

**SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF EQUIPMENTS FOR  
SARDAR YASIN MALIK MEDICAL COMPLEX (SYMMC) & RABIA RASHEED SOORTY BUILDING (RRSB) EMPLOYEE WARD AT  
JINNAH POSTGRADUATE MEDICAL CENTRE-KARACHI**

1. The Office of the Chairman Patients' Aid Foundation & Procurement Committee, Sardar Yasin Malik Medical Complex (SYMMC) & Rabia Rasheed Soorty Building (RRSB) Employee Ward, JPMC Karachi invites sealed tenders as per following details during financial year 2026 – 2027. The International manufacturers having local agents / sole distributors with established credentials in terms of technical, financial and managerial capabilities are eligible to participate.

| S. No. | Tender details                                                                                                                                                                                                                                                                                                                                                                        | Pre-bid meeting            | Tender due date              |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------------------------|
| x.     | ELV System<br>a. - Structured Cabling Network (Section-8312)<br>b. - IP Private Automatic Branch Exchange (Section-8314)<br>c. - Intelligent Addressable Fire Alarm System (Section-8331)<br>d. - IP Closed Circuit Television (CCTV) System (Section-8335)<br>e. - Public Address System (Section-8341)<br>f. - CATV System (Section-8371)<br>g. - Active Equipment (Section – 8003) | 15 <sup>th</sup> July 2026 | 10 <sup>th</sup> August 2026 |

2. Bidders who have already purchased the tender may obtain stamped Tender Documents from the office of the Secretary Procurement Committee, Sardar Yasin Malik Medical Complex (SYMMC) & Rabia Rasheed Soorty Building (RRSB) Employee Ward, (Address: Cyberknife & Tomotherapy building, Room no 17, Jinnah Postgraduate Medical Center, Rafiqui Shaheed Road, Karachi – Pakistan 75510) during office hours on or before **10<sup>th</sup> August 2026**.
3. Unstamped Tender documents can also be downloaded from the website of PAF-JPMC, Karachi.
4. Bidders are required to submit their written application for issuance of tender documents along with copy of CNIC, NTN & GST certificate.
5. After purchasing the tender if any firm / bidder has any reservation or observations regarding specs are required to submit their queries in writing before **15<sup>th</sup> July 2026**.
6. Single stage / two envelopes bidding procedure shall be adopted. The envelope shall be marked as **“TECHNICAL PROPOSAL”** and **“FINANCIAL PROPOSAL”** (sealed) in bold and legible letters.
7. The bidder shall ensure that their tenders are complete in all respects. The bidder should submit tender document till **08<sup>th</sup> July 2026** at Secretary Office Procurement Committee, Sardar Yasin Malik Medical Complex (SYMMC) & Rabia Rasheed Soorty Building (RRSB) (Address: Cyberknife & Tomotherapy building, Room 17, Jinnah Postgraduate Medical Center, Rafiqui Shaheed Road, Karachi – Pakistan 75510). Opening of “Technical Proposal” for respective tender will be communicated to Vendors which will be held in the Conference Room, Cyberknife & Tomotherapy Building, JPMC, Karachi. The incomplete tenders / tenders received after the closing date and time will not be considered.
8. Technical Opening will be held on **10<sup>th</sup> August 2026 at 11:00 am** at Secretary office Procurement Committee, Sardar Yasin Malik Medical Complex (SYMMC) & Rabia Rasheed Soorty Building (RRSB) (Address: Cyberknife & Tomotherapy building, Room 17, Jinnah Postgraduate Medical Center, Rafiqui Shaheed Road, Karachi – Pakistan 75510).
9. Bidders shall ensure pagination of technical bid with complete references of compliance on respective pages of the bid and compliance sheet in both hard copy and soft copy in USB as MS Excel file.
10. Date & time of financial opening will be communicated to responsive vendors through a notification after completion of technical evaluation. The financial proposal of bids found technically non-responsive shall be returned un-opened to the respective bidders.
11. In case the date of opening or last date of submission is declared as public holiday by the Government or non-working day due to any reason, the next official working day shall deem to be the date of submission and opening of bids. The time and venue will remain the same.
12. Original bid security / earnest money 2% of total cost in the form of Pay Order/CDR/Demand Draft in favor of Patients' Aid Foundation should be attached with the financial bid and photocopy of the same without showing the value attached with the technical bid as demanded in the bidding documents.
13. The undersigned / tenderer reserves the rights to reject any or all the tenders without assigning any reason thereof.

**Founder Member Patients' Aid Foundation & Chairman Procurement Committee, SYMMC, RRSB (Employees Ward)**

Cyberknife & Tomotherapy building, Room 16, Jinnah Postgraduate Medical Center, Rafiqui Shaheed Road, Karachi – Pakistan 75510. E-mail: [chairman.paf@pafjpmc.org](mailto:chairman.paf@pafjpmc.org), Cell: +92-306-2727913



# **PATIENTS' AID FOUNDATION JPMC KARACHI**

**SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF ELE SYSTEM**

**Sardar Yasin Malik Medical Complex  
(SYMMC) & Rabia Rasheed Soorty Building  
(RRSB) (Employee Ward) JPMC Karachi**

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**BIDDING AND CONTRACT DOCUMENT**

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**SPECIFICATIONS  
BILL OF QUANTITIES  
DRAWINGS**

**MAY, 2026**



**NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.**  
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## **SECTION – 8002**

### **GENERAL TECHNICAL REQUIREMENTS FOR COMMUNICATION WORKS**

#### **1.0 GENERAL REQUIREMENTS**

This section states the general technical conditions and requirements applicable to the design, manufacture, supply, installation, testing, commissioning and training of equipment and material related to the communication systems including all associated displays and other Human Machine Interface (HMI), and communications network included in this Contract. These conditions shall be read in conjunction with the General Conditions, Special Conditions, Technical Specifications, Schedule of Prices/BoQ, Drawings, etc. and other relevant provision of the Contract.

The General Technical Requirements with accessories shall also comply with the General specifications for Electrical Works, Section – 8001, and with other relevant provisions of the Contract Documents.

##### **1.1. Scope of Work**

The Contractor shall supply and execute the installation of the Communication Systems equipment in such a manner that all requirements of the technical specifications and drawings are fully met for proper and satisfactory operation of the systems as intended. The Contractor shall carryout all work in skilled and workmanlike manner in compliance with modern methods of engineering. The Communication Systems shall broadly include but not limited to the following.

- Structured Cabling Network (Section-8312)
- IP Private Automatic Branch Exchange (Section-8314)
- Intelligent Addressable Fire Alarm System (Section-8331)
- IP Closed Circuit Television (CCTV) System (Section-8335)
- Public Address System (Section-8341)
- CATV System (Section-8371)

The Contractor shall take the responsibilities of General Integrator for all the sub-systems and equipment within the Scope of Work, and ensure the integration of the whole system including interfaces with other systems.

The Contractor is free to offer any design of equipment which in his opinion will be equal to or better than the requirement in this specification without any additional cost and time. Whereas alternative offer is proposed, the Contractor shall furnish details of such alternatives to enable their merits to be assessed. Contractor shall submit to Engineer detailed calculations and layout drawings for approval.

##### **1.2. Regulations and Standards**

The systems, installations and works shall be manufactured and executed in accordance with technical specifications, following the state of the art and the best techniques in use.

Standards specifications and codes of the following listed authorities wherever cited herein are referred to by use of the abbreviations shown below.

All equipment shall be designed, manufactured and tested generally in accordance with the latest revision of the standards laid down by the following institutions or

other approved institutions, except where specifically directed otherwise:

|                                                              |      |
|--------------------------------------------------------------|------|
| - British Standards Institute                                | BS   |
| - National Fire Protection Association                       | NFPA |
| - Deutch Industrie Norms                                     | DIN  |
| - International Electro-technical Commission, Switzerland    | IEC  |
| - Institute of Electrical and Electronics Engineers Inc. USA | IEEE |
| - National Electrical Manufacturers Association – USA        | NEMA |
| - National Electrical Code - USA                             | NEC  |
| - International Standardization Organization                 | ISO  |
| - Euro-Norm                                                  | EN   |

Wherever applicable, the equipment shall also conform to the requirement of Pakistan Standards Institution (PSI).

### **1.3. Execution of the Works**

#### **1.3.1. Contractor's Responsibility**

The Contractor shall bear full and total system-wide responsibility for all systems and products selected, designed, furnished, and installed under this Contract.

The design shall take into account all site and environmental factors.

The reconfiguration, reprogramming and integration for existing communication systems along with co-ordination with ISP Service Provider / Client's telecom team for incoming cables connections inside JPMC Medical Tower is the sole responsibility of the Contractor, and it is expressly agreed by Contractor that anything which is usually furnished as part of such reconfiguration and reprogramming as is called for in this Contract and which is necessary for its proper completion shall be furnished as part of this Specification without additional costs and extensions of time whether or not shown in detail on the drawings, described in detail in the Specifications and BOQ.

#### **1.3.2 Installation Requirements**

The works shall be performed by workmen skilled in the particular trades involve and shall include all works necessary to complete the installation in a professional manner so as to present a neat and finished appearance.

The Contractor shall supply all accessories and other items essential for the proper performance and completion of the works.

## **2.0 GENERAL SPECIFICATIONS FOR EQUIPMENT**

### **2.1 Use of Proven Technology**

For all Original Equipment Manufacturer (OEM) equipment, the Contractor shall clearly identify the brand of the equipment, the country where the equipment has been manufactured, as well as the local agent in Pakistan who is able to provide local maintenance assistance.

Local agent's reference shall include at least (but not limited to)



- Company name,
- Address in Pakistan,
- Contact persons,
- Phone numbers,
- Valid Email,
- Reference of the company in similar fields.
- Authorized Distribution Certificate from OEM
- Certified Engineer's Certificate

Equipment manufactured in Israel and India is not acceptable. The bidder shall clearly mention in his bid the origin of the equipment that he is proposing.

## **2.2 Quality Assurance**

All materials and equipment shall be new and of best quality. Standard components of suppliers regularly engaged in their manufacture shall be offered. All systems and components shall have been thoroughly tested and proven in actual use.

Manufacturers quality control shall be in accordance with the ISO 9000 - series (or DIN equivalent) recommendations. Manufacturers whose quality control has been certified according to ISO 9000 – series will only be acceptable. Certified copy shall be attached to bid. Hardware and software design, quality assurance in the production process, as well as documentation shall be in line with ISO 9000-series.

## **2.3 Standard Products**

Materials furnished under this specifications shall be standard product of manufacturers regularly engaged in the production of such equipment and shall be the manufacturers latest standard design and latest available model. Contractor shall submit end of line (EOL) / end of sales (EOS) of each proposed product with its material submittal for engineer's review and approval. Outdated products and products near to end of line (EOL) / end of sales (EOS) shall not be considered.

## **2.4 Equipment List**

The Contractor shall submit to the Engineer for approval a complete list of materials and equipment to be incorporated in the work. This list shall include at least the manufacturers name, catalogue numbers, dimensions, and other descriptive data as may be required. No consideration will be given to partial lists submitted from time to time.

Approval of material will be based on manufacturer's published data submitted with the list approval of the materials and equipment will be tentative subject to submission of complete shop drawings indicating compliance with the Contract documents.

## **2.5 Shop Drawings**

The Contractor shall prepare the detailed shop, coordination, sectional and installation drawings, as well as manufacturer's recommended calculations and obtain approval of the Engineer prior to execution.

## **3.0 DESIGN REQUIREMENTS**

### **3.1 Ambient Conditions**

Refer General Specification, Section 8001 for ambient conditions.

### 3.2 Computer, Server, Equipment, Hardware & Software

Wherever computers, servers, equipment, hardware & software are utilized in any system covered in this tender, the Contractor shall ensure compliance to the following general requirements:

- All computers & servers shall be with CPU, LED monitor display, keyboard and mouse etc.
- The housing for the computers & servers shall be provided and shall be deemed to be included in the relevant system Bill of Quantities (BOQ) item. No separate payment shall be made for the computer & server housing. The Contractor shall ensure adequate cooling of the computer & server components and if required, forced cooling with thermostatic control shall be included.
- All the computer systems & servers shall be supplied with licensed software which shall include latest version of Operating System and Application Software.
- The workstations shall be supplied with licensed software which shall include latest version of MS Windows™, Operating System and Application Software.
- Back-up software shall be supplied on separate portable hard device.
- Computers & servers shall be of the latest specifications available at the time of procurement / construction and shall minimally comply with the following:
- Industrial type, desktop/rack mounted computers/servers shall be of the latest specifications and shall meet the requirements of specified systems.
- All computers & servers shall be provided with individual intelligent UPS with integrated sealed battery, in case a centralized UPS is not available at a particular/remote location.
- All essential interconnecting cabling and protection shall be provided.

### 3.3 Unit of Measurement

The units to be followed for indication of dimensions in drawings for any kind of measurements shall be in accordance with the metric system.

### 3.4 Guarantees, Tolerances, Rejection

The Contractor shall furnish a Certificate of Compliance for each equipment jointly signed by the Contractor and the manufacturer of the equipment that the equipment conforms to the standards and all other requirements laid down in Contract Specifications and that both the Contractor and the manufacturer assume joint responsibility in respect of performance of the equipment.

During and/or after the installation of equipment, manufacturers representative for each equipment shall visit the site and shall verify that the equipment has been installed as per manufacturer's instructions and the Certificate of Compliance, jointly signed by the Contractor and the manufacturer shall also cover any amendments / modifications made in the installation by the Contractor with due approval of the manufacturer.

All costs in this connection shall be borne by the Contractor.

All equipment and material shall be so designed that the tolerances according to the relevant IEC and other applicable standards and regulations as well as the special requirements for the overall equipment are adhered to, and must demonstrate

compliance both at the manufacturer's works and at site. Should the equipment/material fail to meet the guarantees after due account has been taken of the specified tolerances, the equipment/material will be made available to the Contractor so as to allow the Contractor to carry out rectification on the equipment / material by modifying or replacing defective or wrongly designed parts or equipment/material as a whole.

If the guaranteed values are not achieved even after remedial work has been carried out, the Employer and / or Engineer may reject the equipment(s) as a whole or that part of the system which is causing the non-fulfillment of the guarantee or the completion of system.

If an item of equipment/material has to be rejected because of major deficiencies which are not remediable, then such equipment / material or item shall remain available to the Employer free of charge until such time as a replacement is ready for installation. All costs for such rectification shall be the responsibility of Contractor. Any work which does not impair serviceability and integrity of equipment / material as a whole shall not be deemed as violating the guarantee obligation of Contractor, provided that the Contractor remedies that within 4 weeks.

The Contractor shall guarantee to complete all work called for, so that equipment and material supplied by him are ready for connection and operation within the given period.

The decision regarding the acceptability or otherwise of the equipment and material offered shall be made by the Employer / Engineer whose decision shall be final.

### **3.5 Language**

The language for general correspondence, technical information and data, instruction manuals, literature, pamphlets, drawings, standards and test data shall be exclusively in English. All markings on equipment, dials, name plates and other items shall also be legible in English and also in Urdu where specified. Shipping marks, addresses and instruction on individual packages shall also be printed in capital letters in English only.

The Contractor shall be responsible for replacing at his own cost any item lost or misplaced due to inadequate labeling or marking in any language other than English.

### **3.6 Name Plate**

All equipment shall be provided with stainless steel name plates which shall be mounted in a visible position. The entries on the name plate shall be indelibly marked in English by engraving and shall include the data in accordance with relevant IEC and other relevant standard applicable to each equipment. In addition, any specified requirement stated in these specifications shall also be complied.

The Contractor shall also supply all labels, instruction and warning plates necessary for the identification and safe operation of the plant and all instructions shall be in English and where specified in Urdu languages. All labels, nameplates, instructions and warning plates shall be securely fixed to items of plant and equipment with stainless steel rivets, plated self-tapping screws or by other approved means. The use of adhesives will not be permitted.

### **3.7 Equipment Designation**

All equipment, cables and wires shall be numbered in accordance with the standardization procedures laid down in IEC 750. The system shown on the drawings is intended only as a guideline and bidders shall be solely responsible to

ensure that proper coordination with other sections and disciplines takes place.

### **3.8 Statement of Compliance**

Bidders shall confirm para wise in writing their compliance with the items of these specifications in the form of a qualified Statement of Compliance at the time of material submittal stage. No consideration will be given to the bid without this important document.

### **3.9 Bid Drawings and Data**

The Bidder shall supply with his bid, three sets of the following information, along with the information specified for each equipment in these specifications. Bids with incomplete information are liable to be rejected.

- a. Fully dimensioned and detailed drawings of the communication systems equipment complete with all information necessary for the evaluation of design by the Engineer. These drawings shall be based on the technical requirements and shall specifically include, but not be limited to the following:
  - i. General Arrangement plan, elevations and sections, complete with all dimensions.
  - ii. Reference and descriptive literature pertaining to above drawings and equipment furnished.
- b. All schematic drawings, technical data, literature and information to facilitate proper evaluation of the equipment and material.
- c. Lists of supplies made by Contractor and manufacturer of equipment similar to the equipment to be furnished under this Contract. The lists shall indicate models, type, quantities, and years of supply and names of the purchasers.

### **3.10 Drawings and Technical Data after Award of Work**

- a) The Contractor shall submit four copies of detailed shop drawings, coordination drawings, technical data, calculations and schedules to the Engineer for review and obtain approval at least 15 working days prior to execution of work. In general, these detailed shall include, but not be limited to the following:
  - Riser / Line / Schematic / Single Diagrams
  - General Wiring and Cabling Routing Diagrams
  - Rack Wiring and Equipment Diagrams
  - Conduit and Cable Schedule and Diagrams
  - Grounding Layout and Details
  - Foundation and Trench Arrangement Drawings
  - Plans, Elevations and Sections.
  - Manufacturer's Catalogues
  - Video storage calculation of manufacturer's software for cameras
  - Sound pressure level (SPL) calculations of all proposed speakers
  - Heat Map Coverage pattern for all proposed Wireless Access Point
  - Testing and commissioning protocols / procedures

- b) The purpose of having drawings and other data checked and approved by the Engineer is to assist the Contractor in interpreting the technical specifications so as to eliminate mistakes in the equipment or material actually installed for the work.

### **3.11 Test plans**

The Contractor shall provide test plans that define all the tests required to ensure that the systems meet the technical, operational and performance specifications. The test plans shall identify the capabilities and functions to be tested, including the values and situations that will comprise the test. The Contractor shall submit for Engineer's approval complete details of tests / test plans (testing and commissioning protocols / procedures) at least one week prior to testing. These shall also include details of testing method, testing equipment, diagrams, etc.

The contractor shall develop test procedures from the test plan and design documents. The procedure shall consist of detailed instructions for test set up, execution, and evaluation of test results. The test report shall document the results of the tests.

The Contractor shall furnish all labour, materials, tools and equipment required to install, connect, test and commission all communication equipment specified herein, whether or not such equipment is furnished by him or by others. No separate payment shall be made for any tools and cost shall be deemed to be included in the cost of the Contract.

For all equipment to be installed by the Contractor, the Contractor shall supply and install all erection materials such as foundation bolts, washers, nuts, etc. as required and without any additional costs.

The Contractor shall set out the works himself as per Specifications and Drawings and shall properly position the equipment on specified foundation/location. In general, the manufacturer's instructions for installation shall be followed. Any defect or faulty operation of equipment due to the Contractor not following the manufacturer's instructions shall be corrected and repaired by the Contractor at his own cost.

### **3.12 Operational and Maintenance Manuals**

The Contractor shall provide copies of the manuals bound in hardback, loose leaf binders to Engineer. Provide a draft copy with the Performance Verification Test Procedure for use during site tests and update with any changes required prior to final acceptance.

The Contractor shall identify each manual's contents on the cover. The manuals shall include the names, addresses, and telephone numbers of each sub-contractor installing equipment and systems, and of the nearest service representative for each item of equipment and each system. The manuals shall have a table of contents and tab sheets. The contractor shall update all manuals to include modifications made during installations check out, and acceptance. Manuals provided shall include:

- Functional Design Manual Hardware Manual
- Operator's Manual
- Software Manual
- Maintenance Manual

- a) Functional Design Manuals: The Functional Design Manuals shall identify the operational requirements for the system and explain the theory of operation, and specific functions.

Hardware and software functions, interfaces and requirements shall be provided for all system operating models.

- b) Hardware Manuals: The Hardware Manuals shall describe all equipment provided, including:

- general description and specifications
- installation and check-out procedures
- electrical schematics and layout drawings
- alignment and calibration procedures
- manufacturers repairs parts list indicating source of supply
- interface definition
- signal identification and timing diagrams

- c) Software Manual: The Software Manual shall describe programming and testing, starting with a system overview and proceeding to a detailed description of each software module. The manual shall be oriented to programmers and shall describe all information necessary to enable proper integration, loading, testing and program execution.

- d) Operator's Manual: The Operator's Manual shall provide all procedures and instructions for operation of the system, including:

- use of the systems, command and application details
- alarm presentation
- alarm dictionary
- recovery and re-start procedures
- command directory
- preventive maintenance schedule
- operator's consoles

- e) Maintenance Manual: The Maintenance Manual shall provide description of maintenance for all equipment including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective equipment.

#### **4.0 SPECIAL TOOLS AND EQUIPMENT**

Special tools and equipment for the maintenance, inspection and repair of the individual equipment shall be supplied by the Contractor in sufficient quantity to equip the maintenance personnel for routine work. No separate payment shall be made for any special tools and cost shall be deemed to be included in the cost of the Contract.

#### **5.0 INSTALLATION**

The Contractor shall install all system components and appurtenance in accordance with manufacturer's recommendation and provide all necessary interconnections, services and adjustments required for a complete operable system.

All electrical work shall be in accordance with VDE regulations and as specified.

The Contractor shall provide instrumentation and communication grounding as necessary. All equipment installed outdoors shall be housed in an minimum IP65

enclosure, unless otherwise shown. All penetrations shall be sealed to preclude the entry of water using a silicone material. Enclosure installed in clean dry indoor environment shall be IP42.

#### **6.0 WARRENTY OF GOODS**

The Contractor shall provide one (3) year warranty after issuance of Defects Liability Certificate from his proposed Original Equipment Manufacturer (OEM) for any of the equipment furnished in this Contract.

#### **7.0 AFTER – SALE SERVICE**

After the expiry of the warranty period, the Contractor shall be able to provide maintenance support and any spare part at least during the 10 years following the substantial acceptance of the related equipment/system.

#### **8.0 SITE TESTING**

The Contractor shall provide field testing of the Communication Systems and on-site operational acceptance test of the complete operational systems in the presence of the Engineer and Employer.

#### **9.0 MAINTENANCE AND SERVICES**

The Contractor shall provide all services, materials, and equipment necessary for successful operations of the entire system during defect liability period. Provide necessary material required for the work. Minimize impacts on facility operations when performing scheduled adjustments and non-scheduled work. All equipment/system shall have the provision of tele maintenance / trouble shooting by the manufacturer of the equipment from their factory/service facility. The necessary modem shall be incorporated in the equipment supplied and it shall be totally free during Defects Liability Period.

#### **10.0 MEASUREMENT AND PAYMENT**

Unless specifically stated otherwise, the cost of all material, equipment, labour, services, etc. required to complete the work shall be considered to be included in the amounts stated against each item of the Schedule of Prices.

For items with specified quantities as given in the Schedule of prices, adjustment shall be made in the amount payable to the Contractor in accordance with the actual quantity of work acceptably completed by the Contractor. The payment shall be made at the unit rates stated in the Schedule of Prices. No such adjustments shall be made for items specified in 'Lot' and 'Job' units.

Unless specifically provided for in the Schedule of Prices and Quantities, no payment shall be made for the works stated in this section. Cost shall be deemed to be included in the cost of the Contract.

The rates quoted shall be inclusive of all works and services required for completion of each item as a complete job of work also including surveys, investigations, associated civil works, co-ordinations, etc.

The measurement and payment of items under Schedule of Prices shall be made as under:

**10.1 Items with Unit of Measurement as Number (No.)**

- a) Measurement: Measurement of acceptably completed works of these items will be made on the basis of actual number provided, installed in position, tested and commissioned.
- b) Payment: Payment will be made for acceptable measured quantity of respective items on the basis of unit rate per number quoted in the Schedule of Prices. The unit rate shall include all cost of providing and installing associated accessories, installation materials, etc. and shall constitute full compensation for all the works related to these items.

**10.2 Items with Unit of Measurement as Lot / Job'**

- a) Measurement: Measurement of acceptably completed works of items stated in the unit of Lot / Job, provided and wherever required installed in position, tested and commissioned.
- b) Payment: Payment will be made for acceptable measured quantity of respective items on the basis of lump-sum price per Lot / Job quoted in the Schedule of Prices and shall constitute full compensation for all the works related to these items.

**10.3 Items with Unit of Measurement as "Running feet" (Rft.)**

- a) Measurement: Measurement of acceptably complete works of this item will be made on the basis of actual length in feet as measured along the centre line of respective work acceptably provided, installed in position, tested and commissioned. No measurement shall be made of sag in overhead conductors and slack in underground cables.
- b) Payment: Payment will be made for acceptable measured quantity of overhead conductor/cable on the basis of unit rate per feet length quoted in the Schedule of Prices. The unit rate shall include all cost of equipment, material and accessories and shall constitute full compensation for all the works related to the above items. No payment shall be made for sag in overhead conductors and slack in underground cables.

\*\*\* End of Section 8002 \*\*\*



## SECTION – 8314

### IP PRIVATE AUTOMATIC BRANCH EXCHANGE (IP-PABX)

#### 1. SCOPE OF WORK

The work under this section consists of supplying, installing, configuring, programming, testing, commissioning and training of all material and services of complete IP based Private Automatic Branch Exchange shall be complete in all respect as described in these specifications, drawings, B.O.Q and in accordance with International Organization for Standardization (ISO).

The IP based Private Automatic Branch Exchange with accessories shall also comply with the General Specifications for Electrical Works Section - 8001, General Technical Requirements for Communication Works Section – 8002 and with other relevant provisions of the Contract Document.

#### 2. GENERAL

The system shall comply with the general requirements for telephone system as specified by the Pakistan Telecommunication Authority (PTA). The system shall be capable of accepting analog as well as Integrated Services Digital Network (ISDN) incoming signals.

#### 3. APPLICABLE STANDARDS AND CODE

The latest editions of the following standards/codes shall be applicable for the materials covered within the scope of this section:

|                           |   |                                                                  |
|---------------------------|---|------------------------------------------------------------------|
| DIN 40040                 | - | Class and Reliability of units in Telecommunication              |
| DIN 57800                 | - | Regulations for installation and operation of telecommunication. |
| DIN 57804                 | - | Telecommunications, Manufacture and Test of Apparatus.           |
| ISO 9000-Series Certified | - | Manufacturer for quality control                                 |

#### 4. EQUIPMENT

##### 4.1 IP based Private Automatic Branch Exchange (IP-PABX)

The IP based Private Automatic Branch Exchange shall operate with power supply with smooth operation without interrupting the communication services.

The IP based Private Automatic Branch Exchange shall have the following features;

- Call server must be Unified Communication (UC) and Collaboration Feature enabled.
- Welcome Greetings with external music on hold
- Voice Guide feature must be built in part of PABX (No external solution for voice guides)
- Automatic Route Selection (ARS)
- Broadcast Message
- Built-In Caller-ID
- Call Forwarding
- Advance Call forwarding to Mobile Phones

- Call Pickup Groups
- Day/Night Service
- Hunting Groups
- Centralized directory with call by name
- Manager Secretary Feature without any additional license
- Call Back on Busy
- Extension Call pickup
- Group Listening
- Hotline
- Music on Hold
- Support Voice over Wireless LAN
- Synchronization with I phones, Android & Windows
- Expandable upto 300 Users
- Analog Trunks
- Digital PRI Interface
- Voice Mail System for All Users
- Min 3 Party Conference
- Support for integration with other IP PABX
- Support from Manufacturer
- MDF with Protection for System Side
- Battery Backup for PABX as per the recommendation of OEM.
- Call Logging Application for External Call Logs
- Operator should be able to enable Day Night Mode

The Call Accounting Software shall have the following features;

- Licensed Software Suite.
- Call Logging of Incoming, Outgoing Calls with CLI numbers
- Extension to extension (internal) calls (optional)
- Built-in reports and graphical representations of data.
- Multi-level Security Access.
- In case of PC failure or connection loss, Voice Communication Gateway server system buffer shall store 3 months data which shall be retrievable after reconnection.
- The system shall include latest branded PC with keyboard, Mouse etc. with licensed Windows OS.

The system shall have an Auto Attendant / DISA System for guidance of external incoming callers. It shall have the weekly calendar management options for playing different voice guides at predefined instants for user guidance as well. To minimize the point of failures and increase reliability the Auto Attendant System shall be an integrated one and not be a PC based solution.

The Communication Server shall also be able to operate without any operator. The system shall provide direct inward dialing (DID) and direct outward dialing (DOD) facility. Contractor shall provide co-ordination with service provider for DID/DOD facility.

Telephony License should be universal; same license for IP/SIP/Analog/Digital.

The system shall meet latest IP, SIP and ISDN standards.

Encryption shall be an integral part of the system and shall be available as and when required.

The system shall have central processing control in the main cabinet and most innovative non-blocking architecture to meet the high traffic requirements for voice and data communication.

The system shall allow future expansion and it is possible to reconfigure the system easily when an expansion is implemented without any major shutdown.

Support all Digital, Analog, IP and SIP telephone sets.

System configurations shall be password protected with several levels of securities for audit trail. All the system configuration history shall be accessible for checking of any illegal / erroneous operation.

When due to hardware/software fault, the system shall generate corresponding alarms for the system administrator / operator for addressing. In case of major alarms or if the system is incapacitated, it shall restart automatically without intervention of the operator with minimum interruption of service. Necessary fault report, logging the details of the event shall be recorded for proper diagnosis.

System shall provide built-in diagnostic program/procedure for complete system diagnosis including card level diagnosis.

System shall support operator console(s) with directory access and password controlled access.

System shall have remote maintenance capabilities with restricted access from outside the office. Therefore necessary equipments/devices and software shall be the part of the supply.

All new features like Unified Communication, IP telephony, IP/SIP trunks, Mobility solutions etc. shall be available in the system and shall be provided as and when required.

Networking with other systems shall be available with standard protocols.

#### 4.2 IP Telephone Set

The IP telephone set with Power over Ethernet (PoE) technology shall have following minimum technical specifications:

- Call Line Identification (CLI)
- Call Name Display (CND)
- 12 feature keys and LEDs
- Hands free talking, open listening
- H323, IP/SIP connectivity
- 10 / 100 Mbps PC Port with hard wired switching
- XML Port

#### 5. **INSTALLATION**

IP based Private Automatic Branch Exchange

Installation of IP based Private Automatic Branch Exchange including MDF and Operator Console shall be in strict accordance with manufacturer's recommendation.

## 6. **TRAINING**

The Contractor shall provide the services of competent instructors who will give full instruction to the designated personnel in the operation, maintenance of the telephone system.

Training manuals shall be provided for each trainee who shall describe in detail the information and data imparted in the training programme.

## 7. **MEASUREMENT AND PAYMENT**

### 7.1 **General**

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning, training and completion for all works specified herein and/or as shown on the Contract Drawings related to the item.

### 7.2 **IP based Private Automatic Branch Exchange with License Programming & Call Accounting Software, Operator Console with add-on modules, Tele Maintenance Terminal / Latest Generation Computer, Main Distribution Frame (MDF)**

7.2.1 **Measurement:** Measurement shall be made for the IP based Private Automatic Branch Exchange with License Programming & Call Accounting Software, Operator Console with add-on modules, Tele Maintenance Terminal / Latest Generation Computer, Main Distribution Frame (MDF) as given in BOQ acceptably supplied and installed by the Contractor as a complete job.

7.2.2 **Payment:** Payment shall be made for the complete job measured as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, configuring, programming, testing, commissioning, training and completion of IP based Private Automatic Branch Exchange with License Programming & Call Accounting Software, Operator Console with add-on modules, Tele Maintenance Terminal / Latest Generation Computer, Main Distribution Frame (MDF) complete as mentioned in BOQ along with all essential interconnecting equipment and associated cables as required with all installation material for satisfactory operation of the entire system. Complete in all respect.

### 7.3 **IP Telephone Set**

7.3.1 **Measurement:** Measurement shall be made for the number of each type of IP telephone sets including 3m extension cable acceptably supplied and installed by the Contractor as a complete unit.

7.3.2 **Payment:** Payment shall be made for the number of units measured as provided above at the contract unit price each and shall constitute full compensation for supplying, installing, configuring, programming, testing, commissioning and training of each type of IP telephone sets, including 3m extension, and other required associated components, cable and accessories.

\*\*\* End of Section 8314 \*\*\*

## **SECTION - 8331**

### **INTELLIGENT ADDRESSABLE FIRE ALARM SYSTEM**

#### **1.0 SCOPE OF WORK**

The work under this section consists of supply, installation, configuring, programming, testing, commissioning and training of all equipment, material, accessories and services for Intelligent Addressable Fire Alarm System shall be complete in all respect as described in these specifications, drawings, BOQ and in accordance with International Organization for Standardization (ISO).

The Contractor will discuss the intelligent addressable fire alarm system layout with the Engineer and coordinate at site with other services for exact route, location and position of electrical lines and equipments.

The intelligent addressable fire alarm system with accessories shall also comply with the General Specifications for Electrical Works Section - 8001, General Technical Requirements for Communication Works Section – 8002 and with other relevant provisions of the Contract Document.

#### **2.0 GENERAL**

All outlet boxes shall be considered part of the devices installed on them and shall be supplied alongwith the devices.

The system shall operate on 24 VDC from a battery charger with manufacturer's recommended standby batteries. The incoming supply shall be 230 VAC from emergency circuit.

All the active items of the intelligent addressable fire alarm system shall ideally be listed as a product of a single manufacturer.

Contractor shall provide following information on wall chart mounted near FACP.

- Complete layout of addressable fire alarm system showing locations of all fire and sounder locations.
- Standby battery specification, including ampere-hour capacity Voltage per Cell, number of Cells, and the battery type.
- Operating and maintenance instruction in BLACK colour.
- Emergency instructions in RED colour.
- Name, address & telephone number of the Servicing Contractor.

The characters of written instructions shall be minimum 6 mm high.

Intelligent addressable fire alarm system shall interface with Public Address System in accordance with NFPA72.

Intelligent addressable fire alarm system shall interface with Access Control System in accordance with NFPA101.

Intelligent addressable fire alarm control panel shall have a provision for remote parallel monitoring of individual devices for fire and fault etc.

### **3.0 APPLICABLE STANDARDS/CODES**

The following standards & codes shall be applicable for the materials covered within the scope of this section:

|          |   |                            |
|----------|---|----------------------------|
| NFPA 72  | - | National Fire Alarm Code   |
| NFPA 101 | - | Life Safety Code           |
| BS 5839  | - | Fire Code British Standard |

Each and all items of the Addressable Fire Alarm System shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by under writers laboratories (UL) label / LPCB/ EN54 approved or British Standard.

### **4.0 MATERIAL**

#### **4.1 Addressable Fire Alarm Control Panel**

The main FACP shall perform the following functions:

- 4.1.1 Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
- 4.1.2 Supervise all initiating signaling and notification circuits throughout the facility by way of connection to addressable monitor and control modules.
- 4.1.3 Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed.
- 4.1.4 Visually and audibly annunciate any trouble, supervisory, alarm condition on panel display and annunciators.
  - a. When a fire alarm condition is detected and reported initiating devices or appliances, the following functions shall immediately occur:
    - i. The system alarm LED shall flash.
    - ii. A local audible device in the control panel shall sound a distinctive signal.
    - iii. The LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
    - iv. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
    - v. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated outputs (alarm notification appliances and/or relays) shall be activated.

- b. When a trouble condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
  - i. The system trouble LED shall flash.
  - ii. A local audible device in the control panel shall sound a distinctive signal.
  - iii. The LCD display shall indicate all information associated with the trouble condition, including the type of trouble point and its location within the protected premises.
  - iv. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
  - v. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated outputs (trouble notification appliances and/or relays) shall be activated.
- c. When a supervisory condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
  - i. The system trouble LED shall flash.
  - ii. A local audible device in the control panel shall sound a distinctive signal.
  - iii. The LCD display shall indicate all information associated with the supervisory condition, including the type of trouble point and its location within the protected premises.
  - iv. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
  - v. All system outputs assigned via preprogrammed equations for a particular point in trouble shall be executed, and the associated outputs (notification appliances and/or relays) shall be activated.
- d. When a pre-alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
  - i. The system pre-alarm LED shall flash.
  - ii. A local audible device in the control panel shall sound a distinctive signal.
  - iii. The LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.

- iv. Printing and history storage equipment shall log and print the event information along with a time and date stamp.
- v. All system outputs assigned via preprogrammed equations for a particular point in alarm shall be executed, and the associated outputs (alarm notification appliances and/or relays) shall be activated.

#### 4.1.5 Acknowledge Switch

- a. Activation of the control panel acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and trouble LEDs from flashing mode to steady-ON mode. If multiple alarms or trouble conditions exist, depression of this switch shall advance the LCD display to the next alarm or trouble condition.
- b. Depression of the Acknowledge switch shall also silence all remote annunciator sounders.

#### 4.1.6 Signal Silence Switch

Depression of the Signal Silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition. The selection of notification circuits and relays that are silence able by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.

##### a. Drill Switch

Depression of the Drill switch shall activate all programmed notification appliance circuits. The drill function shall latch until the panel is silenced or reset.

##### b. System Reset Switch

Depression of the System Reset switch shall cause all electronically latched initiating devices to return to their normal condition. Initiating devices shall re-report if active. Active notification appliance circuits shall not silence upon Reset. Systems that de-activate and subsequently re-activate notification appliance circuits shall not be considered equal. All programmed Control-By-Event equations shall be re-evaluated after the reset sequence is complete if the initiating condition has cleared. Non-latching trouble conditions shall not clear and re-report upon reset.

