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED

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REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

BASEMENT – 3

HSCC/AIIMS/TD/OPD/PL-(-03)
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
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EXISTING OPD BLOCK

EXISTING GERIATRICS BLOCK

CONNECTING CORRIDOR WITH OPD

CONNECTING CORRIDOR WITH OPD

CONNECTING CORRIDOR WITH OPD

5500 mm wide Driveway

5500 mm wide Driveway

6200 mm wide Driveway

6200 mm wide Driveway

column to be increased on left as shown

RAMP SLOPE 1:10

RAMP SLOPE 1:10

CUTOUT

CUTOUT

CUTOUT

CUTOUT

185

185

184

183

180

191

192

193

194

197

BLOWER ROOM

BLOWER ROOM

BLOWER ROOM

BLOWER ROOM

BLOWER ROOM

VENTILATION SHAFT

VENTILATION SHAFT

Press. shaft 500 X 1000

Press. shaft Size 600

1570

1570

18

17

19

20

21

22

B

DOWN RAMP

UP RAMP

LIFT-1

AHU

ELECTRICAL ROOM B2-01-003

LIFT- 09 STAFF FIRE B2-01-509

LIFT LOBBY-2 B2-01-001

LIFT- 10 BOH/FIRE B2-01-510

STAIRCASE-02 B2-01-002

PHU ROOM B2-01-011

UPS ROOM B2-01-009

BATTERY ROOM B2-01-008

ELECTRICAL SUBSTATION(ESS) B2-01-007

MEP SERVICES B2-01-006

ENTRANCE LOBBY OF ESS B2-01-016

STORE ROOM B2-01-013

HT PANEL ROOM B2-01-012

JE ROOM B2-01-014

WAITING B2-03-007

HYDROTHERAPY B2-03-008

OFFICE/ CONS. ROOM B2-03-005

LIFT LOBBY-3 B2-03-001

LIFT- 11 BOH/FIRE B2-03-511

LIFT- 12 STAFF FIRE B2-03-512

MEP SERVICES B2-02-009

RECEPTION B2-03-004

MAINT. B2-03-018

CLEAN B2-03-019

MEP SERVICES B2-03-003

DIRTY SUPPLY 02-03-039

AHU

H.K 02-03-038

ELECTRICAL ROOM B2-03-014

DUCT ROOM B2-03-013

EXTERNAL STAIRCASE B2-03-012

JANITOR ROOM B2-02-008

TOILET (M) B2-02-004

TOILET (F) B2-02-007

TOILET (H.C.) B2-02-006

LIFT- 04 PAT. B2-02-504

LIFT- 03 PAT. B2-02-503

LIFT- 02 PAT. B2-02-502

LIFT- 01 PAT. B2-02-501

LIFT LOBBY B2-02-001

LIFT- 05 PAT. B2-02-505

LIFT- 06 PAT. B2-02-506

LIFT- 07 PAT. B2-02-507

LIFT- 08 PAT. B2-02-508

VESTIBULE B2-02-005

LIFT- 13 STAFF FIRE B2-02-513

UPS/BATTERY ROOM FOR MEDICAL EQUIPMENT B2-03-011

PHU ROOM B2-03-022

2.4M CONNECTING CORRIDOR B2-03-023

CORRIDOR B2-03-009

UG TANK

STORE

BLOWER ROOM

STORE ROOM

BLOWER ROOM

STORE ROOM

BLOWER ROOM

UP

DN

FHC

TENDER DRAWING

N

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)
2	110ø/160ø WASTE & VENT PIPE (uPVC)
2@	110ø/160ø LAB SINK WASTE PIPE (uPVC)
3	100ø/150ø R.W. PIPE (uPVC)
4	UWS DN / TAKE
5	FWS DN / TAKE
6	HWS DN / TAKE
7	32ø WASTE PIPE (uPVC)
8	50ø WASTE PIPE (uPVC)
9	40ø SOIL PIPE (uPVC)
	110ø/160ø SOIL PIPE (uPVC)
	110ø/160ø WASTE PIPE (uPVC)
	DOMESTIC WATER SUPPLY PIPE (cPVC)
	FLUSHING WATER SUPPLY PIPE (cPVC)
	HOT WATER SUPPLY PIPE (cPVC)
G	GEYSER (25Ltr.& 35Ltr. CAPACITY)
F.T	FLOOR TRAP 100x100
F.D	FLOOR DRAIN 50ø
COP	CLEAN OUT PLUG
FCO	FLOOR CLEAN OUT
GT	GULLY TRAP(300X300)mm
MH	MANHOLE (900x800)mm
MH	MANHOLE (900ø)
CB	CATCH BASIN(450X450)
	SLUICE VALVE
	NON- RETURN VALVE
KH	KHURRA(450X450)

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

BASEMENT – 2

HSCC/AIIMS/TD/OPD/PL-(-02)
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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NOTES

LEGEND:

1	110ø/160ø SOIL & VENT PIPE (uPVC)	
2	110ø/160ø WASTE & VENT PIPE (uPVC)	
2a	110ø/160ø LAB SINK WASTE PIPE (uPVC)	
3	100ø/150ø R.W. PIPE (uPVC)	
4	DWS DN / TAKE	
5	FWS DN / TAKE	
6	HWS DN / TAKE	
7	32ø WASTE PIPE (uPVC)	
8	50ø WASTE PIPE (uPVC)	
9	40ø SOIL PIPE (uPVC)	
	110ø/160ø SOIL PIPE (uPVC)	
	110ø/160ø WASTE PIPE (uPVC)	
	DOMESTIC WATER SUPPLY PIPE (cPVC)	
	FLUSHING WATER SUPPLY PIPE (cPVC)	
	HOT WATER SUPPLY PIPE (cPVC)	
	GEYSER (25Ltr.& 35Ltr. CAPACITY)	
F.T	FLOOR TRAP 100x100	
F.D	FLOOR DRAIN 50ø	
COP	CLEAN OUT PLUG	
FCO	FLOOR CLEAN OUT	
GT	GULLY TRAP(300X300)mm	
MH	MANHOLE (900x800)mm	
MH	MANHOLE (900ø)	
CB	CATCH BASIN(450X450)	
	SLUICE VALVE	
	NON– RETURN VALVE	
KH	KHURRA(450X450)	

NOTE : ALL PIPES AND FITTINGS SHALL BE AS/ BOQ. ITEM.

NO.	DATE	ISSUED
PRINTS ISSUED		

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REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

PLUMBING TENDER DRAWING

BASEMENT – 1

HSCC/AIIMS/TD/OPD/PL-(-01)
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
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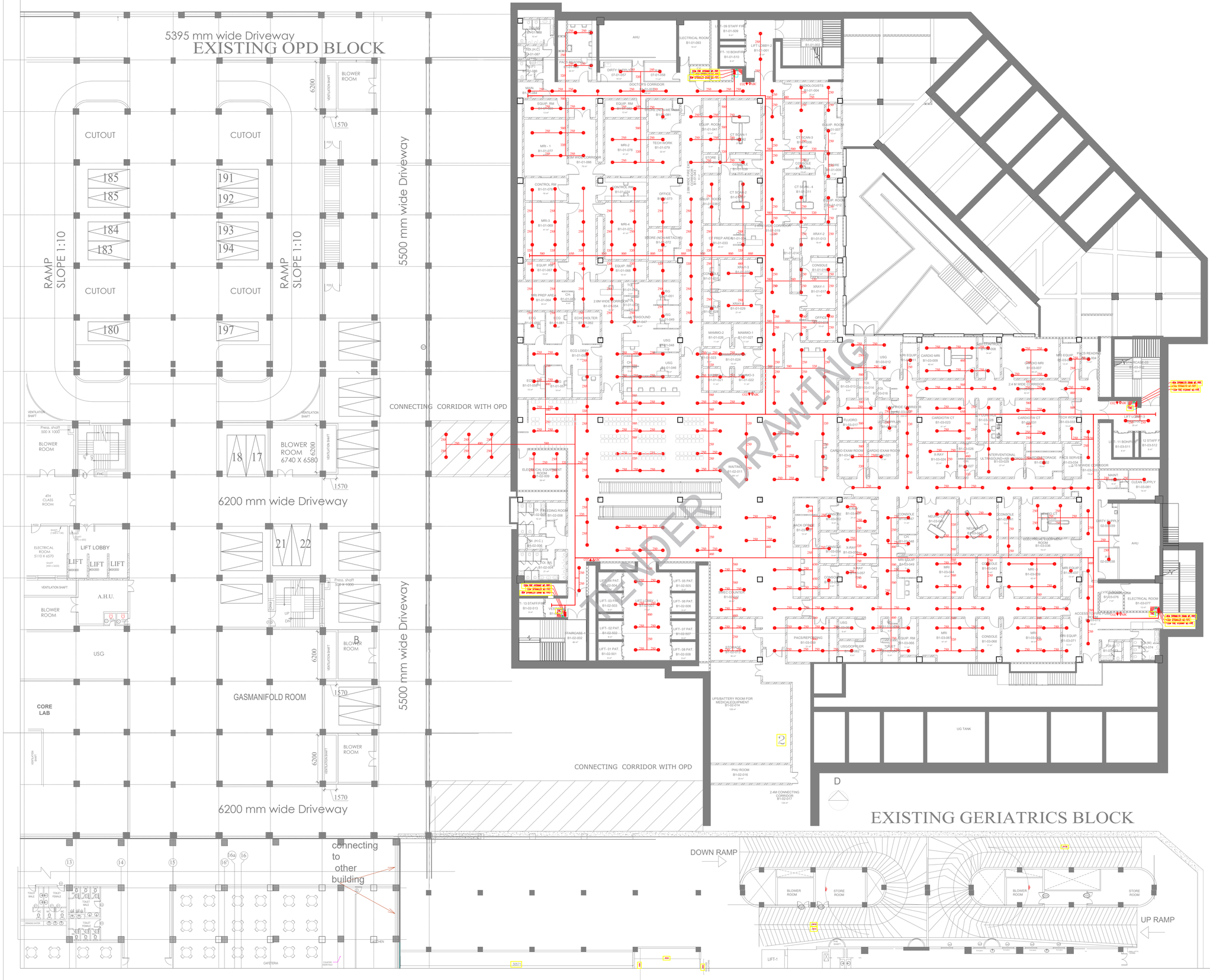
Firefighting Tender Drawings



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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

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REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

BASEMENT – 1

HSCC/AIIMS/TD/OPD/FF-(-01)
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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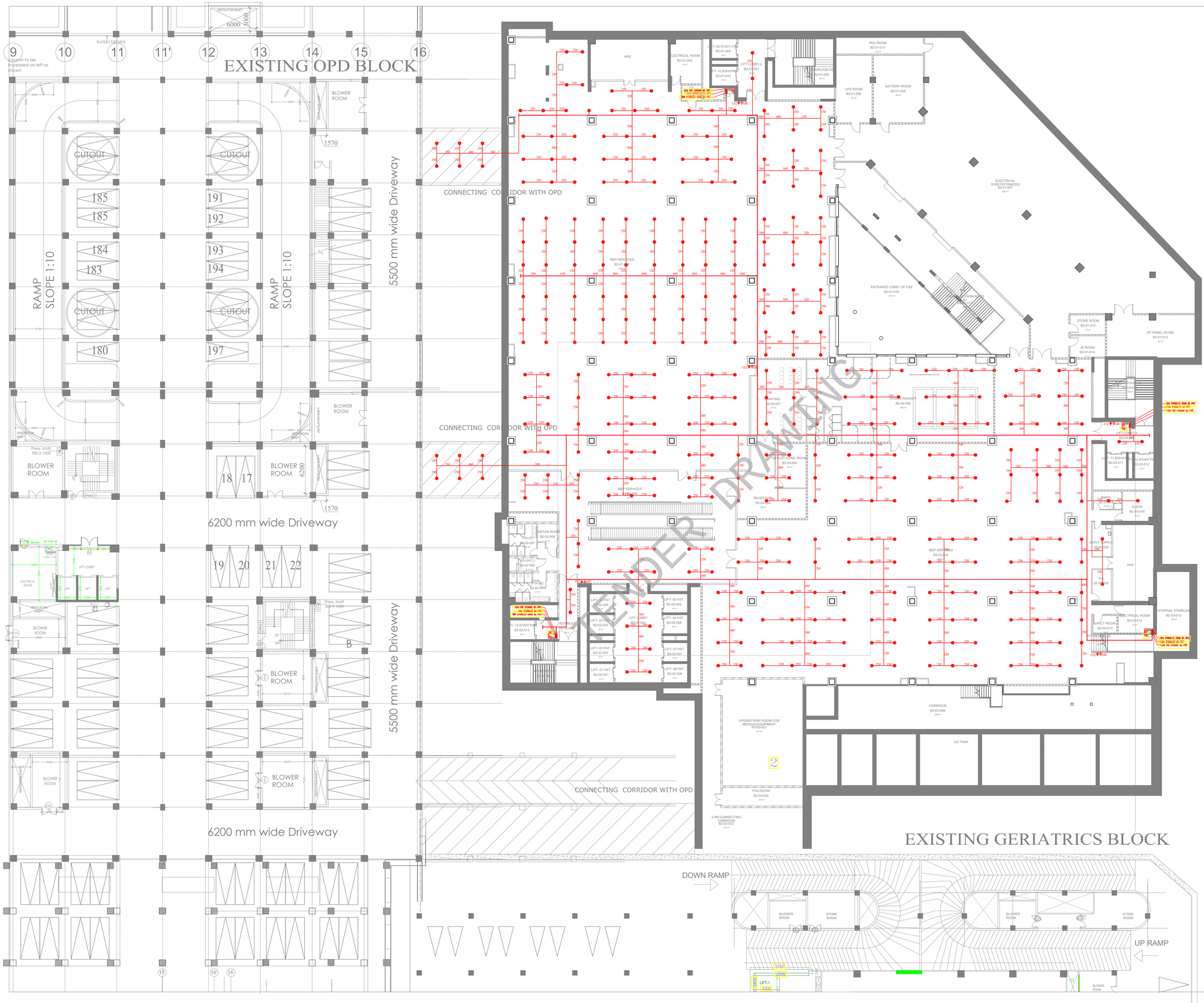

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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
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REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

BASEMENT – 2

HSCC/AIIMS/TD/OPD/FF-(-02)
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
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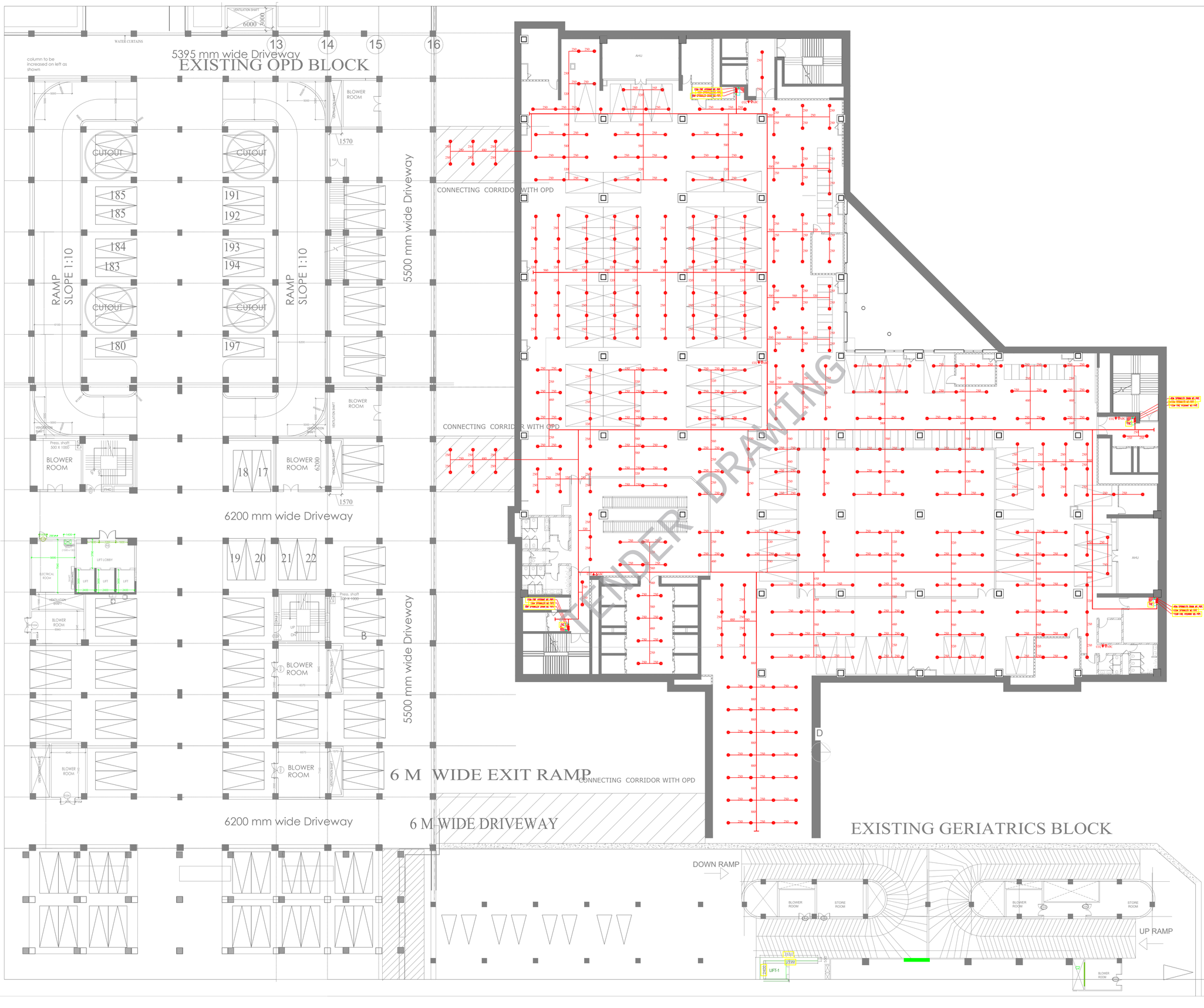