##### c. Lamp Test

The Lamp Test switch shall activate all local system LEDs, light each segment of the liquid crystal display and display the panel software revision for service personal.

##### d. Scroll Display Keys

There shall be scroll display keys for fire alarm, security, supervisory, trouble, and other events. Depression of the scroll



display key shall display the next event in the selected queue allowing the operator to view events by type.

e. Print Screen

Depression of the PRINT SCREEN switch shall send the information currently displayed on the display to the printer.

4.1.7 System Capacity and General Operation

- a. The control panel shall be capable of expansion. Each module loop shall support minimum 127 analog/addressable devices.
- b. The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit liquid crystal display, individual, status LEDs, and a QWERTY style alphanumeric keypad for the field programming and control of the intelligent addressable fire alarm system.
- c. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the fire alarm control panel.
- d. Smoke Detector Sensitivity Test: The system shall provide an automatic smoke detector test function that meets the requirements of NFPA 72 / BS 5839.
- e. On-line or Off-line programming: The system shall provide means to allow panel programming either through an off-line software utility program away from the panel or while connected and on-line. The system shall also support upload and download of programmed database and panel executive system program to a Personal Computer/laptop.
- f. History Events: The panel shall maintain a history file of the events, each with a time and date stamp. History events shall include all alarms, troubles, operator actions, and programming entries. The control panels shall maintain a 1000 event Alarm History.
- g. Drill the system shall support means to activate all silenceable fire output circuits in the event of a practice evacuation or "drill". If enabled for local control, the front panel switch shall be held for a minimum of 2 seconds prior to activating the drill function.
- h. Passwords and Users: The system shall support two password levels, master and user. Minimum 4 user passwords shall be available, each of which may be assigned access to the programming change menus, the alter status menus, or both. Only the master password shall allow access to password change screens.
- i. Environmental Drift Control: The system shall provide means for setting Environmental Drift Compensation by device. When a detector accumulates dust in the chamber and reaches an unacceptable level but yet still below the allowed limit, the control panel shall indicate a maintenance alert warning. When the detector

accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.

#### 4.1.8 Loop (Signaling Line Circuit) Control Module

- a. The Loop Control Module shall monitor and control 127 devices.
- b. The Loop Control Module shall contain its own microprocessor and shall be capable of operating in a local/degrade mode (any addressable device input shall be capable of activating any or all addressable device outputs) in the unlikely event of a failure in the main CPU.
- c. The Loop Control Module shall provide power and communicate with all intelligent addressable detectors and modules on a single pair of wires. This SLC Loop shall be capable of operating as a NFPA Style 4 (Class B) circuit.
- d. The SLC interface board shall receive analog or digital information from all intelligent detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular device. Each SLC Loop shall be isolated and equipped to annunciate an Earth Fault condition. The SLC interface board software shall include software to automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and the automatic determination of detector maintenance requirements.

#### 4.1.9 Enclosures

- a. The control panel shall be housed in a UL-listed cabinet suitable for surface or semi-flush mounting. The cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
- b. The back box and door shall be constructed of 0.060 steel with provisions for electrical conduit connections into the sides and top.
- c. The door shall provide a key lock and include a transparent opening for viewing all indicators. For convenience, the door shall have the ability to be hinged on either the right or left-hand side.
- d. The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.

#### 4.1.10 Power Supply

- a. The Addressable Main Power Supply shall operate on 230 VAC, 50 Hz, and shall provide all necessary power for the FACP.
- b. The Addressable Main Power Supply shall provide a battery charger for 4 hours of standby using dual-rate charging techniques for fast battery recharge. The supply shall be capable of charging batteries within a 48-hour period.
- c. The Addressable Main Power Supply shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.

- d. The Addressable Main Power Supply shall be power-limited per 1995 UL864 requirements.

#### 4.1.11 Printer

- a. Printers shall be of the automatic type, printing code, time, date, location, category, and condition.
- b. The printer shall provide hard-copy printout of all changes in status of the system and shall time-stamp such printouts with the current time-of-day and date. The printer shall be standard carriage with 80-characters per line and shall use standard pin-feed paper. The printer shall be enclosed in a separate cabinet suitable for placement on a desktop or table and UL, ULC listed for use. The printer shall communicate with the control using an interface complying with Electrical Industries Association standard EIA-232D.
- c. Thermal printers are not acceptable.
- d. The system shall have a strip printer capable of being mounted directly in the main FACP enclosure. Alarms shall be printed in easy-to-read RED, other messages, such as a trouble, shall be printed in BLACK. This printer shall receive power from the system power supply and shall operate via battery back up if AC mains are lost. The strip printer shall be UL 864 listed.
- e. Adequate number of printer paper rolls shall be provided.

#### 4.1.12 Field Programming

- a. The system shall be programmable, configurable and expandable in the field without the need for special tools, laptop computers, or other electronic interface equipment. There shall be no firmware changes required to field modify the system time, point information, equations, or annunciator programming/information.
- b. It shall be possible to program through the standard FACP keyboard all system functions.
- c. All field defined programs shall be stored in non-volatile memory.

### 4.2 Notification Appliances

- 4.2.1 Audible visual sounders shall operate on 24 VDC nominal.
- 4.2.2 Audible visual shall be field programmable without the use of special tools, at a sound level of at least 10 dBA above the ambient noise level.
- 4.2.3 Shall be flush or surface mounted as shown on plans.
- 4.2.4 Strobe lights / Flasher shall meet the requirements of the ADA, UL/EN54 Standard and shall be fully synchronized.
- 4.2.5 Audible Visual Combination Devices
  - a. Shall meet the applicable requirements of Section A listed above for audibility / Relevant BS Codes.
  - b. Shall meet the requirements of Section B listed above for visibility / Relevant BS Codes.

#### 4.3 Addressable Devices - General

- 4.3.1 Addressable devices shall provide an address-setting means using rotary decimal switches.
- 4.3.2 Addressable devices shall use simple to install and maintain decade (numbered 0 to 9) type addressable switches.
- 4.3.3 Detectors shall be analog and Addressable, and shall connect to the fire alarm control panel's Signaling Line Circuits.
- 4.3.4 All sensors, call points and sounders shall also have an integral short circuit isolator, which in the event of a single cable fault will isolate the "culprit" piece of cable and retain all devices on loop operationally in less than 1 second
- 4.3.5 Addressable smoke and thermal detectors shall provide status LED. LED shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel, and LED shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LED can be programmed off via the fire control panel program.
- 4.3.6 The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. Sensitivity can be automatically adjusted by the panel on a time-of-day basis.
- 4.3.7 Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.
- 4.3.8 The detectors shall be ceiling-mount and shall include a separate twist-lock base, which includes a tamper proof feature.
- 4.3.9 The following bases and auxiliary functions shall be available:
  - a. Sounder base rated at 85 DBA minimum.
  - b. Form-C Relay base rated 30VDC, 2.0A
  - c. Isolator base
- 4.3.10 The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
- 4.3.11 Addressable Manual Call Station / Point with built-in isolator module
  - a. Addressable Manual Station shall on command from the fire alarm control panel send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key or can be a break glass as per OEM's recommendation.

- b. All operated stations shall have a positive, visual indication of operation and utilize a key type reset / break glass.

#### 4.3.11 Intelligent Addressable Multi Optical and Heat Detector with base, built in isolator module

- a. The intelligent Addressable Multi Optical and Heat Detector shall be an' addressable device that is designed to monitor a minimum of photoelectric and thermal technologies in a single sensing device. The design shall include the ability, to adapt to' its environment by utilizing a built-in microprocessor to determine it's environment and choose the appropriate sensing settings. The detector design shall 'allow a wide sensitivity window, no less than 1 to 4% per' foot obscuration. These detectors shall utilize advanced electronics that react to slow smoldering fires and thermal properties all within a single sensing device.
- b. The microprocessor design shall be capable of selecting the appropriate sensitivity levels based on the environment type it is in (office, manufacturing, kitchen etc.) and then have the ability to automatically change the setting as the environment changes (as walls are moved or as the occupancy changes).
- c. The intelligent Addressable Multi-sensor detection device shall include the ability to combine the signal of the thermal sensor with the signal of the photoelectric signal in an effort to react hastily in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a false alarm condition by examining the characteristics of the thermal and smoke sensing chambers and comparing them to a database of actual fire and deceptive phenomena.
- d. The intelligent Addressable Multi Optical and Heat Detector shall have a capability to have integral sounder on the detector or detector base for alarm notification.

#### 4.3.12 Intelligent Addressable Thermal / Heat Detector with Base, Built-in Isolator Module

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

#### 4.3.14 Addressable Dry Contact Monitor Module

- a. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLCs.
- b. The monitor module shall mount in a 4-inch square (101.6 mm square), 2-1/8 inch (54 mm) deep electrical box.
- c. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.

- d. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch (70 mm) x 1-1/4 inch (31.7 mm) x 1/2 inch (12.7 mm). This version need not include Style D or an LED.

#### 4.3.15 Addressable Control Module

- a. Addressable Control Modules shall be provided. For fan shutdown and, other auxiliary control functions, the control module may be set to operate as a dry contact relay.
- b. The control module shall mount in a standard 4-inch square (101.6 mm square), 2 1/8 inch (54 mm) deep electrical box, or to a surface mounted back box.

### 4.4 Batteries and External Charger

#### 4.4.1 The intelligent Addressable Multi Optical and Heat Detector shall

- a. Shall be 12 volt, Gell-Cell type.
- b. Battery shall have sufficient capacity to power the Intelligent addressable fire alarm system for not less than 24 hours plus 5 minutes of alarm upon a normal AC power failure.
- c. The batteries are to be completely maintenance free and shall be provided as per manufacturer's recommendation. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

#### 4.4.2 External Battery Charger

- a. Shall be completely automatic, with constant potential charger maintaining the battery fully charged under all service conditions. Charger shall operate from a 120/240-volt 50 hertz source.
- b. Shall be rated for fully charging a completely discharged battery within 48 hours while simultaneously supplying any loads connected to the battery.
- c. Shall have protection to prevent discharge through the charger.
- d. Shall have protection for overloads and short circuits on both AC and DC sides.

### 4.5 Wiring and Cabling

Wiring and cabling of Fire and alarm system shall be carried out in conduits. 1.5 mm<sup>2</sup> fire resistant enhanced cables with LSZH outer sheath shall be provided for the intelligent addressable fire alarm system. The cable shall be work for 120 minutes in fire condition.

All wires and cables shall be color-coded, tagged and checked for open, short or ground faults. No transposition of colors will be permitted. All wiring shall be made on terminal blocks of proper size and type for the services involved. Cable joints shall only be allowed on the detector bases.

## **5.0 INSTALLATION**

### **5.1 Intelligent Addressable Fire Alarm System Equipment**

The installation of Intelligent addressable fire alarm system equipment shall be in strict accordance with the manufacturer's instructions / recommendations and these specifications.

The testing of Fire Alarm equipment shall be in compliance with the relevant standards and regulations. During testing of equipment, emphasis shall be laid on the following:

- Operational Safety
- Regular functioning of the system and devices
- Protection against false alarms

Various detectors like smoke, heat, manual call point etc. shall be subjected to the basic tests and sensitivity tests. The automatic detectors shall be tested in various ways to check real and false alarm behaviors.

## **6.0 TRAINING**

A training session shall be presented by a fully qualified, trained representative of the equipment manufacturer/supplier who is thoroughly knowledgeable of the specific installation. The training shall be given to personnel responsible for operation and maintenance of the system.

The training session shall include but not limited to the following:

- 6.1 Detailed explanation of wall charts as mentioned in Article 2.0 of this section.
- 6.2 Function of each control switch
- 6.3 Periodic operational testing of panel/devices.
- 6.4 Maintenance of fire log book supplied by manufacturer.
- 6.5 Actions to be taken upon receiving following signals:
  - 6.5.1 False alarm indication
  - 6.5.2 Trouble on any initiating or indicating zone
  - 6.5.3 Common alarm or common trouble indication
  - 6.5.4 Low battery voltage indication
- 6.6 Field modifiable programming.

## **7.0 MEASUREMENT AND PAYMENT**

### **7.1 General**

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion of all work specified herein and/or as shown on the Tender Drawing related to the item.

- 7.2 **Intelligent Addressable Automatic Multi & Heat Detectors with built-in isolator module**
- 7.2.1 **Measurement:** Measurement shall be made for the total number of each type of automatic multi & heat detectors with built-in isolator module acceptably supplied and installed by the Contractor as complete unit.
- 7.2.2 **Payment:** Payment shall be made for the number of units measured as provided above at the contract unit price and shall constitute full compensation for supplying, installing, configuring, testing, commissioning and completion of each type of the intelligent addressable automatic multi & heat detectors with built-in sounder and isolator module including bases and back boxes as required including all mounting & installation accessories.
- 7.3 **Intelligent Addressable Manual Call Point with built-in isolator module**
- 7.3.1 **Measurement:** Measurement shall be made for the total number of each type of intelligent addressable manual call point with built-in isolator module acceptably supplied and installed by the Contractor as complete unit.
- 7.3.2 **Payment:** Payment shall be made for the number of units measured as provided above at the contract unit price and shall constitute full compensation for supplying, installing, configuring, testing, commissioning and completion of each type of the intelligent addressable manual call point with built-in isolator module including bases and back boxes as required including all mounting & installation accessories.
- 7.4 **Loop Powered Audio Visual Sounder with built-in isolator module**
- 7.4.1 **Measurement:** Measurement shall be made for the number of Audio Visual Sounder with built-in isolator module acceptably supplied and installed by the Contractor as complete unit.
- 7.4.2 **Payment:** Payment shall be made for the number of units measured as provided above at the Contract unit price and shall constitute full compensation for supplying, installing, configuring, testing, commissioning and completion of each type of Audio Visual Sounder with built-in isolator module including all mounting accessories like outlet boxes etc.
- 7.5 **Loop Powered Control Module / Monitor Module**
- 7.5.1 **Measurement:** Measurement shall be made for the number of Loop Powered Control Module / Monitor Module / Interface Module acceptably supplied and installed by the Contractor as complete unit.
- 7.5.2 **Payment:** Payment shall be made for the number of units measured as provided above at the Contract unit price and shall constitute full compensation for supplying, installing, configuring, testing, commissioning and completion of each type of Loop Powered Control Module / Monitor Module / Interface Module as required for interfacing of various system / devices including interconnecting wiring up to the relevant interface point with all mounting accessories like outlet boxes etc.



7.6 **Intelligent Addressable Fire Alarm Control Panel**

7.6.1 **Measurement:** Measurement shall be made for fire alarm control panel including all related equipment as given in BOQ such as power supply, built-in printer, relays, batteries, batteries charger, LAN card, etc. alongwith all accessories acceptably supplied and installed by the Contractor as a complete job

7.6.2 **Payment:** Payment shall be made for the complete job measured as provided above at the contract unit price and shall constitute full compensation for supplying, installing, programming, configuring, testing, commissioning and completion of fire alarm control panel along with maintenance free batteries, battery charger, power supply, printer LAN Ethernet / remote interface etc. as mentioned in BOQ along with all mounting an installation accessories for satisfactory operation of the entire system. Complete in all respect.

7.7 **Wiring of Fire Alarm Loops**

7.7.1 **Measurement:** Measurement shall be made for the total running feet of wiring of fire alarm loops with 2 x1.5 sq mm fire resistant (120 mins) enhanced cable and the required number of junction boxes acceptably supplied and installed by the Contractor.

7.7.2 **Payment:** Payment shall be made for the total running feet measured as provided above at the contract unit price each and shall constitute full compensation for supplying, installing, connecting testing and commissioning of fire alarm loops with 2 x1.5 sq mm fire resistant (120 mins) enhanced cable wiring including junction boxes and all accessories.

\*\*\* End of Section 8331 \*\*\*

## **SECTION - 8335**

### **CLOSED CIRCUIT TELEVISION SYSTEM (CCTV)**

#### **1.0 SCOPE OF WORK**

The work under this section consists of supplying, installing, connecting, configuring, programming, testing, commissioning and training of all materials and services of the complete IP CCTV system as specified herein, or as given in the Drawings and stated in the Bill of Quantities.

The Contractor shall discuss the IP CCTV layout with the Engineer and co-ordinate at the site with other services for exact route, location and position of the conduits, cameras and equipment.

The IP CCTV system with accessories shall also comply with the General specifications for Electrical Works Section - 8001, General Technical Requirements for Communication Works Section – 8002 and with other relevant provisions of the Contract Document.

#### **2.0 GENERAL**

The CCTV System shall be used for general and security surveillance. All the active items of the CCTV System shall be listed as a product of a single manufacturer.

The power to rack of the CCTV system shall be supplied by an uninterruptible power supply (UPS), which shall have an minimum autonomy of 5 minutes minimum.

Proposed CCTV system shall be an open standard based integrated system with IP network centric functional and management architecture aimed at providing high-speed manual/automatic operation for best performance.

System shall have Colour Video Cameras with individual IP address, with Fixed or P/T/Z Lens, Server, Network Attached Storage (NAS) / Raid backup device for recording, Application Software, Colour Video displays, Keyboards with Joystick Controllers / Mouse-Keyboard, software based Video Matrix Switcher, Workstation for System Administration / Management / Maintenance etc.

Central Management Server and Network Storage management shall offer both video stream management and video stream storage management. Recording frame rate & resolution in respect of individual channel shall be programmable.

System should ensure that once recorded, the video can not be altered, ensuring the audit trail is intact for evidential purposes.

Contractor shall submit storage calculations of manufacturer's recommended software on H.264/H.265 or better compression technique based on 1080p recording at 30 fps for 24 hour operation for 30 days of storage for number of cameras as given in BOQ with 25% expansion capacity.

Cameras shall be capable of video analytics function shall generate an alarm for any non-defined behavioral change. Video Analytics shall provide advanced detection and tracking capabilities covering a wide range of behavioral events.

Surveillance CCTV System shall operate on 230 V, 50 Hz single phase power supply. Power for all the equipment will be conditioned using on-line UPS with minimum 30 minutes or more back up.

If any equipment operates on any voltage other than the supply voltage and supply frequency, necessary conversion/correction device for supply shall be supplied along with the equipment. IP cameras shall receive power from POE / POE+ Ethernet switches.

Housing of cameras shall be integrated by the camera manufacturer.

System must provide built-in facility of watermarking or digital certificate to ensure tamperproof recording so that these can be used as evidence at a later date, if so desired. The recording shall support audit trail feature.

All camera recordings shall have Camera ID & location/area of recording as well as date/time stamp. Camera ID, Location/Area of recording & date/time shall be programmable by the system administrator with User ID & Password.

System shall be triplex i.e. it should provide facility of Viewing, Recording & Reply simultaneously.

The offered system shall have facility to export the desired portion of clipping (from a desired date/time to another desired date/time) on Portable hard drive. Viewing of this recording shall be possible on standard PC using standard software like windows media player etc.

PTZ Cameras shall have 64 or more pre-defined positions to be selected through suitable input alarm.

System shall have provision of LAN connectivity for remote monitoring anywhere in Air Craft Painting Facility.

All the control equipments e.g. CCTV servers, NSM/Raid backup device, decoders etc. shall be provided in standard 19" racks.

### **3.0 APPLICABLE STANDARDS AND CODES**

The following standards and codes shall be applicable for the material covered within the scope of the section.

- IEC 801 – 2      Electrostatic discharges
- IEC 801 – 3      Radiated Electromagnetic interference
- IEC 801 – 4      Voltage transients

Install all the signal transmission components in accordance with the relevant standard ANSI Locate all surge protection within meter of building entrance:

- Dust and rain resistance IP67 or better for outdoor cameras.
- Salt mist            According to IEC 60068-2-11 (for outdoor cameras)
- Vibration            According to IEC 60068-2-6
- Bump test            According to IEC 60068-3

### **4.0 EQUIPMENT**

#### **4.1 IP Fixed Colour Bullet Varifocal Camera**

|              |                    |
|--------------|--------------------|
| Image Device | 1/2.8" CMOS sensor |
|--------------|--------------------|

|                             |                                   |
|-----------------------------|-----------------------------------|
| Resolution                  | 2592(H) x 1944(V), 5 MP or better |
| Lens                        | Built-in Varifocal, Auto Iris     |
| Focus length                | 2.8 mm – 12 mm or better          |
| Frame rate                  | 30 frames/sec or better           |
| Aspect Ratio                | 4:3 or better                     |
| With IR                     | 0.0 lux                           |
| Signal-to-noise ratio (SNR) | >55dB                             |
| Wide Dynamic range          | 100 dB or Higher                  |
| Video Compression           | H.265, H.264 or better            |
| Back Light Compensation     | On/off                            |
| Power Supply                | Required as per OEM               |
| IP Rating                   | As per BOQ                        |

#### 4.2 **IP Fixed Colour Dome Varifocal Camera**

|                             |                                   |
|-----------------------------|-----------------------------------|
| Image Device                | 1/2.8" CMOS sensor                |
| Resolution                  | 2592(H) x 1944(V), 5 MP or better |
| Lens                        | Built-in Varifocal, Auto Iris     |
| Focus length                | 2.8 mm – 12 mm or better          |
| Frame rate                  | 30 frames/sec or better           |
| Aspect Ratio                | 4:3 or better                     |
| With IR                     | 0.0 lux                           |
| Signal-to-noise ratio (SNR) | >55dB                             |
| Wide Dynamic range          | 100 dB or Higher                  |
| Video Compression           | H.265, H.264 or better            |
| Back Light Compensation     | On/off                            |
| Power Supply                | Required as per OEM               |
| IP Rating                   | As per BOQ                        |

#### 4.3 IP PTZ Dome Colour Video Camera

Colour video dome camera with PTZ shall have following technical features:

|                             |                                |
|-----------------------------|--------------------------------|
| Image Device                | 1/3" CMOS Sensor or better     |
| Focus length                | 4.3 mm to 129 mm or better     |
| Optical zoom                | 30 X or better                 |
| Digital zoom                | 12 X or better                 |
| Resolution                  | 1920 x 1080 (2MP) or better    |
| Aspect ratio                | 16:9 or better                 |
| Video Sensitivity IR        | 0 lux                          |
| Pan Range                   | 360° Continuous                |
| Presets                     | 256                            |
| Video Compression           | H.265, H.264, M-JPEG or better |
| Iris Control                | Automatic                      |
| Signal-to-noise ratio (SNR) | >45dB                          |
| Back Light Compensation     | ON/OFF                         |
| Wide Dynamic range          | 90 dB or Higher                |
| Power Supply                | Required as per OEM            |
| IP Rating                   | As per BOQ                     |

#### 4.4 Central Management Server on H.264 / H.265 Compression

Central Management Server shall be used to record video streams based on the configuration assigned by administrator. Workstations & Servers within the LAN should be able to access the recorded video streams. The Central Management Server should support simultaneous play back and recording at full duplex operation.

It shall provide a high quality recording storage and play back of images. It should support integration with LAN to provide Centralized Management and shall operate on Windows/Linux OS. Support of user management for security level control and authentication required. The Central Management Server should have the following features and specifications:

|                |                                            |
|----------------|--------------------------------------------|
| Onboard CPU    | Latest Generation Processor                |
| Onboard Memory | As per system / manufacturer's requirement |
| HD Drive       | As per system / manufacturer's requirement |
| Host Interface | As per system / manufacturer's requirement |

|                                 |                                                           |
|---------------------------------|-----------------------------------------------------------|
| RAID Support                    | As per system / manufacturer's requirement                |
| Network Transport Protocols     | TCP / IP and open system protocol                         |
| Network File Protocols          | CIFS, NFS, HTTP/HTTPS, FTP, NTP, SNMP, SMTP, DHCP and DNS |
| Drive Status / Space Monitoring | Supported                                                 |
| Operating System (OS)           | MS Windows OS (Latest Version) or Linux                   |
| Power Supply                    | Hot pluggable Redundant Power Supply                      |

#### 4.5 **Workstation**

Latest industrial standard workstation with all required accessories for operation of IP CCTV system as specified shall be provided with wireless keyboards, mouse, video card, sound card, 10/100/1000 Base-T Ethernet Port, latest operating system, CCTV software and antivirus software.

#### 4.6 **Network Video Storage on H.264 / H.265 compression / Video Recorder**

Network Video Storage on H.264 / H.265 compression / Video Recorder and data base server in accordance with manufacture's recommendation for operation of CCTV system as specified herein and shown on drawing / BOQ.

Contractor shall submit storage calculation on manufacturer's recommended software on H.264 / H.265 or better compression technique based on 1080p recording at 30 fps for 24 hour operation for 30 days of storage for number of cameras given in BOQ and shown on the drawing with 25% expansion capacity.

#### 4.7 **Camera Housing & Mount**

- i) The camera mount/housing should ideally be of the same make as that of camera or any other make satisfying the criteria mentioned in clause 2.0 and suitable for the offered model number of camera as specified by the manufacturer. In case of camera housing/mount having the make other than the camera itself, the supplier shall provide valid/authentic document by the manufacturer proving the suitability of camera with the housing offered.
- ii) Should be compact and indoor/outdoor types as required.
- iii) Should support the weight of Camera and accessories such as housing, pan & tilt head in any vertical or horizontal position etc.

#### 4.8 **Speed Dome Controller / PTZ Controller**

Speed dome controller should have variable speed joystick, LCD display for programming and it should be able to control the speed dome for PAN/TILT/ZOOM.

#### 4.9 Ultra High Definition (UHD) 4k LED Display

42" or available higher size as per the proposed OEM quoted by vendor shall have color LED display shall have following minimum technical specification.

|                  |                      |
|------------------|----------------------|
| ▪ Resolution     | 3840x2160 pixels     |
| ▪ Brightness     | 700 nit              |
| ▪ Orientation    | Landscape / Portrait |
| ▪ Haze           | Non Glare            |
| ▪ Operation Hour | 24/7                 |
| ▪ Display Mode   | HDMI, DVI, DP, VGA   |
| ▪ Contract ratio | 4000:1               |
| ▪ Aspect ratio   | 16:9                 |
| ▪ Bezel Width    | Narrow               |
| ▪ Power Source   | 230 VAC/50 Hz        |

Contractor shall bid 42 inch display for Matrix / Spot viewing including cost of all essential equipment, decoders, software, license and interconnecting cable as required for complete satisfactory operation of CCTV monitoring system.

#### 4.10 Console

The Console shall be designed to provide a smooth, level work area, while complying with accepted human factor criteria. All ergonomic standards shall be taken into consideration, including view/reach distances, keyboard height, and knee well space. The adjustable work surface shall provide further flexibility allowing for customized height positioning. Slanted working surface for screen,

- Materials 1 in (25.5mm) Particle Board
- Finish high-pressure plastic laminate surface veneer
- Static Load 50 lb. / linear ft. (MAXIMUM 250 lb. (90 Kg) per surface on Adjustable Work surfaces)

A frame composed of cross members made up with assembled profiles using angle brackets and junction plates,

Upper front panels with appropriate fixtures to integrate all equipments and screens, Horizontal working surface for PTZ controller, mouse, and telephone set, including on the front string the keyboards drawers, headset panels and lighting panel.

### 5.0 VIDEO SURVEILLANCE APPLICATION SOFTWARE

The software shall operate on open architecture for integration with perimeter safety, access control, public address and fire / safety systems based on open standards.

Digital video surveillance control software should be capable to display and manage the entire surveillance system. It should be capable of supporting variety of device such as IP cameras, PTZ controller, NVR, NAS boxes/Raid backup device etc.

The software should support flexible 1/2/4/16 windows split of 42" screen display or scroll mode on the PC monitor or on preview displays as per site requirement. The software should be able to control all cameras i.e. PTZ control, Iris control, auto/manual focus and color balance of camera, selection of presets, video tour selection etc.

The software is required to generate reports of stored device configuration. The control software is required to provide alarm and alarm log. The log shall be able to be achieved, printed and displayed using a device filter, a device group filter and/or a time window.

The software should have user authority configurable on per device or per device group basis. The user shall have the facility to request the access of any camera and can control the camera for a reservation period.

Control of camera is released after the reservation period.

The system shall provide user activity log (audit trail) with user date, time stamp and action performed etc.

The administrator should be able to add, edit & delete users with rights. It shall be possible to view ability/rights of each user or the cameras which can be viewed & controlled as per the permission assigned by the administrator.

The users should be on a hierarchical basis as assigned by the administrator. The higher priority person can take control of cameras, which are already being controlled by a lower priority user. There should be minimum 3 hierarchical levels of security for providing user level log in.

It should have recording modes viz. continuous, manual or programmed modes on date, time and camera-wise. All modes should be disabled and enabled using schedule configuration. It should be possible to search and replay the recorded images on date, time and camera-wise. It should provide on screen controls for remote operation of PTZ cameras. It should have the facility for schedule recording. Different recording speeds (fps) and resolution for each recording mode for each camera should be possible.

It should provide programmable motion detection and recording, to be defined area-wise. System must be able to support video motion detection algorithms to detect and track objects, learn the scene, adapt to a changing outdoor environment, ignore environmental changes including rain, hail, wind, swaying trees and gradual light changes.

The settings shall be individually configurable for each alarm and each camera pre-record duration. This shall allow the camera server to capture video prior to the alarm/event shall be selectable from a list of values ranging between 0 seconds and 5 minutes. The software for clients should also be working on a browser based system for remote users.

Retrieval: The CCTV application should allow retrieval of data instantaneously or any data/time interval chosen through search functionality of the application software. In case data is older than 30 days and available, the retrieval should be possible.

The system should be allow for backup of specific data on any drives like CD/DVD/Blue ray Recorders or any other device in a format which can be replayed through a standard PC based software.

Log of any such activity should be maintained by the system which can be audited at a later date.

Storage: Data storage should be at a central location. The capacity of the storage should be for 24 hour operation of 30 days recording for all cameras at 1080p, 30 fps and H.264 / H.265 compression in accordance with manufacture's recommendation for operation of CCTV system as specified herein and shown on drawing / BOQ with 25% expansion capacity.

Artificial Intelligence: It shall have image tracking facility. If any object is found to be stationary for a pre-defined period the system shall track the event and alert the operator. This facility shall be provided on all cameras. The system must have the features for abandoned object, intrusion detection, camera sabotage, wrong direction,



loitering detection, object counting, object removal, stopped vehicle, identifying tail-gating, vehicle detection features, unattended baggage identification, queuing analysis, and external text insertion feature and intruder detection.

#### **5.1 Network Passive**

Network passive such as patch panels, patch cords, cable management, 19" rack with fan tray & 13 Amp outlets shall be provided according to the system requirement and in accordance with specification given in Section 8312.

### **6.0 INSTALLATION**

Installation of CCTV System shall be done in strict accordance with the manufacturer's recommendations.

### **7.0 TRAINING**

A training session shall be presented by a fully qualified, trained representative of the equipment manufacturer/supplier who is thoroughly knowledgeable of the specific installation. The training shall be given to personnel responsible for operation and maintenance of the system.

### **8.0 MEASUREMENT AND PAYMENT**

#### **8.1 General**

The Contractor bid amount, against each Bill of Quantities item as given below, shall include design, supply, installation, testing, commissioning and completion for all work specified herein and / or as shown on the Contract Drawings related to the item.

#### **8.2 IP Fixed Colour Camera Power Over Ethernet (POE) / IP PTZ Dome Camera**

**8.2.1 Measurement:** Measurement shall be made for the total number of IP Fixed Colour Camera / IP PTZ Dome Camera with accessories acceptably supplied and installed by the Contractor as a complete unit.

**8.2.2 Payment:** Payment shall be made for IP Fixed Colour Camera / IP PTZ Dome Camera for number of units measured as provided above at the Contractor unit price and shall constitute full compensation for supplying, installing, connecting, testing and commissioning of the IP Fixed Colour Camera / IP PTZ Dome Camera with housing including all installation and mounting accessories.

#### **8.3 42 inch UHD 4k Monitoring LED Displays**

**8.3.1 Measurement:** Measurement shall be made for the complete job of required number of 42 inch UHD 4k LED display for matrix / spot with decoders for viewing with all essential equipment and interconnecting cables as a complete job acceptably supplied and installed by the Contractor.

**8.3.2 Payment:** Payment shall be made for complete job measured as provided above at the Contractor unit price and shall constitute full compensation for supplying, installing, connecting, configuring, programming testing, commissioning and completion of required number of 42 inch UHD 4k LED display for matrix / spot viewing with all essential equipment i.e. decoders, interconnecting cables etc. as required complete in all respect.

#### 8.4 **Operator Console**

8.4.1 **Measurement:** Measurement shall be made for the Operator Console as a complete job acceptably supplied and installed by the Contractor.

8.4.2 **Payment:** Payment shall be made for Operator Console for complete job measured as provided above at the Contractor unit price and shall constitute full compensation for supplying, installing, connecting and completion of the Operator Console for housing LED Displays, computer, PA microphone & PTZ Controller with drawers and chairs including all installation and mounting accessories.

#### 8.5 **Latest Generation version Computer comprising 21" LCD, Wireless Keyboard, Wireless Mouse and associated accessories**

8.5.1 **Measurement:** Measurement shall be made for the total number of Latest Generation version Computer comprising 21" LCD acceptably supplied and installed by the Contractor as a complete job.

8.5.2 **Payment:** Payment shall be made for the complete job of Latest Generation version Computer comprising 21" LCD for complete job measured as provided above at the Contractor unit price and shall constitute full compensation for supplying, installing connecting, testing and commissioning, configuring of Latest Generation version Computer comprising 21" LCD Screen, CPU with license operating system, license Antivirus Software, license CCTV Software, Wireless Keyboard, Wireless Mouse with all essential interconnecting cables as required for system operation.

#### 8.6 **Network Video Recorder on H.265 / H.264 compression & Central Management Server**

8.6.1 **Measurement:** Measurement shall be made for the Network Video Recorder & Central Management Server on as a complete job acceptably supplied and installed by the Contractor.

8.6.2 **Payment:** Payment shall be made for Network Video Recorder on H.265 / H.264 compression & Central Management Server for complete job measured as provided above at the contract unit price and shall constitute full compensation for supplying, installing, testing, commissioning, configuring and completion of the Network Video Recorder on H.264 / H.265 compression standard & Central Management Server for required number of cameras as mentioned in BOQ for 24 hours 30 days with 25% expansion capacity complete in all respect.

#### 8.7 **PTZ Controller**

8.7.1 **Measurement:** Measurement shall be made for the total number of PTZ Controller with accessories acceptably supplied and installed by the Contractor as a complete unit.

8.7.2 **Payment:** Payment shall be made for PTZ Controller for number of units measured as provided above at the Contractor unit price and shall constitute full compensation for supplying, installing connecting, testing and commissioning of the PTZ Controller with control functions complete in all respect.

8.8 **Layer-2 Access PoE Switch**

8.8.1 **Measurement:** Measurement shall be made for the total number of Layer-2 Access PoE Switch each acceptably supplied and installed by the Contractor as a complete unit.

8.8.2 **Payment:** Payment shall be made for the total no. of units of Layer-2 Access PoE Switch measured as provided above at the Contract unit prices each and shall constitute full compensation for supplying, installing connecting, testing, commissioning, configuring and completion of the Layer-2 Access power over Ethernet PoE Switch with required Copper and Fiber SFP ports transceiver as mentioned in BOQ complete in all respect.

\*\*\* End of Section 8335 \*\*\*

## **SECTION – 8341**

### **PUBLIC ADDRESS & VOICE EVACUATION SYSTEM**

#### **1.0 SCOPE OF WORK**

The work under this section consists of supply, installation, connecting, configuring, programming, testing, commissioning and training of all equipment, material, accessories and services for Public Address and Voice Evacuation System shall be complete in all respect as described in these specifications, drawings, B.O.Q and in accordance with International Organization for Standardization (ISO).

The Contractor will discuss the Public Address and Voice Evacuation System layout with the Engineer and coordinate at site with other services for exact route, location and position of electrical / telecommunication lines and equipment.

The Public Address and Voice Evacuation System with accessories shall also comply with the General specifications for Electrical Works Section - 8001, General Technical Requirements for Communication Works Section – 8002 and with other relevant provisions of the Contract Document.

#### **2.0 GENERAL**

Public Address and Voice Evacuation System shall be provided as shown on drawings.

Public address and Voice Evacuation system shall interface with the Addressable Fire Alarm System in accordance with NFPA 72.

All the active items of the Public Address and Voice Evacuation System shall be listed as a product of a single manufacturer.

The system shall make use of modular design to enable future enhancements.

Contractor shall submit Sound Pressure Level (SPL) calculation of speakers for review.

Contractor shall consider 65-70 dB as background noise level for calculation of Sound Pressure Level (SPL) of speakers.

A feedback circuit arrangement shall be provided to keep sound pressure levels at least 10 db above background noise.

A supervisory system shall monitor loudspeaker loop for open circuits, short circuit and earth leakage conditions.

Announcement facility shall be provided at Command & Control Room (CCR).

Configuration of the system for microphone control and priority setting shall be as follows:

- The highest priority input shall be used for emergency announcements from a P.A. announcer console installed in Command & Control Room (CCR).
- The medium priority input shall be used for normal public announcements from a P.A. announcer console installed in Command & Control Room (CCR).
- The lowest priority shall be accorded to the background music input / normal pre-recorded message.

Power amplifier outputs shall be of the 100V type. The equipment rack shall be connected to the UPS.

It shall be possible to combine the zones of within floor and each floor into a group for simultaneous broad casting.

All equipment, cables and wires shall be numbered in accordance with the standardization procedures laid down in IEC 750.

Contractor shall point by point confirm in writing their compliance with the items of this specifications in the form of a qualified statement of compliance.

Materials furnished under this specification shall be standard product of manufacturers, regularly engaged in the production of such equipment. Manufacturer shall also have authorized representative in Pakistan for maintenance of the equipment.

All junction boxes, glands (if required) shall be provided and price shall be deemed included in respective BOQ Item.