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N

NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

BASEMENT – 3

HSCC/AIIMS/TD/OPD/FF-(-03)
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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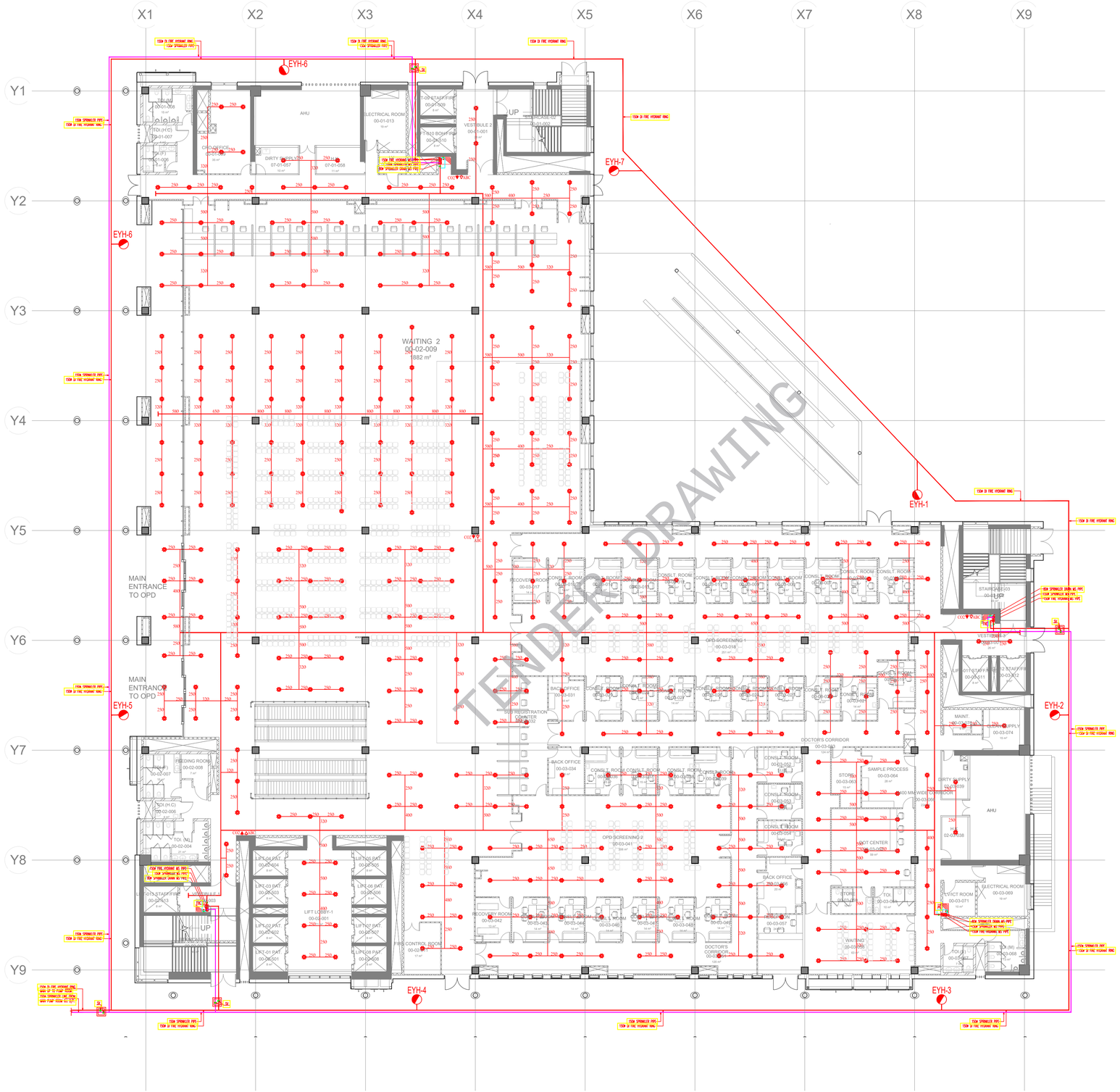
NEW DELHI INDIA


X1
X2
X3
X4
X5
X6
X7
X8
X9
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
EYH-1
EYH-2
EYH-3
EYH-4
EYH-5
EYH-6
EYH-7
15CM SPRINKLER PIPE
15CM DI FIRE HYDRANT RING
AHU
ELECTRICAL ROOM
00-01-013
VESTIBULE 2
00-01-001
WAITING 2
00-02-009
882 m²
MAIN ENTRANCE TO OPD
RECEPTION COUNTER
00-02-002
DOCTOR'S CORRIDOR
00-03-053
OPD SCREENING 1
00-03-018
OPD SCREENING 2
00-03-041
FIRE CONTROL ROOM
00-03-067
LIFT LOBBY-1
00-02-001
STAIR CASE-03
00-03-003
STAIR CASE-02
00-01-002
STAIR CASE-01
00-02-003
SAMPLE PROCESS
00-03-064
STORE
00-03-063
SLOT CENTER
00-03-060
EVICT ROOM
00-03-071
WAITING
00-03-068
DIRTY LINEN
07-01-007
07-01-008
CROSS DUCT
00-01-004
TOILET
00-01-008
TOI.(H.C)
00-01-007
TOILET
00-01-006
TOI.(H.C)
00-02-006
TOI. (M)
00-02-004
FEEDING ROOM
00-02-008
TOILET
00-02-007
TOILET
00-03-062
TOILET
00-03-061
TOILET
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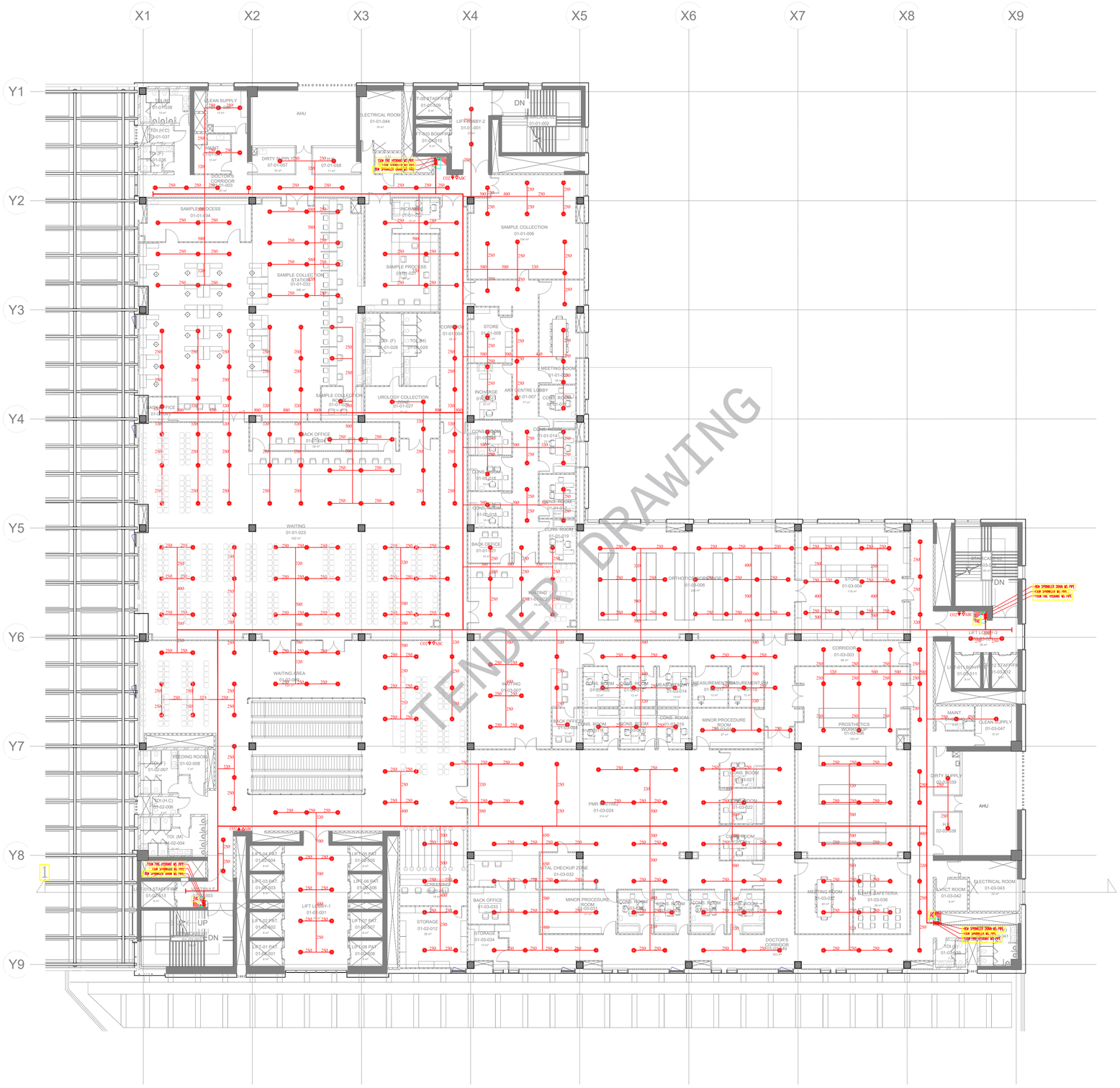
TOILET



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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

FIRST FLOOR

HSCC/AIIMS/TD/OPD/FF-02
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

SECOND FLOOR

HSCC/AIIMS/TD/OPD/FF-03
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

THIRD FLOOR

HSCC/AIIMS/TD/OPD/FF-04
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

FOURTH FLOOR

HSCC/AIIMS/TD/OPD/FF-05
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

FIFTH FLOOR

HSCC/AIIMS/TD/OPD/FF-06
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

SIXTH FLOOR

HSCC/AIIMS/TD/OPD/FF-06
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

SEVENTH FLOOR

HSCC/AIIMS/TD/OPD/FF-07
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

EIGHTH FLOOR

HSCC/AIIMS/TD/OPD/FF-08
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

NINTH FLOOR

HSCC/AIIMS/TD/OPD/FF-09
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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TENDER DRAWING

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NOTES

LEGEND :

SYMBOL	DESCRIPTION
	SIDE WALL SPRINKLER
	UPRIGHT TYPE SPRINKLER / PEDENT TYPE SPRINKLER
	BALL VALVE 25MM DIA
	BUTTERFLY VALVE 150MM DIA
	BUTTERFLY VALVE 50MM DIA
FS	FLOW SWITCH
	SIGHT GLASS
CO2	4.5 KG.CO2 TYPE EXTINGUISHER
ABC	6 KG ABC TYPE EXTINGUISHER
FH	FIRE HYDRANT
	HOSE REEL 20MM X 36 MTRS.
	FIRE HOSE CABINET

NO.	DATE	ISSUED
PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

FIRE-FIGHTING TENDER DRAWING

TERRACE PLAN

HSCC/AIIMS/TD/OPD/FF-10
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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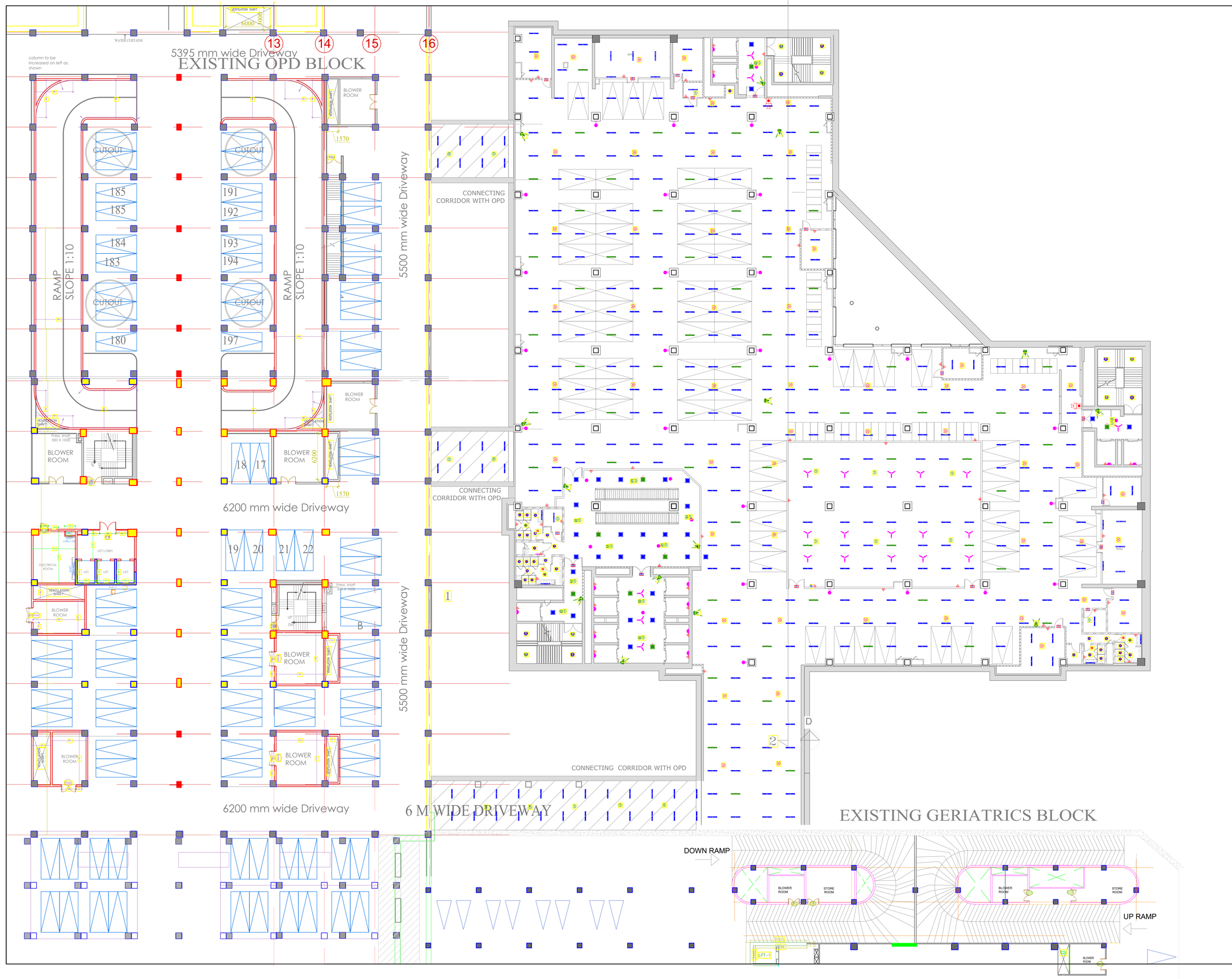
Electrical Tender Drawings



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NOTES

ELECTRICAL LEGEND

S.NO	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-1(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
18		DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23	S	SMOKE DETECTOR BELOW FALSE CEILING
24	S	SMOKE DETECTOR BELOW FALSE CEILING
25	RI	RESPONSE INDICATOR
26	H	HEAT DETECTOR
27		TV OUTLET
28	WM	WALL MOUNTAIN SENSOR
29	PIR	PIR SENSOR
30		INDOOR CCTV
31	MCB	32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT–3

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-01-B3
Drawing No.

Job No.	Scale	Date
App by	Rev. by	Prep. by

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NOTES

ELECTRICAL LEGEND

S.NO.	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-2(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 2NOS 5A)(SWITCH: 16A)
18		DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23	S	SMOKE DETECTOR BELOW FALSE CEILING
24	S	SMOKE DETECTOR BELOW FALSE CEILING
25	RI	RESPONSE INDICATOR
26	H	HEAT DETECTOR
27		TV OUTLET
28	WM	WALL MOUNTAIN SENSOR
29	PIR	PIR SENSOR
30		INDOOR CCTV
31	32A	32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

~~PROJECT~~

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT-2

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-02-B2
Drawing No.

Job No.	Scale	Date
App by	Rev. by	Prep. by

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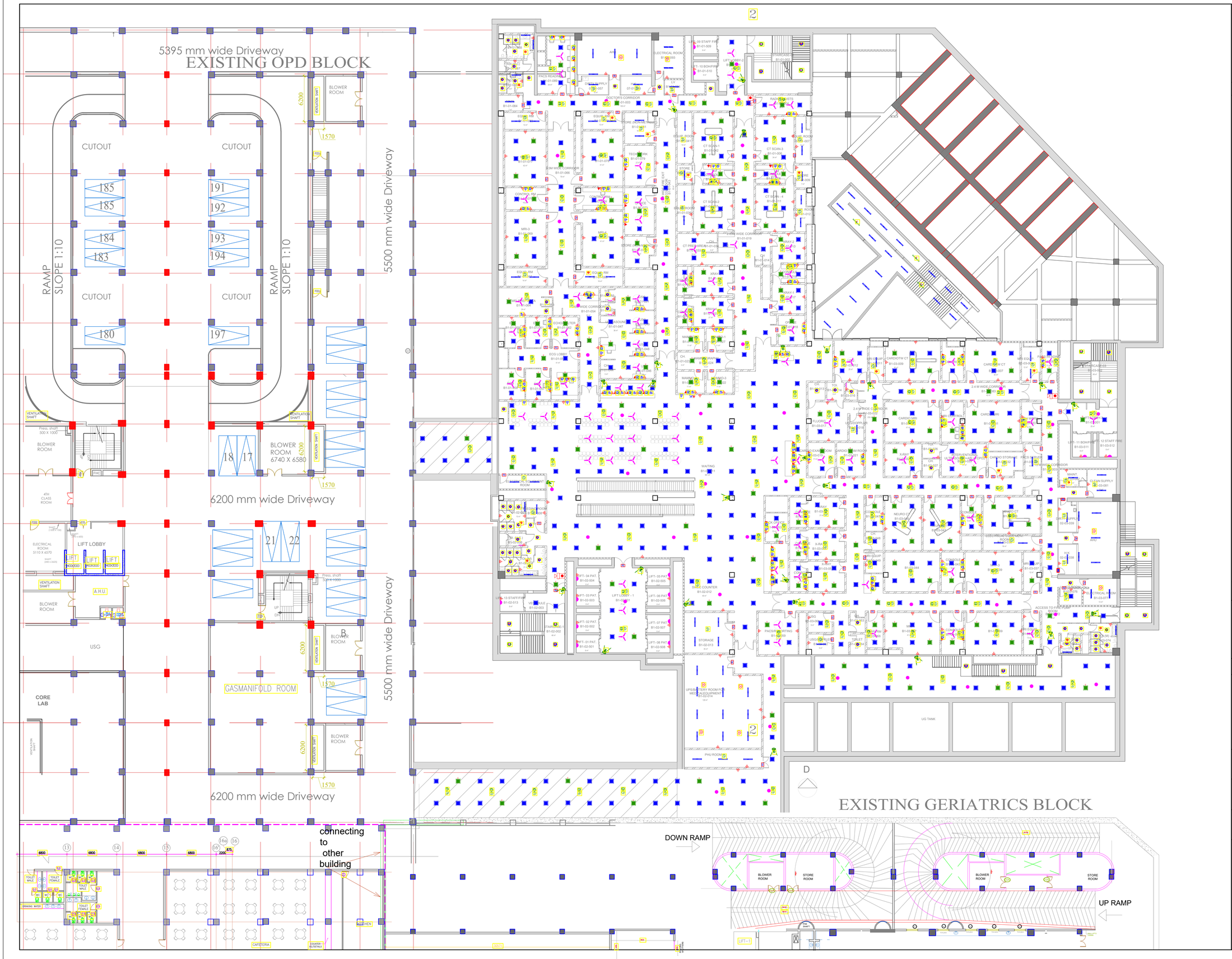
NEW DELHI INDIA



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NOTES

ELECTRICAL LEGEND

S.NO	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET- 2NOS 5AXSWITCH- 5A) FOR TV
15		COMBO-1(SOCKET- 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET- 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET- 3NOS 5AXSWITCH- 16A)
18		DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23	S	SMOKE DETECTOR BELOW FALSE CEILING
24	S	SMOKE DETECTOR BELOW FALSE CEILING
25	RI	RESPONSE INDICATOR
26	H	HEAT DETECTOR
27		TV OUTLET
28	WM	WALL MOUNTAIN SENSOR
29	PIR	PIR SENSOR
30		INDOOR CCTV
31	MCB	32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT – 1

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-03-B1
Drawing No.