### 3.0 APPLICABLE STANDARDS AND CODES

EN54, CE, DIN 4002, DIN 45573 and DIN 45589 shall be applicable for the material covered within the scope of this section.

### 4.0 MATERIAL

#### 4.1 System Manager / Network Controller with Software:

The System Manager with input and output as shown on the drawing and required as per manufacturer's recommendation shall be provided. Required Matrix Zones Bus shall be modular and shall have the following minimum characteristics:

|                           |                                                    |
|---------------------------|----------------------------------------------------|
| - Indication              | Available                                          |
| - LAN                     | Available                                          |
| - Control Input           | 8 inputs minimum                                   |
| - Control Output          | 5 output minimum                                   |
| - Audio Input             | 2 input                                            |
| - Standby Amplifier Input | 1 x input, 1 x output                              |
| - Distortion:             | Less than 1% (at rated output f = 1 kHz Sine wave) |
| - Emergency Power Supply  | Available                                          |
| - CD Player               | Available                                          |

System Manager Component shall have a provision of 25% spare capacity in main console including emergency power supply in order to cater future PA equipment requirement.

#### 4.2 **Power Amplifier**

Contractor shall provide dedicated duty amplifier for each zone as specified in load calculation chart in public address & voice evacuation schematic diagram as per their proposed manufacturer.

1 Nos. of auto standby amplifier of highest wattage shall also be provided and cost of all duty and spare amplifiers shall be deemed included in respective BOQ item.

The power amplifier shall have the following characteristics:

- Rated Output Power: As per zone load calculation given in PA schematic diagram.
- Output Voltage 100 V
- Inputs and Outputs: Available

#### 4.3 **Horn Loudspeaker**

Weather Proof Horn Loudspeaker suitable for mounting on wall brackets shall be used wherever required. Speakers shall be installed with junction box, ceiling rose, built-in driver unit, glands, integrated 100 V-matching transformers and wall mount bracket for which price shall be deemed included in their respective BOQ item.

Horn Loudspeaker shall have following minimum technical specification.

- Rated output power: 30 watt
- Frequency Response: 250 Hz – 10 kHz
- Sensitivity / SPL: 100 dB (1 W, 1 m) or higher
- Rated Voltage: 100 volts.
- IP Rating: IP65 Rated

#### 4.4 **Wall Loudspeaker**

Wall Loudspeaker suitable for mounting on wall brackets shall be used wherever required. Speakers shall be installed with junction box, ceiling rose, built-in driver unit, glands, integrated 100 V-matching transformers and wall mount bracket for which price shall be deemed included in their respective BOQ item.

Wall Loudspeaker shall have following minimum technical specification.

- Rated output power: 30 watt
- Frequency Response: 80 Hz – 20 kHz
- Sensitivity / SPL: 85 dB (1 W, 1 m) or higher
- Rated Voltage: 100 volts.

#### 4.5 Ceiling Loudspeaker

Ceiling Loudspeaker shall be provided as per requirement. Speakers shall be installed with fire dome, junction box, ceiling rose, driver unit, glands, integrated 100 V-matching transformers and other required accessories for which price shall be deemed included in their respective BOQ item.

Ceiling Loudspeaker shall have following minimum technical specification.

- Rated Power 6 watt
- Rated Voltage 100 volts.
- Frequency Range 80 Hz – 20 kHz
- Sound Pressure Level (SPL) 87 dB (1 W, 1 m) or higher

#### 4.6 Remote Microphone

The remote microphone shall have the following characteristics:

- Distortion: Less than 1%
- Frequency Response: 100 Hz – 20 kHz
- Signal to Noise Ratio (S/N)  $\geq$  60 dB

#### 4.7 Loudspeaker Cable

Wiring and cabling of loudspeaker cable shall be carried out in PVC/G.I conduits as required. 2 x 1.5 mm<sup>2</sup> fire resistant enhanced cable with LSZH outer sheath / manufacturer's recommended cable shall be provided for the wiring of loudspeaker cable for Public Address System. The cable shall be able to work for 120 minutes in fire condition.

All wires and cables shall be checked for open, short or ground faults. All wiring shall be made on terminal blocks of proper size and type for the services involved. Cable joints shall only be allowed on the speaker junction boxes. Appropriate size nos of cable glands and junction boxes shall be provided for speakers.

#### 4.8 Remote Microphone Cable

Wiring of microphone cable shall be carried out in PVC/G.I conduits as required. Cat 6 STP LSZH cable / manufacturer's recommended cable shall be provided for the wiring of remote microphone of Public Address and Voice Evacuation System.

#### 4.9 Public Address and Voice Evacuation Rack

Cabinet shall be 19 inch, with tie and retainers for cabling system and 600mm x 600mm, 800mm x 600mm and 1000mm x 800mm cabinet shall be suitable to install:

- Colour of rack: Black.
- Plexi glass door.
- Frame thickness 2mm, mounting rail thickness 2mm, roof thickness 1.63mm, rear door thickness 1.63mm and side panels thickness 1.2mm.
- At least two cooling fan.

- Cable entries from both top and bottom panel.
- Cabling guide system in each internal side of cabinet for front and back side.
- Earthing / grounding point.
- Door lock with key locking capacities.
- Right or left opening of door of rack shall be provided as per requirement of room.
- A cabling guide system in each internal side of the cabinet for the front side;
- A cabling guide system in each internal side of the cabinet for the backside;
- An earthing point, multi-socket strip for supply power to the active equipment;
- Metallic door shall be provided with key locking capabilities.

Power distribution unit (PDU) must have following specification:

- At least two extra sockets as per requirement of active equipment installed inside rack.
- PDU with sockets compatible with active equipment
- Industrial male plug / compatible with power socket.
- Two PDUs in each rack for active equipments that have dual power supply.

## 5.0 **MULTIMEDIA PROJECTOR AND MOTORIZED PROJECTOR SCREEN**

### 5.1 **Multimedia Projector:**

Multimedia projector has following minimum specifications:

Resolution: WUXGA (1920 x 1200 pixels)  
 Brightness: 5000 lumens  
 Contrast: 16000:1  
 Panel size: 0.64 inches (16:10 aspect ratio)  
 Screen size: 30-300 inches  
 (Diagonal)  
 HDMI Port: Available

### 5.2 **Motorized Projector Screen:**

Multimedia projector screen has following minimum specifications:

Aspect Ratio: High Definition (16:9)  
 Screen Size: 10'.7" x 6'x8"  
 Screen Surface: Matte White

All VGA, HDMI, RC Outlet with faceplate shall be provided in standard switch backbox. Contractor to interface proposed multimedia projector screen with public address system of Conference Room and cost shall be deemed included in respective BOQ item.

High Speed HDMI cable shall be provided to handle video resolutions of 1080p and beyond. The cable must be LLC Certified of any approved European brand in appropriate size of PVC conduit from HDMI outlet box to Multimedia Projector and shall be complete with termination at both ends including connectors. Complete in all respects.

Contractor shall prepare detailed conduiting layout in shop drawing for projector according to proposed selected make i.e. Conduiting layout shall be in accordance with proposed manufacturer's recommendation including all floor boxes, each type of communication cables, power cables, power sockets as required. Complete in all respect.



## 6.0 TRAINING

A training session shall be presented by a fully qualified, trained representative of the equipment manufacturer/supplier who is thoroughly knowledgeable of the specific installation. The training shall be given to personnel responsible for operation and maintenance of the system.

## 7.0 INSTALLATION

### 7.1 Public Address and Voice Evacuation System Equipment

The installation of Public Address System Equipment shall be in strict accordance with the manufacturer's instructions/recommendations and these specifications.

The testing of Public Address equipment shall be in compliance with the relevant standards and regulations. During testing of equipment, emphasis shall be laid on the following:

- Zone wise and group wise microphone live broadcast routing
- Microphone priority testing

### 7.2 Wiring and Cabling

Wiring and cabling of Public Address and Voice Evacuation System shall be carried out as per instructions given in Section 8212 'Low Tension Cables' of these specifications.

### 7.3 Conduits and Accessories

Conduits and accessories for PA system shall be installed as per instructions given in section 'Conduits and Pipes', of contract specifications.

## 8.0 MEASUREMENT AND PAYMENT

### 8.1 General

The Contractor's bid amount against each Bill of quantities item as given below shall include supply, installation, testing, commissioning and completion of all work specified herein and/or as shown on the Contract Drawing related to the item.

### 8.2 System Manager with required Matrix Bus with Software etc.

**8.2.1 Measurement:** Measurement shall be made for System Manager with required Matrix bus with 25% spare capacity having microprocessor modular matrix, MP3 / USB / CD / SD / Tuner format playing card, input card, output card, LAN connectivity, dedicated duty amplifier for each zone as mentioned in load calculation sheet in schematic diagram, auto standby amplifier of highest wattage, automatic switchover, line fault detection system, manufacturer's recommended emergency power supply backup with DC power output, trickle charging, with suitable manufacturer's recommended backup batteries as required, PA software, SPL calculations, interfacing with fire alarm system including any other essential interconnecting equipment and cabling as required with all installation and mounting accessories for satisfactory operation of the entire public address & voice evacuation system acceptably supplied and installed by the Contractor as a complete job.

- 8.2.2 **Payment:** Payment shall be made for the complete job measured as provided above at the contract unit price and shall constitute full compensation for supplying, installing, connecting, configuring, programming, testing, commissioning and completion of System Manager with required Matrix bus with 25% spare capacity having microprocessor modular matrix, MP3 / USB / CD / SD / Tuner format playing card, input card, output card, LAN connectivity, dedicated duty amplifier for each zone as mentioned in load calculation sheet in schematic diagram, auto standby amplifier of highest wattage, automatic switchover, line fault detection system, manufacturer's recommended emergency power supply backup with DC power output, trickle charging, with suitable manufacturer's recommended backup batteries as required, PA software, SPL calculations, interfacing with fire alarm system including any other essential interconnecting equipment and cabling as required with all installation and mounting accessories for satisfactory operation of the entire public address & voice evacuation system.

### 8.3 **Horn / Wall / Ceiling Loudspeaker with Matching Transformer**

- 8.3.1 **Measurement:** Measurement shall be made for the total number of each type of Horn / Wall / Ceiling Loudspeaker acceptably supplied and installed by the Contractor as complete unit.
- 8.3.2 **Payment:** Payment shall be made for the complete unit as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing, commissioning and completion of each type of Horn / Wall / Ceiling Loudspeaker complete with driver unit, integrated matching transformer, fire dome and wall / ceiling mount brackets as specified in BOQ and specification including all mounting and installation accessories as required. Complete in all respect.

### 8.4 **Remote Microphone**

- 8.4.1 **Measurement:** Measurement shall be made for the total number of each type of Remote Microphone acceptably supplied and installed by the Contractor as complete unit.
- 8.4.2 **Payment:** Payment shall be made for the complete unit as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, testing, commissioning and completion of each type of Remote Microphone with essential interconnecting equipment as specified in BOQ including all mounting and installation accessories.

### 8.5 **Public Address Rack**

- 8.5.1 **Measurement:** Measurement shall be made for the total number of each type of Public Address Rack for installation of system manager, power amplifier, and accessories of public address system and terminal strips for speaker circuits and microphone, earthing point, multi-socket strip for supply power to the amplifier, Plexi glass door with key locking capabilities acceptably supplied and installed by the Contractor as a complete unit.
- 8.5.2 **Payment:** Payment shall be made for the complete unit as provided above at the Contract unit Price each and shall constitute full compensation for supplying, installing, connecting testing, commissioning and completion of each type of Public Address Rack for

installation of system manager, power amplifier, and accessories of public address system and terminal strips for speaker circuits and microphone, earthing point, multi-socket strip for supply power to the amplifier, Plexi glass door with key locking capabilities acceptably supplied and installed by the Contractor as a complete unit.

**8.6 Wiring of P.A & V.A System- Loudspeaker / Microphone Cable**

**8.6.1 Measurement:** Measurement shall be made for the total running feet of wiring of Loudspeaker / Microphone of P.A & V.A System acceptably supplied and installed by the Contractor.

**8.6.2 Payment:** Payment shall be made for the total running feet as provided above at the Contract unit Price each and shall constitute full compensation for supplying, installing, connecting, laying, testing and commissioning of Loudspeaker / Microphone of P.A & V.A System acceptably supplied and installed by the Contractor including all installation accessories.

**8.7 Multimedia Projector, Motorized Projector Screen, Floor Boxes, Cabling, Conduiting etc.**

**8.7.1 Measurement:** Measurement shall be made for the complete job of Multimedia Projector, Motorized Projector Screen, Floor Boxes, Cabling, Conduiting, power sockets etc. acceptably supplied and installed by the Contractor.

**8.7.2 Payment:** Payment shall be made for the complete job of Multimedia Projector, Motorized Projector Screen, Floor Boxes, Cabling, Conduiting etc. measured as provided above at the Contract unit prices and shall constitute full compensation for detailed engineering design, supplying, installing, laying, connecting, configuring, programming, testing, commissioning and completion of the Multimedia Projector, Motorized Projector Screen, Floor Boxes, Power Sockets etc. interfacing with public address system as mentioned in BOQ including power supply, all essential interconnecting cables and conduiting and conduiting layout, mounting and installation accessories for satisfactory operation of the entire system. Complete in all respect.

\*\*\* End of Section 8341 \*\*\*

## SECTION - 8371

### CABLE ANTENNA TV SYSTEM (CATV)

#### 1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing, commissioning and training of all material and services of Cable Antenna TV System as stated herein, as shown on the Bidding Drawings and as given in the Bill of Quantities.

The Contractor will discuss the Cable Antenna TV System layout with the Engineer and coordinate at site with other services for exact route, location and position of electrical lines and equipments.

The Cable Antenna TV System with accessories shall also comply with the general Specifications for Electrical works Section 8001 and with other relevant provisions of the Bidding Documents.

#### 2.0 GENERAL

The CATV System shall be of single manufacturer.

The CATV System under present contract covers following:

- RG-6 and RG-11 co-axial cable
- Splitters / Tapoffs and TV Sockets
- Conduits
- Cabinet

Contractor is to co-ordinate with local CATV Service Provider for installation of their active CATV equipment covered in CATV Service Provider scope of work and also route of their incoming TV Cable.

#### 3.0 APPLICABLE STANDARDS/CODES

IEC-728 and relevant DIN Standards shall be applied for the material covered within the scope of this section.

#### 4.0 MATERIAL

##### 4.1 8 way Splitter

Splitter shall have the following minimum technical Specifications:

|                        |   |                    |
|------------------------|---|--------------------|
| Frequency range        | : | 5 to 1000 MHz      |
| Distribution/insertion | : | less than 11 dB    |
| Isolation              | : | greater than 25 dB |
| Screening factor       | : | greater than 85 dB |

##### 4.2 4 way and 8 way Tap-off

Directional tap-off units shall have the following minimum technical Specifications:

|               |   |             |
|---------------|---|-------------|
| 4 Way Tap-off | : | RG11 to RG6 |
| Frequency     | : | 470-862 MHz |
| Through loss  | : | 3 dB in-out |

|                         |   |                            |
|-------------------------|---|----------------------------|
| Side loss attenuation   | : | 14.5 dB in-tap             |
| Directional attenuation | : | greater than 28 dB out-tap |
| Isolation               | : | greater than 40 dB tap-tap |
| 8 Way Tap-off           | : | RG11 to RG6                |
| Frequency               | : | 470-862 MHz                |
| Through loss            | : | 6.7 dB in-out              |
| Side loss attenuation   | : | 15 dB in-tap               |
| Directional attenuation | : | greater than 30 dB out-tap |
| Isolation               | : | greater than 35 dB tap-tap |

#### 4.3 TV sockets

TV sockets shall have the following minimum technical Specifications:

|                  |   |                            |
|------------------|---|----------------------------|
| Frequency        | : | 5-862 MHz                  |
| Screening factor | : | greater than 85 dB class A |
| Isolation        | : | greater than 20 dB         |

#### 4.4 Coaxial Cable

RG-11 Coaxial Cable shall have the following minimum technical Specifications:

|                    |   |                     |
|--------------------|---|---------------------|
| Inner Conductor    | : | Cu-core, bare       |
| Dielectric Coating | : | PE foamed / PIB     |
| Outer conductors   | : |                     |
| First screening    | : | Bonded Al-foil      |
| Second screening   | : | Cu-Sn braid         |
| Third screening    | : | Al-foil             |
| Outer sheath       | : | LSZH                |
| Screening factor   | : | greater than 115 dB |
| Loop resistance    | : | 31 ohm/km           |

RG-6 Coaxial Cable shall have the following minimum technical Specifications:

|                    |   |                     |
|--------------------|---|---------------------|
| Inner Conductor    | : | Cu-core, bare       |
| Dielectric Coating | : | PE foamed / PIB     |
| Outer conductors   | : |                     |
| First screening    | : | Bonded Al-foil      |
| Second screening   | : | Cu-Sn braid         |
| Third screening    | : | Al-foil             |
| Outer sheath       | : | LSZH                |
| Screening factor   | : | greater than 110 dB |
| Loop resistance    | : | 16 ohm/km           |

#### 4.5 CATV Cabinet

CATV Cabinet for installation of tap-off, splitter with all mounting and installation accessories.

#### 5.0 INSTALLATION

Installation of the CATV System shall be in strict accordance with manufacturer's instruction and recommendations. Contractor shall coordinate with the service provider for installation, testing and commissioning of CATV system.

## 6.0 MEASUREMENT AND PAYMENT

### 6.1 General

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion of all work specified herein and/or as shown on the Bidding Drawing related to the item.

### 6.2 Splitters / Tapoff / TV Sockets

6.2.1 **Measurement:** Measurement shall be made for the total number of each type of passive device such as splitters, tap-offs and TV sockets acceptably supplied and installed by the Contractor as a complete unit.

6.2.2 **Payment:** Payment shall be made for the number of units measured as provided above at the contract unit price each and shall constitute full compensation for supplying, installing, testing and commissioning of each type of the passive device such as splitters, tap-offs and TV sockets including all accessories.

### 6.3 Coaxial Cable

6.3.1 **Measurement:** Measurement shall be made for the total number of units / running feet for each type of Coaxial Cable acceptably supplied and installed by the Contractor.

6.3.2 **Payment:** Payment shall be made for the total number of units / running feet of Coaxial Cable measured as provided above at the contract unit price each and shall constitute full compensation for supplying, installing, connecting, laying, testing and commissioning of the each type of Coaxial Cable including all accessories.

### 6.4 CATV Cabinet

6.4.1 **Measurement:** Measurement shall be made for the total number of each type of 16 SWG CATV Cabinet for installation of tap-off, splitter etc. acceptably supplied and installed by the Contractor as a complete unit.

6.4.2 **Payment:** Payment shall be made for the number of units of 16 SWG CATV Cabinet measured as provided above at the contract unit price each and shall constitute full compensation for supplying, installing and completion of each type of the CATV Cabinet for installation of CATV Active Equipment (covered in Service Provider scope of work), tap-offs, splitters with all mounting and installation accessories as shown on drawings with 25% expansion capacity for future use.

\*\*\* End of Section 8371 \*\*\*

# BILL OF QUANTITIES

**PATIENTS' AID FOUNDATION - JINNAH POST GRADUATE MEDICAL CENTRE (PAF-JPMC) KARACHI**  
**SARDAR YASIN MALIK MEDICAL COMPLEX (SYMMC) AND RABIA RASHEED SOORTY BUILDING (RRSB), (EMPLOYEE WARD), JPMC KARACHI**

**BILL OF QUANTITIES OF ELV PASSIVE WORKS**

| Item No. | Description | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate | Total Amount (Rupees) |
|----------|-------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|----------------|-----------------------|
| (1)      | (2)         | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)   | (12 = 8 + 10)         |

**T. COMMUNICATION SYSTEMS**

Ref Spec Sec: 8001 & 8002

The entire electrical installation/work shall be carried out by licensed Contractor, authorised to undertake such work under the provisions of the Electricity Act 1910 and The Electricity Rules 1937 as adopted and modified upto date by the Government of Pakistan. The work includes supply, installation, testing, commissioning of the following Electrical work items (unless specifically stated otherwise). The specifications section 8001 and recommended list of manufacturer applicable to all BoQ items. The work includes all material, labour, tools, plant, storage, transportation, accessories, related civil works required for proper completion of each item. The Contractor is bound to provide submittals for the Engineer's approval with relevant standards, data sheets, catalog, brochures, manuals, shop drawings etc. Note: In case of any discrepancy found between BoQ, technical compliance sheets, specifications and drawings, then the sequence of document priority that will govern is technical compliance sheets, BoQ, specifications and drawings.

**PABX**

Ref. Spec. Sec. 8001, 8002, 8230, 8290, 8312, 8314

01-1T Conventional/Hybrid PABX System comprising of following:

- a) Dual CPU in hot/standby mode, Dual Power Supply, including MDF, Tele Maintenance Terminal, Call Accounting Software, Maintenance free backup batteries for 2 hours, 1 x Operator Console, DISA facility, BGM, Stabilizer, 25% expanbale PRI Lines, Analog Trunk Lines, Analog Extensions, Digital Extensions and IP Phones. Complete in all respects for satisfactory operation of the entire system. (Make Alcatel-Lucent or Huawei or Approved Equivalent)

1 Medical Tower and Rabia Rashid Soorti Building shall have a combine PABX System

- |                      |     |    |    |                                       |
|----------------------|-----|----|----|---------------------------------------|
| b) PRI lines         | No. | 2  | 1  | Rates to be included in item 01-1T(a) |
| c) Analog Trunk Line | No. | 24 | 10 | Rates to be included in item 01-1T(a) |



| Item No.                                     | Description                                                                                                                                                                                                                                     | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate                        | Total Amount (Rupees) |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|---------------------------------------|-----------------------|
| (1)                                          | (2)                                                                                                                                                                                                                                             | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)                          | (12 = 8 + 10)         |
|                                              | d) Analog Extension                                                                                                                                                                                                                             | No.  | 286                      | 97                             |                              |                           |                              |                                                          |                                                                  | Rates to be included in item 01-1T(a) |                       |
|                                              | e) Digital Extension                                                                                                                                                                                                                            | No.  | 30                       | 10                             |                              |                           |                              |                                                          |                                                                  | Rates to be included in item 01-1T(a) |                       |
| 01-2T                                        | Analog Set with CLI (Make Alcatel-Lucent or Huawei or Approved Equivalent)                                                                                                                                                                      | Nos. | 286                      | 97                             |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| 01-3T                                        | Digital Telephone Set with all installation accessories. (Make Alcatel-Lucent or Huawei or Approved Equivalent)                                                                                                                                 | Nos. | 15                       | 2                              |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| <b><u>ADDRESSABLE FIRE ALARM SYSTEM</u></b>  |                                                                                                                                                                                                                                                 |      |                          |                                |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| Ref. Spec. Sec. 8001, 8002, 8230, 8290, 8331 |                                                                                                                                                                                                                                                 |      |                          |                                |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| 01-4T                                        | 1.5 sq.mm fire resistant 2 core (120 min) LSZH enhanced cable complying BS5839, BS6387, EN50200, BS8434-2:2003 + A2:2009 in already installed conduit. (UL/FM/Vde Certified)                                                                    | Rft. | 59,600                   | 15,400                         |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| 01-5T                                        | Intelligent addressable multi optical and heat detector complete with built-in isolator, base including all mounting and installation accessories. (3 years complete support services + replacement warranty) (UL/FM/Vde Certified)             | Nos. | 596                      | 154                            |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| 01-6T                                        | Intelligent addressable multi optical and heat detector complete with built-in isolator and sounder, base including all mounting and installation accessories. (3 years complete support services + replacement warranty) (UL/FM/Vde Certified) | Nos. | 194                      | -                              |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| 01-7T                                        | Intelligent addressable heat detector complete with built-in isolator, base including all mounting and installation accessories. (3 years complete support services + replacement warranty) (UL/FM/Vde Certified)                               | Nos. | 62                       | 7                              |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| 01-8T                                        | Addressable manual call point including built-in isolator module including all mounting and installation accessories. (3 years complete support services + replacement warranty) (UL/FM/Vde Certified)                                          | Nos. | 19                       | 21                             |                              |                           |                              |                                                          |                                                                  |                                       |                       |
| 01-9T                                        | Addressable loop powered audio visual sounder with built-in isolator including all mounting and installation accessories. (3 years complete support services + replacement warranty) (UL/FM/Vde Certified)                                      | Nos. | 33                       | 21                             |                              |                           |                              |                                                          |                                                                  |                                       |                       |

| Item No. | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate | Total Amount (Rupees) |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|----------------|-----------------------|
| (1)      | (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)   | (12 = 8 + 10)         |
| 01-10T   | Weather Proof Type addressable manual call point including built-in isolator module including all mounting and installation accessories. (IP65 Rated) (3 years complete support services + replacement warranty) (UL/FM/Vde Certified)                                                                                                                                                                                                                                                                     | Nos. | 16                       | 2                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-11T   | Weather Proof Type addressable loop powered audio visual sounder with built-in isolator including all mounting and installation accessories. (IP65 Rated) (3 years complete support services + replacement warranty) (UL/FM/Vde Certified)                                                                                                                                                                                                                                                                 | Nos. | 16                       | 2                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-12T   | Addressable loop powered control / output module with manufacturer's recommended interfacing cable including all mounting and installation accessories. (3 years complete support services + replacement warranty) (UL/FM/Vde Certified)                                                                                                                                                                                                                                                                   | Nos. | 152                      | 70                             |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-13T   | Addressable loop powered monitor / input module with manufacturer's recommended interfacing cable including all mounting and installation accessories. (3 years complete support services + replacement warranty) (UL/FM/Vde Certified)                                                                                                                                                                                                                                                                    | No.  | 1                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-14T   | Fire Alarm Maintenance Workstation having latest generation Computer version comprising 21" LCD screen, CPU with license operating system, anti-virus software, wireless keyboard, wireless mouse with all essential interconnecting cables including all installation and mounting accessories as required for system operation. Complete in all respect. (3 years complete support services + replacement warranty) (Dell)                                                                               | Job. | 1                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-15T   | 2 loops fire alarm control panel expandable upto 6 loops complete with network card (RS485/RS-232/IP), licensed Client's end fire alarm software, LAN interface, fire alarm software, interfacing with public address, access control system, lifts etc. maintenance free batteries, battery charger, power supply, printer including any other essential interconnecting equipment as required. Complete in all respect. (3 years complete support services + replacement warranty) (UL/FM/Vde Certified) | Job. | 3                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |

| Item No. | Description | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate | Total Amount (Rupees) |
|----------|-------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|----------------|-----------------------|
| (1)      | (2)         | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)   | (12 = 8 + 10)         |

01-16T Fire Alarm Repeater Panel 160 character display with touch key pad complete with network card (RS485/RS-232/IP), licensed Client's end fire alarm software, LAN interface, fire alarm software, interfacing with public address, access control system, lifts etc. maintenance free batteries, battery charger, both power supply & loop powered including any other essential interconnecting equipment as required. Complete in all respect. (UL/FM/Vde Certified)

Job. 3 3

#### **CCTV SYSTEM (HIGH END AI SERIES)**

Ref. Spec. Sec. 8001, 8002, 8230, 8290, 8335

01-17T IP Dome colour fixed camera having 8 megapixel resolution, 1/1.8 inch sensor with varifocal lens, power over ethernet (PoE), H.264/265 compression, SNR >50db, deep learning functions, multi targeted type detections, face capture, face comparison, Perimeter Protection, People Capture, People Counting, Queue Management, heat map, hard hat detection, metadata, IP67, IK10, anti-corrosion protection including all wall/ceiling installation and mounting accessories. (3 years complete support services + replacement warranty)

Nos. 155 56

01-18T Weather proof type IP Dome colour fixed camera having 8 megapixel resolution, Built-in IR, 1/1.8 inch sensor with varifocal lens, power over ethernet (PoE), H.264/265 compression, SNR >50db, deep learning functions, multi targeted type detections, face capture, face comparison, Perimeter Protection, People Capture, People Counting, Queue Management, heat map, hard hat detection, metadata, IP67, IK10, anti-corrosion protection including all installation and mounting accessories. (3 years complete support services + replacement warranty)

No. 10 10

01-19T Weather proof type IP PTZ dome colour camera with built-in IR having 8 mega pixel resolution with power supply, power adaptor / PoE injector, 1/3 inch image sensor, 30X Optical Zoom, 12 X Digital Zoom, 360 degree rotation, H.264/265 compression SNR >50db, deep learning functions, multi targeted type detections, face capture, face comparison, Perimeter Protection, People Capture, People Counting, Queue Management, heat map, hard hat detection, metadata, IP67, IK10, anti-corrosion protection including required backbox cover with all installation and mounting accessories. (IP65 Rated) (3 years complete support services + replacement warranty)

No. 4 2

| Item No. | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate | Total Amount (Rupees) |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|----------------|-----------------------|
| (1)      | (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)   | (12 = 8 + 10)         |
| 01-20T   | Network Video Storage on H.264/265 compression standard and Raid 5 backup storage for 150 nos. of cameras with recording resolution at 1080p at 30 fps for 24 hours of 30 days with 25% expansion capacity for future use including central management server, latest operating windows, licensed CCTV software, latest SQL server, KVM Switch, camera management application software and licenses including any other essential interconnecting equipment, cabling with mounting and installation accessories. Complete in all respect. (For JPMC Medical Tower) (3 years complete support services + replacement warranty)   | Job. | 1                        | -                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-21T   | Network Video Storage on H.264/265 compression standard and Raid 5 backup storage for 56 nos. of cameras with recording resolution at 1080p at 30 fps for 24 hours of 30 days with 25% expansion capacity for future use including central management server, latest operating windows, licensed CCTV software, latest SQL server, KVM Switch, camera management application software and licenses including any other essential interconnecting equipment, cabling with mounting and installation accessories. Complete in all respect. (For Rabia Soorty Building) (3 years complete support services + replacement warranty) | Job. | -                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-22T   | 9 nos. (3 x 3) 42" UHD 4k LED Display, 3840 x 2160 pixels resolution with all essential interconnecting equipment, decoders, interconnecting cables, mounting brackets/frames, installation accessories etc. as required complete in all respect. (3 years complete support services + replacement warranty)                                                                                                                                                                                                                                                                                                                    | Job. | 1                        | -                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-23T   | 2 nos. (2 x 1) 42" UHD 4k LED Display, 3840 x 2160 pixels resolution with all essential interconnecting equipment, decoders, interconnecting cables, mounting brackets/frames, installation accessories etc. as required complete in all respect.                                                                                                                                                                                                                                                                                                                                                                               | Job. | -                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-24T   | CCTV Monitoring Workstation having Latest Generation Computer comprising 21 inch LED Display Screen, CPU with license operating system, licensed Antivirus Software, wireless Keyboard, wireless Mouse with all essential interconnecting cables as required for system operation. (3 years complete support services + replacement warranty)                                                                                                                                                                                                                                                                                   | Job. | 2                        | 2                              |                              |                           |                              |                                                          |                                                                  |                |                       |

| Item No.                                     | Description                                                                                                                                                                                                                                                                | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate | Total Amount (Rupees) |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|----------------|-----------------------|
| (1)                                          | (2)                                                                                                                                                                                                                                                                        | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)   | (12 = 8 + 10)         |
| 01-25T                                       | Operator Console for housing LED Displays, PTZ Controller, PA remote microphone, telephone set and computer with drawers and chairs including all installation & mounting accessories. Complete in all respect. (3 years complete support services + replacement warranty) | Job. | 1                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-26T                                       | PTZ Controller with Keyboard including interconnecting cables with all installation accessories. (3 years complete support services + replacement warranty)                                                                                                                | No.  | 1                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| <b><u>IP BASED PUBLIC ADDRESS SYSTEM</u></b> |                                                                                                                                                                                                                                                                            |      |                          |                                |                              |                           |                              |                                                          |                                                                  |                |                       |
| Ref. Spec. Sec. 8001, 8002, 8230, 8290, 8341 |                                                                                                                                                                                                                                                                            |      |                          |                                |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-27T                                       | 6 Watts Recessed Wide Dispersion Ceiling Loudspeaker with matching transformer including all installation and mounting accessories.                                                                                                                                        | Nos. | 441                      | 80                             |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-28T                                       | Weather Proof Type 20 Watts Wall Mounted Loudspeaker with matching transformer including all installation and mounting accessories. (IP65 Rated) (3 years complete support services + replacement warranty)                                                                | Nos. | 28                       | 5                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-29T                                       | 30 Watts Horn Loudspeaker with matching transformer, wall mounted bracket including all installation and mounting accessories. (3 years complete support services + replacement warranty)                                                                                  | Nos. | 4                        | 4                              |                              |                           |                              | 16,000                                                   |                                                                  |                |                       |
| 01-30T                                       | Wiring of speakers from PA Rack with 1.5 sq.mm fire resistant 2 core (120 min) LSZH enhanced cable complying BS5839, BS6387, EN50200, BS8434-2:2003 + A2:2009 in already installed conduit. (UL/FM/Vde Certified) recommended cable in already installed conduit.          | Rft. | 88,200                   | 16,000                         |                              |                           |                              |                                                          |                                                                  |                |                       |

| Item No. | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate | Total Amount (Rupees) |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|----------------|-----------------------|
| (1)      | (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)   | (12 = 8 + 10)         |
| 01-31T   | System Manager with required Matrix bus with 25% spare capacity having microprocessor modular matrix, MP3 / USB / CD / SD / Tuner format playing card, input card, output card, LAN connectivity, dedicated duty amplifier for each zone as mentioned in load calculation chart in schematic diagram, auto standby amplifier of highest wattage, automatic switchover, line fault detection system, manufacturer's recommended emergency power supply backup with DC power output, trickle charging, with suitable manufacturer's recommended backup batteries as required, PA software, SPL calculations, interfacing with fire alarm system including any other essential interconnecting equipment and cabling as required with all installation and mounting accessories for satisfactory operation of the entire public address & voice evacuation system. Complete in all respect. (For JPMC Medical Tower) (3 years complete support services + replacement warranty)    | Job. | 1                        | -                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-32T   | System Manager with required Matrix bus with 25% spare capacity having microprocessor modular matrix, MP3 / USB / CD / SD / Tuner format playing card, input card, output card, LAN connectivity, dedicated duty amplifier for each zone as mentioned in load calculation chart in schematic diagram, auto standby amplifier of highest wattage, automatic switchover, line fault detection system, manufacturer's recommended emergency power supply backup with DC power output, trickle charging, with suitable manufacturer's recommended backup batteries as required, PA software, SPL calculations, interfacing with fire alarm system including any other essential interconnecting equipment and cabling as required with all installation and mounting accessories for satisfactory operation of the entire public address & voice evacuation system. Complete in all respect. (For Rabia Soorty Building) (3 years complete support services + replacement warranty) | Job. | -                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-33T   | Public Address Maintenance Workstation having Latest Generation Computer comprising 21 inch LED Display Screen, CPU with license operating system, licensed Antivirus Software, licensed public address software, wireless Keyboard, wireless Mouse with all essential interconnecting cables as required for system operation. (3 years complete support services + replacement warranty)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Job. | 1                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |
| 01-34T   | Remote Microphone with keypad for required number of zones, fault monitoring including patch cord, all installation and mounting accessories. Complete in all respect. (3 years complete support services + replacement warranty)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | No.  | 1                        | 1                              |                              |                           |                              |                                                          |                                                                  |                |                       |

| Item No. | Description | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate | Total Amount (Rupees) |
|----------|-------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|----------------|-----------------------|
| (1)      | (2)         | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)   | (12 = 8 + 10)         |

01-35T Detail engineering designing of Public Address System for Lecture Room having mixer amplifier, goose neck microphone, microphone socket outlet, required number of speakers including any other essential interconnecting equipment, cabling, conduiting, rack as required. Complete in all respect. (Note: To be submitted to the Engineer for approval)

1 1

#### CATV SYSTEM

Ref Specs 8001, 8002, 8230, 8290 & 8371

01-36T 8-way Splitter including all installation and mounting accessories. Nos.

- 2

01-37T Following type Tap-off with all installation and mounting accessories.

a) 4-way Tapp-Off No.

- 1

b) 8-way Tapp-Off Nos.

- 12

01-38T TV outlet with face plate and sheet steel back box including all installation and mounting accessories. Nos.

- 78

01-39T Following type solid copper, copper braid co-axial cable in already installed PVC conduit / cable tray.

a) RG-6 Horizontal Cable (from tapp-offs to TV outlet) Nos.

- 78

b) RG-11 Distribution Cable (from splitter to tapp-offs) Rft.