Job No.	Scale	Date
App by	Rev. by	Prep. by

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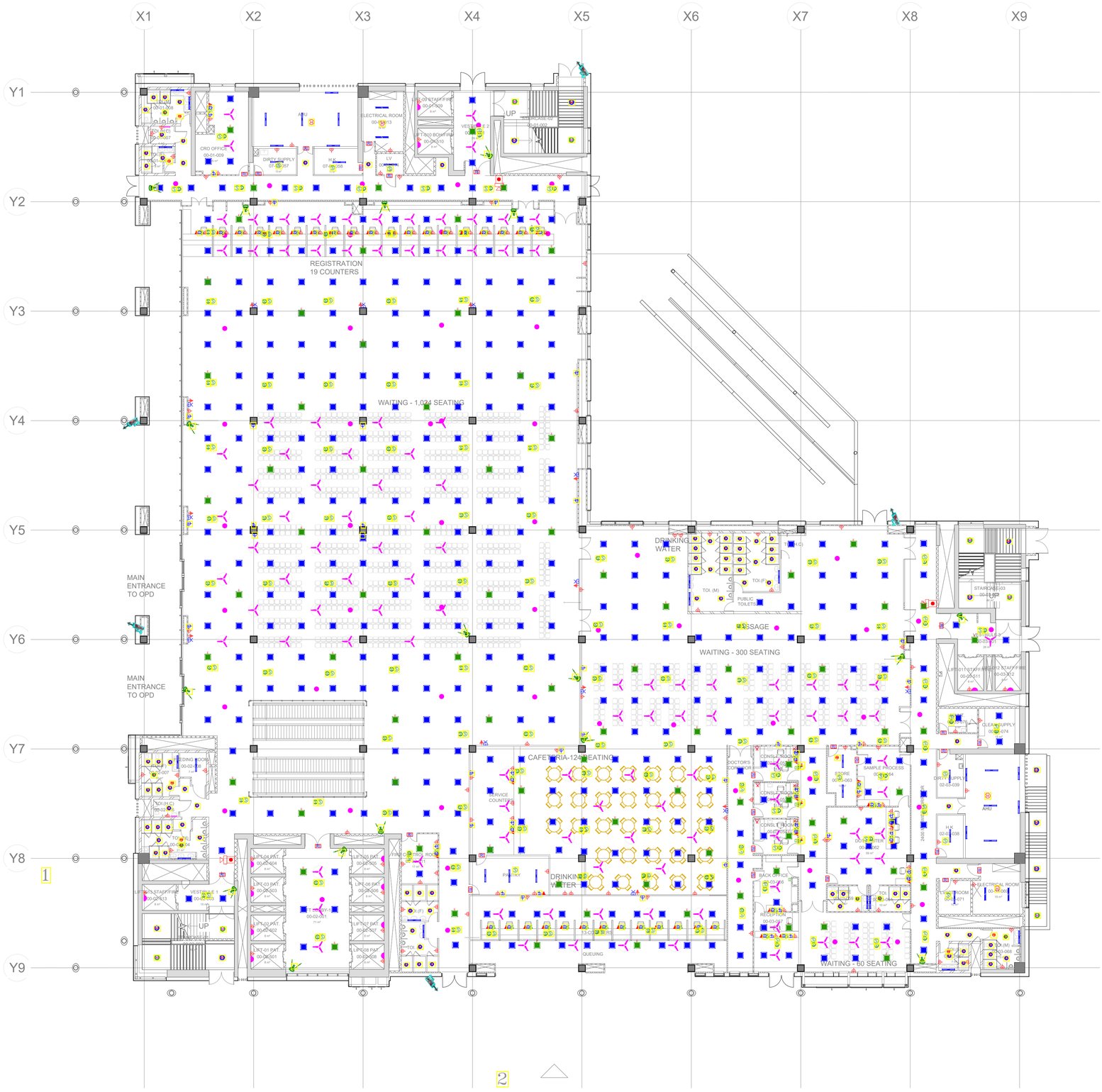

ELECTRICAL LEGEND

S.NO	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-1(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
18	C	DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23	S	SMOKE DETECTOR BELOW FALSE CEILING
24	S	SMOKE DETECTOR BELOW FALSE CEILING
25	RI	RESPONSE INDICATOR
26	H	HEAT DETECTOR
27		TV OUTLET
28	WM	WALL MOUNTAIN SENSOR
29	PIR	PIR SENSOR
30	IR	INDOOR CCTV
31	32A	32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35	Bullet	BULLET CCTV

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NOTES

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REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

GROUND FLOOR

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-04-GF.
Drawing No.

Job No.	1:200 Scale	March'24 Date
App by	Rev. by	Prep. by

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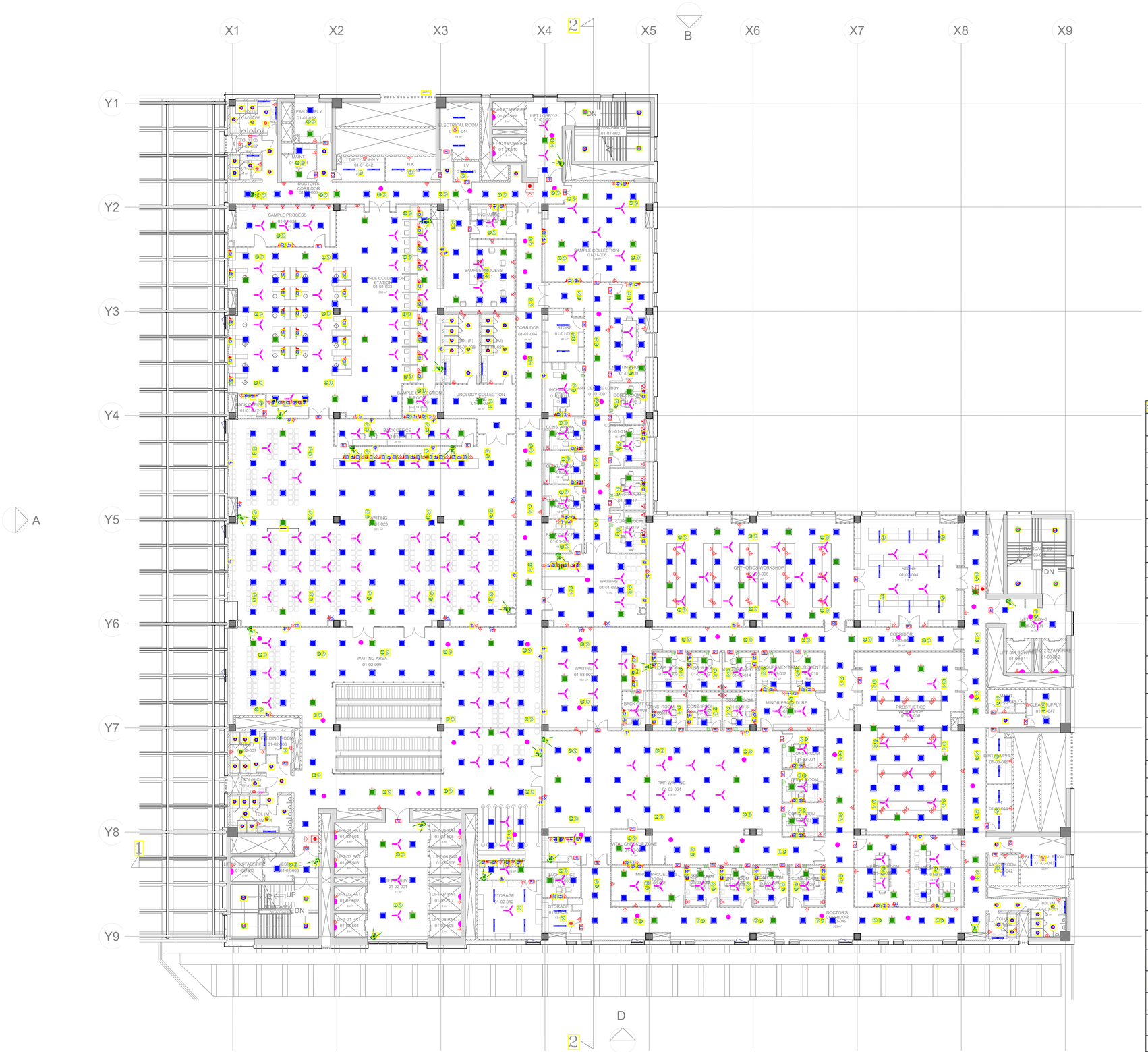
NEW DELHI INDIA



ELECTRICAL LEGEND

S.NO.	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-1(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
18		DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23		SMOKE DETECTOR BELOW FALSE CEILING
24		SMOKE DETECTOR BELOW FALSE CEILING
25		RESPONSE INDICATOR
26		HEAT DETECTOR
27		TV OUTLET
28		WALL MOUNTAIN SENSOR
29		PIR SENSOR
30		INDOOR CCTV
31		32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

N

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PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

FIRST FLOOR

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-05-1F.
Drawing No.

Job No.	1:200 Scale	March'24 Date
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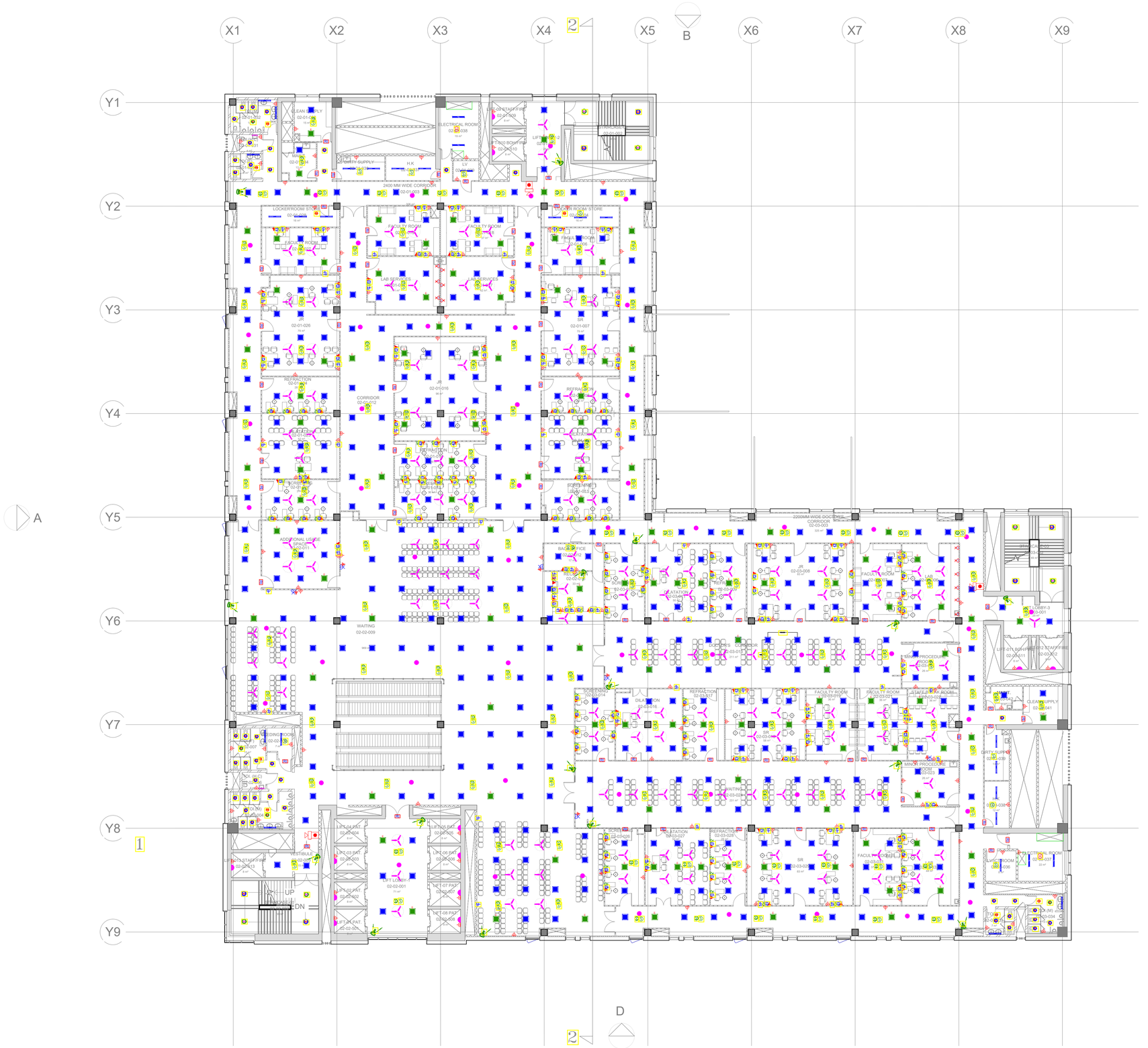

ELECTRICAL LEGEND

S.NO.	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-1(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
18		DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23		SMOKE DETECTOR BELOW FALSE CEILING
24		SMOKE DETECTOR BELOW FALSE CEILING
25		RESPONSE INDICATOR
26		HEAT DETECTOR
27		TV OUTLET
28		WALL MOUNTAIN SENSOR
29		PIR SENSOR
30		INDOOR CCTV
31		32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

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PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SECOND FLOOR

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-06-2F.
Drawing No.

Job No.	1:200 Scale	March'24 Date
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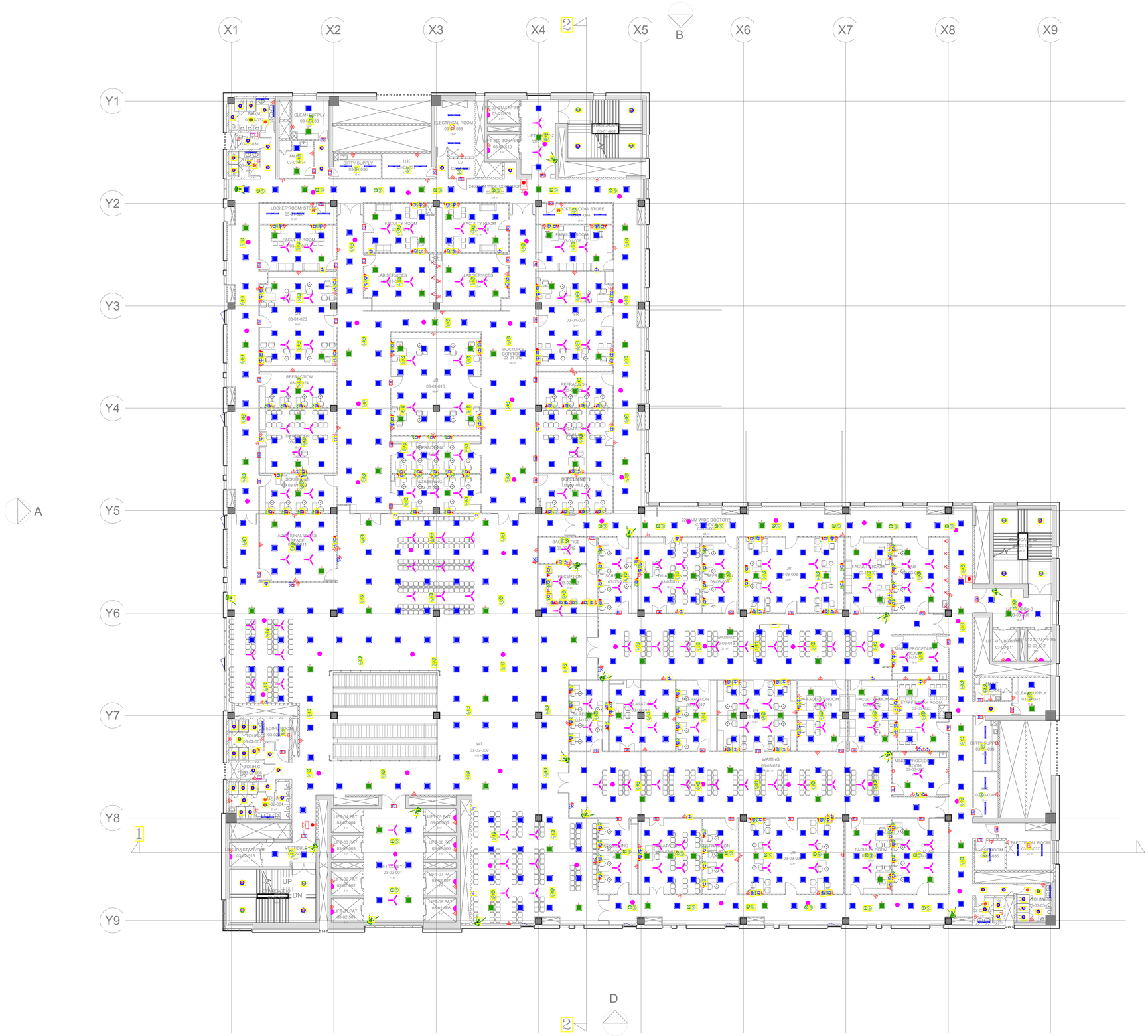

ELECTRICAL LEGEND

S.NO.	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-1(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
18		DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23		SMOKE DETECTOR BELOW FALSE CEILING
24		SMOKE DETECTOR BELOW FALSE CEILING
25		RESPONSE INDICATOR
26		HEAT DETECTOR
27		TV OUTLET
28		WALL MOUNTAIN SENSOR
29		PIR SENSOR
30		INDOOR CCTV
31		32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

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REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

THIRD FLOOR

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-07-3F.
Drawing No.