- 1,000

01-40T Appropriate size 16 SWG Cabinet for installation of tapp-off, splitter, CATV amplifier etc with 25% expansion capacity. complete in all respect including all mounting and installation accessories as shown on drawings. Job

- 7

| Item No. | Description | Unit | Quantity (Medical Tower) | Quantity (Rabia Rashid Soorty) | Total Quantity Rate (Rupees) | Supply Unit Rate (Rupees) | Supply Total Amount (Rupees) | Installation, Testing & Commissioning Unit Rate (Rupees) | Installation, Testing & Commissioning Unit Total Amount (Rupees) | Composite Rate | Total Amount (Rupees) |
|----------|-------------|------|--------------------------|--------------------------------|------------------------------|---------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------|----------------|-----------------------|
| (1)      | (2)         | (3)  | (4)                      | (5)                            | (6 = 4 + 5)                  | (7)                       | (8 = 6 X 7)                  | (9)                                                      | (10 = 6 X 9)                                                     | (11 = 7 + 9)   | (12 = 8 + 10)         |

**RAISED FLOORING FOR DATA CENTER**

Ref Specs 8001, 8002, 8230 & 8290

|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |       |   |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|---|
| 01-41T | Providing of Anti-Static Raised Floor CONCORDE SOLUTIONS / MERO GERMANY consisting of 38mm thick panels (600mmx600mm), composed of High Density Partical board in sandwich construction, approved finish on top and steel on the panel underside, full depth ABS edge band applied creating a fully encapsulated panel. FFH 300mm Panel Size: 600x600 mm Panel thickness: (no covering): 38 mm Panel bottom side: galvanized steel sheet aluminum foil without coating System weight: ~ 59 - 95 kg/m² Panel weight: ~ 18 - 26 kg/unit FIRE PROTECTION Building material class acc. to DIN EN 13501 T1: A1 FIRE RESISTANCE CLASSacc. to DIN 4102 T2: F30 possible acc. to DIN EN 1366-6: REI30 possible Including With precision steel pedestals, PVC Skirting and Accessories | Sq.ft | 2,000 | - |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|---|

**TOTAL COST OF TELECOMMUNICATION WORKS**

**SST @ 15% on ITC Total Amount (Column Number 10)**

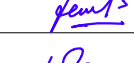
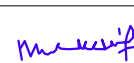


# MEDICAL TOWER AT JPMC KARACHI

## **DRAWINGS** **Refer Volume III**

| LIST OF DRAWINGS |                     |                                                                                                                              |
|------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------|
| S.NO             | DRWGING NO.         | TITLE                                                                                                                        |
| 1                | 4662/50B/BD/00T000  | TELECOMMUNICATION WORKS<br>LIST OF DRAWING                                                                                   |
| 2                | 4662/50B/BD/00T001  | LEGEND & GENERAL NOTES                                                                                                       |
| 3                | 4662/50B/BD/00T002  | STRUCTURED CABLING NETWORK, IP CCTV, IP NURSE CALL &<br>IP ACCESS CONTROL SYSTEMS MASTER SCHEMATIC DIAGRAM<br>(SHEET 1 OF 3) |
| 4                | 4662/50B/BD/00T003  | STRUCTURED CABLING NETWORK & IP NURSE CALL SYSTEMS RACK<br>SCHEMATIC DIAGRAM (SHEET 2 OF 3)                                  |
| 5                | 4662/50B/BD/00T004  | IP CCTV & IP ACCESS CONTROL SYSTEMS RACK SCHEMATIC DIAGRAM<br>(SHEET 3 OF 3)                                                 |
| 6                | 4662/50B/BD/00T005  | ADDRESSABLE FIRE ALARM SYSTEM SCHEMATIC DIAGRAM                                                                              |
| 7                | 4662/50B/BD/00T006  | PUBLIC ADDRESS SYSTEM SCHEMATIC DIAGRAM                                                                                      |
| 8                | 4662/50B/BD/00T007  | CABLE ANTENNA TV SYSTEM (CATV) SCHEMATIC DIAGRAM                                                                             |
| 9                | 4662/50B/BD/01T001  | LOWER GROUND FLOOR & GROUND FLOOR STRUCTURED CABLING<br>NETWORK & CABLE TRAY LAYOUT                                          |
| 10               | 4662/50B/BD/01T002  | 1ST & 2ND FLOOR<br>STRUCTURED CABLING NETWORK & CABLE TRAY LAYOUT                                                            |
| 11               | 4662/50B/BD/01T003  | 3RD & 4TH FLOOR<br>STRUCTURED CABLING NETWORK & CABLE TRAY LAYOUT                                                            |
| 12               | 4662/50B/BD/01T004  | 5TH & 6TH FLOOR<br>STRUCTURED CABLING NETWORK & CABLE TRAY LAYOUT                                                            |
| 13               | 4662/50B/BD/01T005  | 7TH & 8TH FLOOR<br>STRUCTURED CABLING NETWORK & CABLE TRAY LAYOUT                                                            |
| 14               | 4662/50B/BD/01T006  | 9TH FLOOR & ROOF<br>STRUCTURED CABLING NETWORK & CABLE TRAY LAYOUT                                                           |
| 15               | 4662/50B/BD/01T007  | LOWER GROUND FLOOR & GROUND FLOOR<br>IP CCTV & IP ACCESS CONTROL SYSTEMS LAYOUT                                              |
| 16               | 4662/50B/BD/01T008  | 1ST & 2ND FLOOR<br>IP CCTV & IP ACCESS CONTROL SYSTEMS LAYOUT                                                                |
| 17               | 4662/50B/BD/01T009  | 3RD & 4TH FLOOR<br>IP CCTV & IP ACCESS CONTROL SYSTEMS LAYOUT                                                                |
| 18               | 4662/50B/BD/01T010  | 5TH & 6TH FLOOR<br>IP CCTV & IP ACCESS CONTROL SYSTEMS LAYOUT                                                                |
| 19               | 4662/50B/BD/01T011  | 7TH & 8TH FLOOR<br>IP CCTV & IP ACCESS CONTROL SYSTEMS LAYOUT                                                                |
| 20               | 4662/50B/BD/01T012  | 9TH FLOOR & ROOF<br>IP CCTV & IP ACCESS CONTROL SYSTEMS LAYOUT                                                               |
| 21               | 4662/50B/BD/01T013A | LOWER GROUND FLOOR & ELECTRICAL SUB STATION<br>ADDRESSABLE FIRE ALARM SYSTEM LAYOUT                                          |
| 22               | 4662/50B/BD/01T013B | GROUND FLOOR<br>ADDRESSABLE FIRE ALARM SYSTEM LAYOUT                                                                         |
| 23               | 4662/50B/BD/01T014  | 1ST & 2ND FLOOR<br>ADDRESSABLE FIRE ALARM SYSTEM LAYOUT                                                                      |
| 24               | 4662/50B/BD/01T015  | 3RD & 4TH FLOOR<br>ADDRESSABLE FIRE ALARM SYSTEM LAYOUT                                                                      |
| 25               | 4662/50B/BD/01T016  | 5TH & 6TH FLOOR<br>ADDRESSABLE FIRE ALARM SYSTEM LAYOUT                                                                      |
| 26               | 4662/50B/BD/01T017  | 7TH & 8TH FLOOR<br>ADDRESSABLE FIRE ALARM SYSTEM LAYOUT                                                                      |

| LIST OF DRAWINGS |                    |                                                                          |
|------------------|--------------------|--------------------------------------------------------------------------|
| S.NO             | DRWGING NO.        | TITLE                                                                    |
| 27               | 4662/50B/BD/01T018 | 9TH FLOOR & ROOF<br>ADDRESSABLE FIRE ALARM SYSTEM LAYOUT                 |
| 28               | 4662/50B/BD/01T019 | LOWER GROUND FLOOR & GROUND FLOOR<br>PUBLIC ADDRESS SYSTEM LAYOUT        |
| 29               | 4662/50B/BD/01T020 | 1ST & 2ND FLOOR<br>PUBLIC ADDRESS SYSTEM LAYOUT                          |
| 30               | 4662/50B/BD/01T021 | 3RD & 4TH FLOOR<br>PUBLIC ADDRESS SYSTEM LAYOUT                          |
| 31               | 4662/50B/BD/01T022 | 5TH & 6TH FLOOR<br>PUBLIC ADDRESS SYSTEM LAYOUT                          |
| 32               | 4662/50B/BD/01T023 | 7TH & 8TH FLOOR<br>PUBLIC ADDRESS SYSTEM LAYOUT                          |
| 33               | 4662/50B/BD/01T024 | 9TH FLOOR & ROOF<br>PUBLIC ADDRESS SYSTEM LAYOUT                         |
| 34               | 4662/50B/BD/01T025 | LOWER GROUND FLOOR & GROUND FLOOR<br>IP NURSE CALL & CATV SYSTEMS LAYOUT |
| 35               | 4662/50B/BD/01T026 | 1ST & 2ND FLOOR<br>IP NURSE CALL & CATV SYSTEMS LAYOUT                   |
| 36               | 4662/50B/BD/01T027 | 3RD & 4TH FLOOR<br>IP NURSE CALL & CATV SYSTEMS LAYOUT                   |
| 37               | 4662/50B/BD/01T028 | 5TH & 6TH FLOOR<br>IP NURSE CALL & CATV SYSTEMS LAYOUT                   |
| 38               | 4662/50B/BD/01T029 | 7TH & 8TH FLOOR<br>IP NURSE CALL & CATV SYSTEMS LAYOUT                   |
| 39               | 4662/50B/BD/01T030 | 9TH FLOOR<br>IP NURSE CALL & CATV SYSTEMS LAYOUT                         |

|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       |         |                                            |                    |                                                                                            |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------------------|----------|-------------|---------------------------------------------------------------------------------------|---------|--------------------------------------------|--------------------|--------------------------------------------------------------------------------------------|--|--|
| <div>CLIENT</div> <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</div> | <div>CONSULTANT</div> <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.<br/>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> | 04   |           |                    |          | DRAWN       |  | PROJECT | TELECOMMUNICATION WORKS<br>LIST OF DRAWING |                    | SCALE                                                                                      |  |  |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 03   |           |                    |          | SUBMITTED   |  |         |                                            |                    | NTS                                                                                        |  |  |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 02   |           |                    |          | RECOMMENDED |  |         |                                            |                    |                                                                                            |  |  |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 01   | AUG. 2024 | ISSUED FOR BIDDING |          | CHD./VER.   |  |         |                                            |                    |                                                                                            |  |  |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED    |  |         |                                            |                    | REV.  |  |  |
| MEDICAL TOWER AT JPMC KARACHI.                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       |         | DATE                                       | DRAWING No.        |                                                                                            |  |  |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       |         | AUGUST, 2024                               | 4662/50B/BD/00T000 |                                                                                            |  |  |



GENERAL NOTES:

- 1- CO-ORDINATE AT SITE WITH OTHER SERVICES FOR EXACT LOCATION AND POSITION OF CONDUITS AND COMMUNICATION EQUIPMENT/DEVICES.
- 2- ALL COMMUNICATION DRAWINGS SHALL BE READ IN CONJUNCTION WITH SPECIFICATIONS, BOQ, ARCHITECTURE, ELECTRICAL, STRUCTURE, HVAC, PLUMBING DRAWINGS AND ALL OTHER RELEVANT DETAILS.
- 3- DIMENSIONS/MEASUREMENTS GIVEN IN LAYOUTS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALCULATE ACTUAL DIMENSIONS/MEASUREMENTS ACCORDING TO STRUCTURE AND ARCHITECTURE DRAWINGS.
- 4- THE ROUTES OF EXTERNAL CABLE AND PIPES SHALL BE FOLLOWED AS SHOWN ON THE DRAWING, ANY CHANGE IN ROUTES REQUIRED DUE TO SITE CONDITIONS SHALL BE MADE IN CO-ORDINATION WITH OTHER SERVICES, AFTER OBTAINING ENGINEER'S APPROVAL
- 5- WHERE CABLES ENTER BUILDINGS, THESE SHALL BE LAID IN PROTECTIVE PIPES. HAND HOLE SHALL BE PROVIDED OUTSIDE THE BUILDING.
- 6- ALL UNDERGROUND PIPES SHALL BE LAID MINIMUM 1'-4" BELOW THE TOP OF PAVEMENT THE DEPTH MAY BE INCREASED / DECREASED DUE TO THE SITE CONDITIONS AFTER OBTAINING ENGINEER'S APPROVAL.
- 7- ALL UNDERGROUND PIPES, MAN HOLES & HANDHOLES SHALL BE PROPERLY SEALED WATER TIGHT AT ENDS/JOINTS AFTER INSTALLATION.
- 8- SPARE PIPES SHALL HAVE THEIR ENDS PROPERLY PLUGGED WITH CAP AND MADE WATER TIGHT. BOTH ENDS OF PIPES SHALL BE MARKED BY PIPE END MARKERS FOR IDENTIFICATION.
- 9- CABLE MARKERS SHALL BE PROVIDED AT 100 FEET INTERVALS ALONG STRAIGHT RUNS OF CABLE DUCT / ROUTE AND AT EACH BEND.
- 10- ALL ROUTING OF PIPES, PIPE DUCTS & CONNECTION DETAILS SHALL BE CARRIED OUT WITH THE APPROVAL OF THE ENGINEER.
- 11- MANUFACTURER'S RECOMMENDATION SHALL BE FOLLOWED FOR INSTALLATION OF ALL COMMUNICATION SYSTEMS.
- 12- THE CONTRACTOR SHALL TAKE THE RESPONSIBILITIES OF GENERAL INTEGRATOR FOR ALL THE SUB-SYSTEMS AND EQUIPMENT WITHIN THE SCOPE OF WORK INCLUDING INTERFACES WITH OTHER SYSTEMS.
- 13- ALL COMMUNICATION SYSTEMS SHALL BE FED FROM UNINTERRUPTED POWER SUPPLY (UPS).
- 14- CONDUIT SHALL BE SIZED ACCORDING TO CLAUSE 4.4.2.4 OF EIA/TIA 569 STANDARD AS GIVEN BELOW.

| CONDUIT<br>TRADE<br>SIZE | CONDUIT SIZING<br>MAX.NUMBER OF CABLES BASED UPON ALLOWABLE FILL |       |       |       |       |       |       |       |       |       |   |  |
|--------------------------|------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|--|
|                          | CABLE OUTSIDE DIAMETER,mm (in)                                   |       |       |       |       |       |       |       |       |       |   |  |
|                          | 3.3                                                              | 4.6   | 5.6   | 6.1   | 7.4   | 7.9   | 9.4   | 13.5  | 15.8  | 17.8  |   |  |
| mm, inch                 | (.13)                                                            | (.18) | (.22) | (.24) | (.29) | (.31) | (.37) | (.53) | (.62) | (.70) |   |  |
| 21                       | (3/4)                                                            | 6     | 5     | 4     | 3     | 2     | 2     | 1     | 0     | 0     | 0 |  |
| 27                       | (1)                                                              | 8     | 8     | 7     | 6     | 3     | 3     | 2     | 1     | 0     | 0 |  |
| 35                       | (1 1/4)                                                          | 16    | 14    | 12    | 10    | 6     | 4     | 3     | 1     | 1     | 1 |  |
| 41                       | (1 1/2)                                                          | 20    | 18    | 16    | 15    | 7     | 6     | 4     | 2     | 1     | 1 |  |
| 53                       | (2)                                                              | 30    | 26    | 22    | 20    | 14    | 12    | 7     | 4     | 3     | 2 |  |
| 63                       | (2 1/2)                                                          | 45    | 40    | 36    | 30    | 17    | 14    | 12    | 6     | 3     | 3 |  |
| 78                       | (3)                                                              | 70    | 60    | 50    | 40    | 20    | 20    | 17    | 7     | 6     | 6 |  |
| 91                       | (3 1/2)                                                          | —     | —     | —     | —     | —     | 22    | 12    | 7     | 6     |   |  |
| 103                      | (4)                                                              | —     | —     | —     | —     | —     | 30    | 14    | 12    | 7     |   |  |

- 15- EN 50174-2 RECOMMENDATIONS SHALL BE FOLLOWED FOR SEPARATION DISTANCE BETWEEN POWER AND VOICE/LAN NETWORK CABLES IN GIVEN BELOW TABLE.

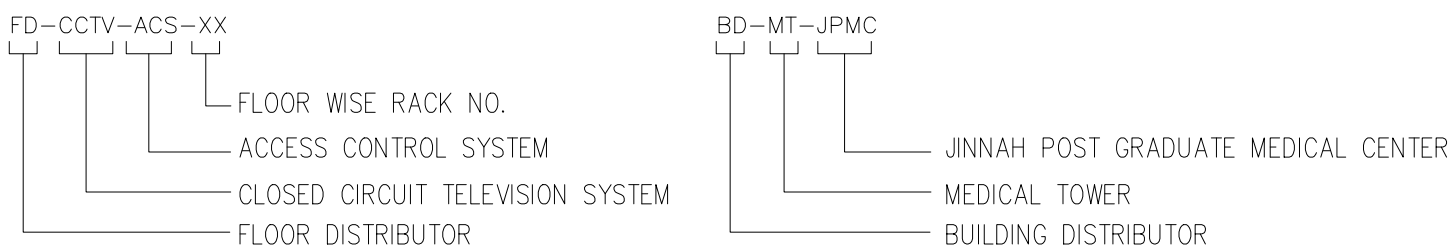
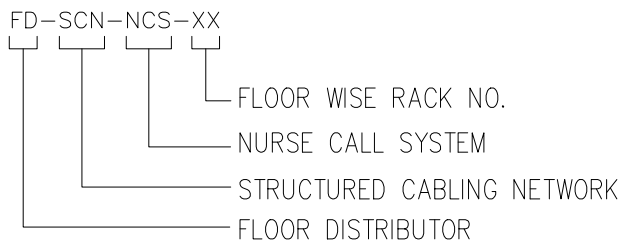
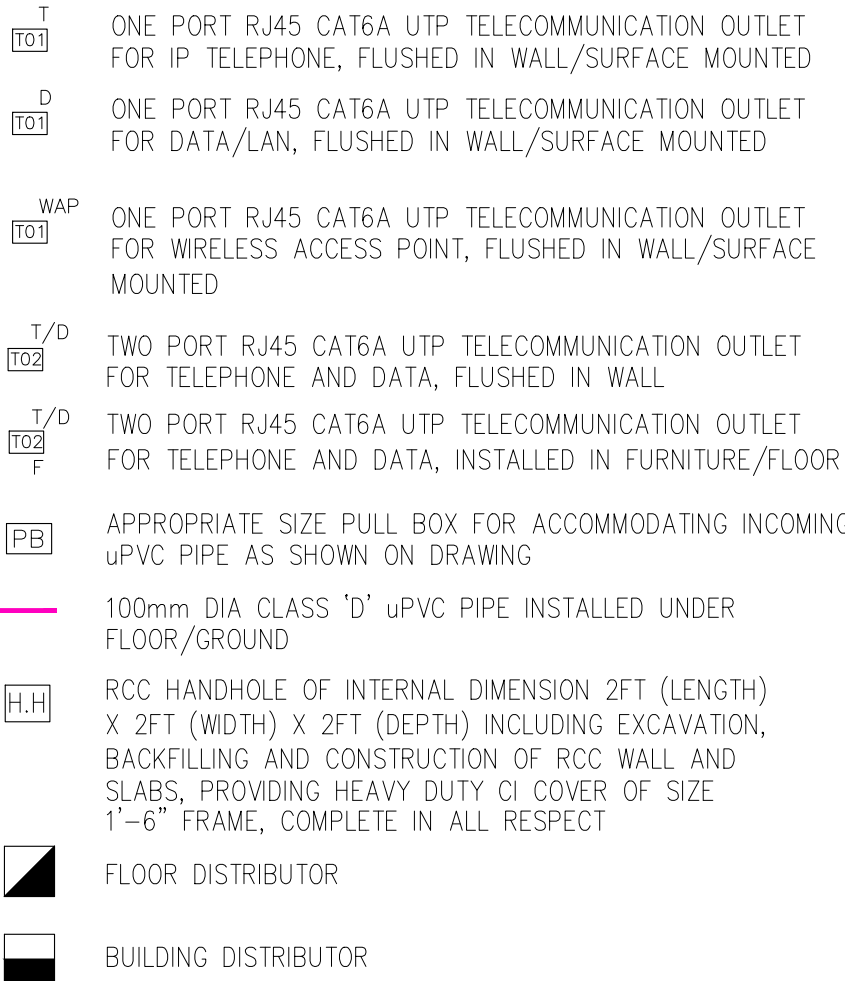
| TYPE OF<br>INSTALLATION                                               | MINIMUM SEPERATION<br>DISTANCE (mm.) |                             |                          |
|-----------------------------------------------------------------------|--------------------------------------|-----------------------------|--------------------------|
|                                                                       | WITHOUT<br>METALLIC<br>DIVIDER       | WITH<br>METALLIC<br>DIVIDER | WITH<br>STEEL<br>DIVIDER |
| UNSCREENED POWER<br>CABLE AND<br>UNSCREENED<br>COMMUNICATION<br>CABLE | 200                                  | 100                         | 50                       |
| UNSCREENED POWER<br>CABLE AND<br>SCREENED<br>COMMUNICATION<br>CABLE   | 50                                   | 20                          | 5                        |

- 16- MOUNTING HEIGHT OF FOLLOWING DEVICES SHALL BE INSTALLED AT THE INDICATED HEIGHT FROM FINISHED FLOOR LEVEL (F.F.L) TO THE BOTTOM OF DEVICE UNLESS OTHERWISE MENTIONED OR INSTRUCTED:
- TELECOMMUNICATION OUTLET FOR IP TELEPHONE/LAN----- 10 INCH/AS PER SITE
- TELECOMMUNICATION OUTLET FOR WAP----- 87 INCH/AS PER SITE
- FLOOR DISTRIBUTOR----- 54 INCH
- BUILDING DISTRIBUTOR----- FLOOR STANDING/54 INCH
- ADDRESSABLE FIRE ALARM CONTROL PANEL-----54 INCH
- ADDRESSABLE CONTROL/MONITOR MODULE----- 87 INCH/AS PER SITE
- ADDRESSABLE MANUAL CALL POINT ----- 54 INCH
- ADDRESSABLE AUDIO VISUAL SOUNDER----- 87 INCH / AS PER SITE
- IP CAMERA----- 8 FEET / AS PER SITE
- HORN SPEAKER -----10 FEET/ AS PER SITE CONDITION
- MICRO PHONE SOCKET OUTLET----- 54 INCHES/ AS PER SITE CONDITION

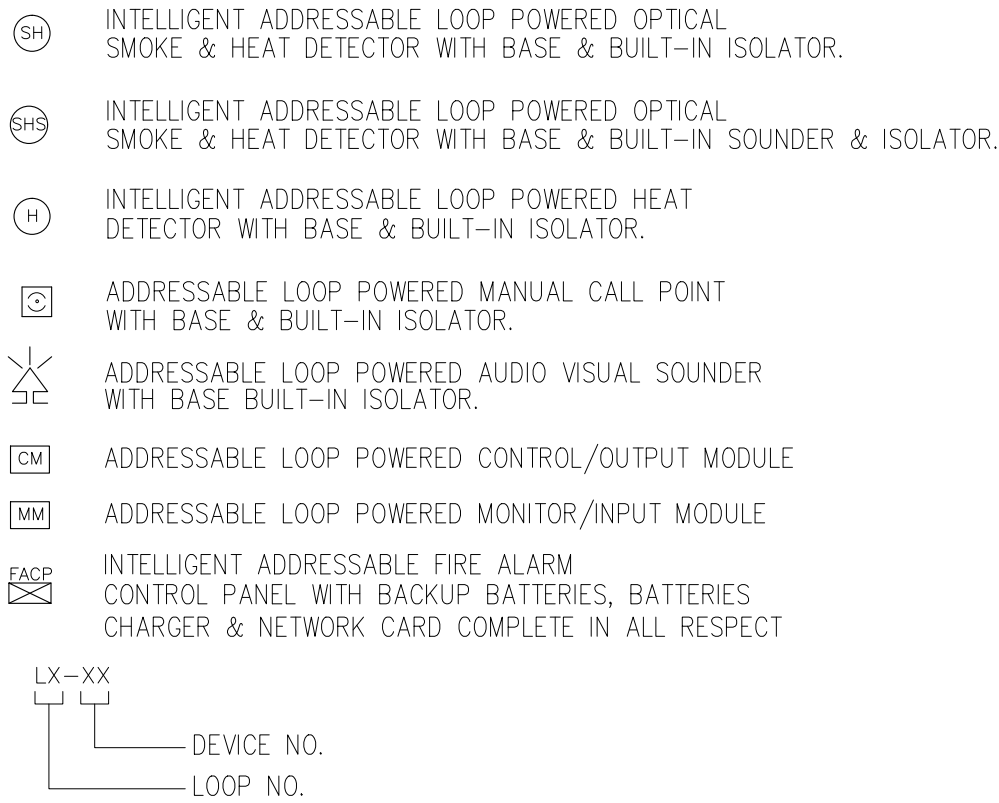
- 17- COLOUR, SHAPE & MOUNTING HEIGHT OF FACE PLATE OF TELECOM SOCKET OUTLETS SHALL MATCH WITH ELECTRICAL SOCKET OUTLET
- 18- DETECTORS SHALL BE INSTALLED 1 FEET AWAY FROM ANY PART OF ANY LIGHT FIXTURE AND 3 FEET AWAY FROM DIFFUSER OF HVAC SYSTEM.
- 19- WHERE MANUAL CALL POINT AND SOUNDER ARE SHOWN SIDE, BY SIDE THEY SHALL BE INSTALLED IN SAME VERTICAL LINE.
- 20- AT LEAST 30 DAYS OF RECORDING CAPACITY SHALL BE PROVIDED FOR ALL CCTV CAMERAS WITH 25% EXPANSION CAPACITY.
- 21- ALL RACKS SHALL BE FED FROM UNINTERRUPTED POWER SUPPLY (UPS) TO AVERT ANY INTERRUPTION IN ANY TELECOMMUNICATION SYSTEM.
- 22- CONTRACTOR SHALL SUBMIT SOUND PRESSURE LEVEL (SPL) CALCULATION OF SPEAKERS ON THE LAYOUT DRAWINGS FOR REVIEW AND APPROVAL OF ENGINEER.
- 23- CONTRACTOR SHALL SUBMIT CO-ORDINATION SHOP DRAWING OF COMMUNICATION LAYOUT WITH POWER LAYOUT BEFORE EXECUTION OF WORKS.
- 24- CONTRACTOR SHALL CO-ORDINATE WITH HVAC LAYOUT FOR PLACEMENT OF RACKS IN TECHNICAL ROOMS
- 25- CONTRACTOR SHALL CO-ORDINATE WITH CATV SERVICE PROVIDER FOR INSTALLATION OF THEIR CATV ACTIVE EQUIPMENT COVERED IN ISP SCOPE OF WORK IN DATA RACK.
- 26- CONTRACTOR SHALL CO-ORDINATE WITH CLIENT'S USER TEAM FOR INCOMING TELECOMMUNICATION SERVICES UPTO THE TECHNICAL ROOMS.
- 27- CABLE TRAY LAYOUT IS TENTATIVELY SHOWN ON DRAWINGS AND CAN BE ADJUSTED AS PER SITE REQUIREMENT AND/OR AS PER ENGINEER'S INSTRUCTION.

LEGEND:

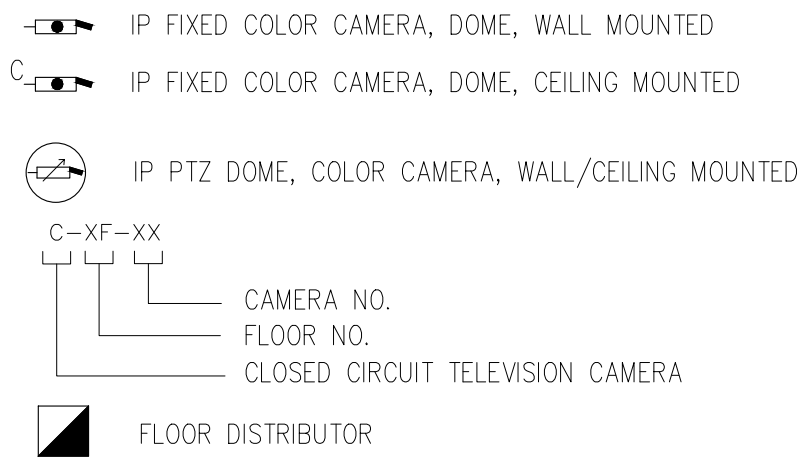
TELEPHONE & LAN NETWORK



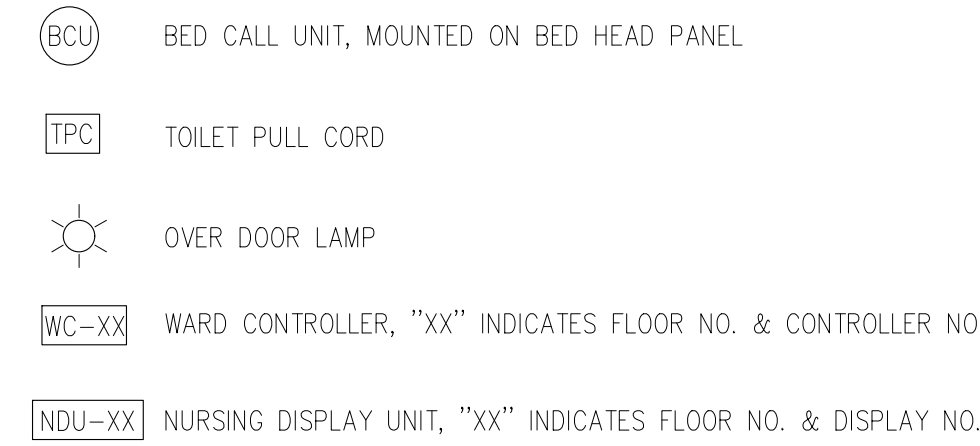
ADDRESSABLE FIRE ALARM SYSTEM



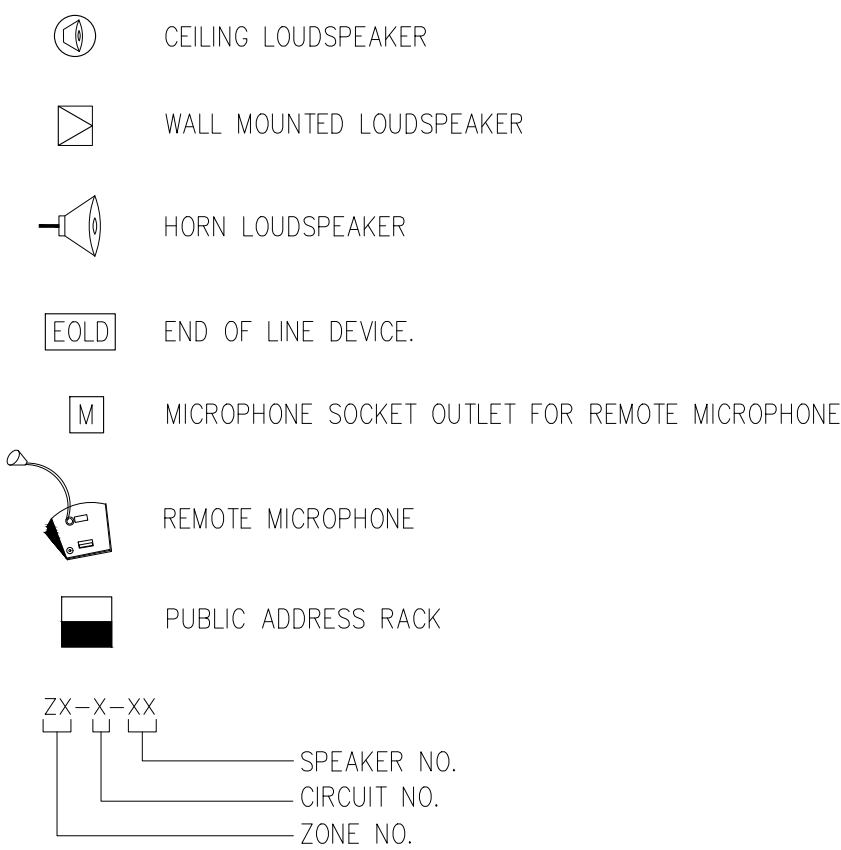
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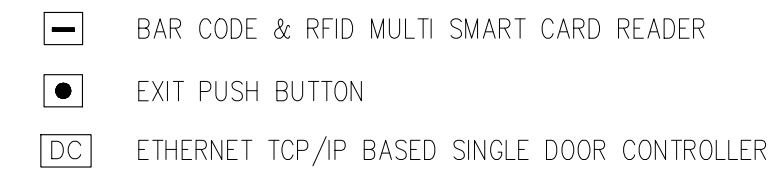
IP NURSE CALL SYSTEM (NCS):



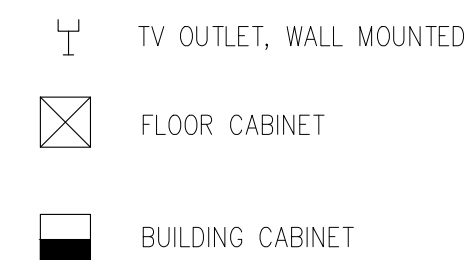
PUBLIC ADDRESS SYSTEM (PAS):



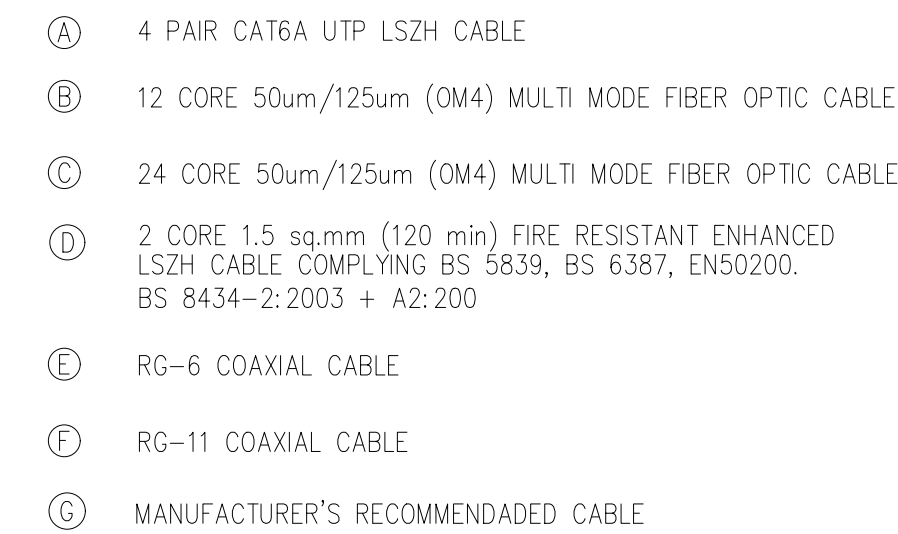
ACCESS CONTROL SYSTEM



CATV SYSTEM

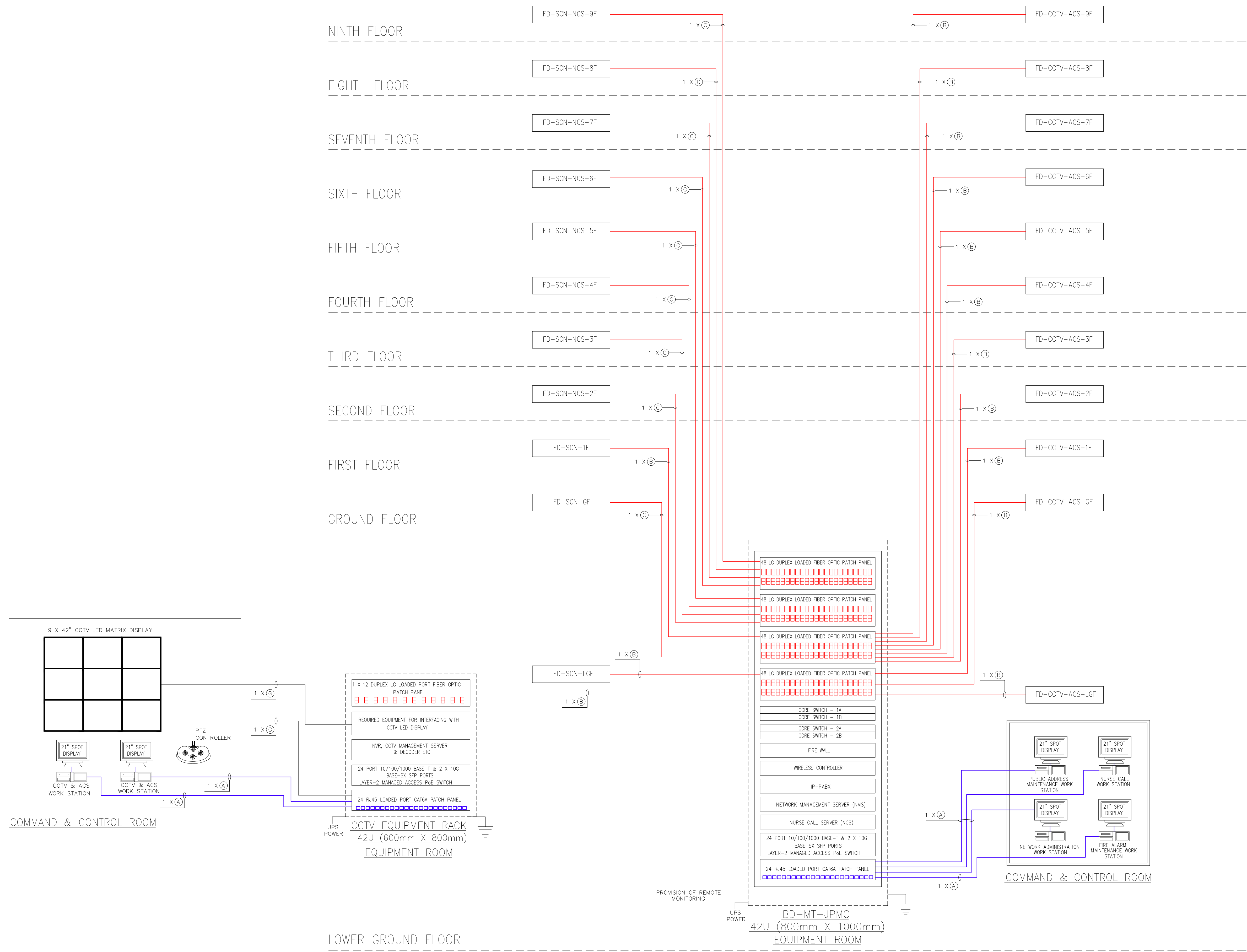


CABLE SHEDULE



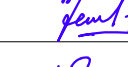
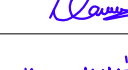
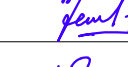
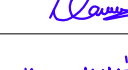
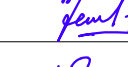
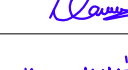
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| <div>CLIENT</div> <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</div> | <div>CONSULTANT</div> <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div> <div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> | 04   |           |                    |          | DRAWN       |  | PROJECT<br><br>MEDICAL TOWER AT JPMC KARACHI. | LEGEND & GENERAL NOTES |                                   | SCALE                                                                                         |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                 | 03   |           |                    |          | SUBMITTED   |  |                                               |                        |                                   | NTS                                                                                           |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                 | 02   |           |                    |          | RECOMMENDED |  |                                               |                        |                                   |                                                                                               |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                 | 01   | AUG. 2024 | ISSUED FOR BIDDING |          | CHD./VER.   |  |                                               | DATE<br>AUGUST, 2024   | DRAWING No.<br>4662/50B/BD/00T001 | REV.<br> |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                 | REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED    |  |                                               |                        |                                   |                                                                                               |





NOTE:

1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.

|                                                                                                                                                                                                                   |           |                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                                                                                       |  |      |   |  |       |                                                                                       |    |  |  |  |  |           |                                                                                       |    |  |  |  |  |             |                                                                                       |    |           |                    |  |  |          |                                                                                       |      |      |             |          |          |  |                                                                                       |                                                                     |  |                                                                                                                                                    |  |       |     |
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| <div>CLIENT</div> <div><b>PATIENTS' AID FOUNDATION</b><br/><b>JINNAH POST GRADUATE MEDICAL CENTER</b><br/><b>KARACHI</b></div> |           | <div>CONSULTANT</div> <div><b>NATIONAL ENGINEERING SERVICES</b><br/><b>PAKISTAN (PVT.) LTD.</b><br/><small>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</small></div> |          | <table><tr><td>04</td><td></td><td></td><td></td><td></td><td>DRAWN</td><td></td></tr><tr><td>03</td><td></td><td></td><td></td><td></td><td>SUBMITTED</td><td></td></tr><tr><td>02</td><td></td><td></td><td></td><td></td><td>RECOMMENDED</td><td></td></tr><tr><td>01</td><td>AUG. 2024</td><td>ISSUED FOR BIDDING</td><td></td><td></td><td>CHD/VER.</td><td></td></tr><tr><td>REV.</td><td>DATE</td><td>DESCRIPTION</td><td>APPROVED</td><td>APPROVED</td><td></td><td></td></tr></table> |             | 04                                                                                    |  |      |   |  | DRAWN |  | 03 |  |  |  |  | SUBMITTED |  | 02 |  |  |  |  | RECOMMENDED |  | 01 | AUG. 2024 | ISSUED FOR BIDDING |  |  | CHD/VER. |  | REV. | DATE | DESCRIPTION | APPROVED | APPROVED |  |  | <div>PROJECT</div> <div><b>MEDICAL TOWER AT JPMC KARACHI.</b></div> |  | <div>STRUCTURED CABLING NETWORK, IP CCTV,<br/>IP NURSE CALL &amp; IP ACCESS CONTROL SYSTEM<br/>MASTER SCHEMATIC DIAGRAM<br/>(SHEET 01 OF 03)</div> |  | SCALE | NTS |
| 04                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | DRAWN       |  |  |      |   |  |       |                                                                                       |    |  |  |  |  |           |                                                                                       |    |  |  |  |  |             |                                                                                       |    |           |                    |  |  |          |                                                                                       |      |      |             |          |          |  |                                                                                       |                                                                     |  |                                                                                                                                                    |  |       |     |
| 03                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | SUBMITTED   |  |  |      |   |  |       |                                                                                       |    |  |  |  |  |           |                                                                                       |    |  |  |  |  |             |                                                                                       |    |           |                    |  |  |          |                                                                                       |      |      |             |          |          |  |                                                                                       |                                                                     |  |                                                                                                                                                    |  |       |     |
| 02                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                           |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | RECOMMENDED |  |  |      |   |  |       |                                                                                       |    |  |  |  |  |           |                                                                                       |    |  |  |  |  |             |                                                                                       |    |           |                    |  |  |          |                                                                                       |      |      |             |          |          |  |                                                                                       |                                                                     |  |                                                                                                                                                    |  |       |     |
| 01                                                                                                                                                                                                                | AUG. 2024 | ISSUED FOR BIDDING                                                                                                                                                                                                                                                                                                                        |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | CHD/VER.    |  |  |      |   |  |       |                                                                                       |    |  |  |  |  |           |                                                                                       |    |  |  |  |  |             |                                                                                       |    |           |                    |  |  |          |                                                                                       |      |      |             |          |          |  |                                                                                       |                                                                     |  |                                                                                                                                                    |  |       |     |
| REV.                                                                                                                                                                                                              | DATE      | DESCRIPTION                                                                                                                                                                                                                                                                                                                               | APPROVED | APPROVED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |  |  |      |   |  |       |                                                                                       |    |  |  |  |  |           |                                                                                       |    |  |  |  |  |             |                                                                                       |    |           |                    |  |  |          |                                                                                       |      |      |             |          |          |  |                                                                                       |                                                                     |  |                                                                                                                                                    |  |       |     |
| DATE                                                                                                                                                                                                              |           | AUGUST, 2024                                                                                                                                                                                                                                                                                                                              |          | DRAWING No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             | 4662/50B/BD/00T002                                                                    |  | REV. | 0 |  |       |                                                                                       |    |  |  |  |  |           |                                                                                       |    |  |  |  |  |             |                                                                                       |    |           |                    |  |  |          |                                                                                       |      |      |             |          |          |  |                                                                                       |                                                                     |  |                                                                                                                                                    |  |       |     |





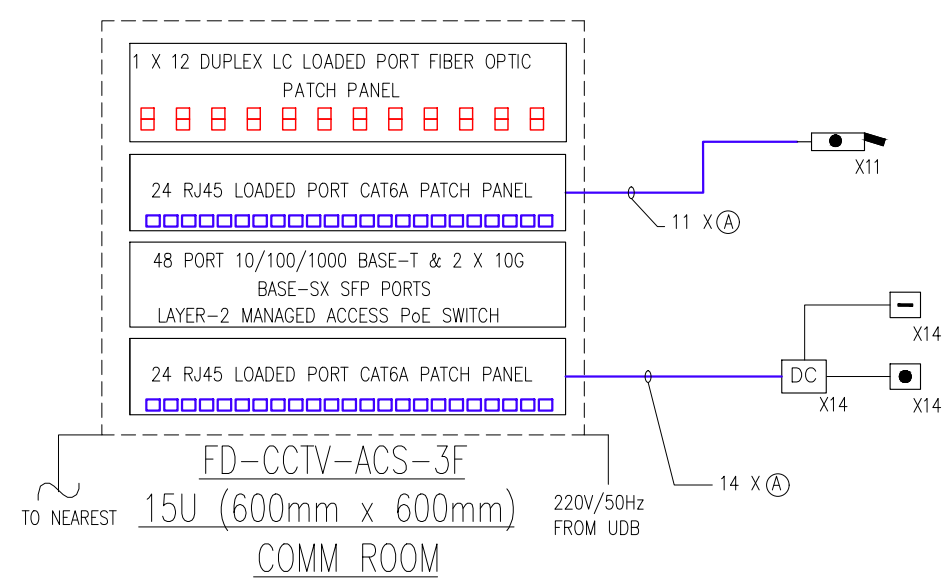
# NOTE:

1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.

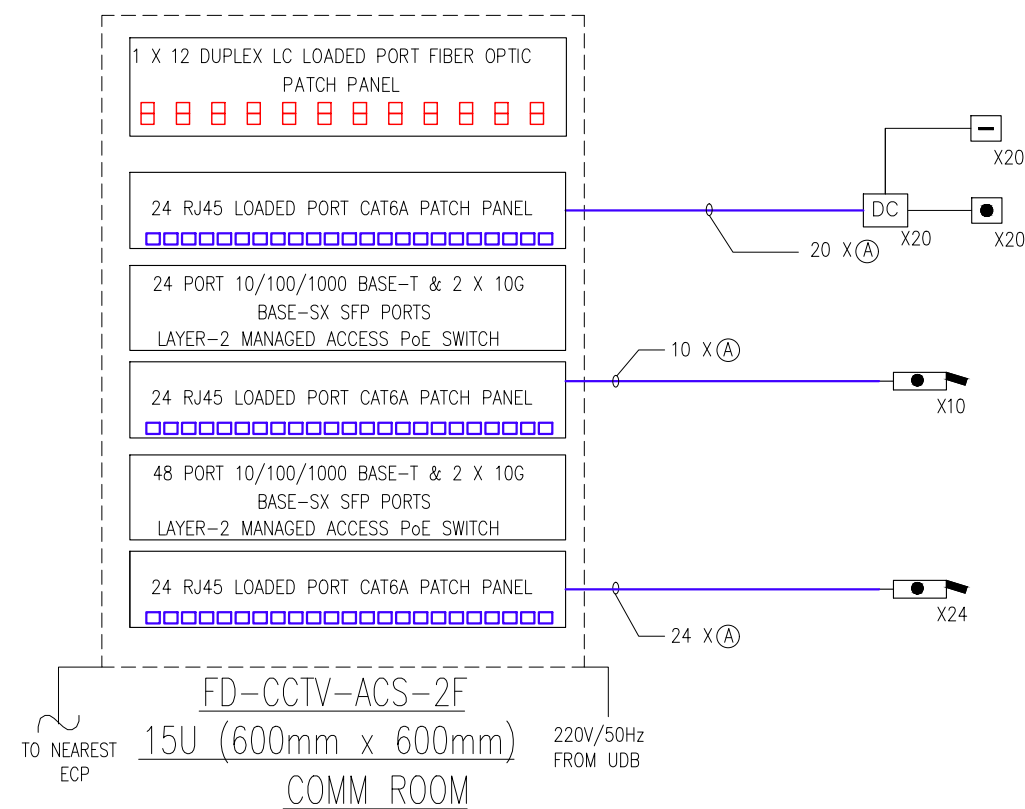
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| <p>CLIENT</p>  <p><b>PATIENTS' AID FOUNDATION</b><br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</p> | <p>CONSULTANT</p>  <p><b>NATIONAL ENGINEERING SERVICES</b><br/>PAKISTAN (PVT.) LTD.<br/>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</p> | <table> <tr> <td>04</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>03</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>02</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>01</td><td>AUG. 2024</td><td>ISSUED FOR BIDDING</td><td></td><td></td><td></td></tr> <tr> <td>REV.</td><td>DATE</td><td>DESCRIPTION</td><td>APPROVED</td><td>APPROVED</td><td></td></tr> </table> | 04       |          |  |  |  |  | 03 |  |  |  |  |  | 02 |  |  |  |  |  | 01 | AUG. 2024 | ISSUED FOR BIDDING |  |  |  | REV. | DATE | DESCRIPTION | APPROVED | APPROVED |  | <p>DRAWN</p> <p>SUBMITTED</p> <p>RECOMMENDED</p> <p>CHD/VER.</p> <p>PROJECT</p> <p><b>MEDICAL TOWER AT JPMC KARACHI.</b></p> | <p>STRUCTURED CABLING NETWORK<br/>&amp; IP NURSE CALL SYSTEM RACK SCHEMATIC DIAGRAM<br/>(SHEET 02 OF 03)</p> <p>DATE</p> <p>AUGUST, 2024</p> <p>DRAWING No.</p> <p><b>4662/50B/BD/00T003</b></p> | <p>SCALE</p> <p>NTS</p> <p>REV.</p> <p>0</p> |
| 04                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                              |                                                                                                                                                                                                  |                                              |
| 03                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                              |                                                                                                                                                                                                  |                                              |
| 02                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                              |                                                                                                                                                                                                  |                                              |
| 01                                                                                                                                                                                           | AUG. 2024                                                                                                                                                                                                                                                                                                    | ISSUED FOR BIDDING                                                                                                                                                                                                                                                                                                                                                                                                          |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                              |                                                                                                                                                                                                  |                                              |
| REV.                                                                                                                                                                                         | DATE                                                                                                                                                                                                                                                                                                         | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                 | APPROVED | APPROVED |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                              |                                                                                                                                                                                                  |                                              |



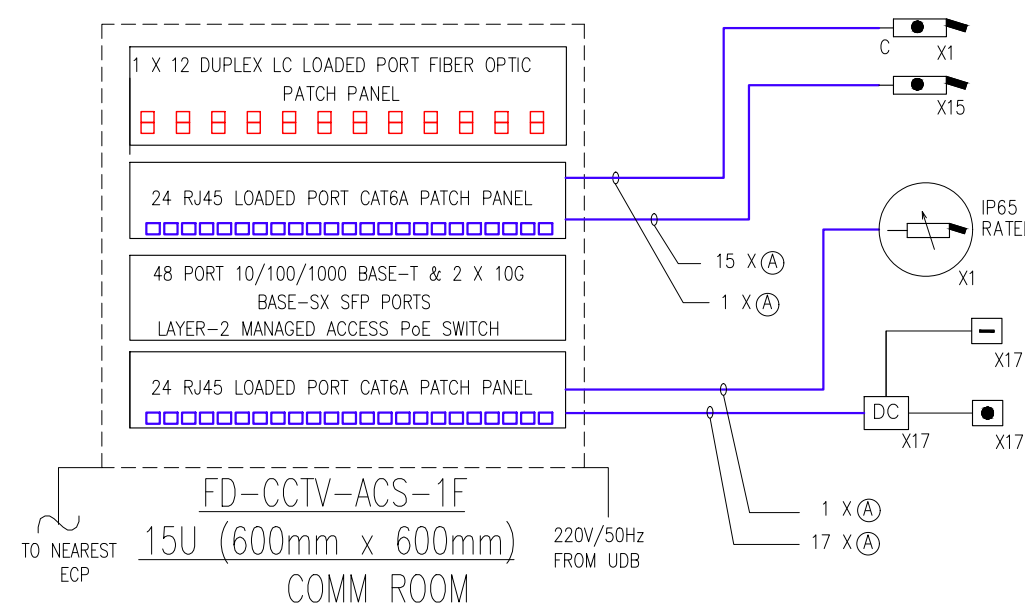
THIRD FLOOR



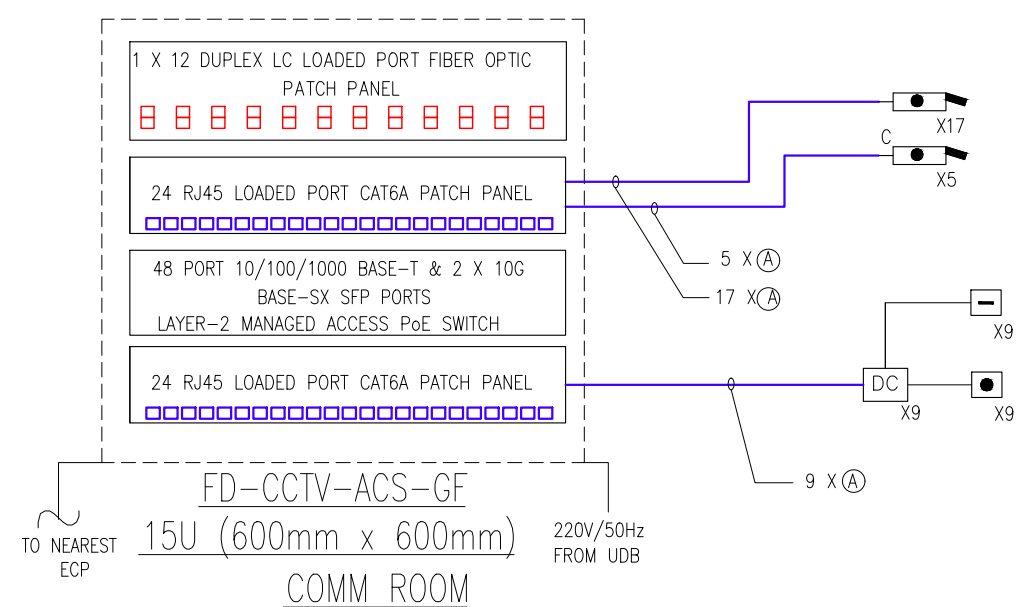
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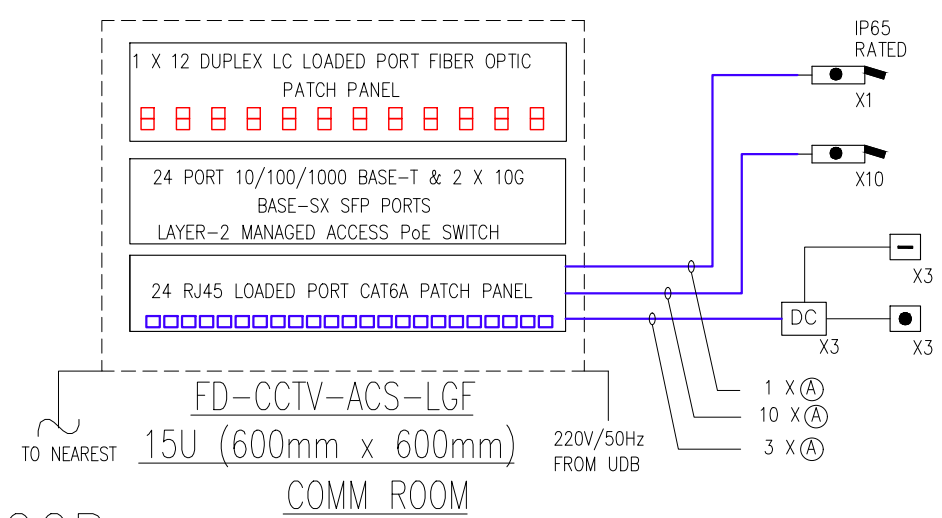
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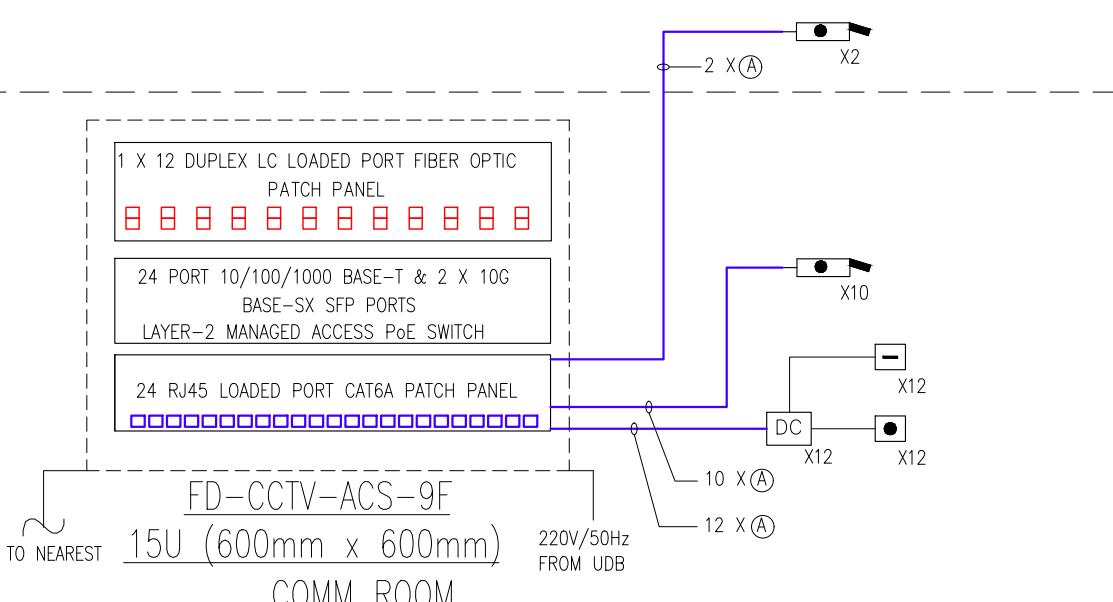
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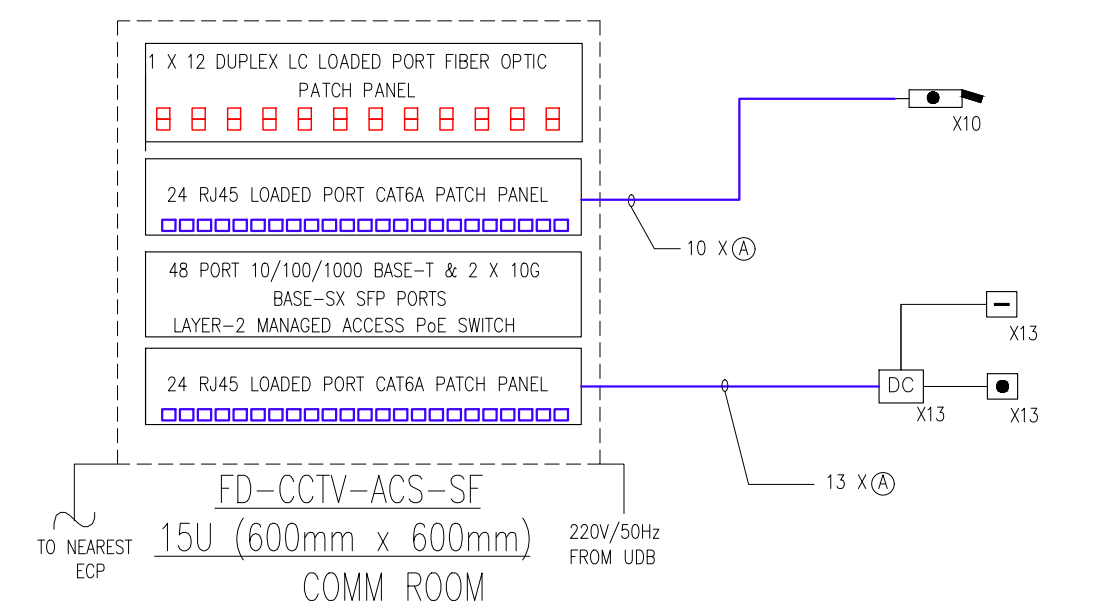
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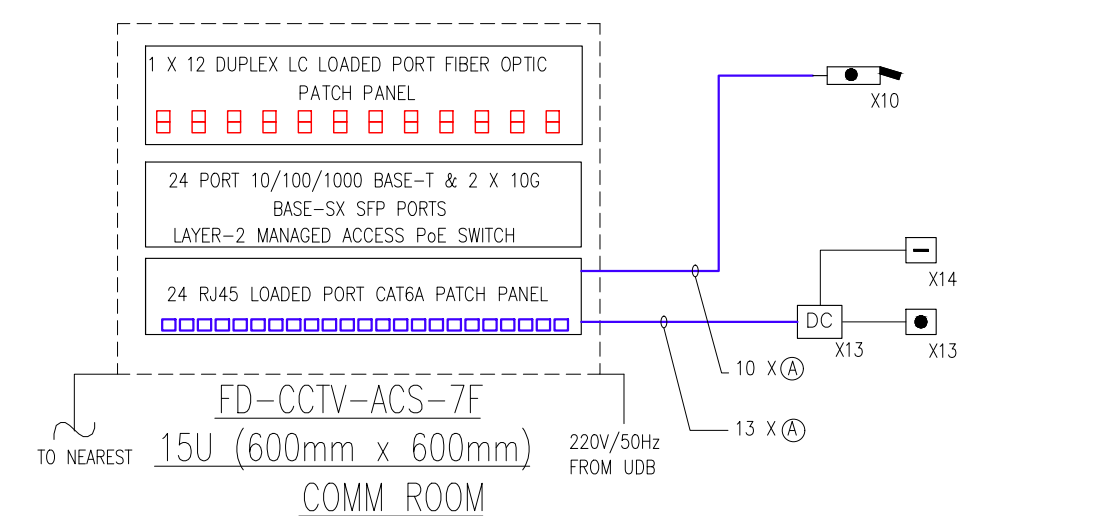
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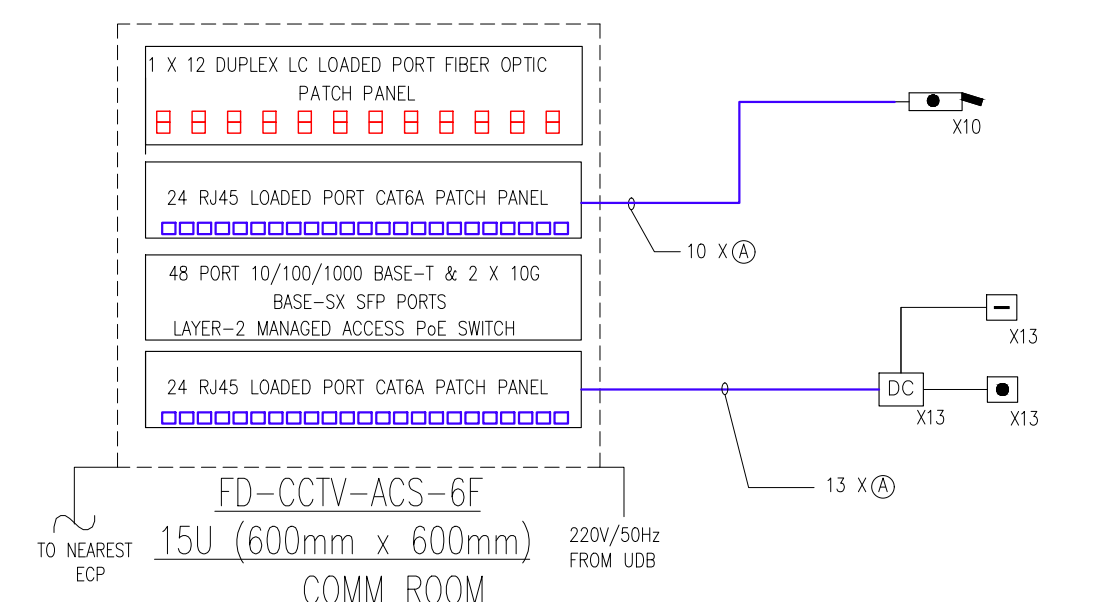
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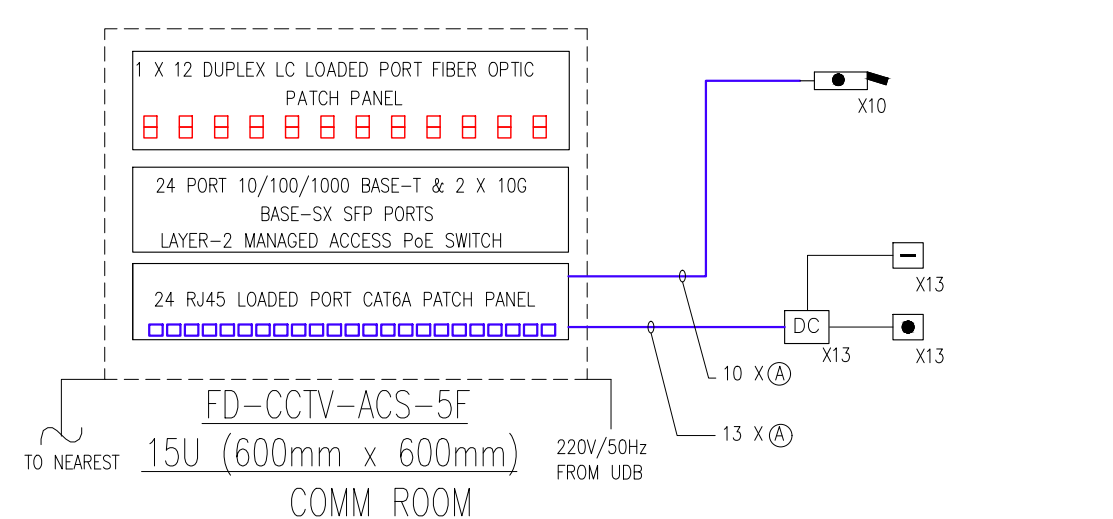
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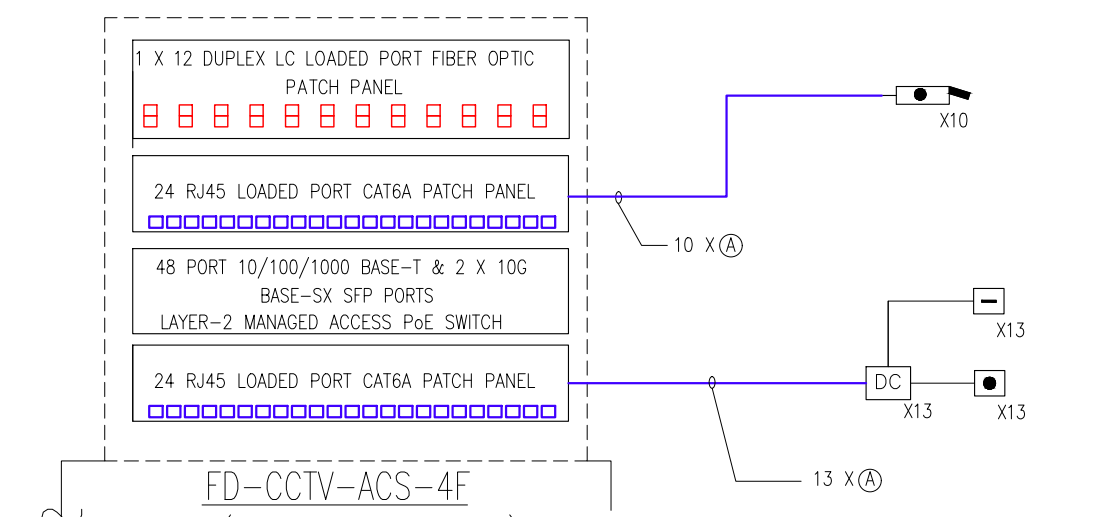
SEVENTH FLOOR



SIXTH FLOOR



FIFTH FLOOR



FOURTH FLOOR



NOTE:

1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.

CLIENT



PATIENTS' AID FOUNDATION  
JINNAH POST GRADUATE MEDICAL CENTER  
KARACHI

CONSULTANT



NATIONAL ENGINEERING SERVICES  
PAKISTAN (PVT.) LTD.

ARCHITECTURE & PLANNING DIVISION KARACHI.  
4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34

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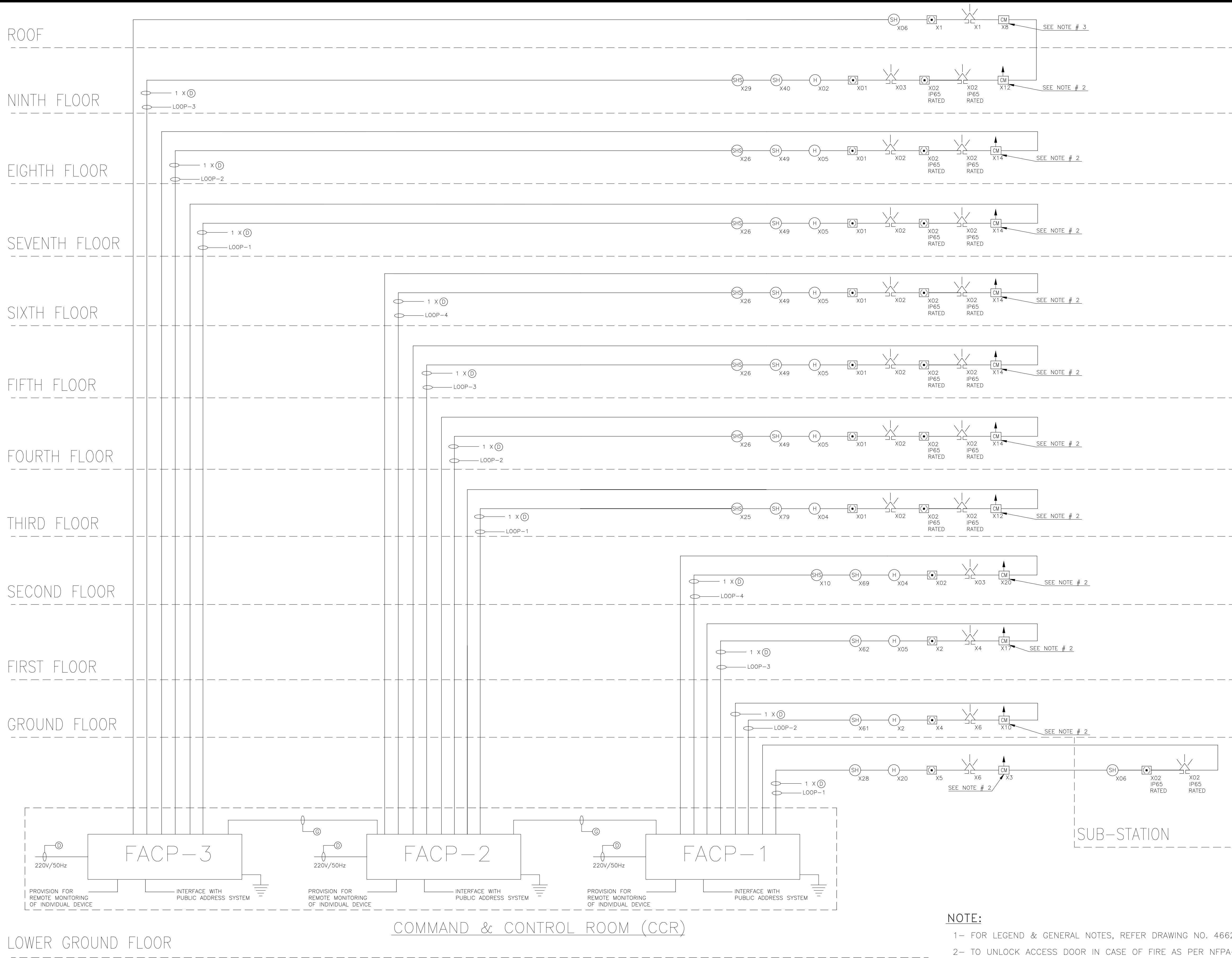
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- NOTE:
- 1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
  - 2- TO UNLOCK ACCESS DOOR IN CASE OF FIRE AS PER NFPA-101.
  - 3- TO CALL-OFF LIFT AT GROUND FLOOR IN CASE OF FIRE AS PER NFPA-72.

|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                               |      |           |                    |             |                                                                                       |         |                                                    |  |                                                                                       |              |                    |                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------------------|-------------|---------------------------------------------------------------------------------------|---------|----------------------------------------------------|--|---------------------------------------------------------------------------------------|--------------|--------------------|---------------------------------------------------------------------------------------|
| <div>CLIENT</div> <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</div> | <div>CONSULTANT</div> <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.<br/><br/>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> | 04   |           |                    | DRAWN       |  | PROJECT | ADDRESSABLE FIRE ALARM SYSTEM<br>SCHEMATIC DIAGRAM |  | SCALE                                                                                 |              |                    |                                                                                       |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                               | 03   |           |                    | SUBMITTED   |  |         |                                                    |  | NTS                                                                                   |              |                    |                                                                                       |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                               | 02   |           |                    | RECOMMENDED |  |         |                                                    |  |                                                                                       |              |                    |                                                                                       |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                               | 01   | AUG. 2024 | ISSUED FOR BIDDING | CHD./VER.   |  |         |                                                    |  |                                                                                       |              |                    |                                                                                       |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                               | REV. | DATE      | DESCRIPTION        | APPROVED    | APPROVED                                                                              |         |                                                    |  |  | DATE         | DRAWING No.        | REV.                                                                                  |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                               |      |           |                    |             |                                                                                       |         |                                                    |  |                                                                                       | AUGUST, 2024 | 4662/50B/BD/00T005 |  |





**NOTES:**

- 1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
- 2- CONTRACTOR IS TO CARRY OUT DETAIL ENGINEERING DESIGN FOR PUBLIC ADDRESS SYSTEMS IN LECTURE HALL AT 9TH FLOOR.
- 3- CONTRACTOR IS TO ENSURE TO PROVIDE POWER AMPLIFIERS FOR EACH ZONE AS PER 25% EXPANSION WATTAGE OF LOAD CALCULATION CHART FOR PROPOSED MANUFACTURER.
- 4- 42U (800mm X 1000mm) RACK SIZE IS SHOWN INDICATIVE, HOWEVER, CONTRACTOR IS TO ADD ANOTHER RACK, IF REQUIRED, CONSIDERING COOLING FACTOR / HEAT DISSIPATION ETC.

|                                                                                                                                                                         |                                                                                                                                                   |  |      |           |                    |             |               |         |                                |                                         |                    |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--|------|-----------|--------------------|-------------|---------------|---------|--------------------------------|-----------------------------------------|--------------------|-------|
|  <b>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</b> | CONSULTANT                                                                                                                                        |  | 04   |           |                    | DRAWN       | <i>Shafiq</i> | PROJECT | MEDICAL TOWER AT JPMC KARACHI. | PUBLIC ADDRESS SYSTEM SCHEMATIC DIAGRAM |                    | SCALE |
|                                                                                                                                                                         |  <b>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</b> |  | 03   |           |                    | SUBMITTED   | <i>Pandit</i> |         |                                | NTS                                     |                    |       |
|                                                                                                                                                                         |                                                                                                                                                   |  | 02   |           |                    | RECOMMENDED | <i>Usoom</i>  |         |                                |                                         |                    |       |
|                                                                                                                                                                         |                                                                                                                                                   |  | 01   | AUG. 2024 | ISSUED FOR BIDDING |             | CHD./VER.     |         |                                | <i>Musawir</i>                          |                    |       |
|                                                                                                                                                                         | ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34                          |  | REV. | DATE      | DESCRIPTION        | APPROVED    | APPROVED      |         |                                | <i>Musawir</i>                          |                    |       |
|                                                                                                                                                                         |                                                                                                                                                   |  |      |           |                    |             |               |         |                                | DATE                                    | DRAWING No.        | REV.  |
|                                                                                                                                                                         |                                                                                                                                                   |  |      |           |                    |             |               |         |                                | AUGUST, 2024                            | 4662/50B/BD/00T006 | 0     |