Job No.	1:200 Scale	March'24 Date
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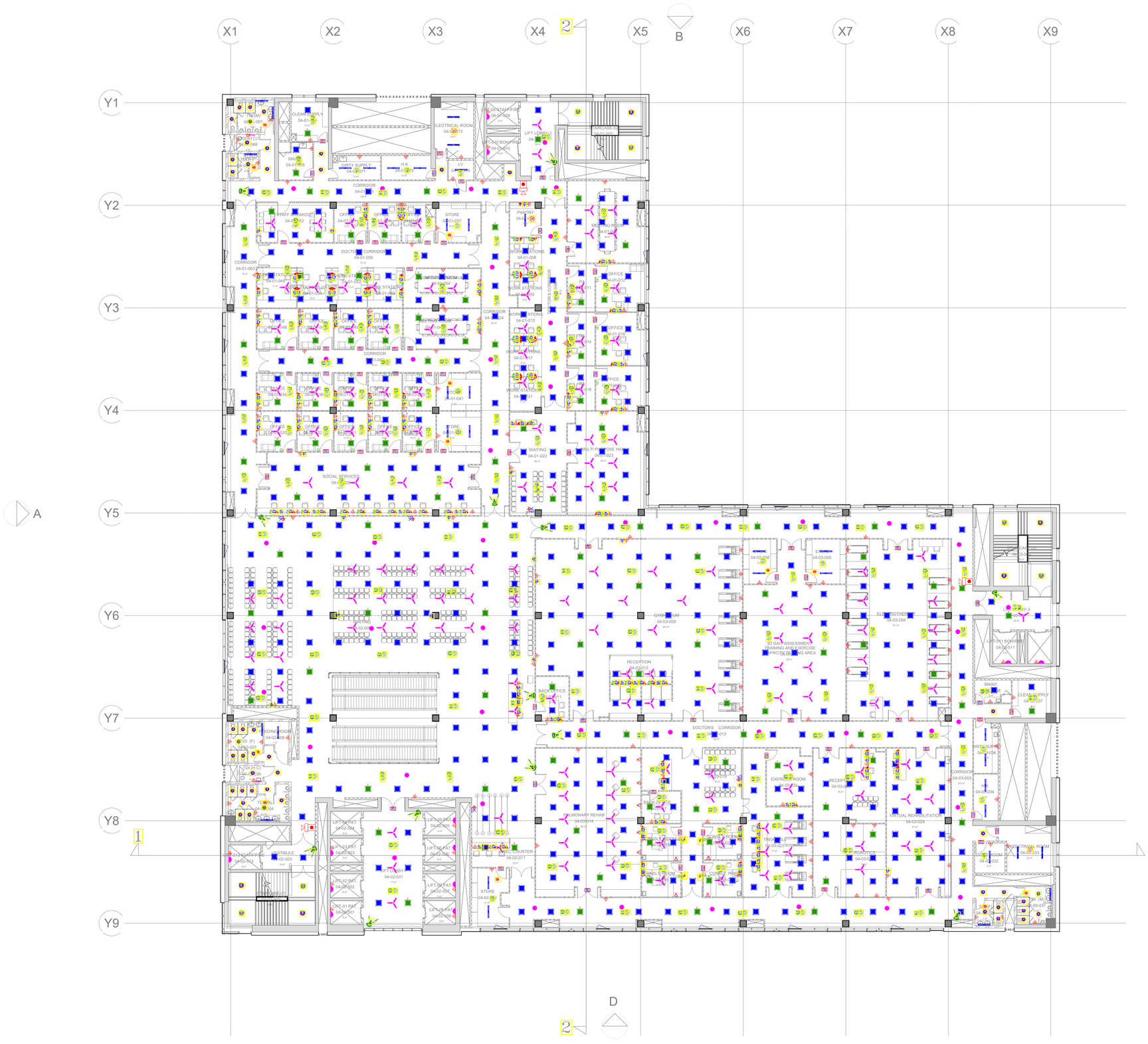
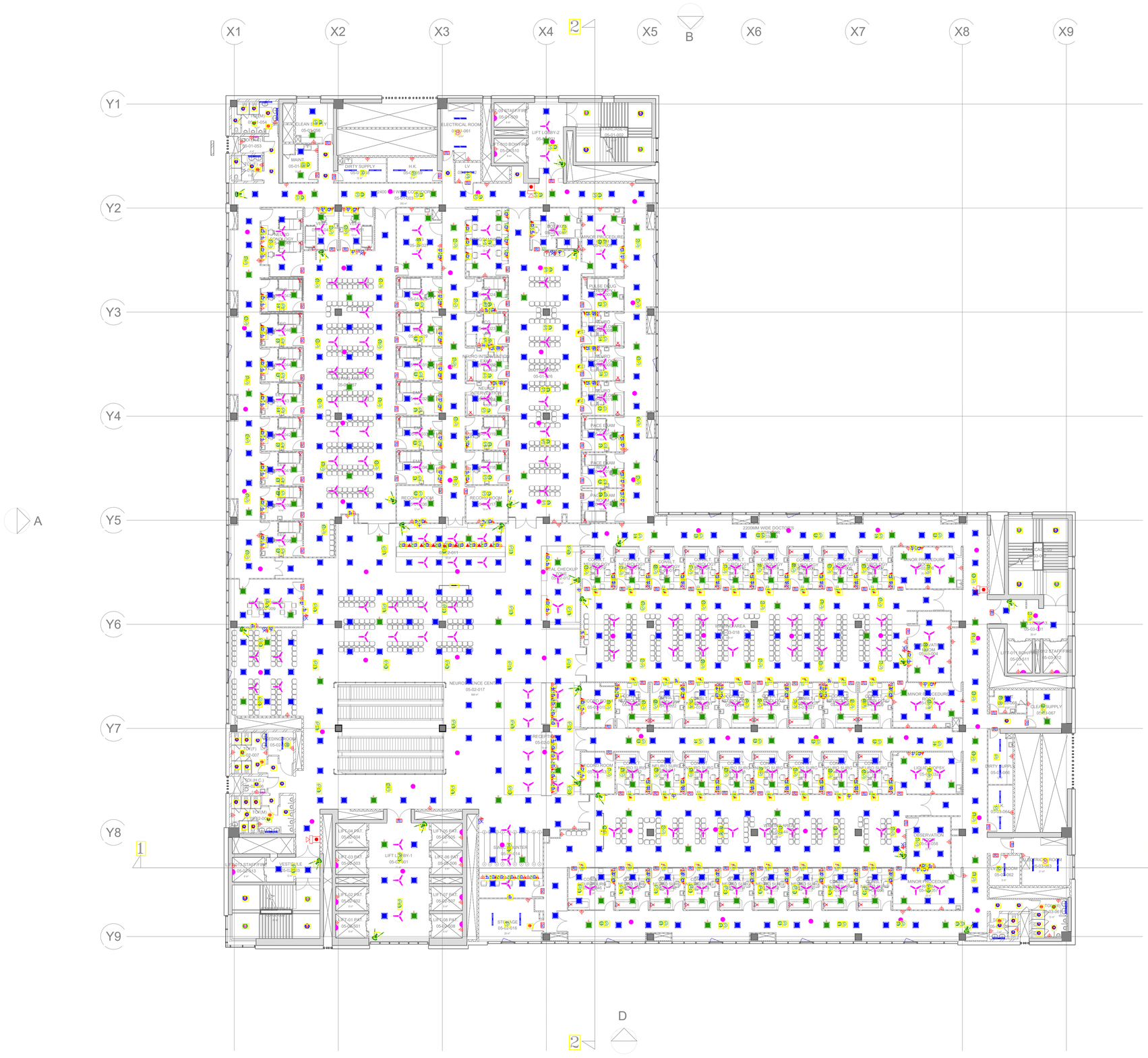
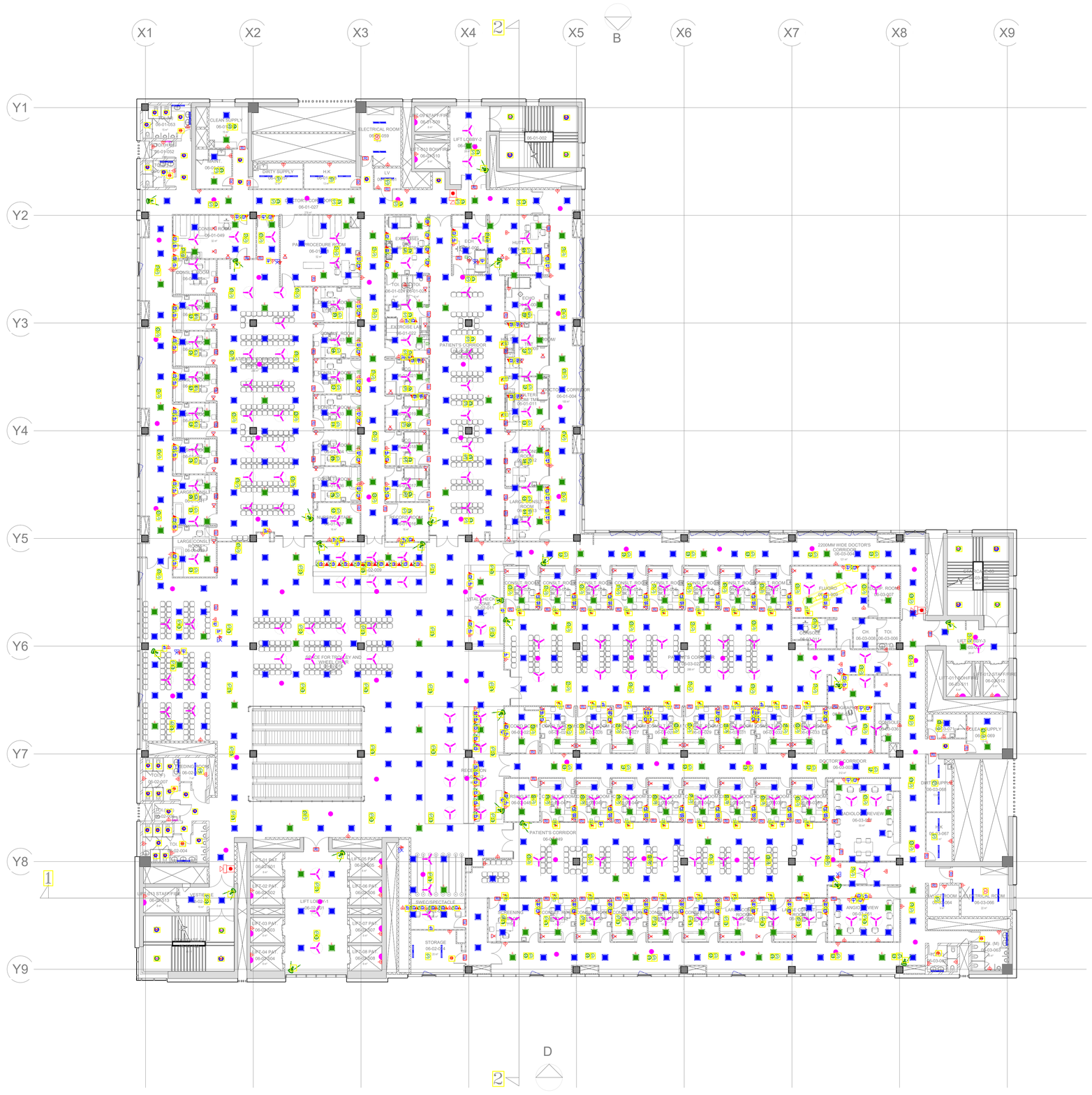

X1
X2
X3
X4
X5
X6
X7
X8
X9
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
A
B
D
1
2
CORRIDOR 04-01-063
DOCTORS CORRIDOR 04-01-056
CORRIDOR 04-01-058
CORRIDOR 04-01-060
CORRIDOR 04-01-061
CORRIDOR 04-01-062
CORRIDOR 04-01-064
CORRIDOR 04-01-065
CORRIDOR 04-01-066
CORRIDOR 04-01-067
CORRIDOR 04-01-068
CORRIDOR 04-01-069
CORRIDOR 04-01-070
CORRIDOR 04-01-071
CORRIDOR 04-01-072
CORRIDOR 04-01-073
CORRIDOR 04-01-074
CORRIDOR 04-01-075
CORRIDOR 04-01-076
CORRIDOR 04-01-077
CORRIDOR 04-01-078
CORRIDOR 04-01-079
CORRIDOR 04-01-080
CORRIDOR 04-01-081
CORRIDOR 04-01-082
CORRIDOR 04-01-083
CORRIDOR


X1
X2
X3
X4
X5
X6
X7
X8
X9
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
A
B
D
1
2
ELECTRICAL ROOM
LIFT LOBBY-2
DIRTY SUPPLY
H.K.
MAINT.
PULSE DEUO
NEURO INTERVENTION
PACE EXAM
RECORD ROOM
2200MM WIDE DOCTOR
MINOR PROCEDURE
NEURO SURGERY
NEURO SURGERY WAITING AREA
NEURO SURGERY CONSULTANT
NEURO SURGERY RESIDENT
NEURO SURGERY NURSE
NEURO SURGERY PROCEDURE
NEURO SURGERY CONSULTANT ROOM
NEURO SURGERY RESIDENT ROOM
NEURO SURGERY NURSE ROOM
NEURO SURGERY PROCEDURE ROOM
NEURO SURGERY OBSERVATION
NEURO SURGERY OBSERVATION ROOM
NEURO SURGERY MINOR PROCEDURE
NEURO SURGERY MINOR PROCEDURE ROOM
NEURO SURGERY LIQUID NURSY
NEURO SURGERY LIQUID NURSY ROOM
NEURO SURGERY DIRTY SUPPLY
NEURO SURGERY DIRTY SUPPLY ROOM
NEURO SURGERY CLEAN SUPPLY
NEURO SURGERY CLEAN SUPPLY ROOM
NEURO SURGERY TOILET
NEURO SURGERY TOILET ROOM
NEURO SURGERY TOILET (M)
NEURO SURGERY TOILET (M) ROOM
NEURO SURGERY TOILET (F)
NEURO SURGERY TOILET (F) ROOM
NEURO SURGERY TOILET (H)
NEURO SURGERY TOILET (H) ROOM
NEURO SURGERY TOILET (P)
NEURO SURGERY TOILET (P) ROOM
NEURO SURGERY TOILET (SW)
NEURO SURGERY TOILET (SW) ROOM
NEURO SURGERY TOILET (SW) ROOM
NEURO SURGERY TOILET (SW) ROOM



ELECTRICAL LEGEND

S.NO.	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-1(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
18		DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23		SMOKE DETECTOR BELOW FALSE CEILING
24		SMOKE DETECTOR BELOW FALSE CEILING
25		RESPONSE INDICATOR
26		HEAT DETECTOR
27		TV OUTLET
28		WALL MOUNTAIN SENSOR
29		PIR SENSOR
30		INDOOR CCTV
31		32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

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NOTES

NO.	DATE	ISSUED

PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SIXTH FLOOR

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-10-6F.
Drawing No.