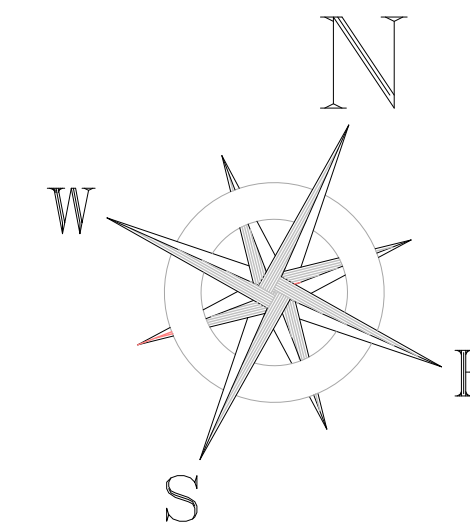
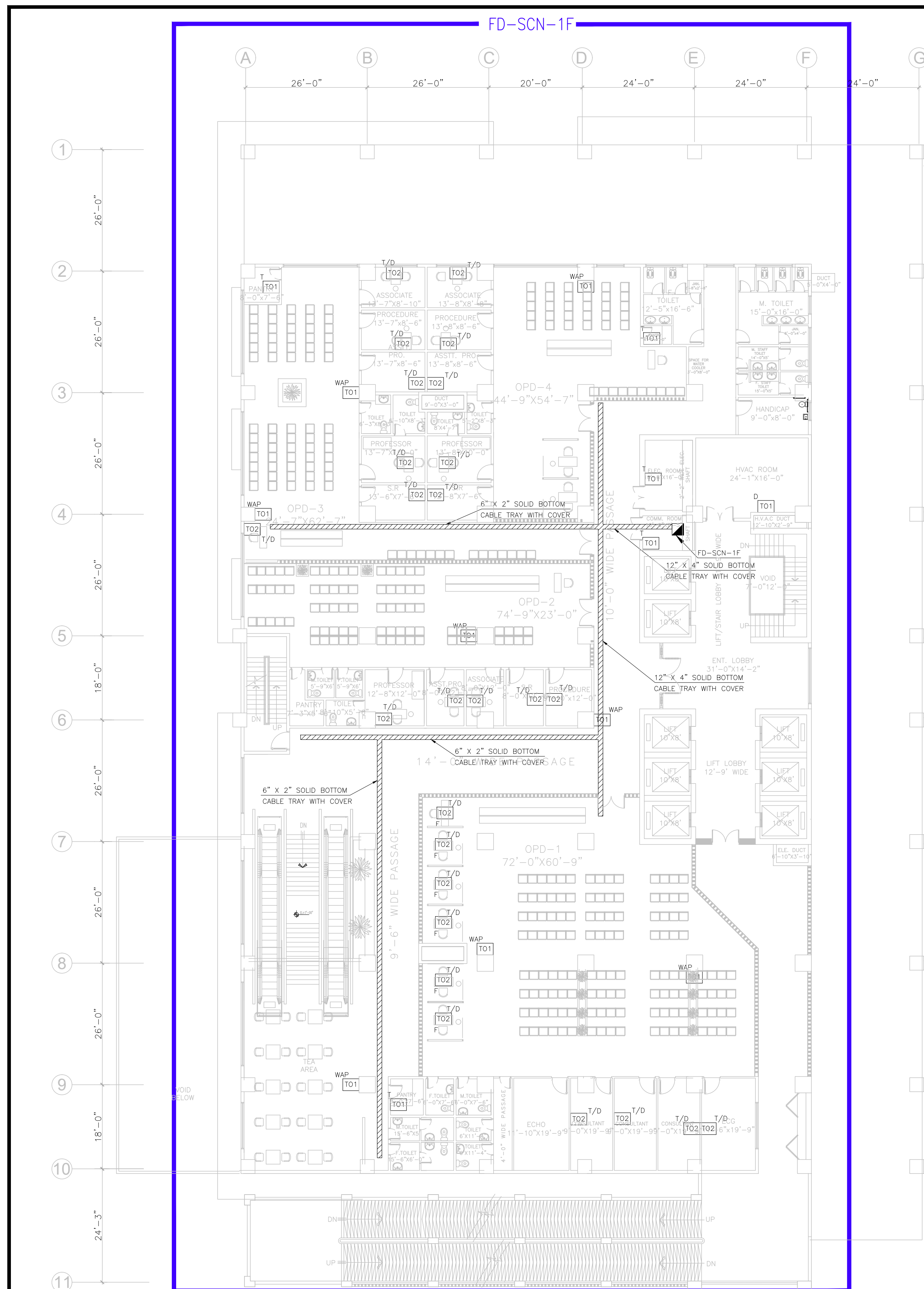












NOTES:

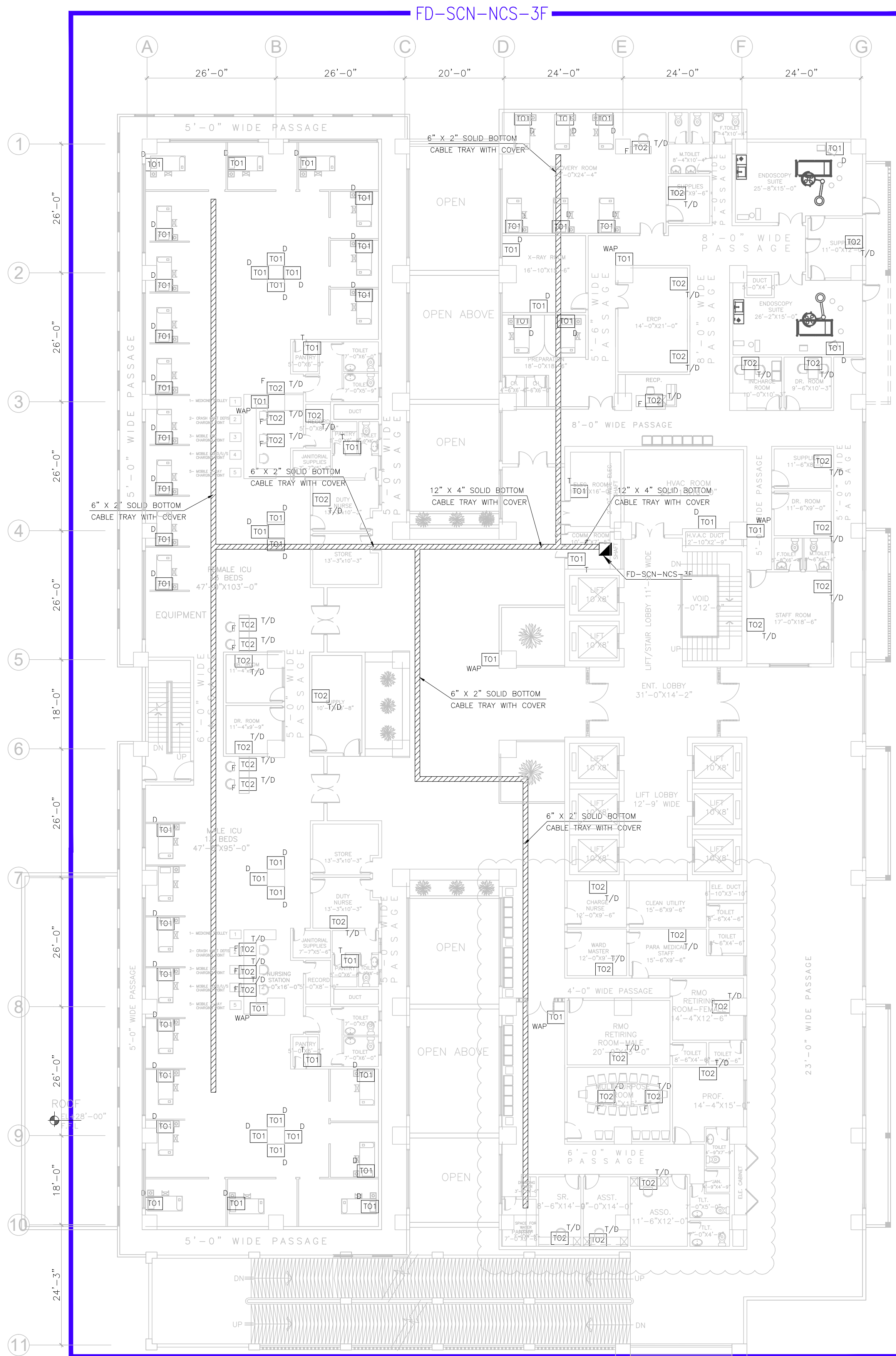
- 1- FOR LEGEND & GENERAL NOTES  
REFER DRAWING NO.  
4662/50B/BD/00T001.
- 2- FOR STRUCTURED CABLING  
NETWORK SCHEMATIC DIAGRAM,  
REFER DRAWING NO.  
4662/50B/BD/00T002 &  
4662/50B/BD/00T003.

1st FLOOR PLAN  
SPECIAL CLINICS

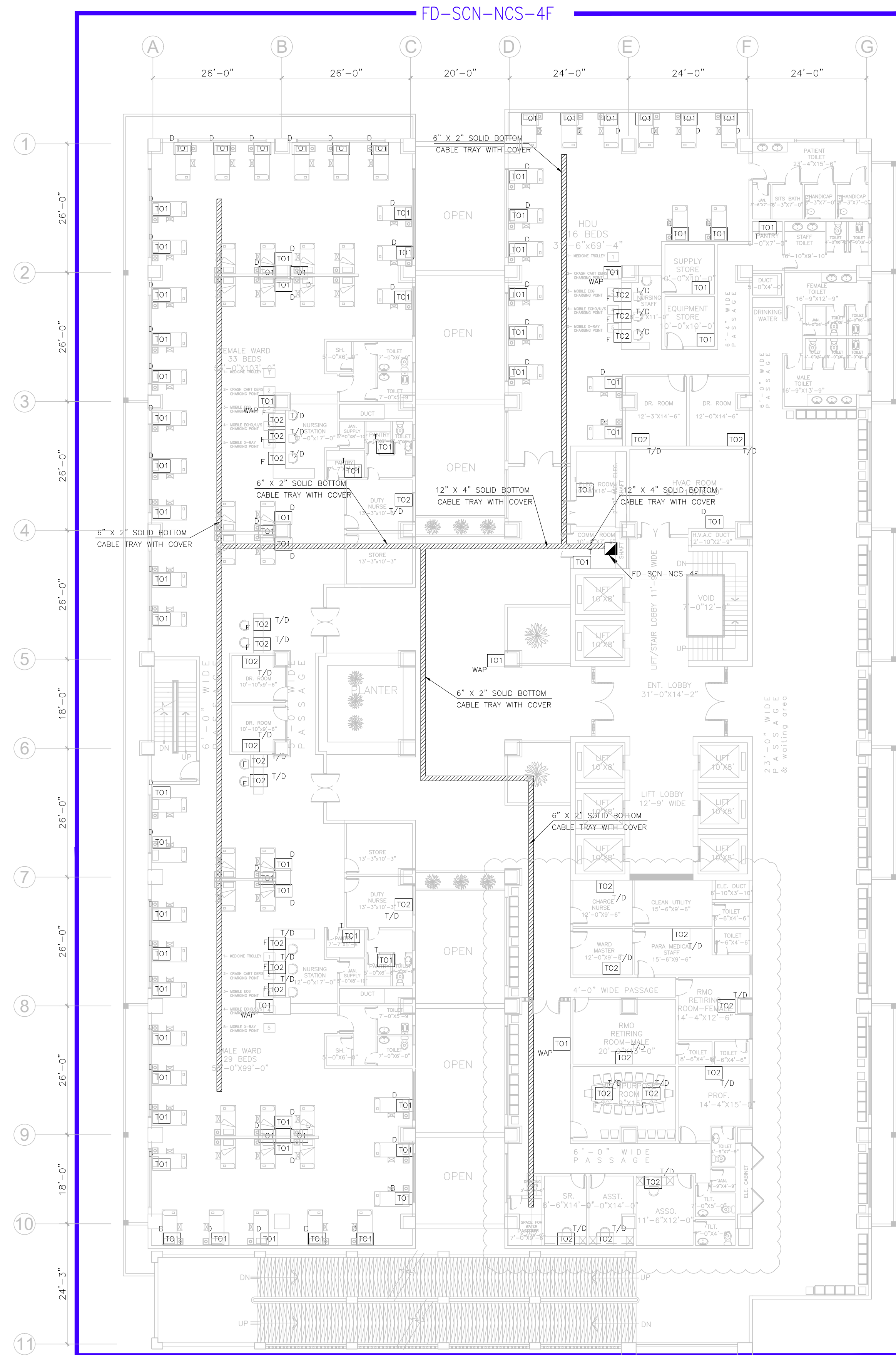
2nd FLOOR PLAN  
ICU & ENDOSCOPY SUITE

|                                                                                                                                                                                     |                                                                                                                                                                              |  |      |           |                    |          |             |                 |                                                             |                                                                                                   |                                          |           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|-----------|--------------------|----------|-------------|-----------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------|-----------|
|  <b>PATIENTS' AID FOUNDATION</b><br><b>JINNAH POST GRADUATE MEDICAL CENTER</b><br><b>KARACHI</b> | <b>CONSULTANT</b><br> <b>NATIONAL ENGINEERING SERVICES</b><br><b>PAKISTAN (PVT.) LTD.</b> |  | 04   |           |                    |          | DRAWN       | <i>Officer</i>  | <b>PROJECT</b><br><br><b>MEDICAL TOWER AT JPMC KARACHI.</b> | <b>1st &amp; 2nd FLOOR</b><br><b>STRUCTURED CABLING NETWORK &amp; CABLE TRAY</b><br><b>LAYOUT</b> | <b>SCALE</b><br><br><b>3/64"=1'-0"</b>   |           |
|                                                                                                                                                                                     |                                                                                                                                                                              |  | 03   |           |                    |          | SUBMITTED   | <i>Paul</i>     |                                                             |                                                                                                   |                                          |           |
|                                                                                                                                                                                     |                                                                                                                                                                              |  | 02   |           |                    |          | RECOMMENDED | <i>Ali Raza</i> |                                                             |                                                                                                   |                                          |           |
|                                                                                                                                                                                     |                                                                                                                                                                              |  | 01   | AUG. 2024 | ISSUED FOR BIDDING |          | CHD./VER.   | <i>Munir</i>    |                                                             |                                                                                                   |                                          |           |
|                                                                                                                                                                                     | <b>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.</b><br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34                                          |  | REV. | DATE      | DESCRIPTION        | APPROVED |             | <i>Munir</i>    |                                                             |                                                                                                   |                                          |           |
| <b>MEDICAL TOWER AT JPMC KARACHI.</b>                                                                                                                                               |                                                                                                                                                                              |  |      |           |                    |          |             |                 |                                                             | DATE<br>AUGUST, 2024                                                                              | DRAWING No.<br><b>4662/50B/BD/01T002</b> | REV.<br>0 |

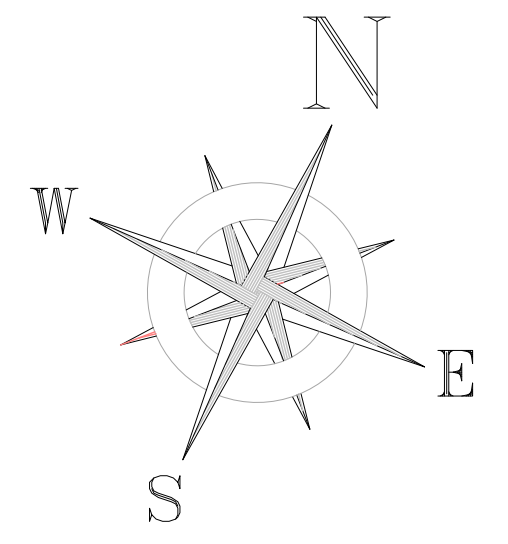




3rd FLOOR PLAN  
ICU & ENDOSCOPY SUITE



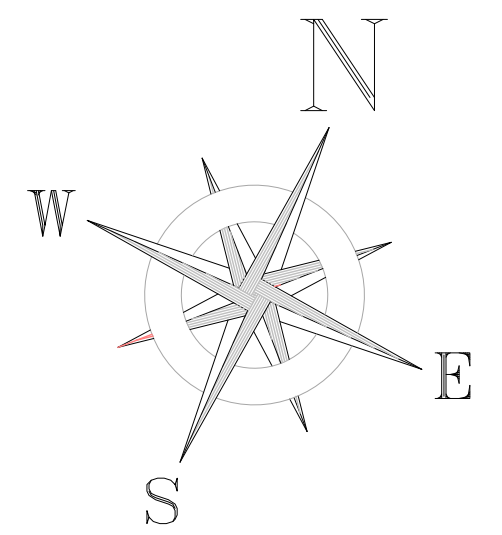
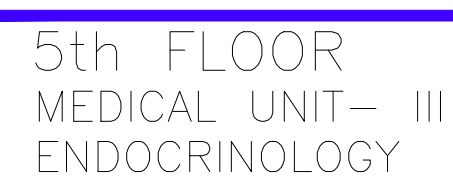
4th FLOOR PLAN  
MEDICAL UNIT - I,  
GASTROENTEROLOGY



- NOTES:**
- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
  - FOR STRUCTURED CABLING NETWORK SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T002 & 4662/50B/BD/00T003.

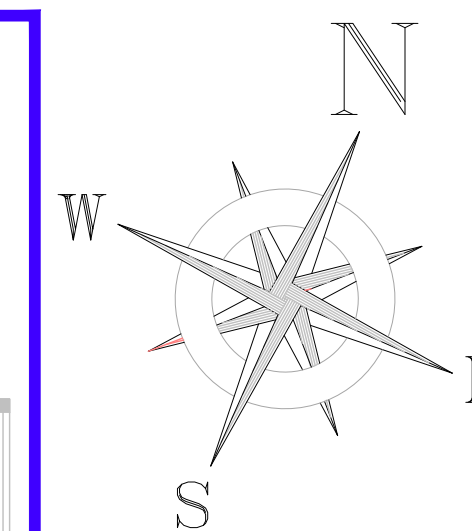
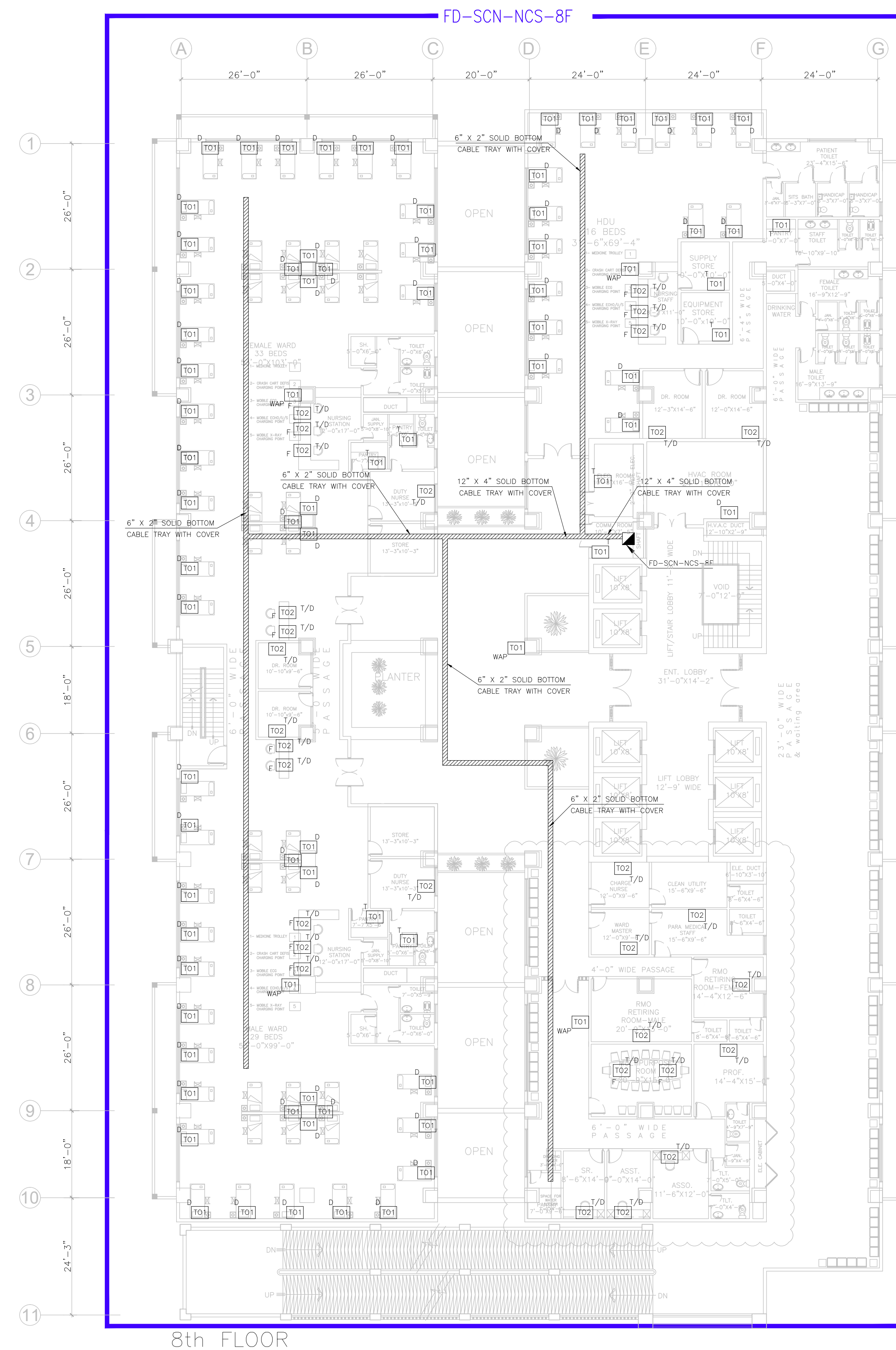
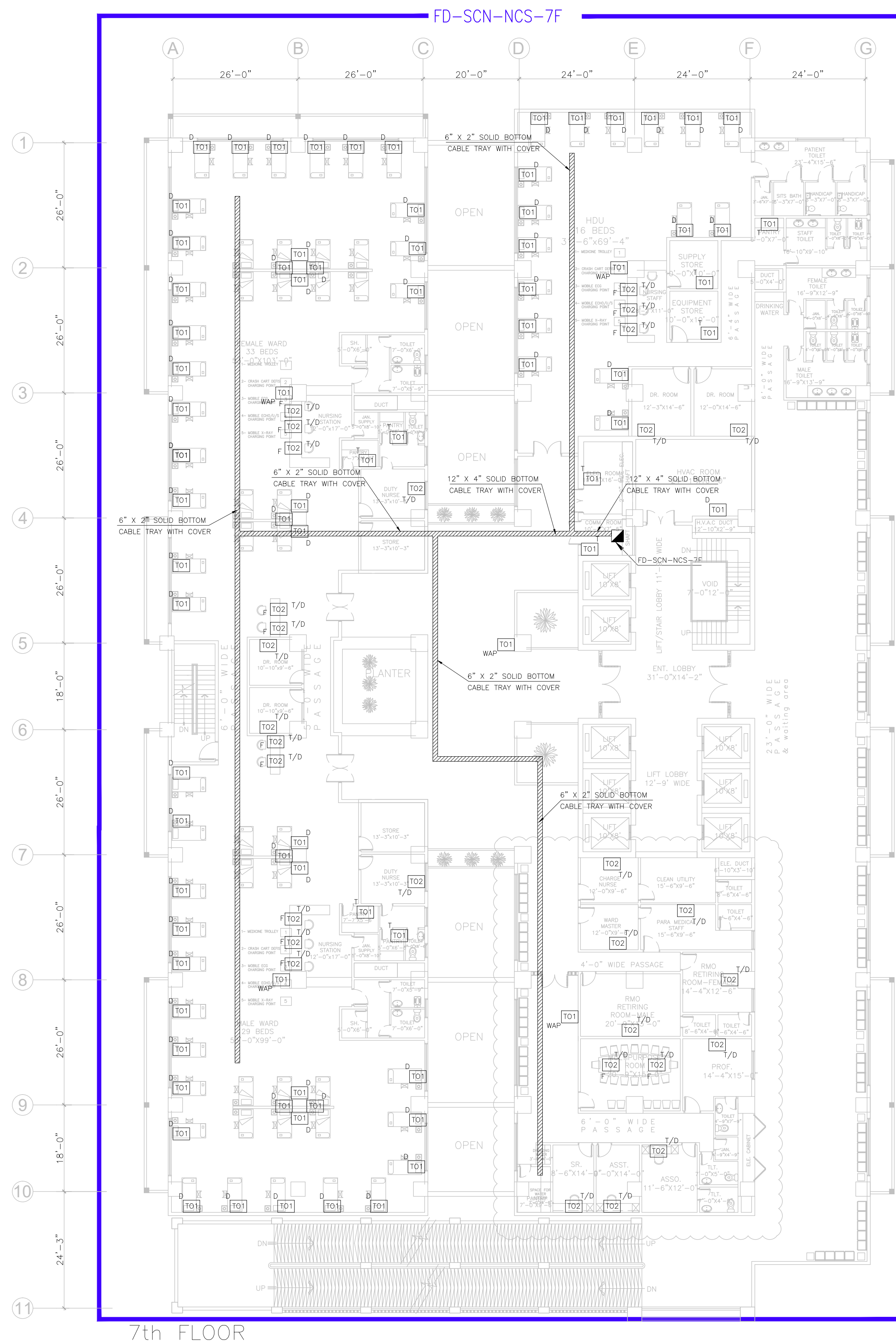
|                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                                                                            |  |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                              |                                                                                                                                                                                                            |                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div><div></div><div><p>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</p></div></div> |  | <div><div></div><div><p>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</p></div></div> <div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> |  | <div><div>04</div><div></div><div></div><div></div></div> <div><div>03</div><div></div><div></div><div></div></div> <div><div>02</div><div></div><div></div><div></div></div> <div><div>01</div><div>AUG. 2024</div><div>ISSUED FOR BIDDING</div><div></div></div> <div><div>REV.</div><div>DATE</div><div>DESCRIPTION</div><div>APPROVED</div></div> | <div><div>DRAWN</div><div></div></div> <div><div>SUBMITTED</div><div></div></div> <div><div>RECOMMENDED</div><div></div></div> <div><div>CHD./VER.</div><div></div></div> <div><div>APPROVED</div><div></div></div> | <div>PROJECT</div> <div>MEDICAL TOWER AT JPMC KARACHI.</div> | <div>3rd &amp; 4th FLOOR<br/>STRUCTURED CABLING NETWORK &amp; CABLE TRAY<br/>LAYOUT</div> <div><div>DATE</div><div>AUGUST, 2024</div></div> <div><div>DRAWING No.</div><div>4662/50B/BD/01T003</div></div> | <div>SCALE</div> <div>3/64"=1'-0"</div> <div><div>REV.</div><div></div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|





2- FOR STRUCTURED CABLING  
NETWORK SCHEMATIC DIAGRAM,  
REFER DRAWING NO.  
4662/50B/BD/00T002 &  
4662/50B/BD/00T003.

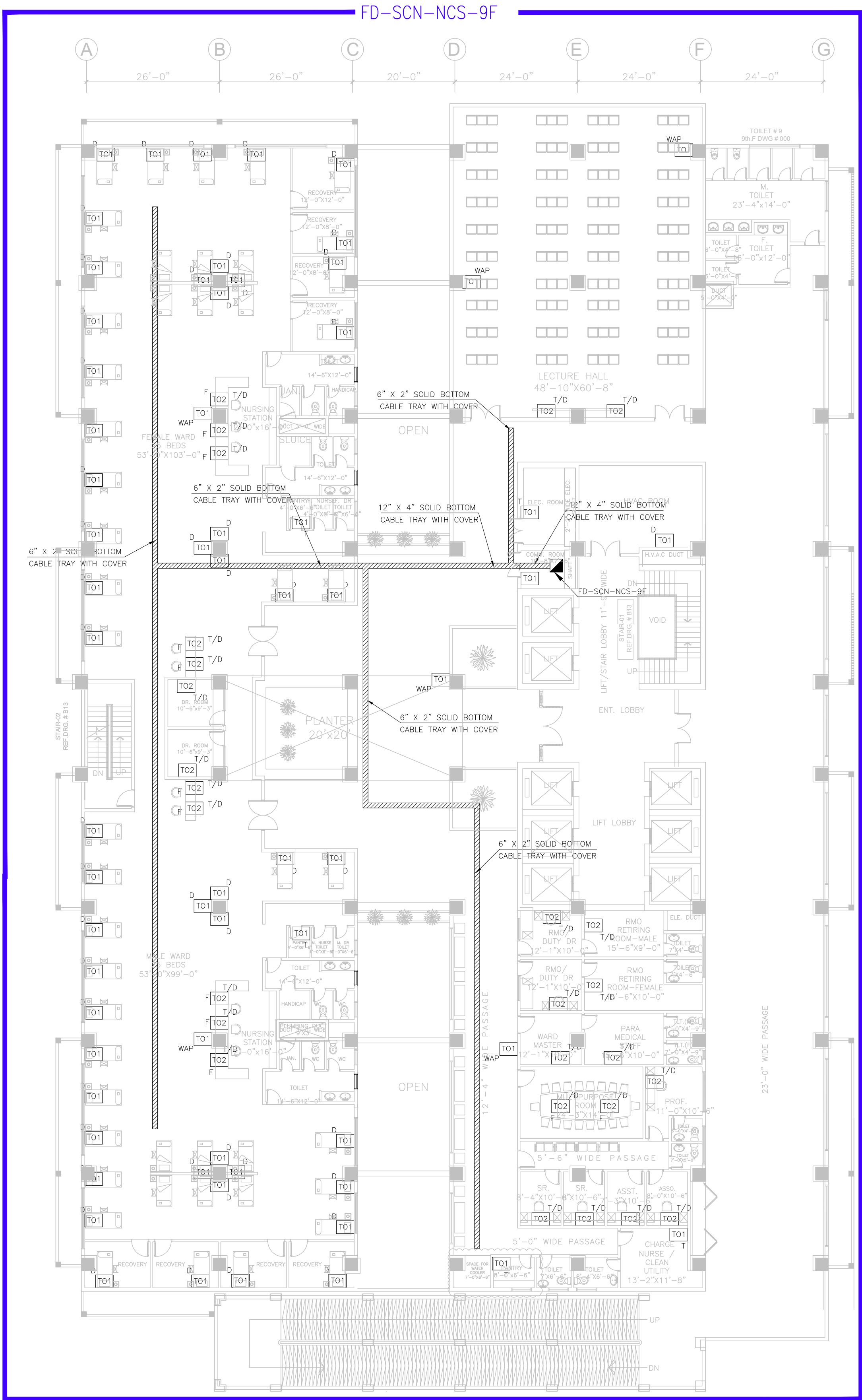




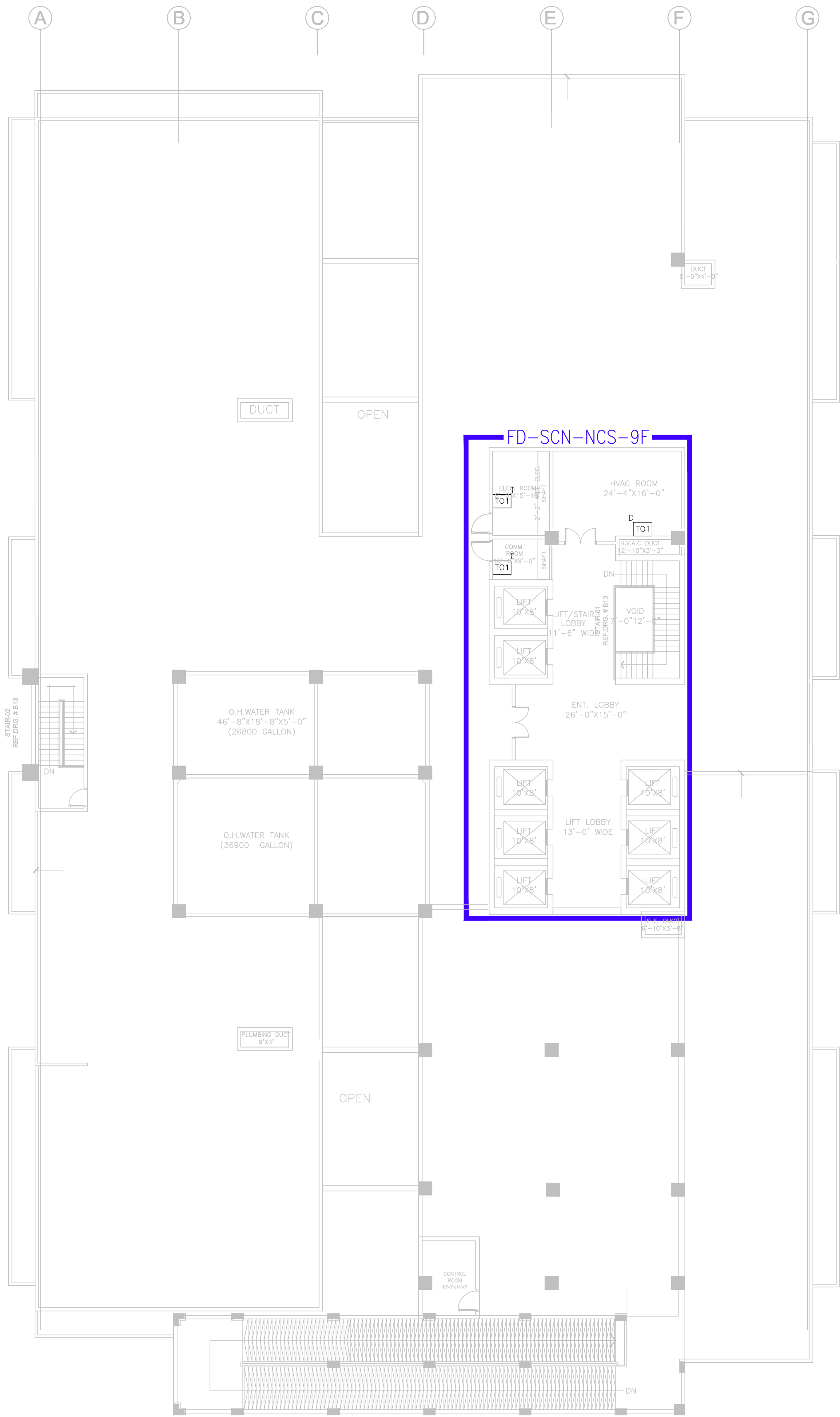
NOTES:

- 1- FOR LEGEND & GENERAL NOTES,  
REFER DRAWING NO.  
4662/50B/BD/00T001.
- 2- FOR STRUCTURED CABLING  
NETWORK SCHEMATIC DIAGRAM,  
REFER DRAWING NO.  
4662/50B/BD/00T002 &  
4662/50B/BD/00T003.

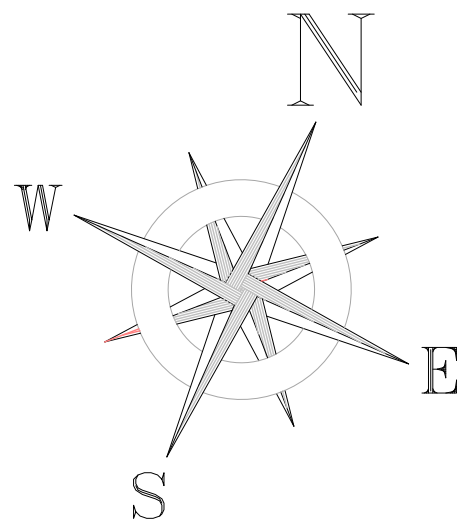




9th FLOOR PLAN  
DERMATOLOGY  
LECTURE HALL



ROOF PLAN



- NOTES:**
- 1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
  - 2- FOR STRUCTURED CABLING NETWORK SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T002 & 4662/50B/BD/00T003.

CLIENT  
**PATIENTS' AID FOUNDATION**  
**JINNAH POST GRADUATE MEDICAL CENTER**  
**KARACHI**

CONSULTANT  
**NATIONAL ENGINEERING SERVICES**  
**PAKISTAN (PVT.) LTD.**  
ARCHITECTURE & PLANNING DIVISION KARACHI.  
4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34

|      |           |                    |          |          |  |
|------|-----------|--------------------|----------|----------|--|
| 04   |           |                    |          |          |  |
| 03   |           |                    |          |          |  |
| 02   |           |                    |          |          |  |
| 01   | AUG. 2024 | ISSUED FOR BIDDING |          |          |  |
| REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED |  |

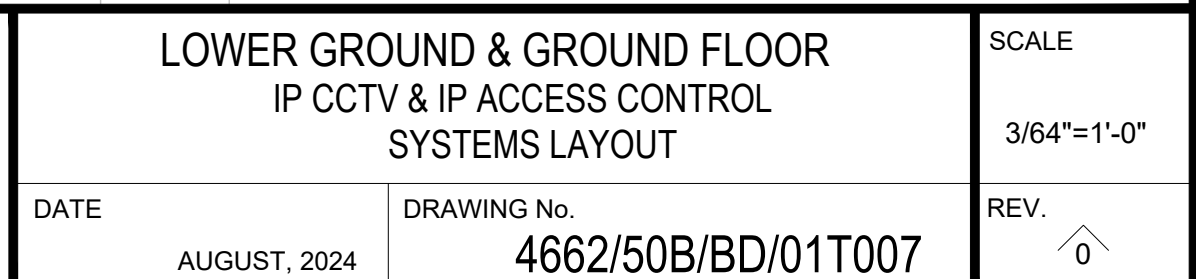
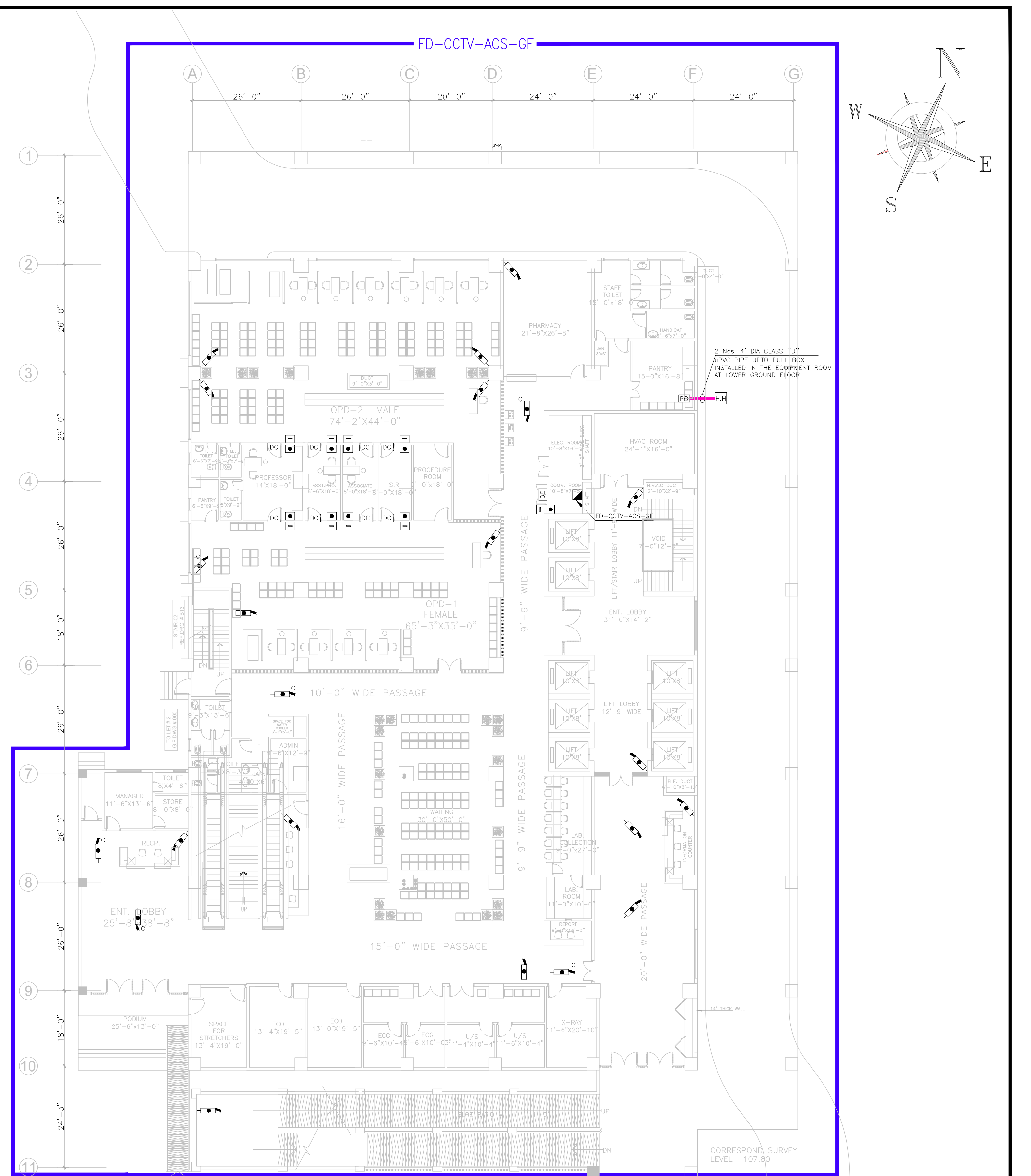
|             |                    |
|-------------|--------------------|
| DRAWN       | <i>[Signature]</i> |
| SUBMITTED   | <i>[Signature]</i> |
| RECOMMENDED | <i>[Signature]</i> |
| CHD.VER.    | <i>[Signature]</i> |
| APPROVED    | <i>[Signature]</i> |

PROJECT  
**MEDICAL TOWER AT JPMC KARACHI.**

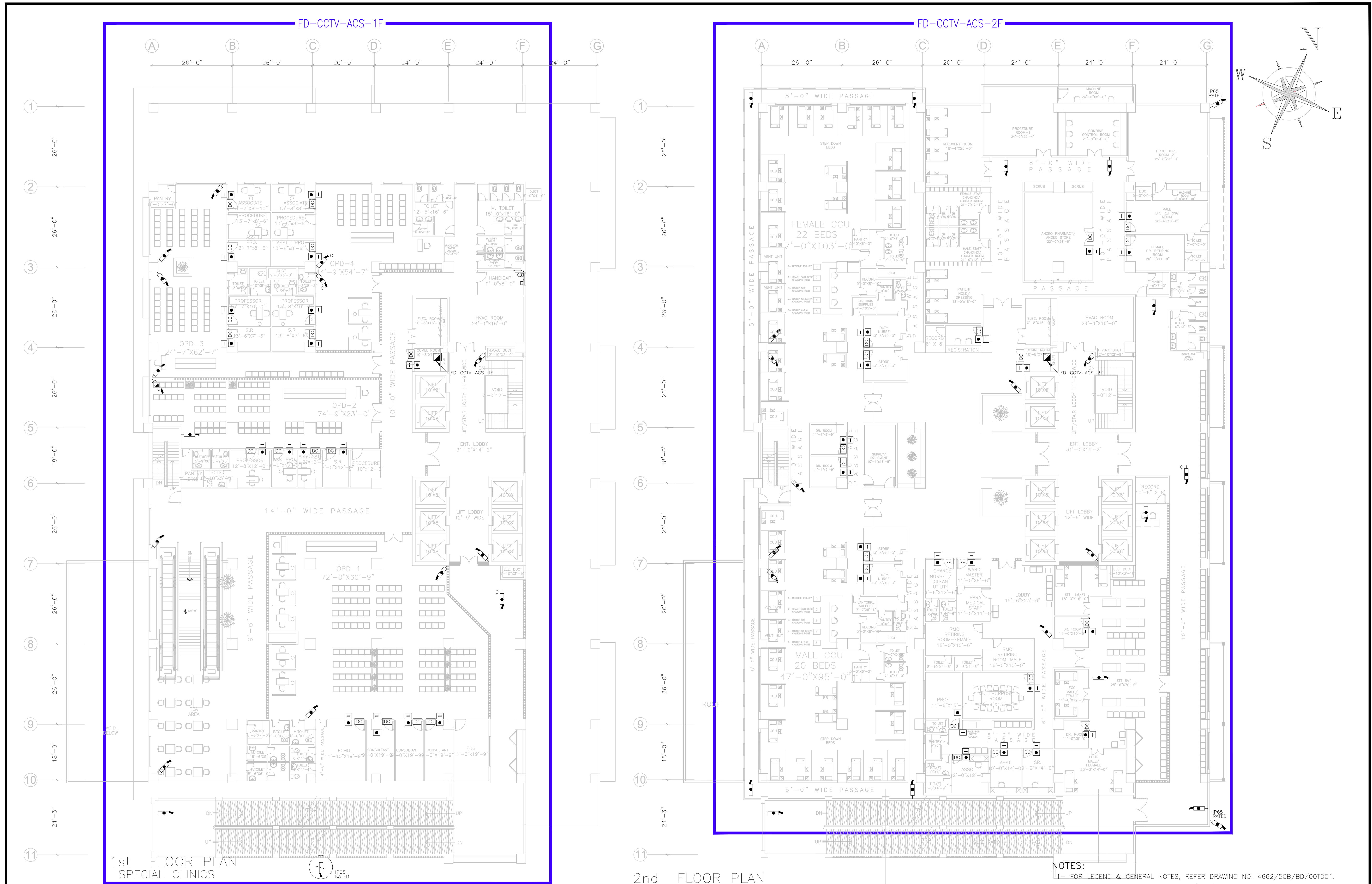
|                                                                 |                                   |
|-----------------------------------------------------------------|-----------------------------------|
| 9th & ROOF<br>STRUCTURED CABLING NETWORK & CABLE TRAY<br>LAYOUT |                                   |
| DATE<br>AUGUST, 2024                                            | DRAWING No.<br>4662/50B/BD/01T006 |

|                      |
|----------------------|
| SCALE<br>3/64"=1'-0" |
| REV.<br>0            |









NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR IP CLOSED CIRCUIT TELEVISION (CCTV) & ACCESS CONTROL SYSTEMS SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T004.

|                                                                                     |           |                                                                                     |          |             |  |                                |  |                                                                  |  |             |
|-------------------------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------------|----------|-------------|--|--------------------------------|--|------------------------------------------------------------------|--|-------------|
| CLIENT                                                                              |           | CONSULTANT                                                                          |          | DRAWN       |  | PROJECT                        |  | 1st & 2nd FLOOR<br>IP CCTV & IP ACCESS CONTROL<br>SYSTEMS LAYOUT |  | SCALE       |
|  |           |  |          | SUBMITTED   |  | MEDICAL TOWER AT JPMC KARACHI. |  | DATE                                                             |  | 3/64"=1'-0" |
| PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL CENTER<br>KARACHI          |           | NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.                               |          | RECOMMENDED |  |                                |  | DRAWING No.                                                      |  | REV.        |
| ARCHITECTURE & PLANNING DIVISION KARACHI.                                           |           | 4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34         |          | CHD/VER.    |  |                                |  | AUGUST, 2024                                                     |  | 0           |
| 04                                                                                  |           |                                                                                     |          | APPROVED    |  |                                |  |                                                                  |  |             |
| 03                                                                                  |           |                                                                                     |          | APPROVED    |  |                                |  |                                                                  |  |             |
| 02                                                                                  |           |                                                                                     |          | APPROVED    |  |                                |  |                                                                  |  |             |
| 01                                                                                  | AUG. 2024 | ISSUED FOR BIDDING                                                                  |          | APPROVED    |  |                                |  |                                                                  |  |             |
| REV.                                                                                | DATE      | DESCRIPTION                                                                         | APPROVED | APPROVED    |  |                                |  |                                                                  |  |             |





3rd FLOOR PLAN  
ICU & ENDOSCOPY SUITE

4th FLOOR PLAN  
MEDICAL UNIT - I,  
GASTROENTEROLOGY

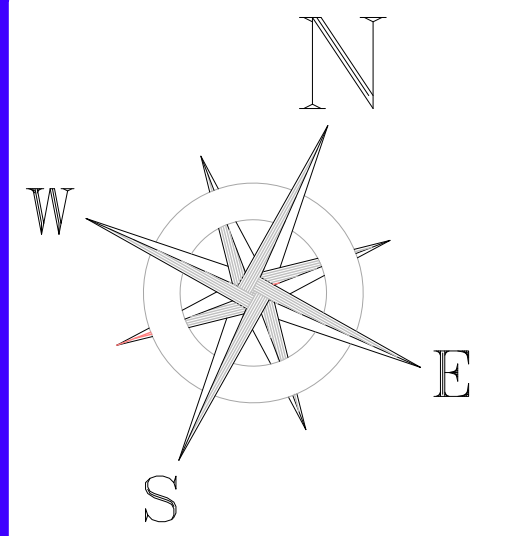
NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR IP CLOSED CIRCUIT TELEVISION (CCTV) & ACCESS CONTROL SYSTEMS SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T004.

|                                                                                                                                                                                        |  |  |  |                                                                                                                                                                  |  |  |  |                                                                                                                                    |  |  |  |                                                                                                       |  |  |  |                                                              |  |  |  |                                                                                                                        |  |  |  |                                         |  |  |  |                                                      |  |  |  |                              |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------|--|--|--|-----------------------------------------|--|--|--|------------------------------------------------------|--|--|--|------------------------------|--|--|--|
| <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</div> |  |  |  | <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div> |  |  |  | <div>04</div> <div>03</div> <div>02</div> <div>01</div> <div>REV.</div> <div>DATE</div> <div>DESCRIPTION</div> <div>APPROVED</div> |  |  |  | <div>DRAWN</div> <div>SUBMITTED</div> <div>RECOMMENDED</div> <div>CHD./VER.</div> <div>APPROVED</div> |  |  |  | <div>PROJECT</div> <div>MEDICAL TOWER AT JPMC KARACHI.</div> |  |  |  | <div>3rd &amp; 4th FLOOR<br/>IP CCTV &amp; IP ACCESS CONTROL<br/>SYSTEMS LAYOUT</div> <div>SCALE<br/>3/64"=1'-0"</div> |  |  |  | <div>DATE</div> <div>AUGUST, 2024</div> |  |  |  | <div>DRAWING No.</div> <div>4662/50B/BD/01T009</div> |  |  |  | <div>REV.</div> <div>0</div> |  |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-------------------------------------------------------------------------------------------------------|--|--|--|--------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------|--|--|--|-----------------------------------------|--|--|--|------------------------------------------------------|--|--|--|------------------------------|--|--|--|



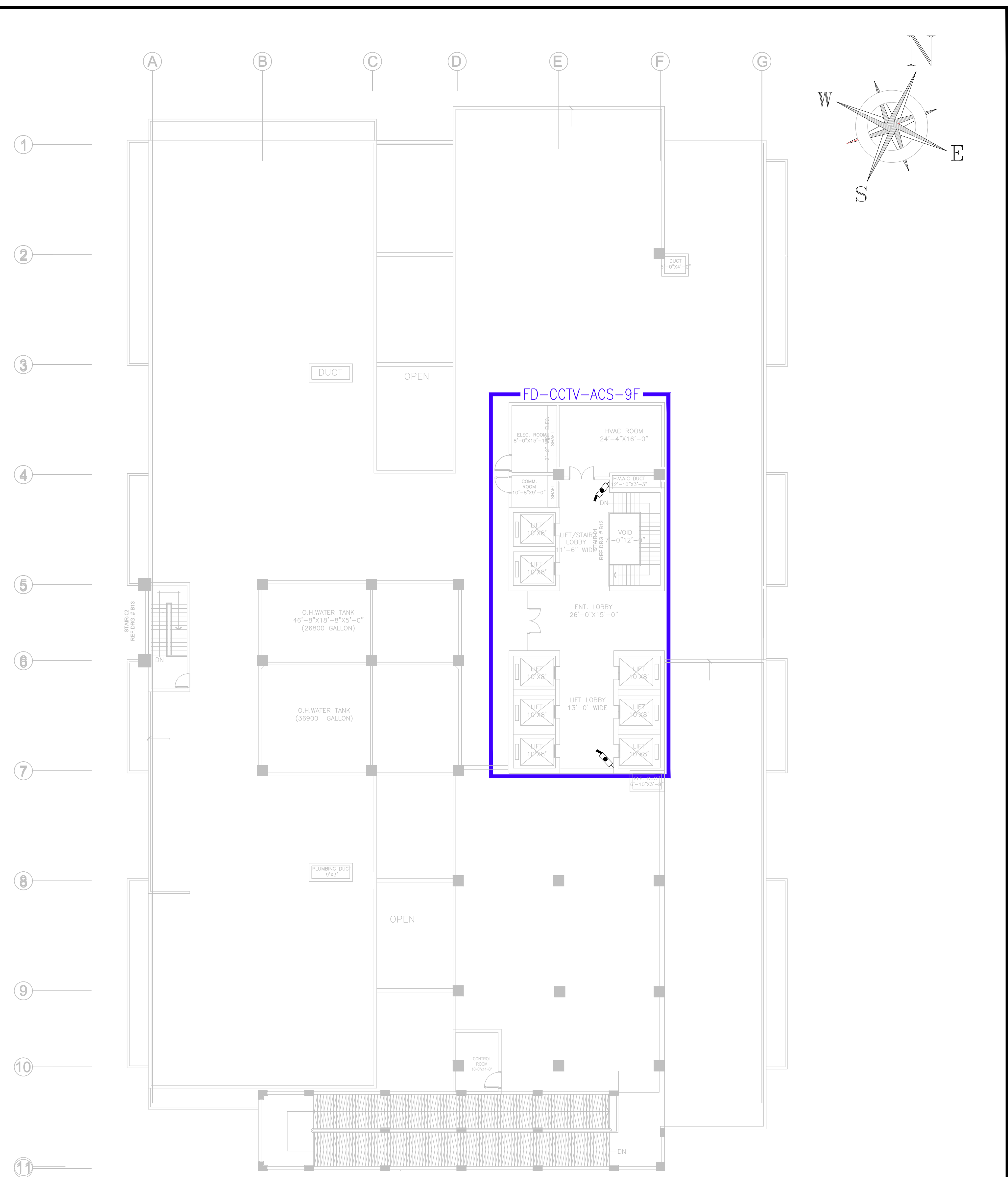
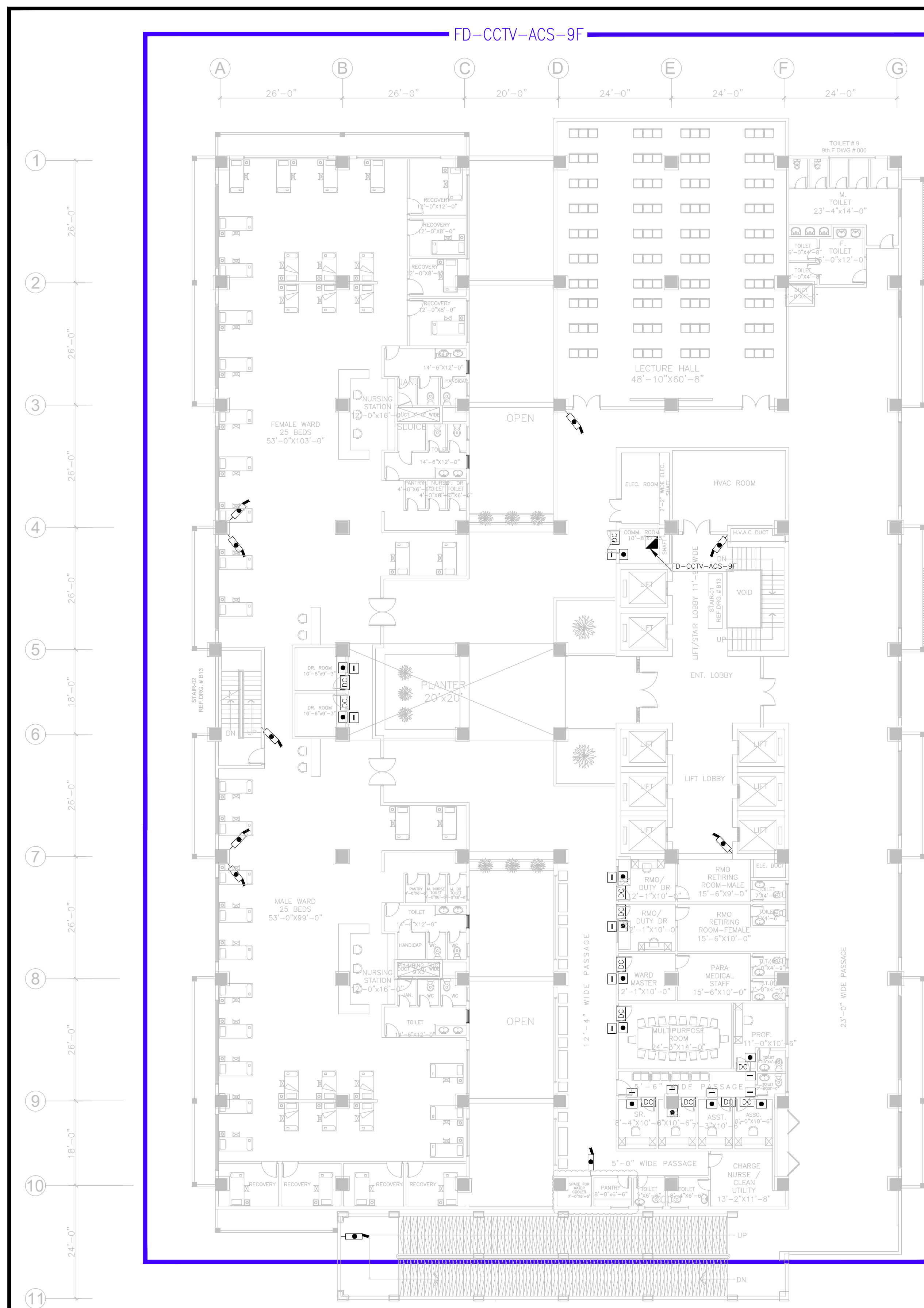






1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR IP CLOSED CIRCUIT TELEVISION (CCTV) & ACCESS CONTROL SYSTEMS SCHEMATIC  
DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T004.



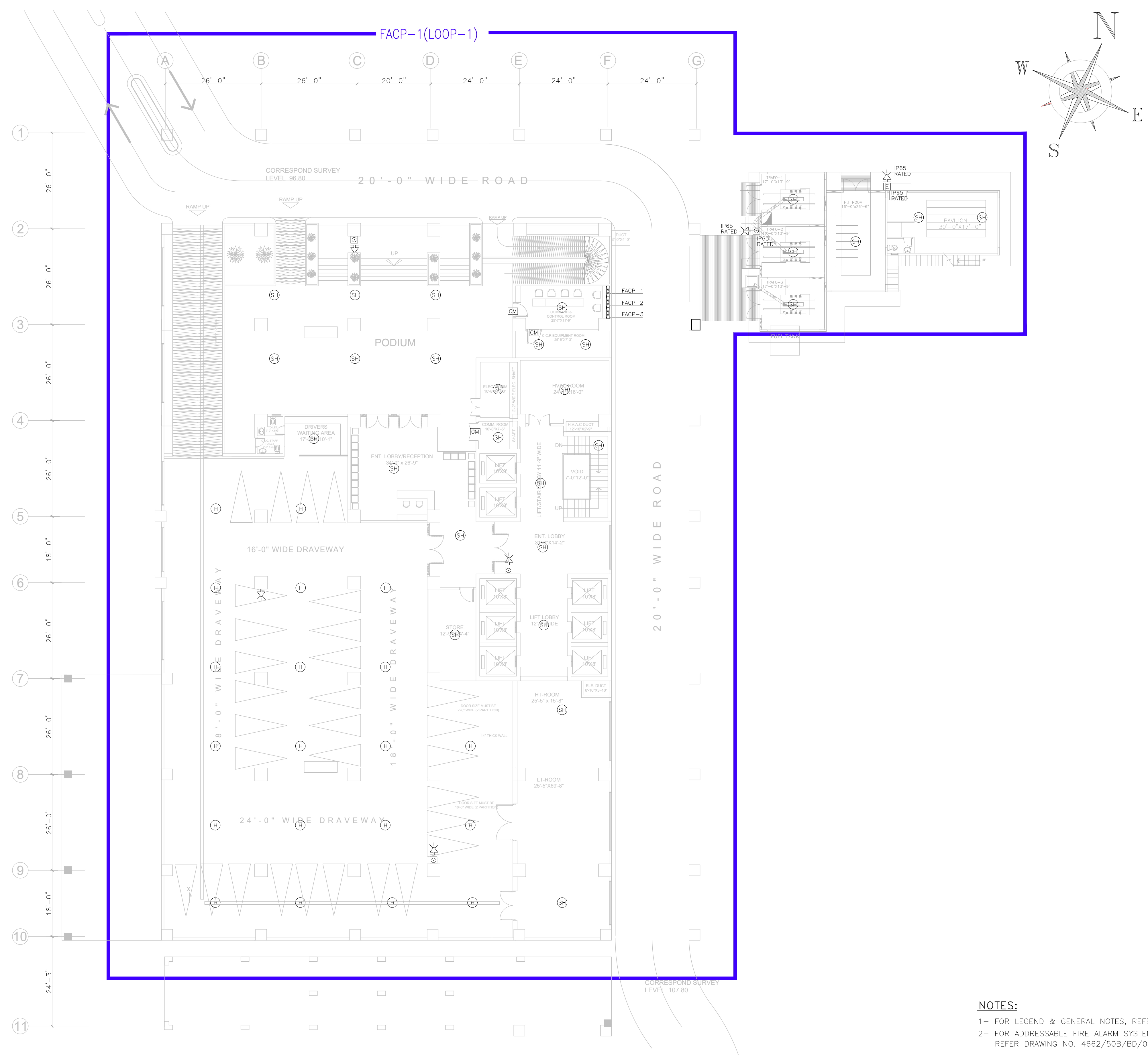


**NOTES:**

- 1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
- 2- FOR IP CLOSED CIRCUIT TELEVISION (CCTV) & ACCESS CONTROL SYSTEMS SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T004.

|                                                                                                                                                                         |        |                                                                                                                                                   |      |           |                    |          |             |               |         |                                       |                                                                                    |                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------------------|----------|-------------|---------------|---------|---------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|  <b>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</b> | CLIENT | CONSULTANT                                                                                                                                        | 04   |           |                    |          | DRAWN       | <i>off</i>    | PROJECT | <b>MEDICAL TOWER AT JPMC KARACHI.</b> | <b>9th FLOOR &amp; ROOF<br/>IP CCTV &amp; IP ACCESS CONTROL<br/>SYSTEMS LAYOUT</b> | SCALE                                                                                         |
|                                                                                                                                                                         |        |  <b>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</b> | 03   |           |                    |          | SUBMITTED   | <i>Paul</i>   |         |                                       |                                                                                    | 3/64"=1'-0"                                                                                   |
|                                                                                                                                                                         |        |                                                                                                                                                   | 02   |           |                    |          | RECOMMENDED | <i>Reza</i>   |         |                                       |                                                                                    |                                                                                               |
|                                                                                                                                                                         |        | ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.I. Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34                         | 01   | AUG. 2024 | ISSUED FOR BIDDING |          | CHD./VER.   | <i>museif</i> |         |                                       |                                                                                    |                                                                                               |
|                                                                                                                                                                         |        |                                                                                                                                                   | REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED    | <i>museif</i> |         |                                       |                                                                                    |                                                                                               |
|                                                                                                                                                                         |        |                                                                                                                                                   |      |           |                    |          |             |               |         | DATE<br>AUGUST, 2024                  | DRAWING No.<br><b>4662/50B/BD/01T012</b>                                           | REV.<br> |

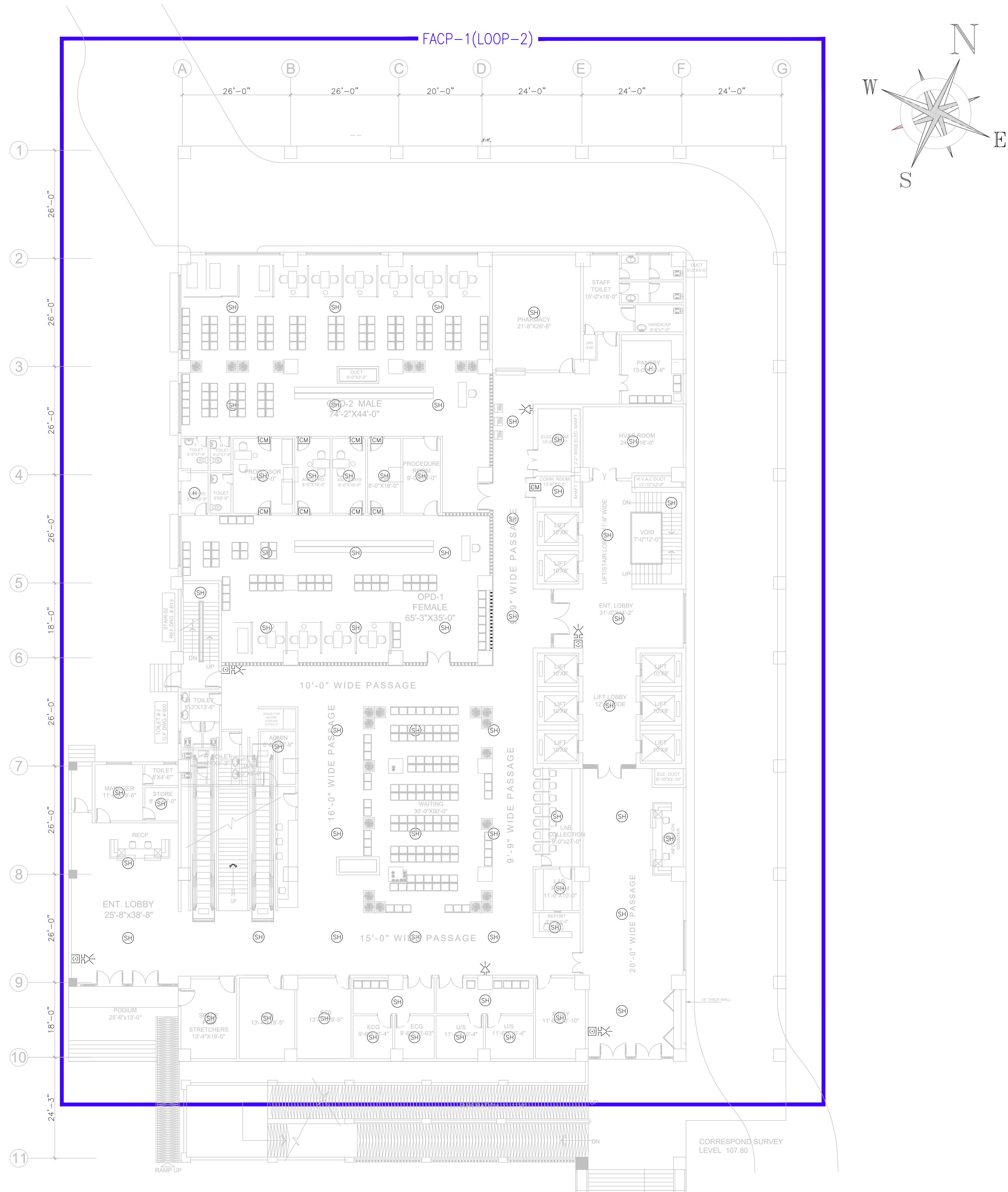




NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR ADDRESSABLE FIRE ALARM SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T005.

|                                                                                                                                                                                        |  |                                                                                                                                                                  |  |      |           |                    |          |             |                                                                                       |                                               |                                               |                                    |                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|-----------|--------------------|----------|-------------|---------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------------------------|---------------------------------------------------------------------------------------|
| <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL<br/>CENTER KARACHI</div> |  | <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div> |  | 04   |           |                    |          | DRAWN       |  | PROJECT<br><br>MEDICAL TOWER AT JPMC KARACHI. | LOWER GROUND FLOOR & ELECTRICAL<br>SUBSTATION |                                    | SCALE                                                                                 |
|                                                                                                                                                                                        |  |                                                                                                                                                                  |  | 03   |           |                    |          | SUBMITTED   |  |                                               | ADDRESSABLE FIRE ALARM SYSTEM LAYOUT          |                                    | 3/64"=1'-0"                                                                           |
|                                                                                                                                                                                        |  |                                                                                                                                                                  |  | 02   |           |                    |          | RECOMMENDED |  |                                               |                                               |                                    |                                                                                       |
|                                                                                                                                                                                        |  |                                                                                                                                                                  |  | 01   | AUG. 2024 | ISSUED FOR BIDDING |          | CHD./VER.   |  |                                               |                                               |                                    |                                                                                       |
| ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34                                                               |  |                                                                                                                                                                  |  | REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED    |  |                                               |                                               |                                    | REV.                                                                                  |
|                                                                                                                                                                                        |  |                                                                                                                                                                  |  |      |           |                    |          |             |                                                                                       |                                               | AUGUST, 2024                                  | DRAWING No.<br>4662/50B/BD/01T013A |  |

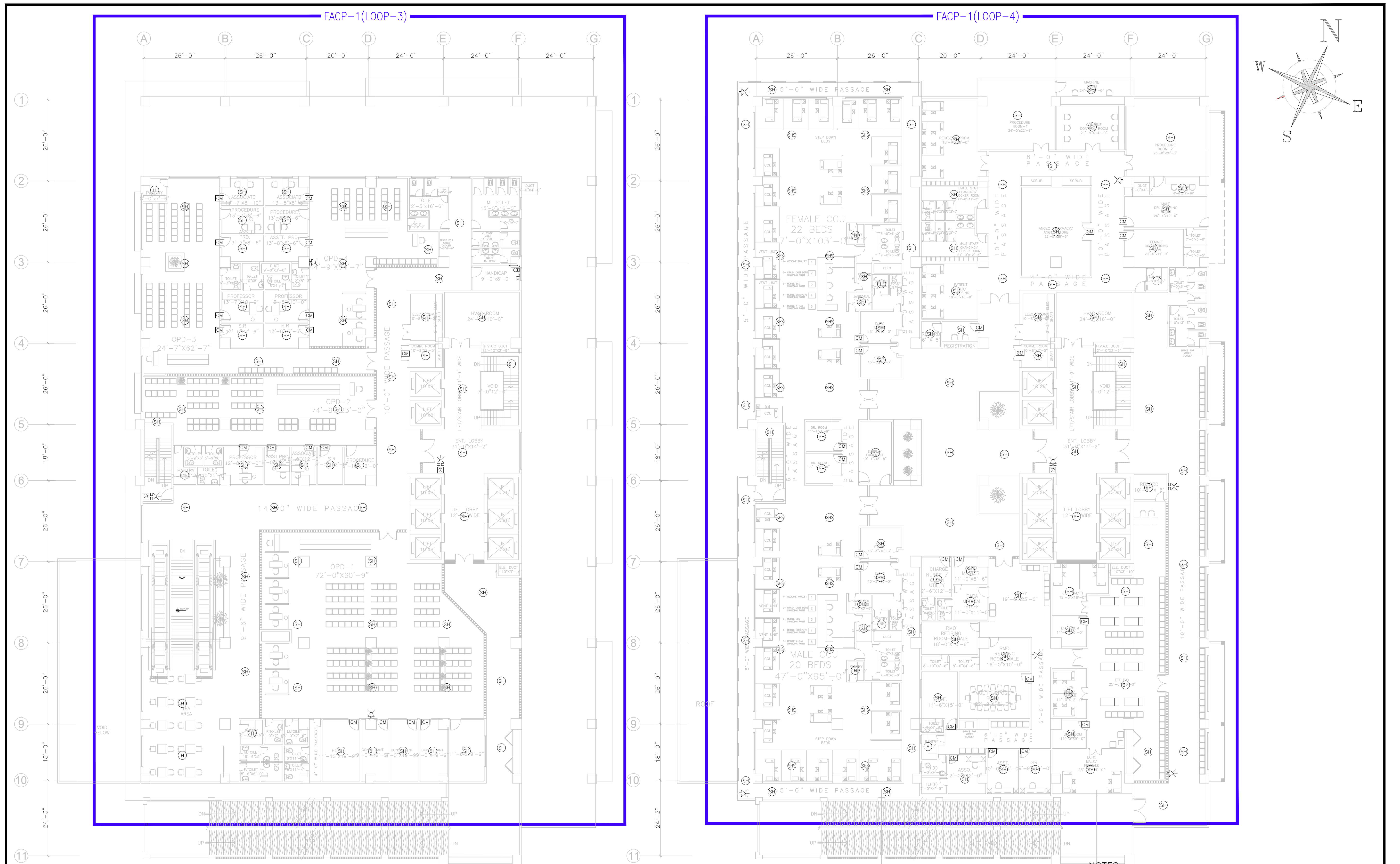




NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR ADDRESSABLE FIRE ALARM SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T005.

|                                                                                               |                                                                            |                                                                                                                                                                                                                                                                                     |                              |                                                        |                      |                                                            |                                           |                                                         |                                    |                                                                                                                       |
|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------------------------------------------------------|----------------------|------------------------------------------------------------|-------------------------------------------|---------------------------------------------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| CLIENT<br> | PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL<br>CENTER KARACHI | CONSULTANT<br> NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.<br>ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 | 04<br>03<br>02<br>01<br>REV. | AUG, 2024<br>ISSUED FOR BIDDING<br>DATE<br>DESCRIPTION | APPROVED<br>APPROVED | DRAWN<br>SUBMITTED<br>RECOMMENDED<br>CHD./VER.<br>APPROVED | PROJECT<br>MEDICAL TOWER AT JPMC KARACHI. | GROUND FLOOR<br>ADDRESSABLE FIRE ALARM SYSTEM<br>LAYOUT |                                    | SCALE<br>3/64"=1'-0"<br>REV.<br> |
|                                                                                               |                                                                            |                                                                                                                                                                                                                                                                                     |                              |                                                        |                      |                                                            |                                           | DATE<br>AUGUST, 2024                                    | DRAWING No.<br>4662/50B/BD/01T013B |                                                                                                                       |