Job No.	1:200 Scale	March'24 Date
App by	Rev. by	Prep. by

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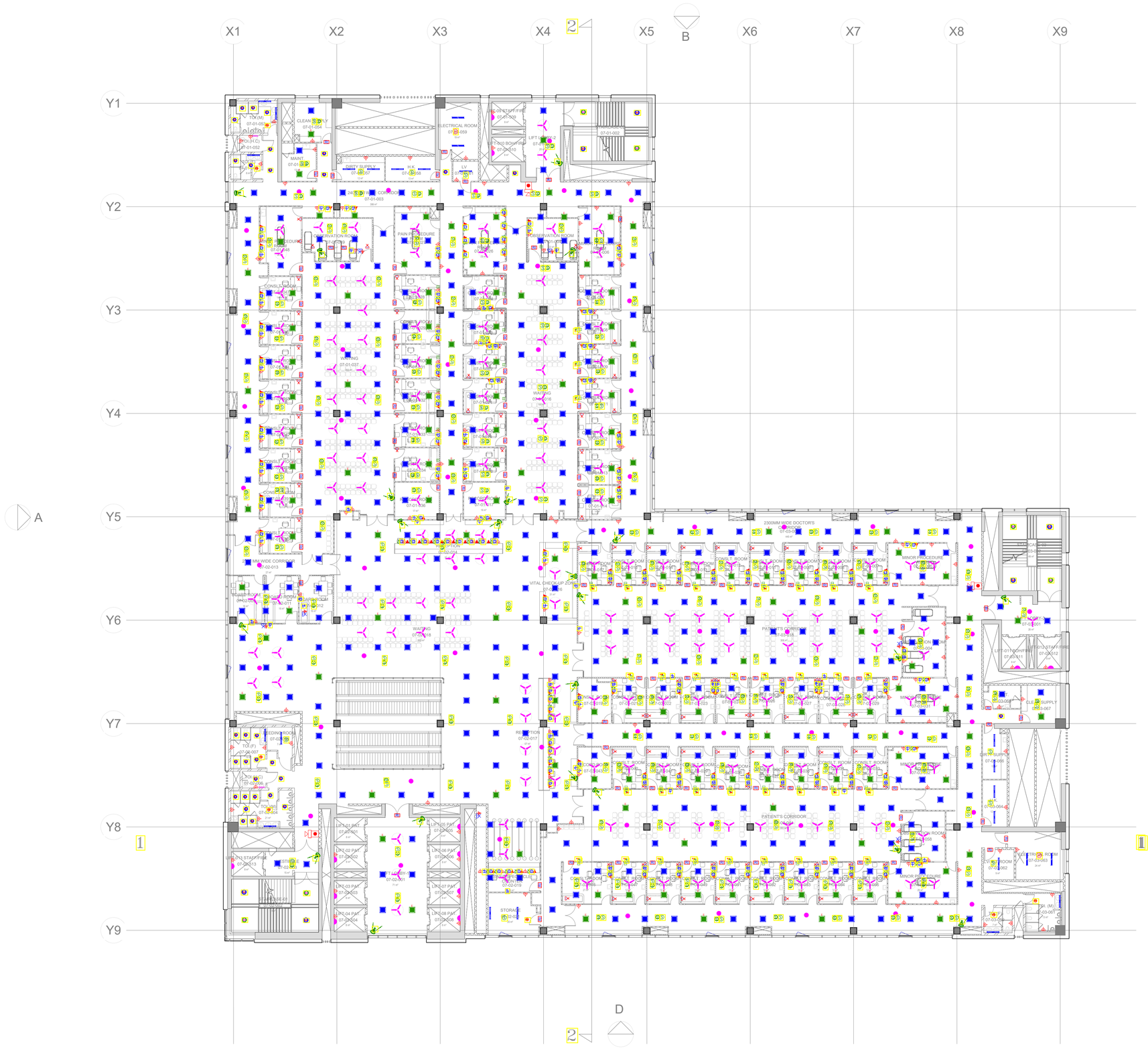

ELECTRICAL LEGEND

S.NO.	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-1(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
18		DATA OUTLET
19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23		SMOKE DETECTOR BELOW FALSE CEILING
24		SMOKE DETECTOR BELOW FALSE CEILING
25		RESPONSE INDICATOR
26		HEAT DETECTOR
27		TV OUTLET
28		WALL MOUNTAIN SENSOR
29		PIR SENSOR
30		INDOOR CCTV
31		32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

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PRINTS ISSUED

REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SEVENTH FLOOR

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-11-7F.
Drawing No.

Job No.	1:200 Scale	March'24 Date
App by	Rev. by	Prep. by

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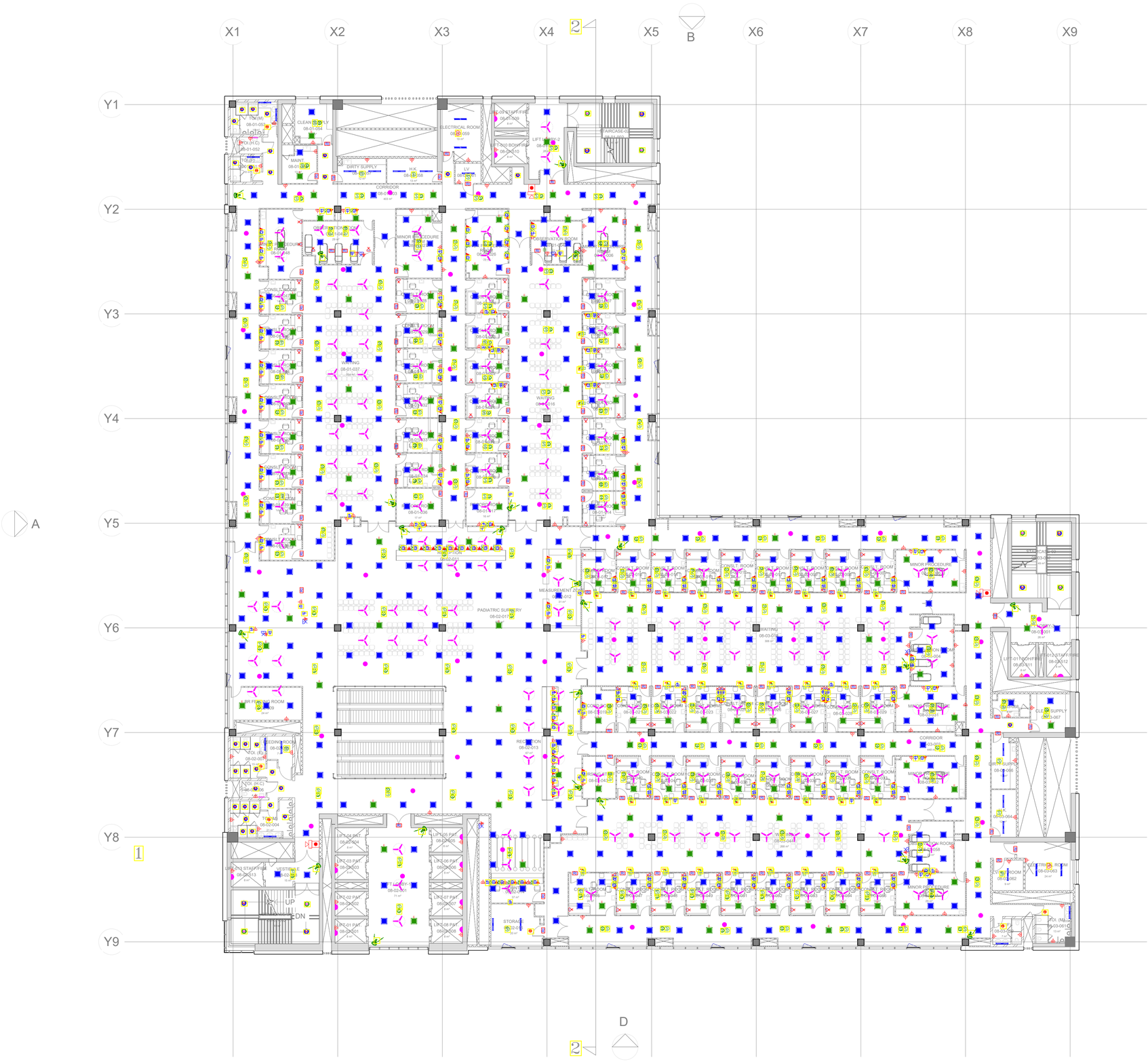

ELECTRICAL LEGEND

S.NO.	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
11		EXHAUST FAN FOR TOILET
12		15A POWER POINT
13		5A POWER POINT
14		COMBO-3(SOCKET: 2NOS 5A)(SWITCH: 5A) FOR TV
15		COMBO-1(SOCKET: 2NOS 16A,2NOS 5A)
16		COMBO-2(SOCKET: 1NOS 16A,2NOS 5A)
17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
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19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23		SMOKE DETECTOR BELOW FALSE CEILING
24		SMOKE DETECTOR BELOW FALSE CEILING
25		RESPONSE INDICATOR
26		HEAT DETECTOR
27		TV OUTLET
28		WALL MOUNTAIN SENSOR
29		PIR SENSOR
30		INDOOR CCTV
31		32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

N

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PRINTS ISSUED		

REV	DATE	DESCRIPTION
REVISION		

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

EIGHTH FLOOR

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-12-8F.
Drawing No.

Job No.	1:200 Scale	March'24 Date
App by	Rev. by	Prep. by

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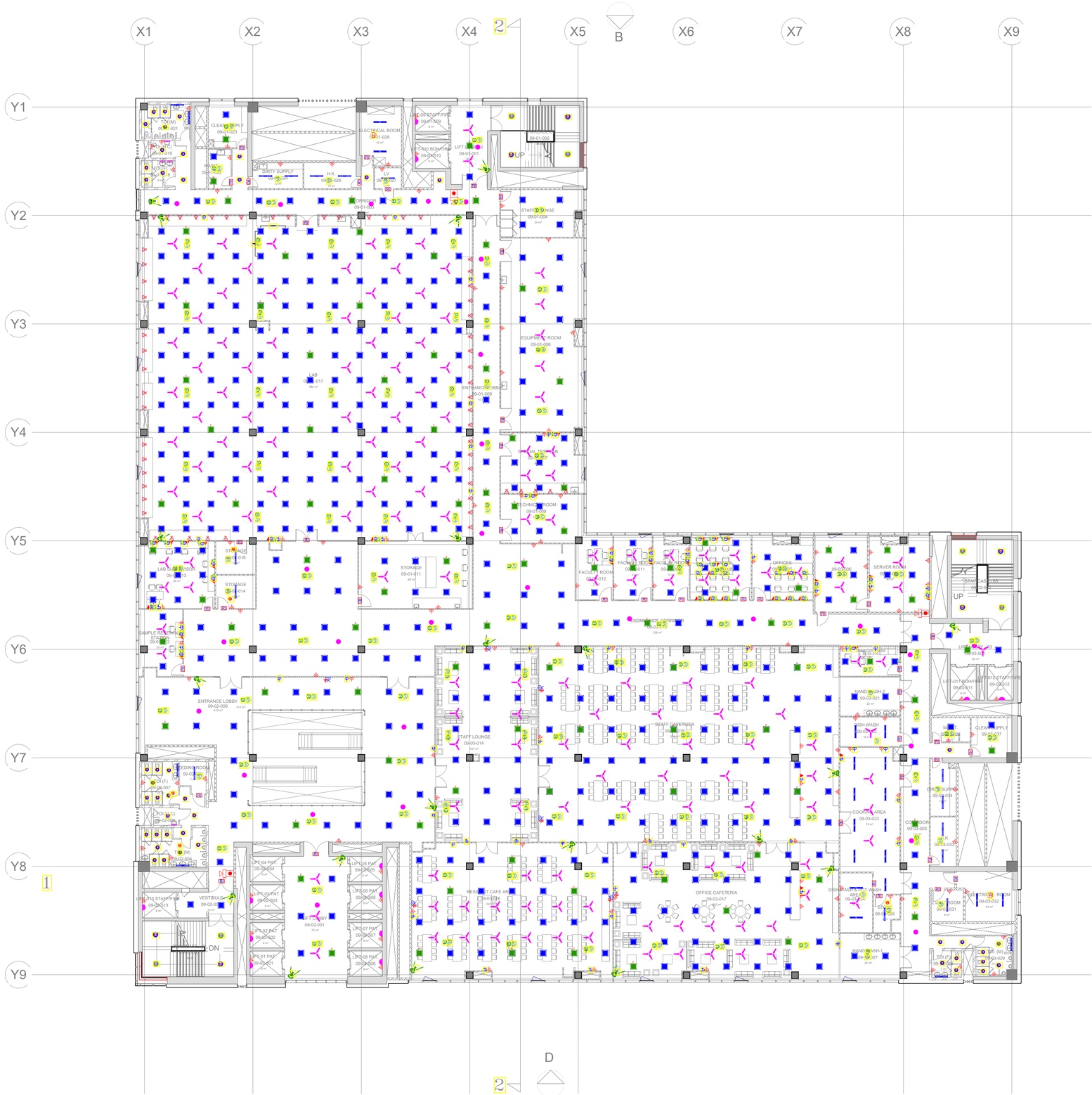

ELECTRICAL LEGEND

S.NO.	SYMBOL	DESCRIPTION
1		1200 MM CEILING FAN
2		20 WATT LED LIGHT FIXTURE SURFACE
3		36 WATT LED LIGHT FIXTURE SURFACE
4		36 WATT LED LIGHT FIXTURE RECESS
5		6 WATT LED BULK HEAD
6		10 WATT LED MIRROR LIGHT FIXTURE
7		12WATT LED DOWN LIGHT RECESS
8		6WATT LED DOWN LIGHT RECESS
9		20WATT LED DOWN LIGHT SURFACE
10		EXHAUST FAN FOR KITCHEN
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17		10A POINT FOR COMPUTER (SOCKET: 3NOS 5A)(SWITCH: 16A)
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19		TELEPHONE POINT
20		HOOTER
21		MANUAL CALL POINT
22		CEILING MOUNT SPEAKER
23		SMOKE DETECTOR BELOW FALSE CEILING
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25		RESPONSE INDICATOR
26		HEAT DETECTOR
27		TV OUTLET
28		WALL MOUNTAIN SENSOR
29		PIR SENSOR
30		INDOOR CCTV
31		32A MCB
32		40 WATT DOUBLE HEIGHT DOWN LIGHT
33		WALL MOUNT SPEAKER
34		NURSE CALL BELL
35		BULLET CCTV

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REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

NINTH FLOOR

ELECTRICAL LAYOUT DRAWING

HSCC/AIIMS/TD/OPD/EL-13-9F.
Drawing No.

Job No.	1:200 Scale	March'24 Date
App by	Rev. by	Prep. by

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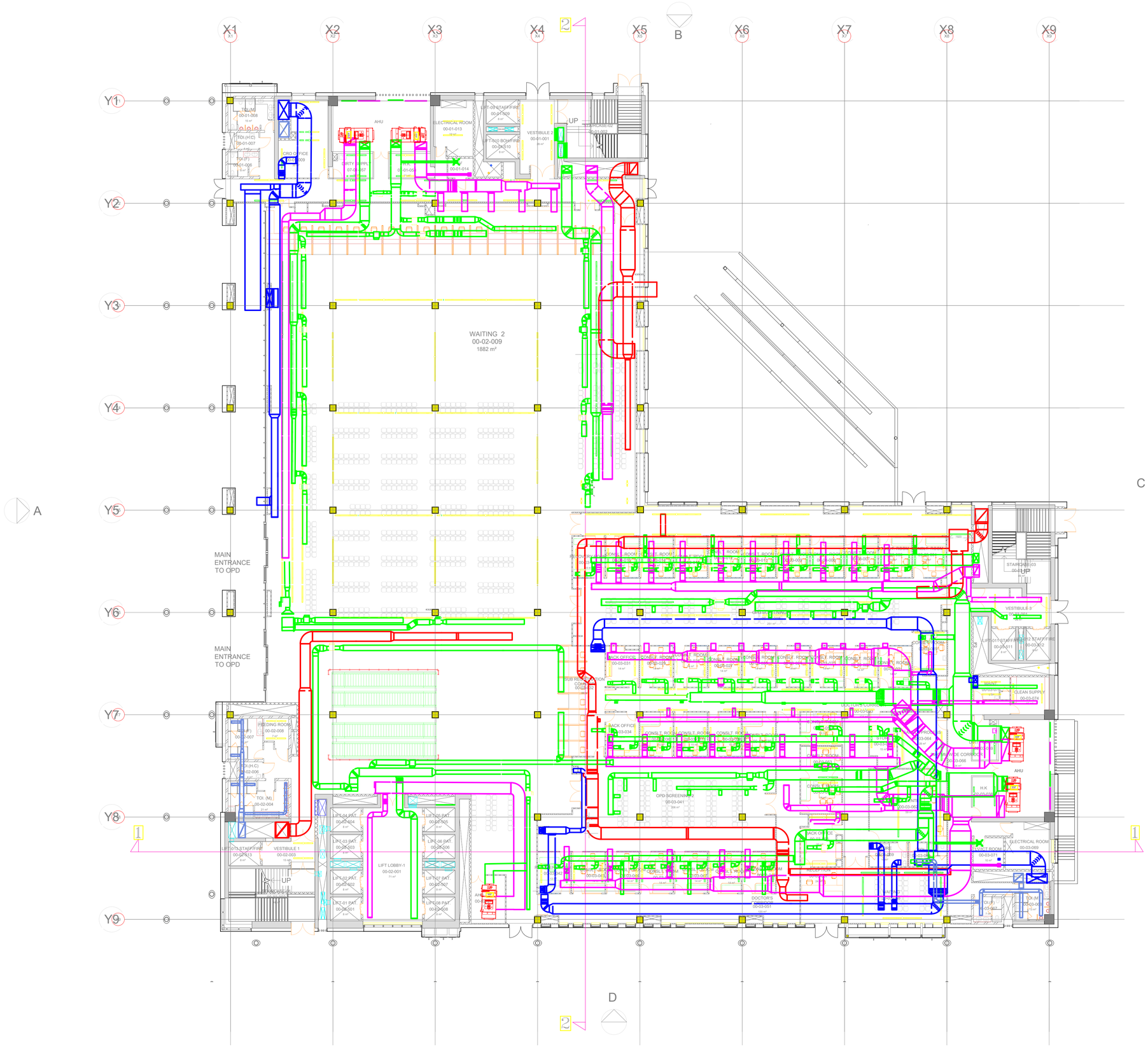
HVAC Tender Drawings



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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

GROUND FLOOR

HSCC/AIIMS/HVAC/OPD/002
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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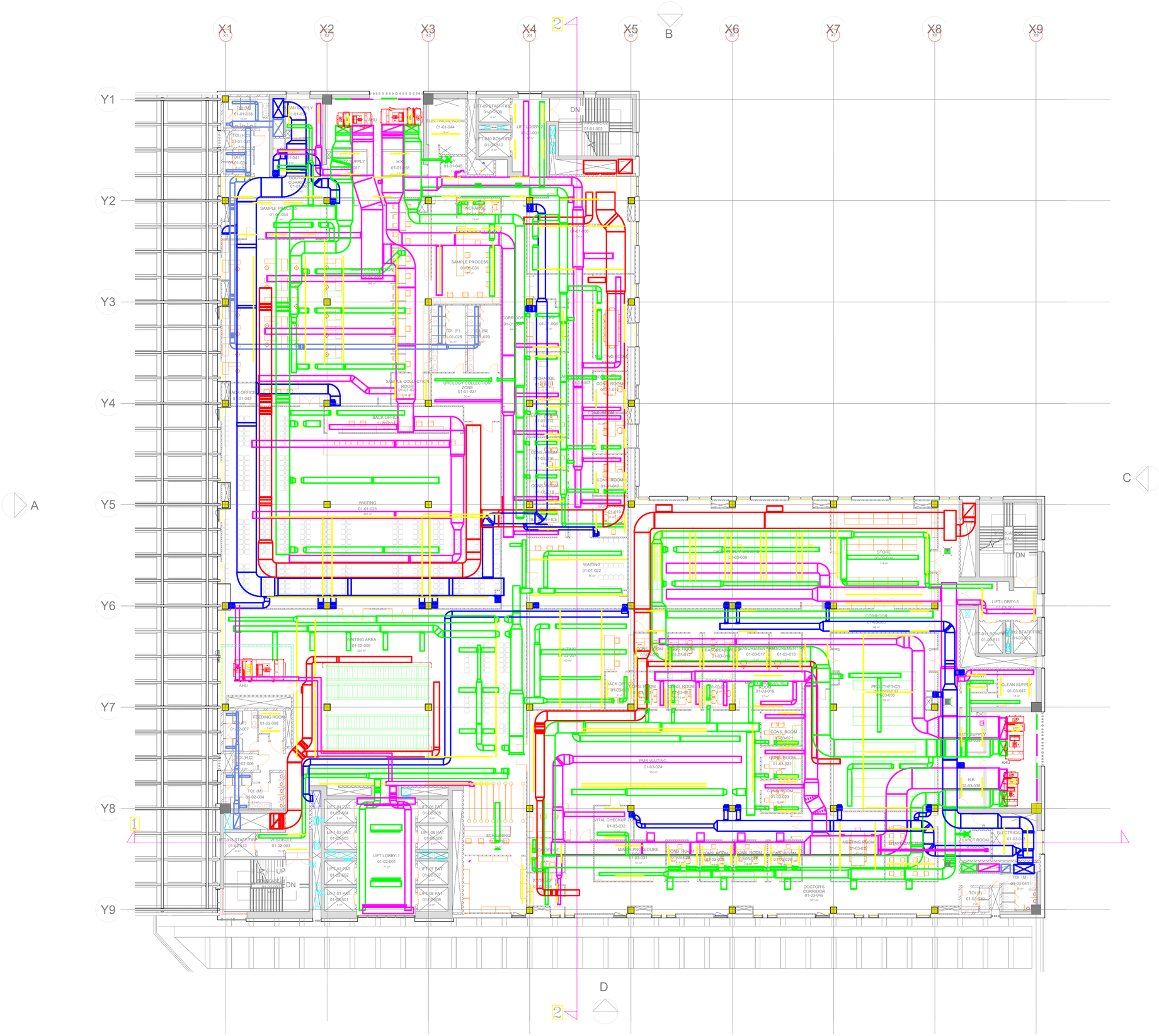

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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

FIRST FLOOR

HSCC/AIIMS/HVAC/OPD/006
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
App by	Rev. by	Prep. by

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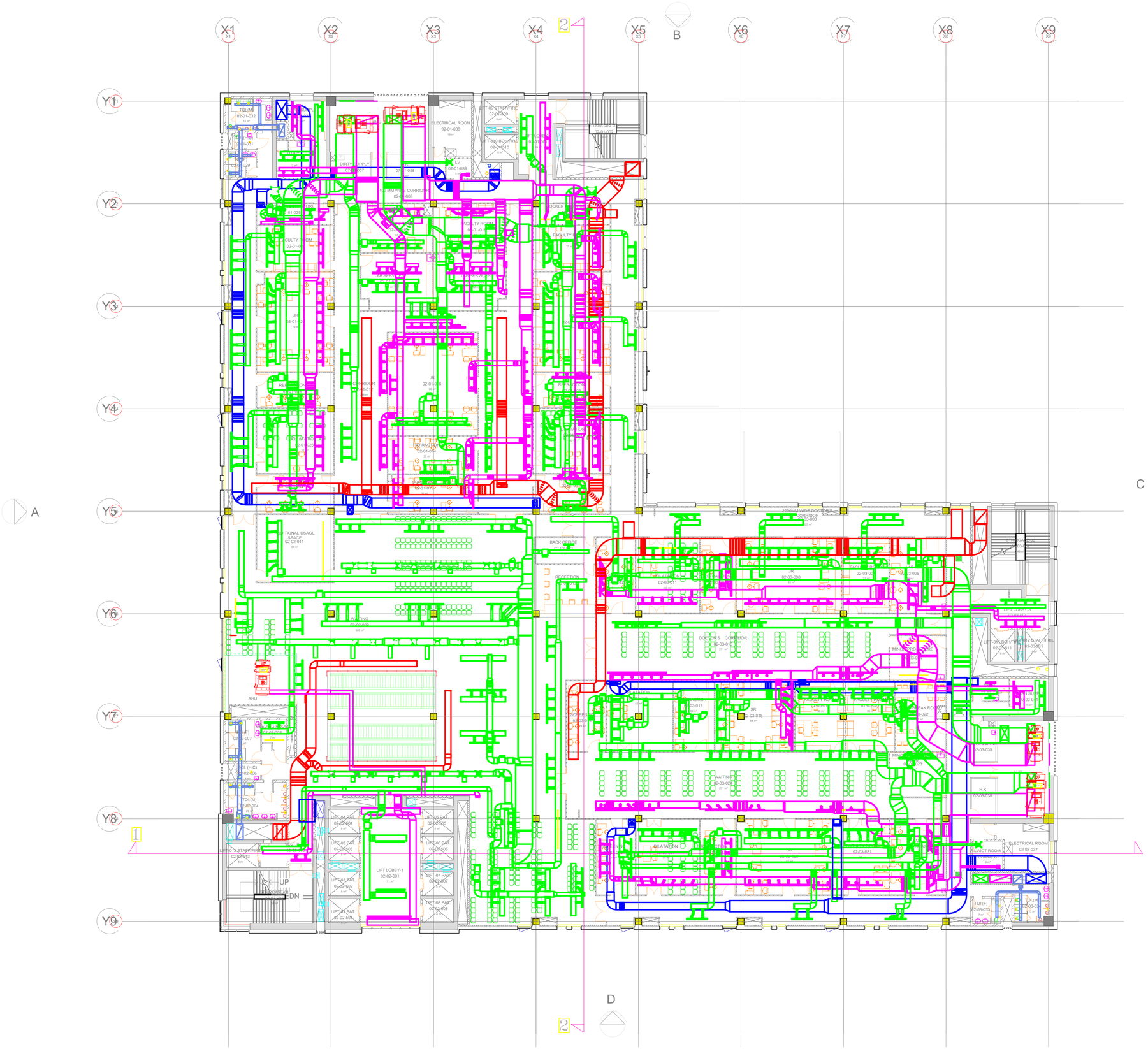
X1
X2
X3
X4
X5
X6
X7
X8
X9
Y1
Y2
Y3
Y4
Y5
Y6
Y7
Y8
Y9
A
B
C
D
1
2
ELECTRICAL ROOM
02-01-038
LIFT-07 STAFF/FIRE
02-01-009
LIFT-08 BOM/FIRE
02-01-010
LV
02-01-039
DIRECTOR
02-01-026
FACULTY ROOM
02-01-027
FACULTY ROOM
02-01-028
FACULTY ROOM
02-01-029
JR
02-01-030
JR
02-01-031
JR
02-01-032
CONFERENCE
02-01-033
RECEPTION
02-01-034
BACK OFFICE
02-01-035
WAITING
02-01-036
JR
02-01-037
JR
02-01-038
JR
02-01-039
JR
02-01-040
JR
02-01-041
JR
02-01-042
JR
02-01-043
JR
02-01-044
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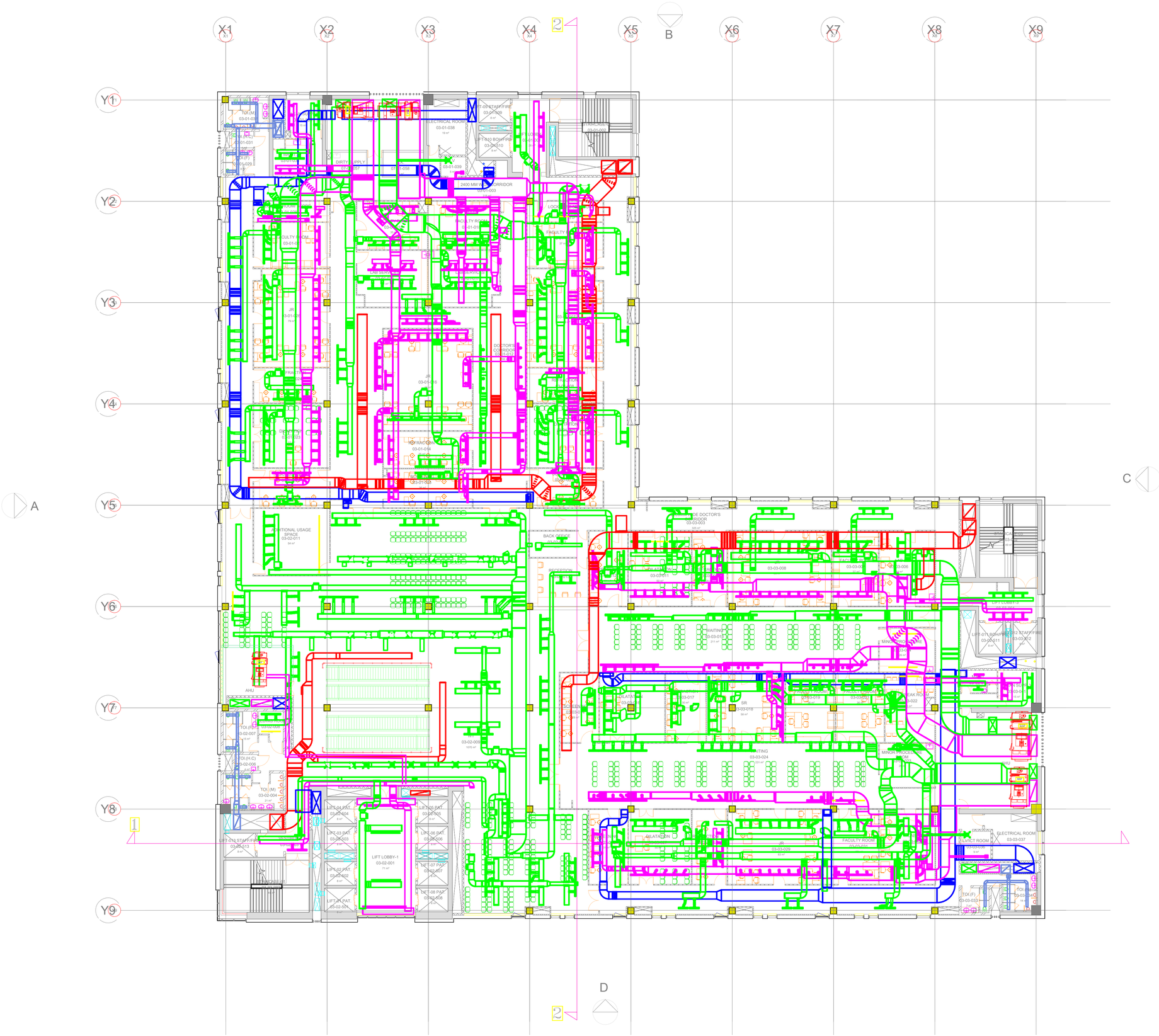
02-01-055
JR



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REV	DATE	DESCRIPTION

REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

THIRD FLOOR

HSCC/AIIMS/HVAC/OPD/008
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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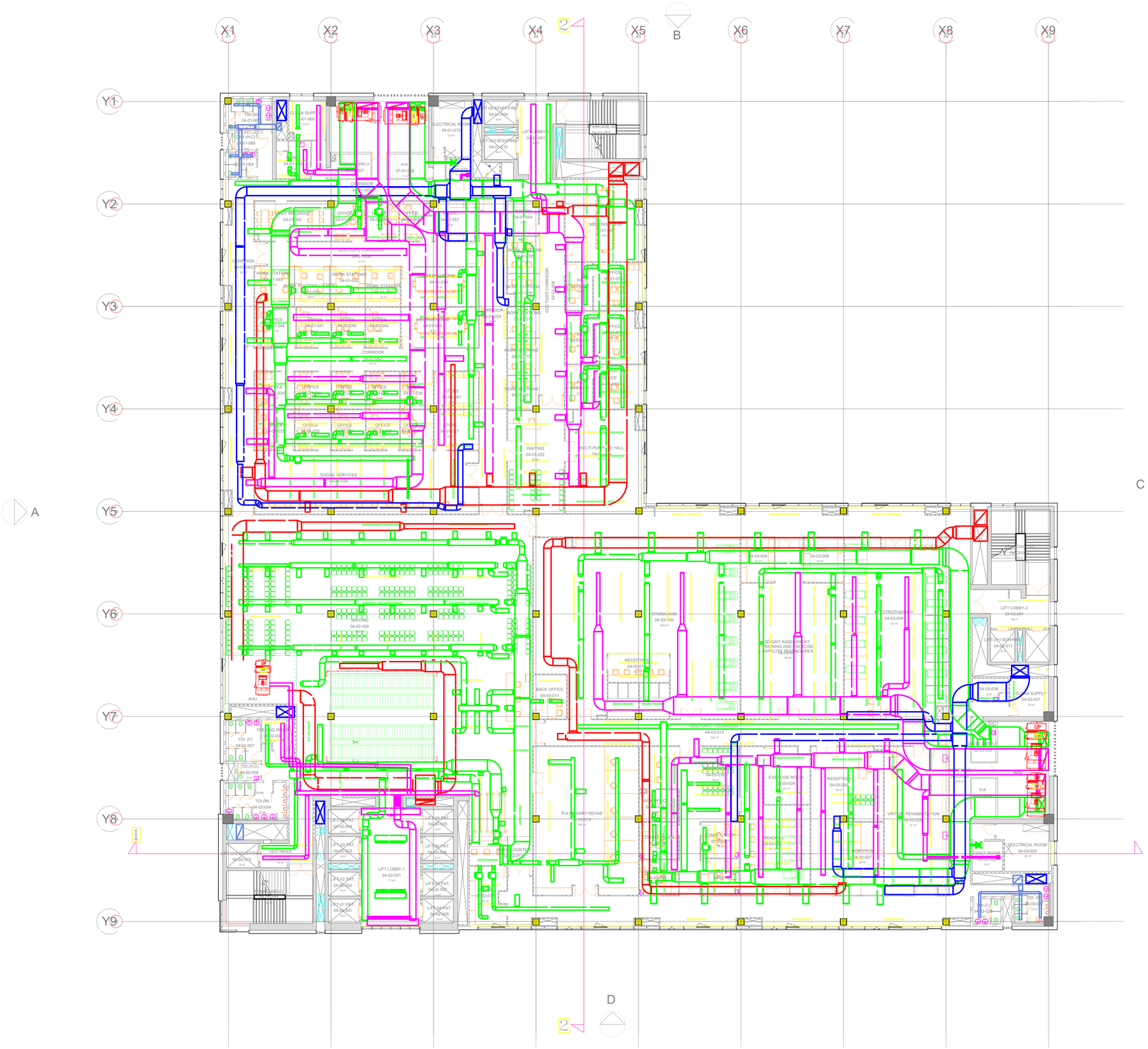

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

FOURTH FLOOR

HSCC/AIIMS/HVAC/OPD/009
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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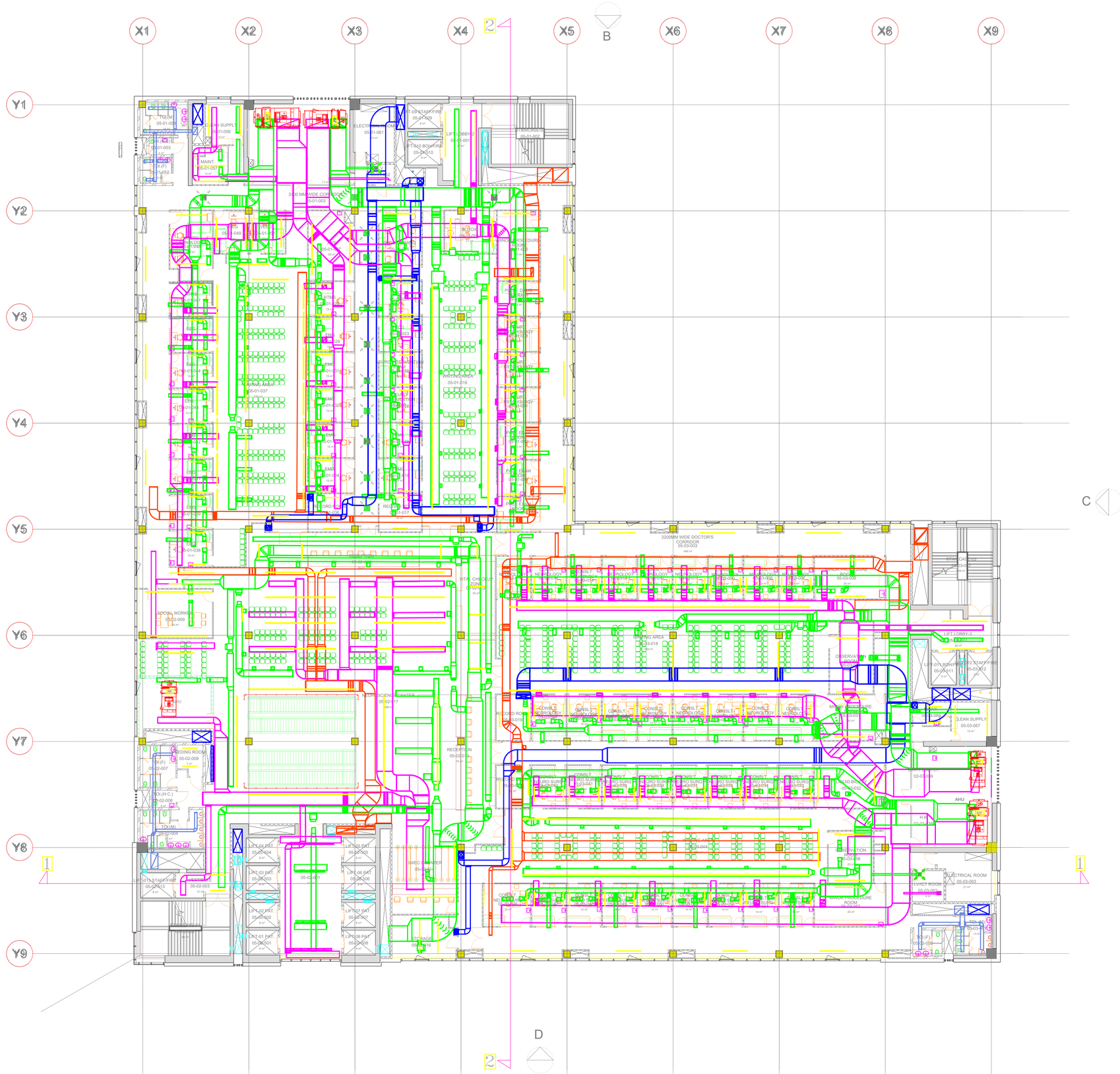

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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

FIFTH FLOOR

HSCC/AIIMS/HVAC/OPD/010
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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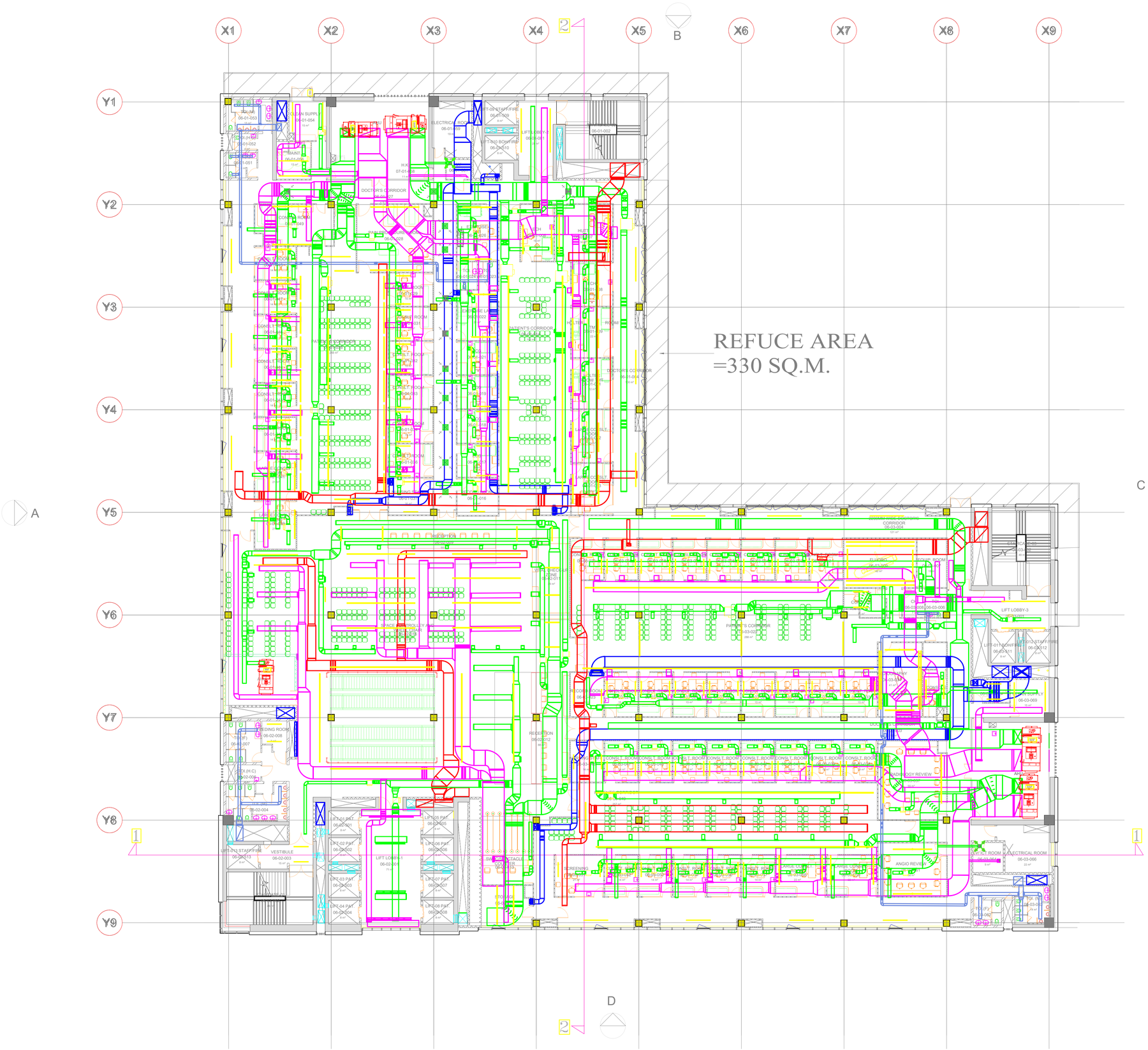

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SIXTH FLOOR

HSCC/AIIMS/HVAC/OPD/011
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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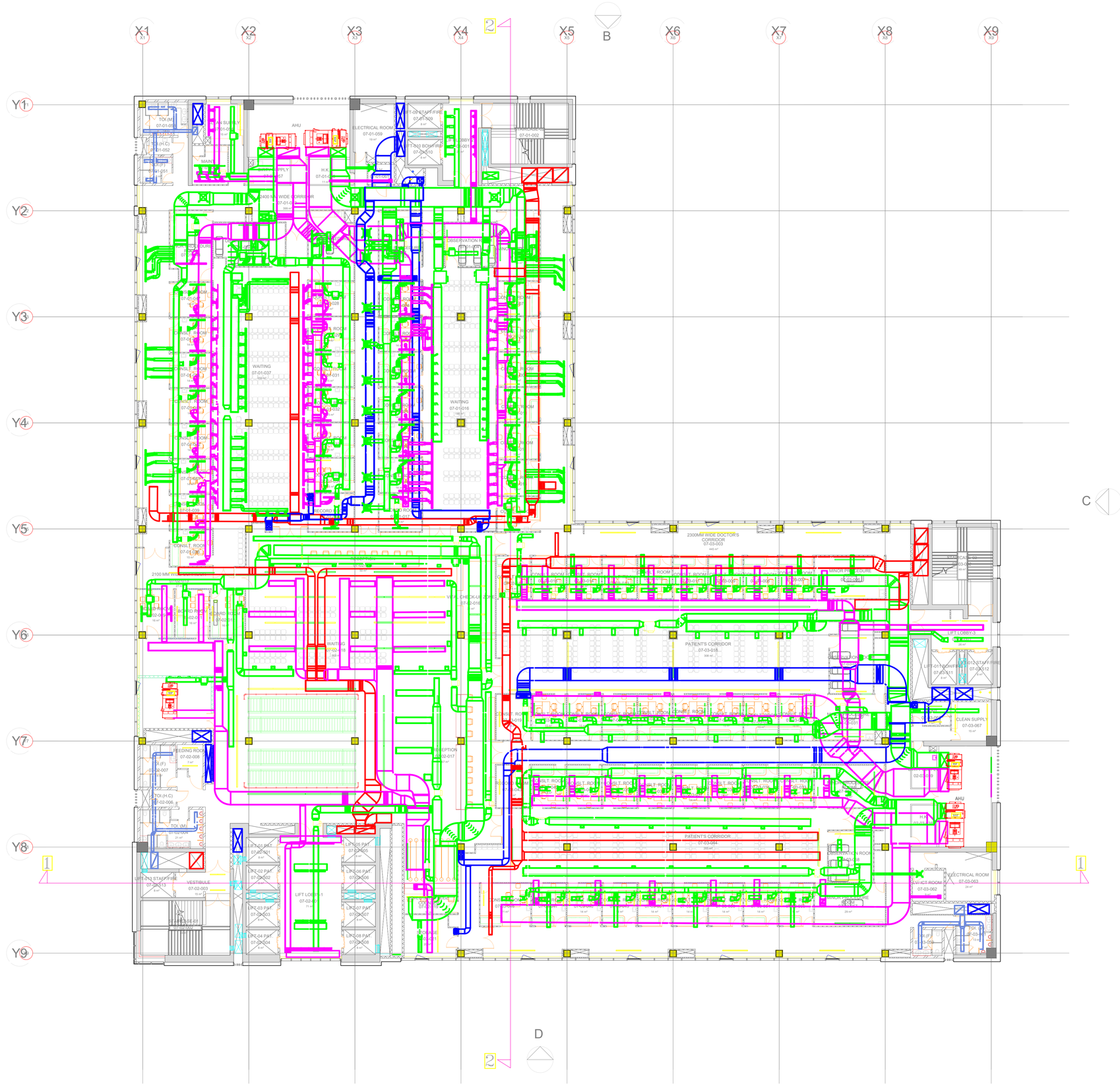

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

SEVENTH FLOOR

HSCC/AIIMS/HVAC/OPD/012
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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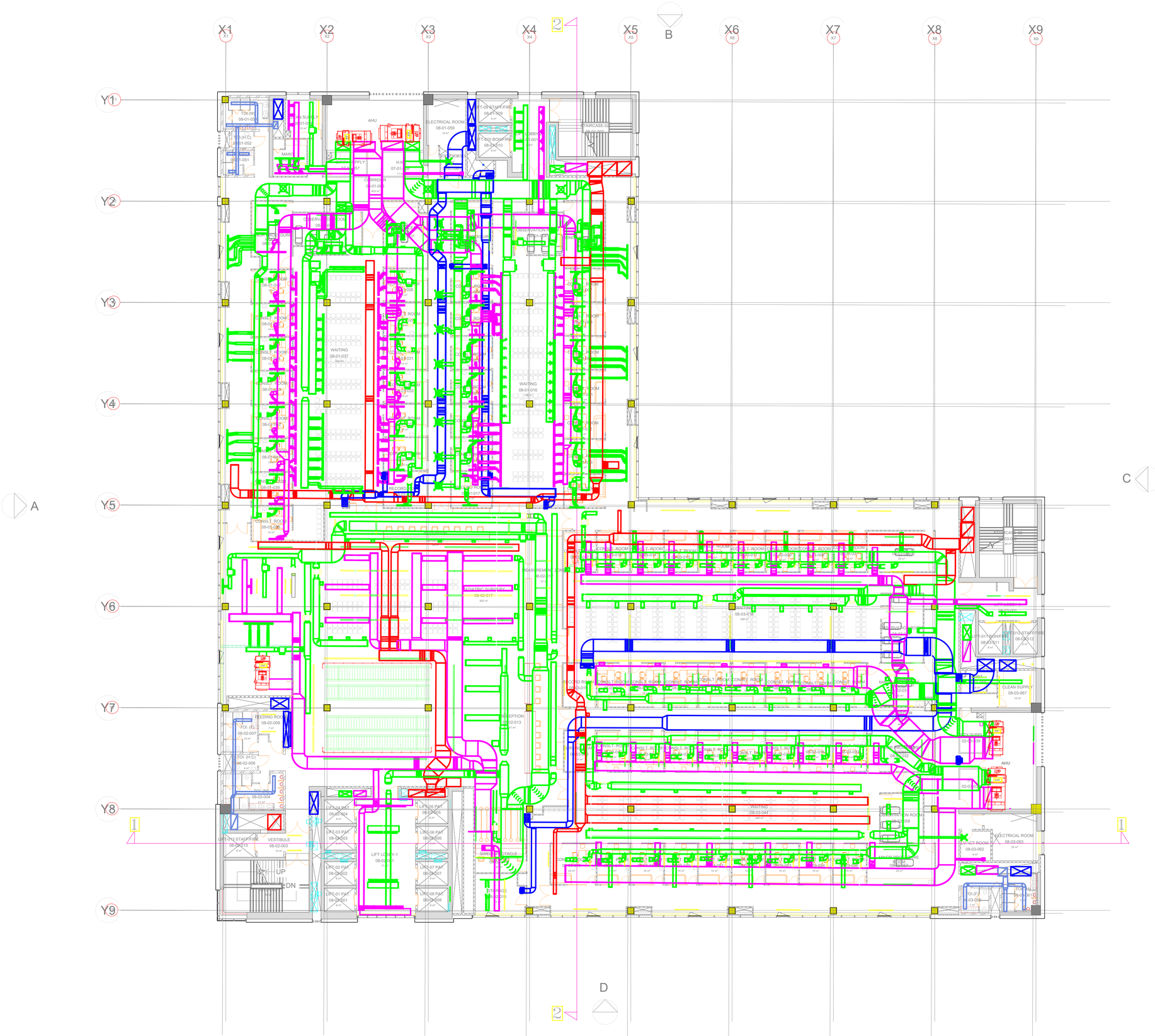

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REVISION

PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

EIGHTH FLOOR

HSCC/AIIMS/HVAC/OPD/013
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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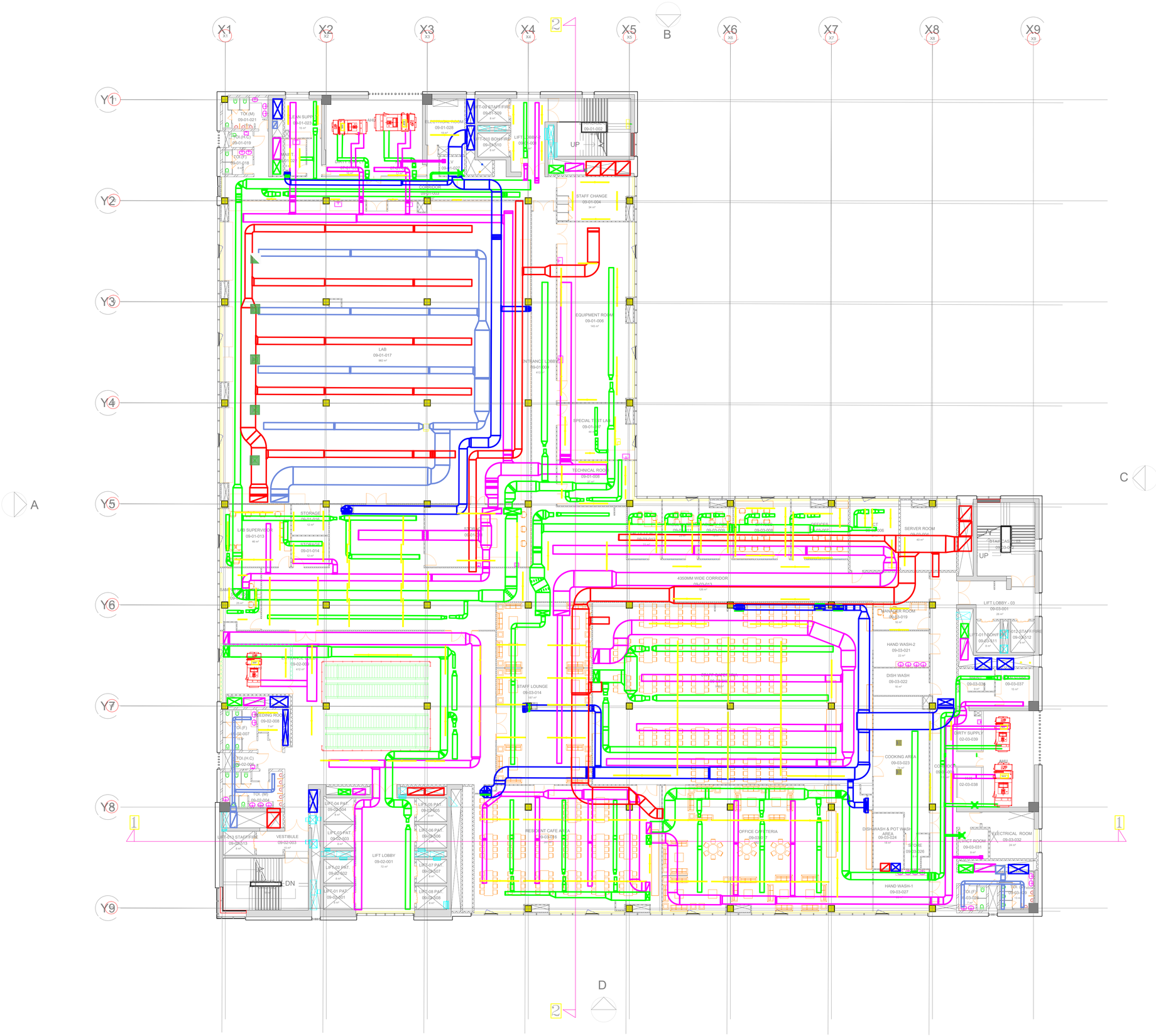

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

NINTH FLOOR

HSCC/AIIMS/HVAC/OPD/014
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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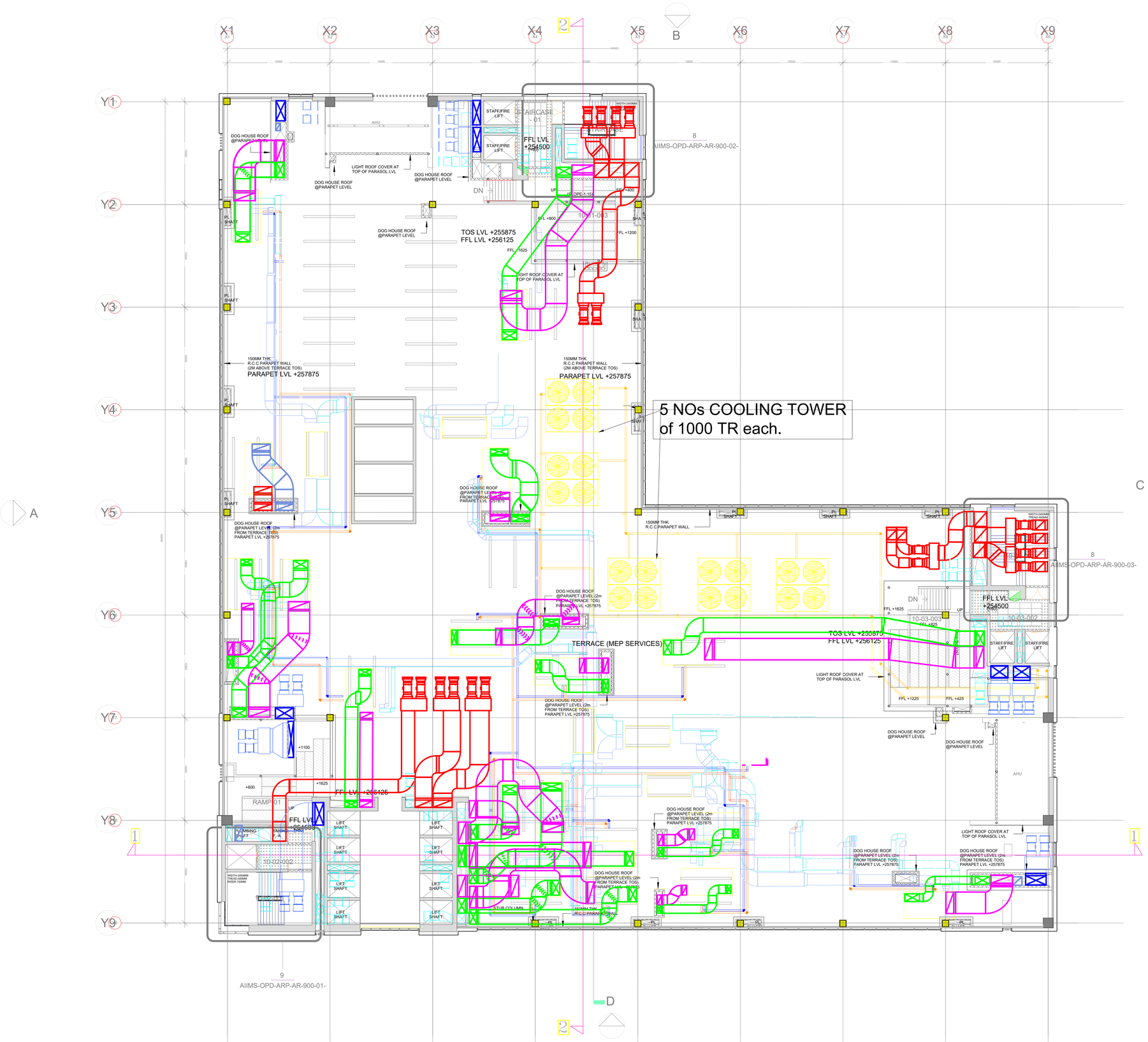

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

TERRACE PLAN

HSCC/AIIMS/HVAC/OPD/015
Drawing No.

Job No.	1:200 Scale	APRIL'24 Date
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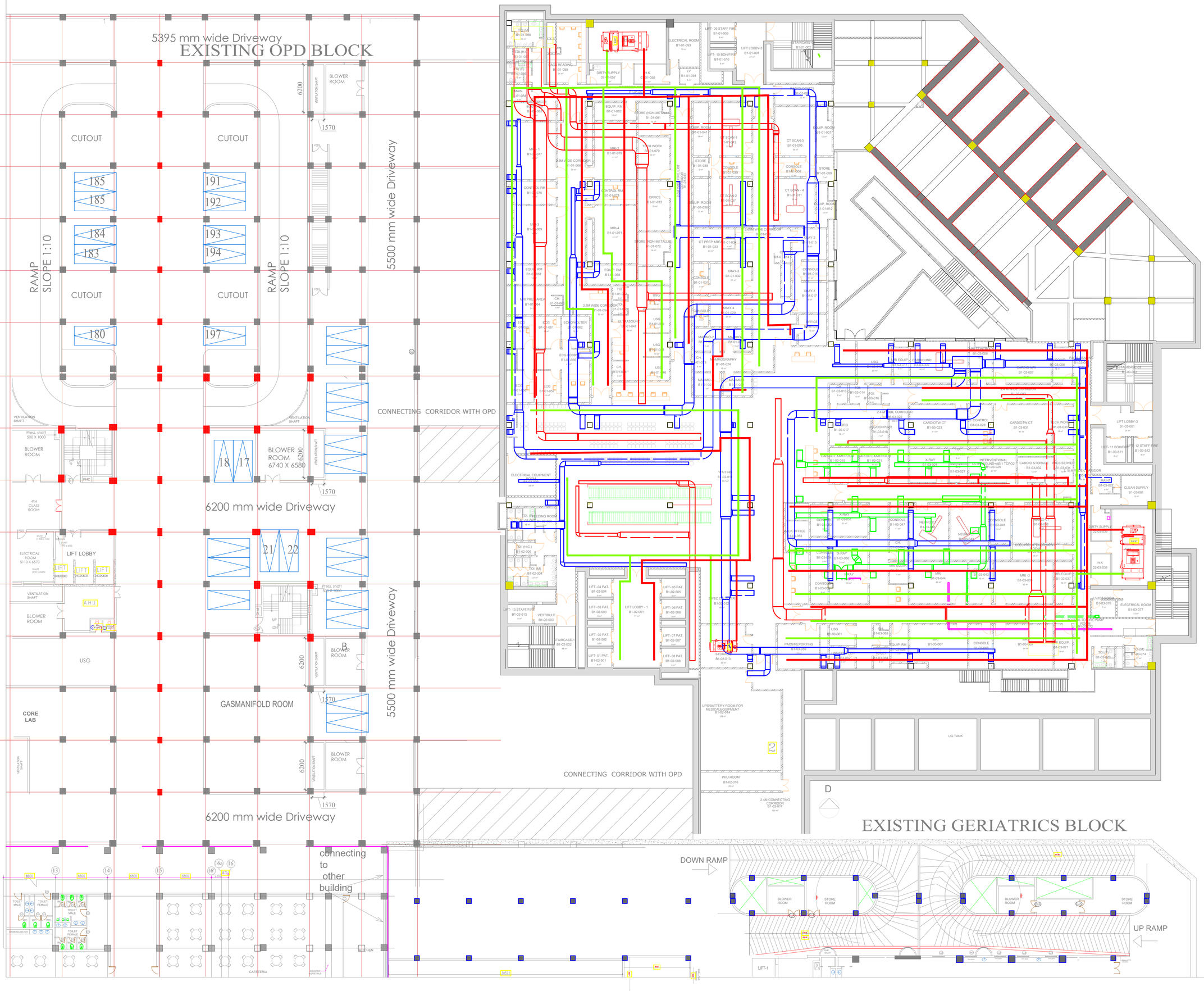

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT – 1

HSCC/AIIMS/HVAC/OPD/003
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
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EXISTING OPD BLOCK

AC PLANT ROOM AT BASEMENT-2 LEVEL

EXISTING GERIATRICS BLOCK

CONNECTING CORRIDOR WITH OPD

CONNECTING CORRIDOR WITH OPD

CONNECTING CORRIDOR WITH OPD

5500 mm wide Driveway

6200 mm wide Driveway

5500 mm wide Driveway

6200 mm wide Driveway

Column to be increased on left as shown

RAMP SLOPE 1:10

RAMP SLOPE 1:10

CUTOUT

BLOWER ROOM

VENTILATION SHAFT

WATER CURTAINS

Press. shaft 500 X 1000

LIFT LOBBY

ELECTRICAL ROOM

VENTILATION SHAFT

AHU

ELECTRICAL ROOM B2-01-003

LIFT- 09 STAFF FIRE B2-01-009

LIFT- 10 BOHFIRE B2-01-510

LIFT LOBBY-2 B2-01-001

STAIRCASE-02 B2-01-002

PHU ROOM B2-01-011

LIPS ROOM B2-01-009

BATTERY ROOM B2-01-008

ELECTRICAL SUBSTATION(ESS) B2-01-007

ENTRANCE LOBBY OF ESS B2-01-016

STAIRCASE FROM B2ND B2-01-017

STORE ROOM B2-01-013

HT PANEL ROOM B2-01-012

JE ROOM B2-01-014

MEP SERVICES B2-01-006

WAITING B2-03-027

HYDROTHERAPY B2-03-004

OPTICIAN'S CHAMBER B2-03-006

LIFT LOBBY-3 B2-03-001

LIFT- 11 BOHFIRE B2-03-511

LIFT- 12 STAFF FIRE B2-03-512

MEP SERVICES B2-02-009

RECEPTION B2-03-004

MAINT. B2-03-018

CLEAN B2-03-019

DIRTY SUPPLY 02-03-039

AHU

H.K. 02-03-038

JANITOR ROOM B2-02-008

TOI (H.C.) B2-02-006

TOI (M) B2-02-004

LIFT- 13 STAFF/FIRE B2-02-513

VESTIBULE B2-02-003

LIFT LOBBY B2-02-001

LIFT- 04 PAT. B2-02-504

LIFT- 03 PAT. B2-02-503

LIFT- 02 PAT. B2-02-502

LIFT- 01 PAT. B2-02-501

LIFT- 05 PAT. B2-02-505

LIFT- 06 PAT. B2-02-506

LIFT- 07 PAT. B2-02-507

LIFT- 08 PAT. B2-02-508

MEP SERVICES B2-03-003

LVICT ROOM B2-03-013

ELECTRICAL ROOM B2-03-014

STAIRCASE B2-03-011

EXTERNAL STAIRCASE B2-03-012

UPS/BATTERY ROOM FOR MEDICAL EQUIPMENT B2-03-021

CORRIDOR B2-03-009

UG TANK

PHU ROOM B2-03-022

2.4M CONNECTING CORRIDOR B2-03-023

DOWN RAMP

UP RAMP

BLOWER ROOM

STORE ROOM

LIFT-1

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT–2

HSCC/AIIMS/HVAC/OPD/003
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
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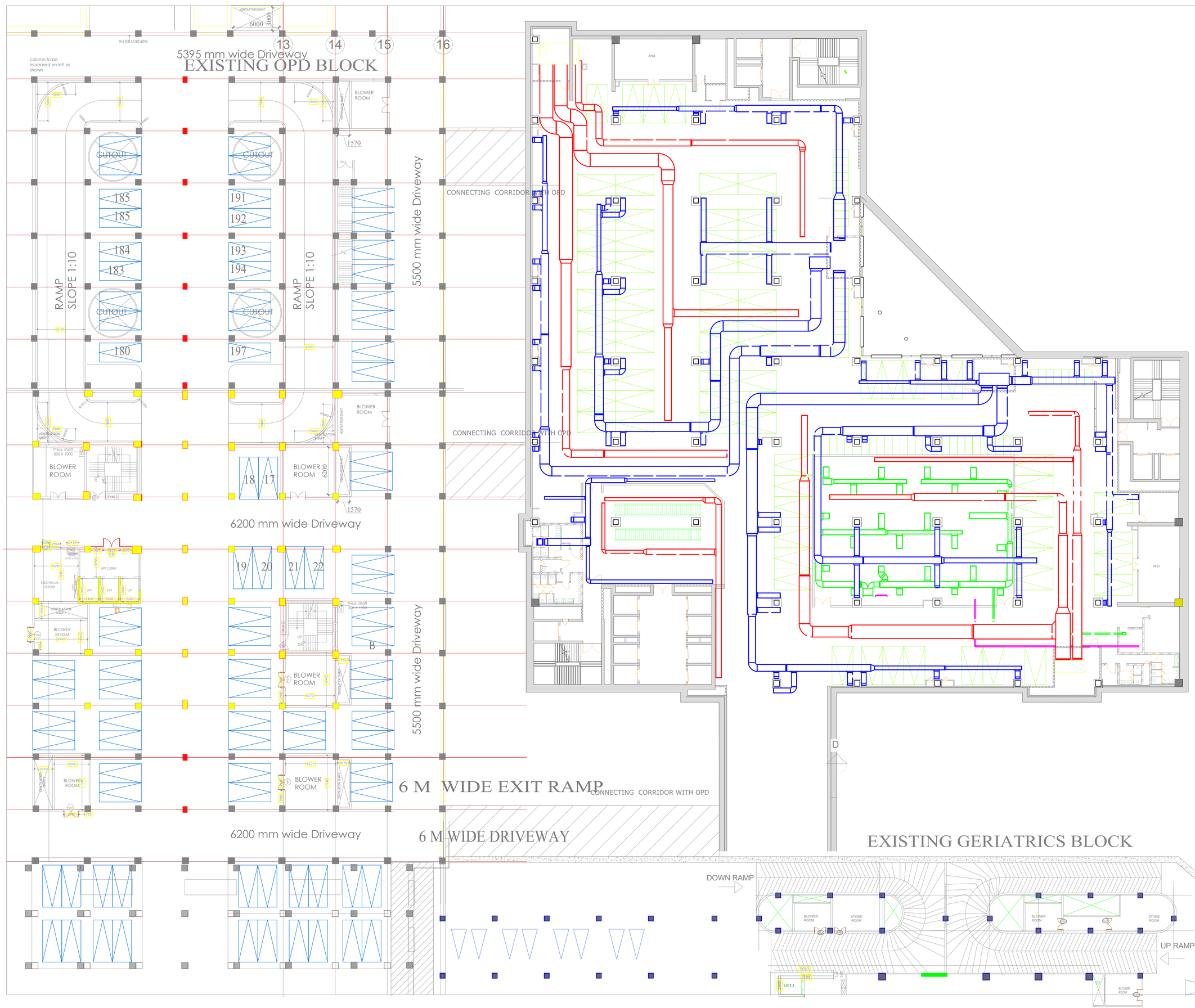

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PROJECT

SUPER SPECIALTY OPD BLOCK, AIIMS- NEW DELHI

TITLE

TENDER DRAWING

BASEMENT–3

HSCC/AIIMS/HVAC/OPD/003
Drawing No.

Job No.	1:225 Scale	APRIL'24 Date
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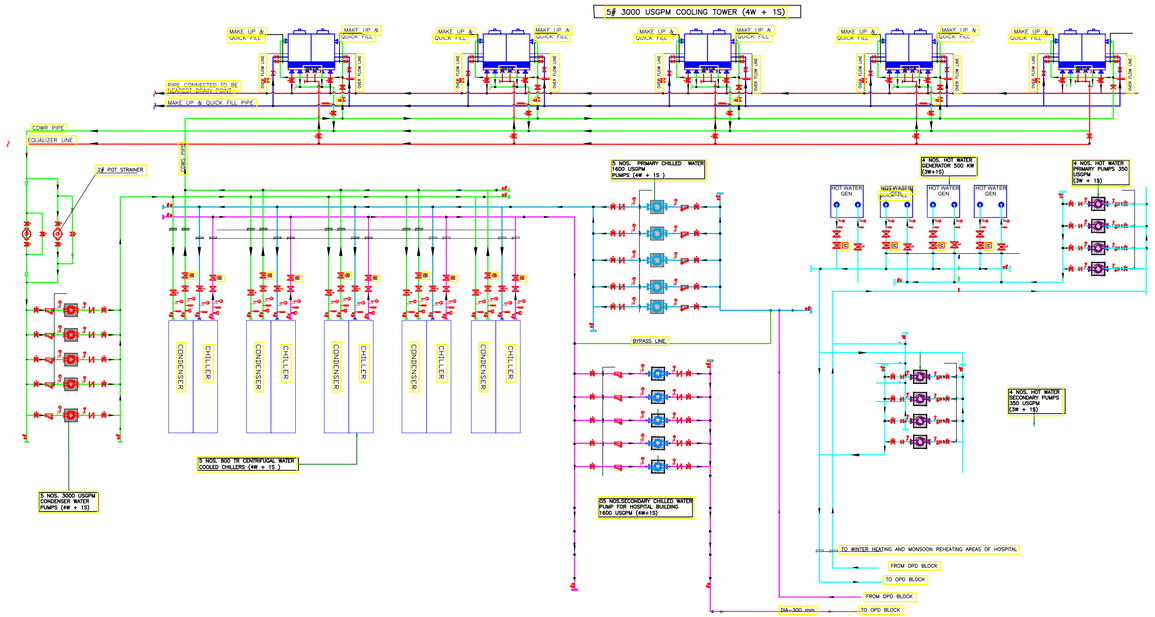
5# 3000 USGPM COOLING TOWER (4W + 1S)
MAKE UP & QUICK FILL
PIPE CONNECTED TO BE TAKEOUT ACROSS CWSC
MAKE UP & QUICK FILL PIPE
CWSC
CWSR
CWSR
CWSC
CWSR
CWSC
CWSR
CWSC

HSCC(India) Limited

As Executing Agency of
AIIMS, New Delhi

EPC Contract

Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis

Volume VIII

Amended Quoting Sheet for the Bidders/ Tenderers

OCTOBER' 2024

Executing Agency

HSCC (INDIA) LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
E-6A, Sector-01, Noida-201301

Tender No. HSCC/AIIMS/OPD -AIIMS/EPC/2024/75

HSCC (India) Limited

E-6 (A), Sector -1, Noida (U.P.)

Amended Quoting Sheet for the Bidder

NIT No.-	HSCC/AIIMS/OPD -AIIMS/EPC/2024/75
Name of Work:-	Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis.
Estimated Cost put to Tender	Rs.436.98 Crores
Name of the Firm	
	Lump Sump (L.S.) Quoted Amount {in Indian Rupees (INR)}

PART-A (MAIN BUILDING WORKS)

Serial No	Name of Project components	Qty	Unit	Quoted Amount in Figures {Indian Rupees (INR)}	Quoted Amount In Words { Indian Rupees (INR)}	Total Cost {Indian Rupees (INR)}
a	b	c	d	e	f	g
1	Construction of Super Speciality OPD Block at Masjid Moth in AIIMS, New Delhi and their Maintenance during Defect Liability Period on Comprehensive Design, Engineering, Procurement and Construction (EPC) basis.	1	Complete Job		Only	0.00

PART-B (OPERATION AND MAINTENANCE WORKS)

Serial No	Description	Qty	Unit	% of PART A - Amount	Total Cost {Indian Rupees (INR)}
1	Operation during Defect Liability Period for First Year	1	Complete Job	0.57%	0.00
2	Operation during Defect Liability Period for Second Year	1	Complete Job	0.61%	0.00
3	Operation and Maintenance during for Third Year	1	Complete Job	2.01%	0.00
4	Operation and Maintenance during for Fourth Year	1	Complete Job	2.18%	0.00
5	Operation and Maintenance during for FifthYear	1	Complete Job	2.36%	0.00
6	Operation and Maintenance during for Sixth Year	1	Complete Job	2.67%	0.00
7	Operation and Maintenance during for Seventh Year	1	Complete Job	2.91%	0.00
8	Operation and Maintenance during for Eighth Year	1	Complete Job	3.15%	0.00
9	Operation and Maintenance during for Ninth Year	1	Complete Job	3.42%	0.00
10	Operation and Maintenance during for Tenth Year	1	Complete Job	3.72%	0.00
		Part-B Total			0.00

1 Amount filled in any form shall be considered only in Lump sum
2 Amount shall be filled in figures, otherwise tender shall be rejected
3 In Quoting Sheet, The Amount quoted in figures shall prevail and taken as correct.
4 Amount filled at any other place in the document shall not be considered.
5 No condition shall be accepted.
6 The rates quoted shall be inclusive of all taxes.
7. L-1 considered as per PART-A only