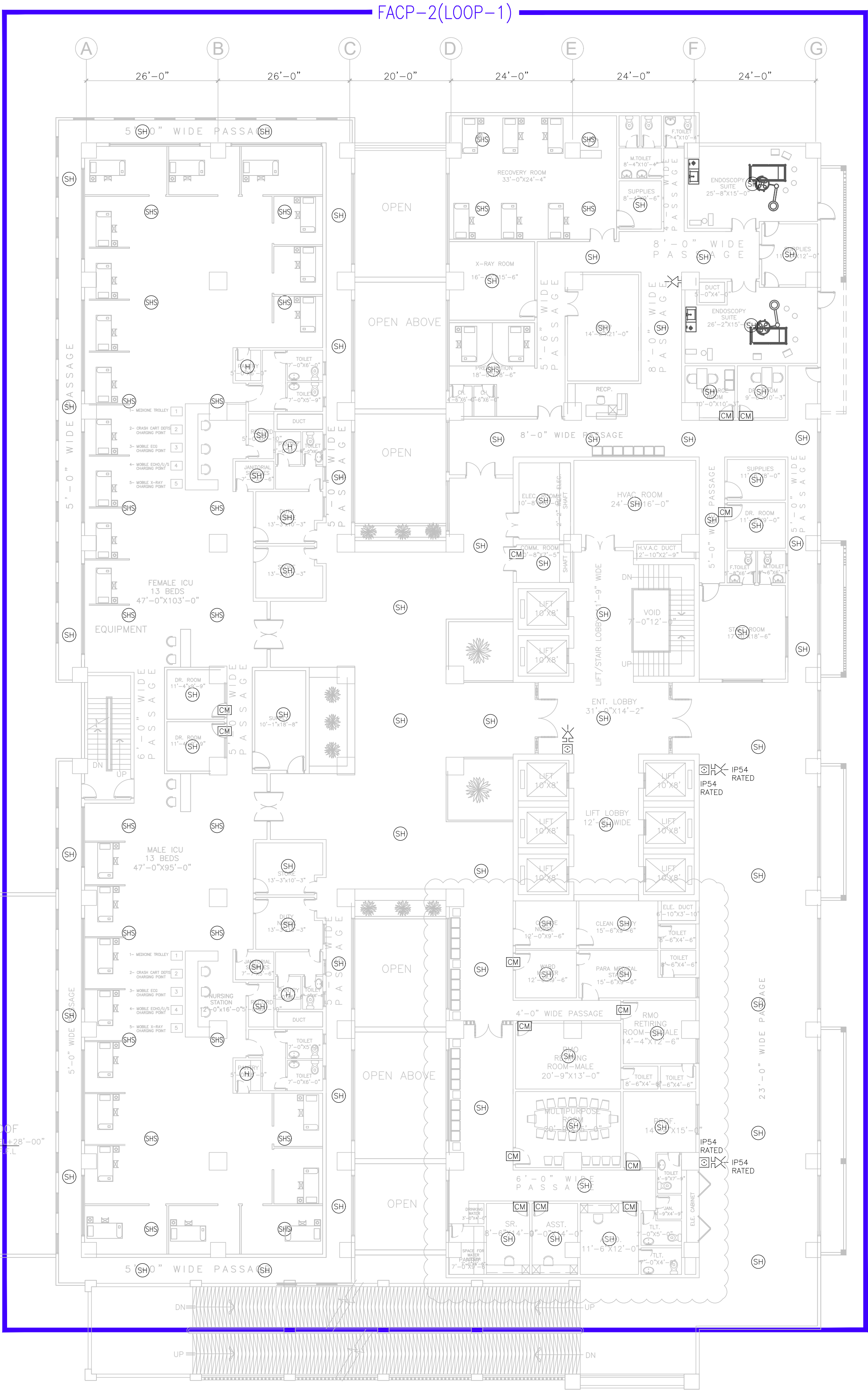
1st FLOOR PLAN  
SPECIAL CLINICS

2nd FLOOR PLAN

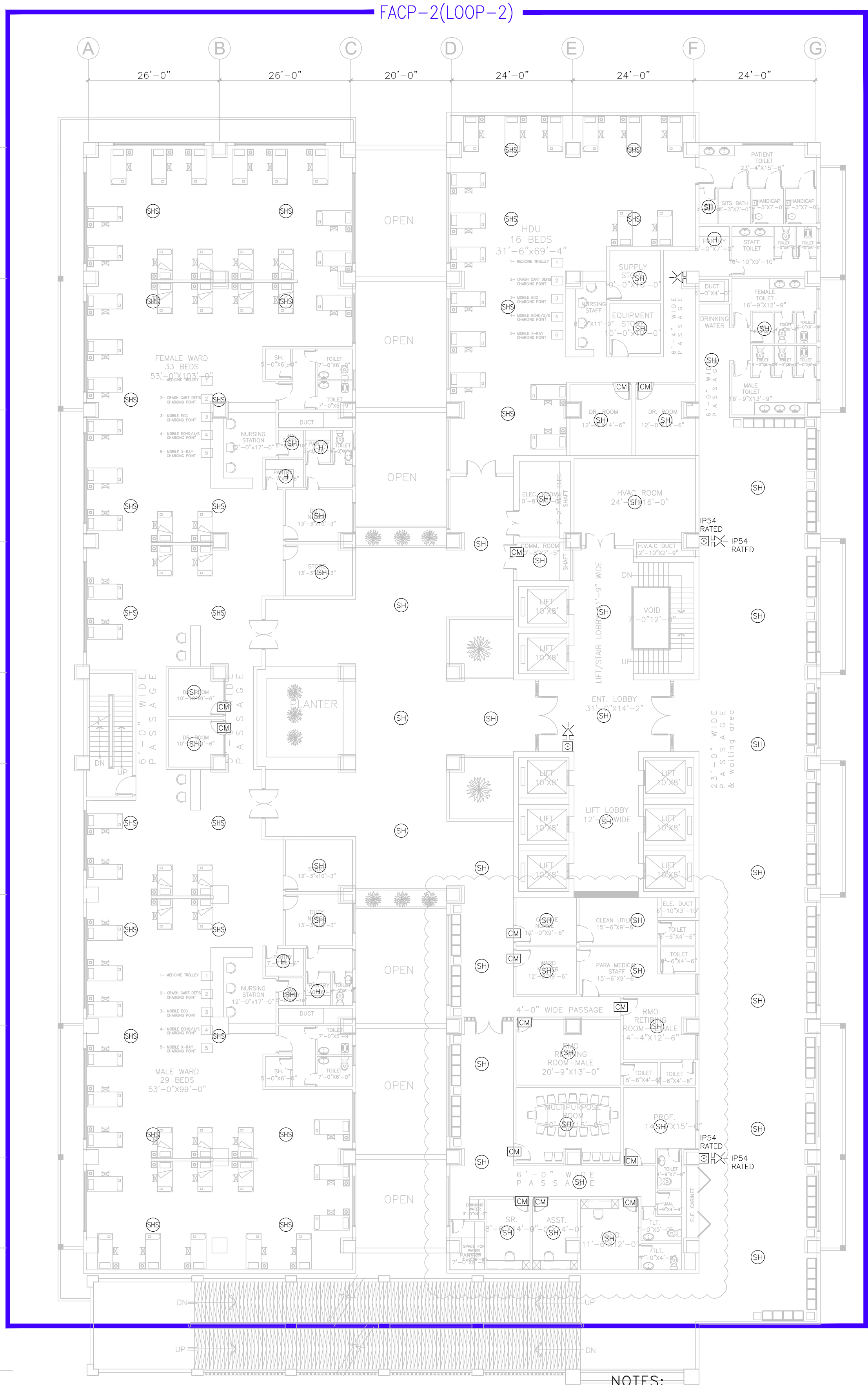
NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR ADDRESSABLE FIRE ALARM SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T005.

|                                                                                     |  |                                                                                                                          |  |                    |  |                                |  |                                                            |  |                    |
|-------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------|--|--------------------|--|--------------------------------|--|------------------------------------------------------------|--|--------------------|
| CLIENT                                                                              |  | CONSULTANT                                                                                                               |  | DRAWN              |  | PROJECT                        |  | 1st & 2nd FLOOR<br>ADDRESSABLE FIRE ALARM SYSTEM<br>LAYOUT |  | SCALE              |
|  |  |                                       |  | SUBMITTED          |  | MEDICAL TOWER AT JPMC KARACHI. |  | DATE                                                       |  | 3/64"=1'-0"        |
| PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL<br>CENTER KARACHI          |  | NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.                                                                    |  | RECOMMENDED        |  |                                |  | DRAWING No.                                                |  | REV.               |
|                                                                                     |  | ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |  | CHD./VER.          |  |                                |  | AUGUST, 2024                                               |  | 4662/50B/BD/01T014 |
| 04                                                                                  |  |                                                                                                                          |  | APPROVED           |  |                                |  |                                                            |  |                    |
| 03                                                                                  |  |                                                                                                                          |  |                    |  |                                |  |                                                            |  |                    |
| 02                                                                                  |  |                                                                                                                          |  |                    |  |                                |  |                                                            |  |                    |
| 01                                                                                  |  | AUG, 2024                                                                                                                |  | ISSUED FOR BIDDING |  |                                |  |                                                            |  |                    |
| REV.                                                                                |  | DATE                                                                                                                     |  | DESCRIPTION        |  | APPROVED                       |  |                                                            |  |                    |





3rd FLOOR  
ICU & ENDOSCOPY SUITE

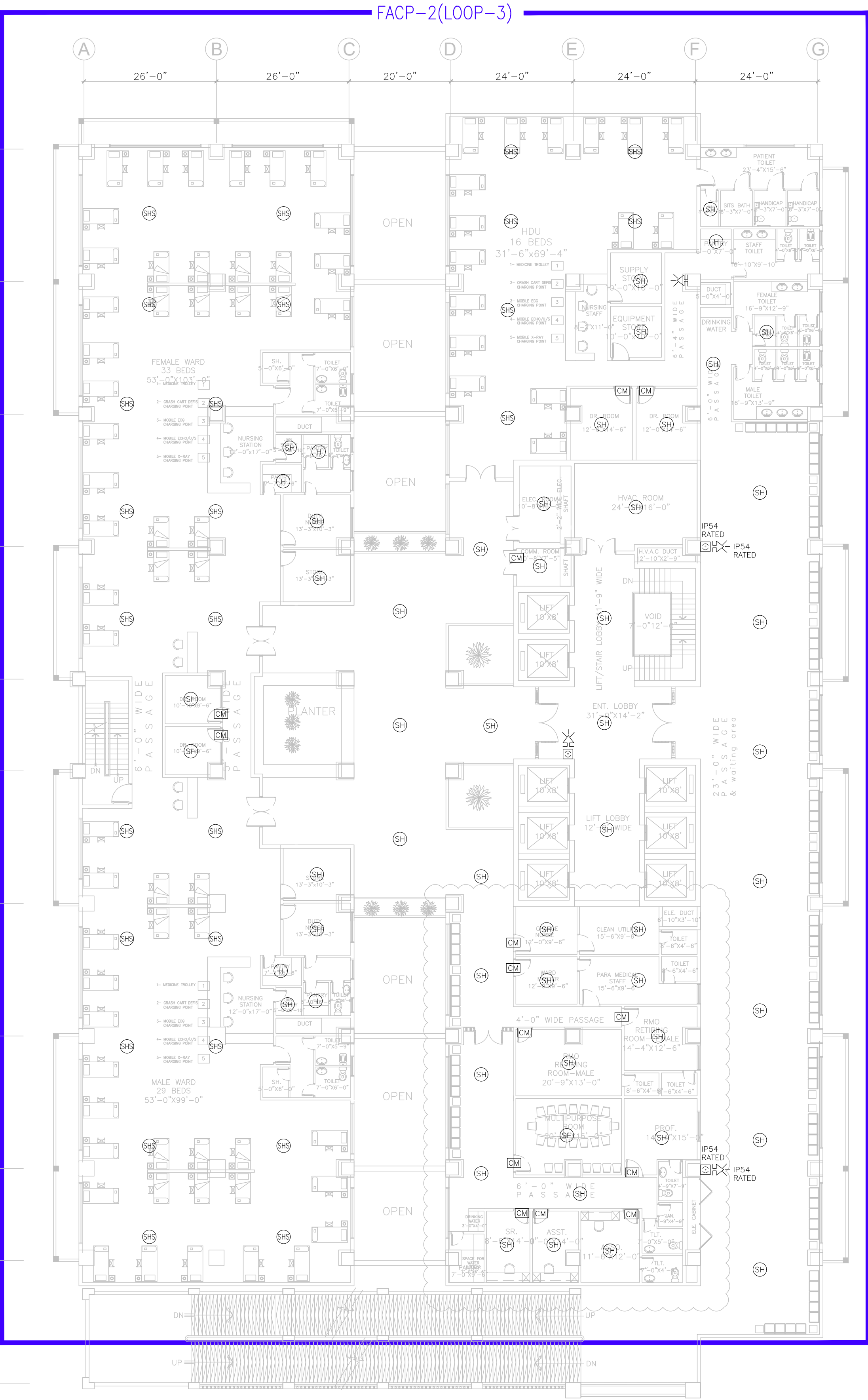


4th FLOOR  
MEDICAL UNIT - I,  
GASTROENTEROLOGY

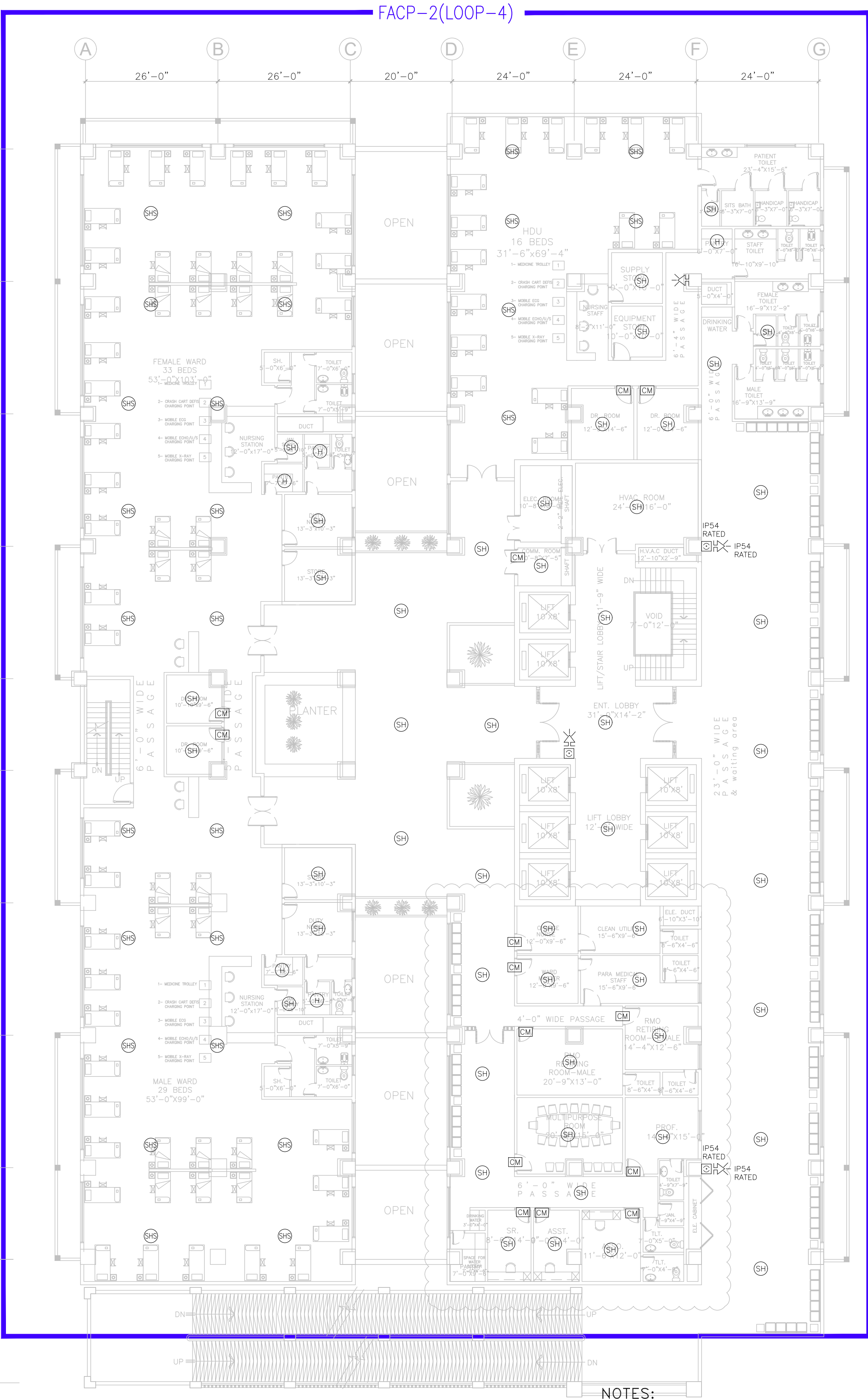
NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR ADDRESSABLE FIRE ALARM SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T005.

|                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                                                                                |  |                                                                                                                                    |                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                              |                                                                                                                                                                          |                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>CLIENT</div> <div><div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL<br/>CENTER KARACHI</div></div> |  | <div>CONSULTANT</div> <div><div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div></div> <div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI,<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> |  | <div>04</div> <div>03</div> <div>02</div> <div>01</div> <div>REV.</div> <div>DATE</div> <div>DESCRIPTION</div> <div>APPROVED</div> | <div></div> <div></div> <div></div> <div>AUG, 2024</div> <div>ISSUED FOR BIDDING</div> <div></div> | <div>DRAWN</div> <div>SUBMITTED</div> <div>RECOMMENDED</div> <div>CHD./VER.</div> <div>APPROVED</div> <div></div> <div></div> <div></div> <div></div> <div></div> | <div>PROJECT</div> <div>MEDICAL TOWER AT JPMC KARACHI.</div> | <div>3rd &amp; 4th FLOOR<br/>ADDRESSABLE FIRE ALARM SYSTEM<br/>LAYOUT</div> <div>DATE</div> <div>AUGUST, 2024</div> <div>DRAWING No.</div> <div>4662/50B/BD/01T015</div> | <div>SCALE</div> <div>3/64"=1'-0"</div> <div>REV.</div> <div></div> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|

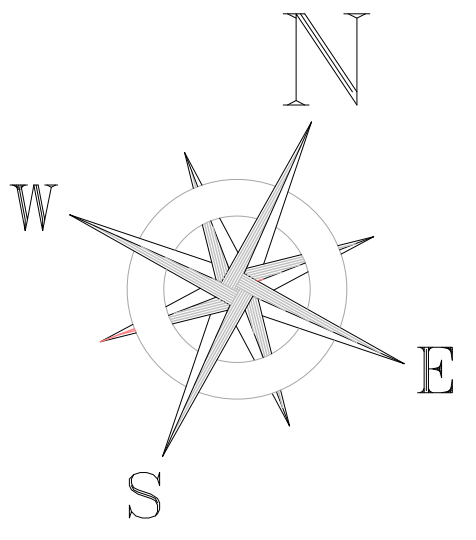




5th FLOOR PLAN  
MEDICAL UNIT- III



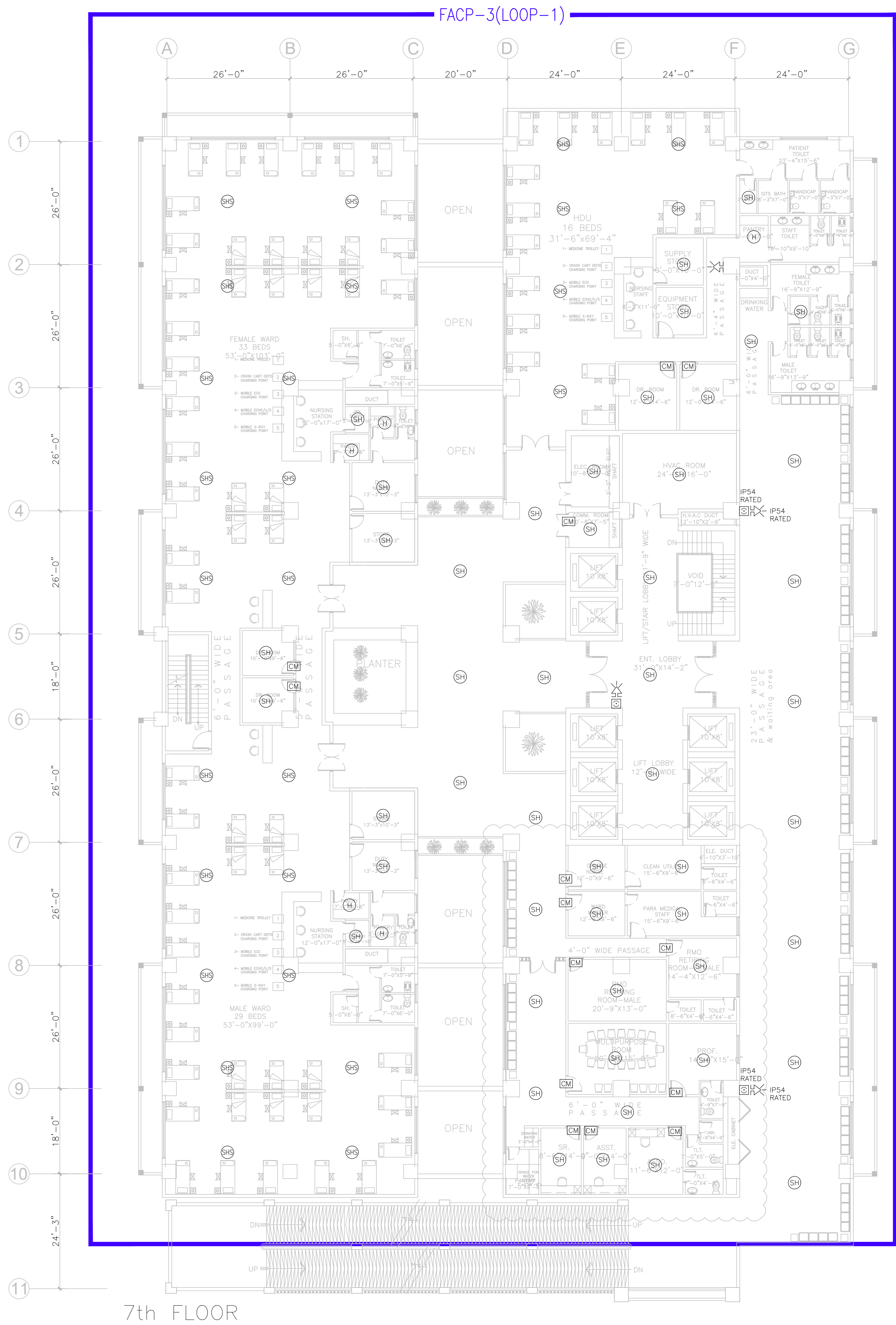
6th FLOOR PLAN  
MEDICAL UNIT - IV



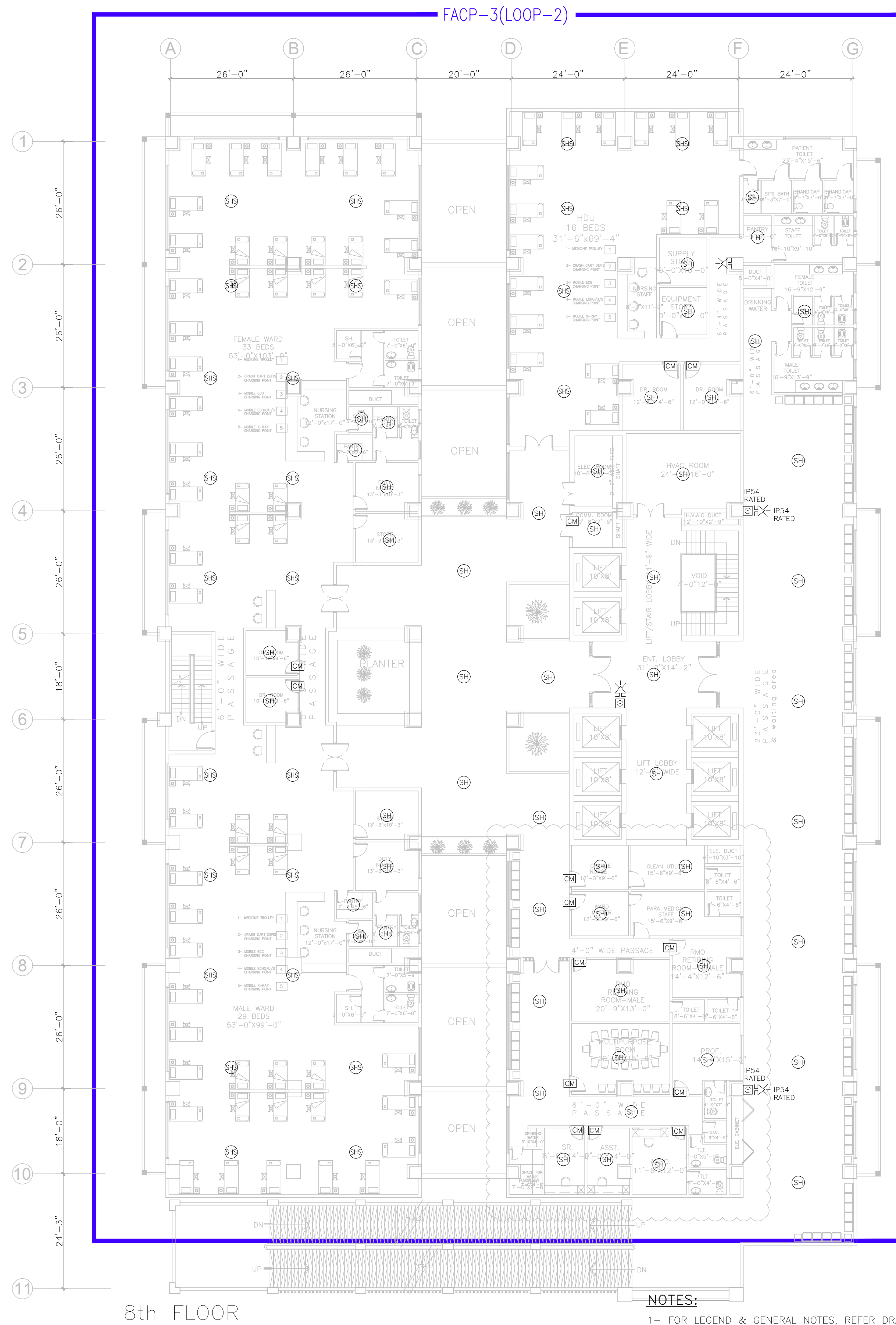
- NOTES:
- 1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
  - 2- FOR ADDRESSABLE FIRE ALARM SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T005.

|                                                                            |  |                                                                                                                                                                                   |  |             |  |                                |  |                                                            |  |                    |
|----------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------|--|--------------------------------|--|------------------------------------------------------------|--|--------------------|
| CLIENT                                                                     |  | CONSULTANT                                                                                                                                                                        |  | DRAWN       |  | PROJECT                        |  | 5th & 6th FLOOR<br>ADDRESSABLE FIRE ALARM SYSTEM<br>LAYOUT |  | SCALE              |
|                                                                            |  |                                                                                                                                                                                   |  |             |  | MEDICAL TOWER AT JPMC KARACHI. |  | DATE                                                       |  | 3/64"=1'-0"        |
| PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL<br>CENTER KARACHI |  | NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.<br>ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |  | SUBMITTED   |  | REV.                           |  | DRAWING No.                                                |  | REV.               |
| 04                                                                         |  | 03                                                                                                                                                                                |  | 02          |  | 01                             |  | AUGUST, 2024                                               |  | 4662/50B/BD/01T016 |
| AUG, 2024                                                                  |  | ISSUED FOR BIDDING                                                                                                                                                                |  | CHD./VER.   |  | APPROVED                       |  |                                                            |  |                    |
| REV.                                                                       |  | DATE                                                                                                                                                                              |  | DESCRIPTION |  | APPROVED                       |  |                                                            |  |                    |

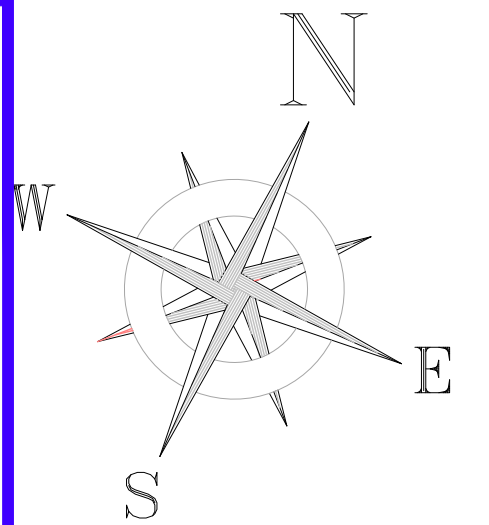




7th FLOOR

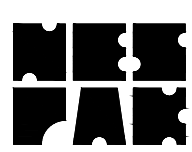


8th FLOOR

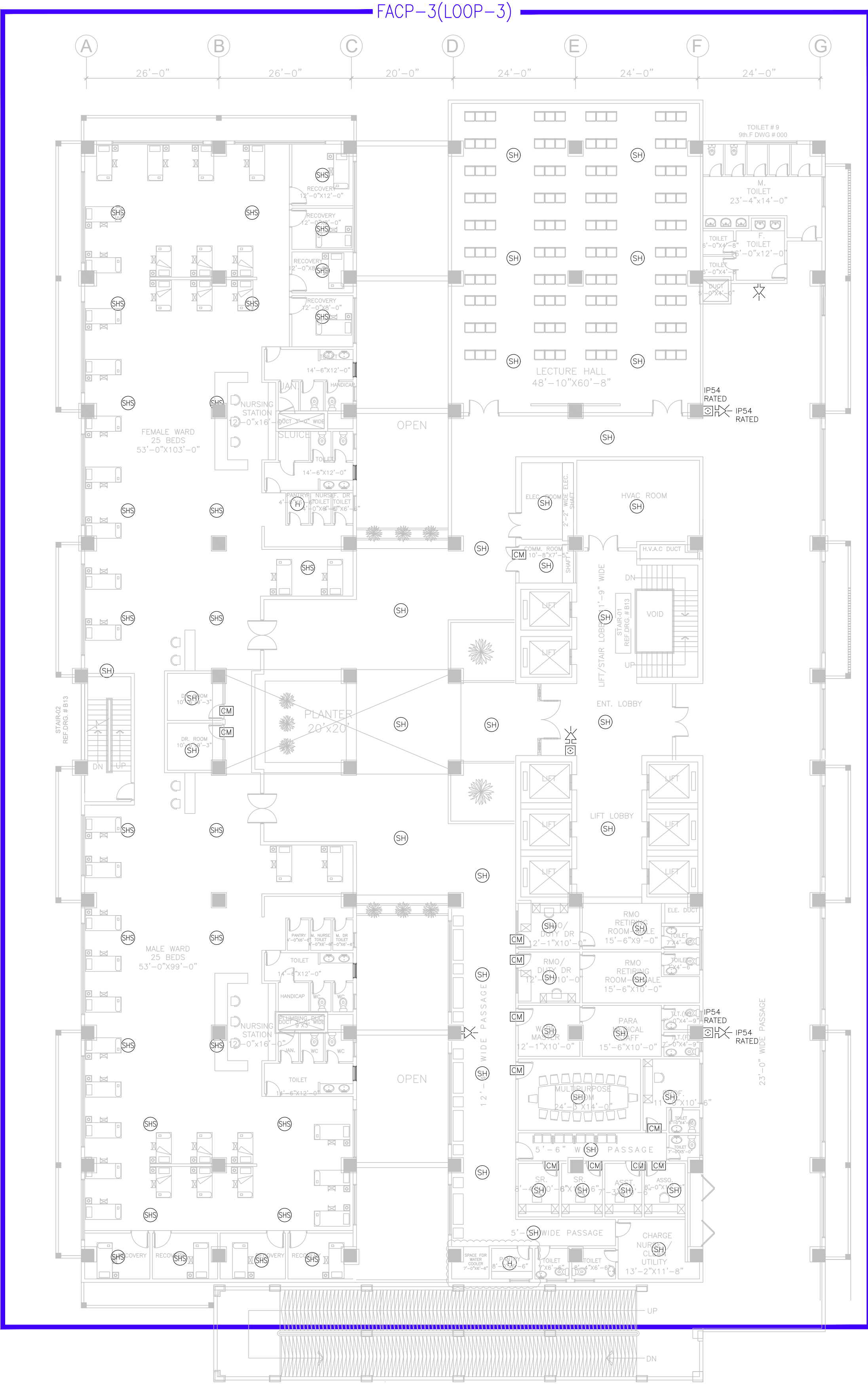


NOTES:

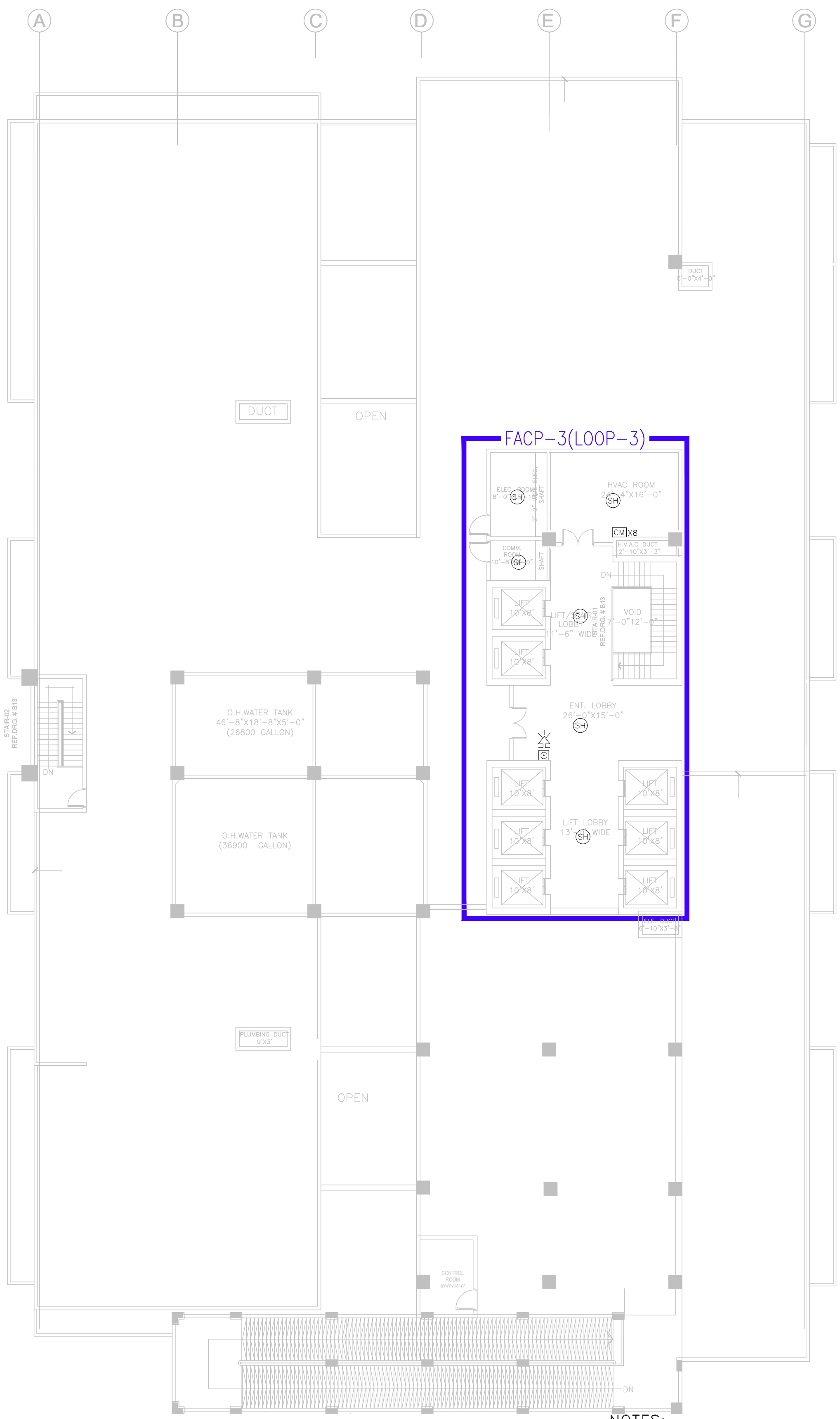
- 1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
- 2- FOR ADDRESSABLE FIRE ALARM SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T005.

|                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                                               |                                                                                                                                                             |                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|--|--|--|--|----|--|--|--|--|--|----|--|--|--|--|--|----|-----------|--------------------|--|--|--|------|------|-------------|----------|----------|--|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <p>CLIENT</p>  <p><b>PATIENTS' AID FOUNDATION</b><br/>JINNAH POST GRADUATE MEDICAL<br/>CENTER KARACHI</p> | <p>CONSULTANT</p>  <p><b>NATIONAL ENGINEERING SERVICES</b><br/>PAKISTAN (PVT.) LTD.<br/>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</p> | <table> <tr> <td>04</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>03</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>02</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>01</td><td>AUG, 2024</td><td>ISSUED FOR BIDDING</td><td></td><td></td><td></td></tr> <tr> <td>REV.</td><td>DATE</td><td>DESCRIPTION</td><td>APPROVED</td><td>APPROVED</td><td></td></tr> </table> | 04       |          |  |  |  |  | 03 |  |  |  |  |  | 02 |  |  |  |  |  | 01 | AUG, 2024 | ISSUED FOR BIDDING |  |  |  | REV. | DATE | DESCRIPTION | APPROVED | APPROVED |  | <p>DRAWN</p> <p>SUBMITTED</p> <p>RECOMMENDED</p> <p>CHD./VER.</p> <p>APPROVED</p> <p>PROJECT</p> <p><b>MEDICAL TOWER AT JPMC KARACHI.</b></p> | <p>7th &amp; 8th FLOOR<br/>ADDRESSABLE FIRE ALARM SYSTEM<br/>LAYOUT</p> <p>DATE</p> <p>AUGUST, 2024</p> <p>DRAWING No.</p> <p><b>4662/50B/BD/01T017</b></p> | <p>SCALE</p> <p>3/64"=1'-0"</p> <p>REV.</p> <p>⬆</p> |
| 04                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                                               |                                                                                                                                                             |                                                      |
| 03                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                                               |                                                                                                                                                             |                                                      |
| 02                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                             |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                                               |                                                                                                                                                             |                                                      |
| 01                                                                                                                                                                                           | AUG, 2024                                                                                                                                                                                                                                                                                                    | ISSUED FOR BIDDING                                                                                                                                                                                                                                                                                                                                                                                                          |          |          |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                                               |                                                                                                                                                             |                                                      |
| REV.                                                                                                                                                                                         | DATE                                                                                                                                                                                                                                                                                                         | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                 | APPROVED | APPROVED |  |  |  |  |    |  |  |  |  |  |    |  |  |  |  |  |    |           |                    |  |  |  |      |      |             |          |          |  |                                                                                                                                               |                                                                                                                                                             |                                                      |

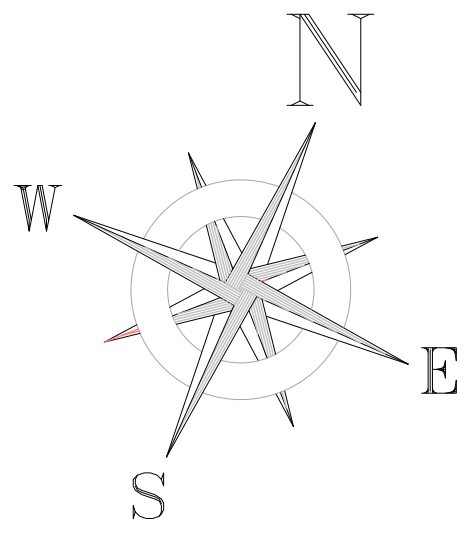




9th FLOOR PLAN  
DERMATOLOGY  
OUTPATIENT CLINIC



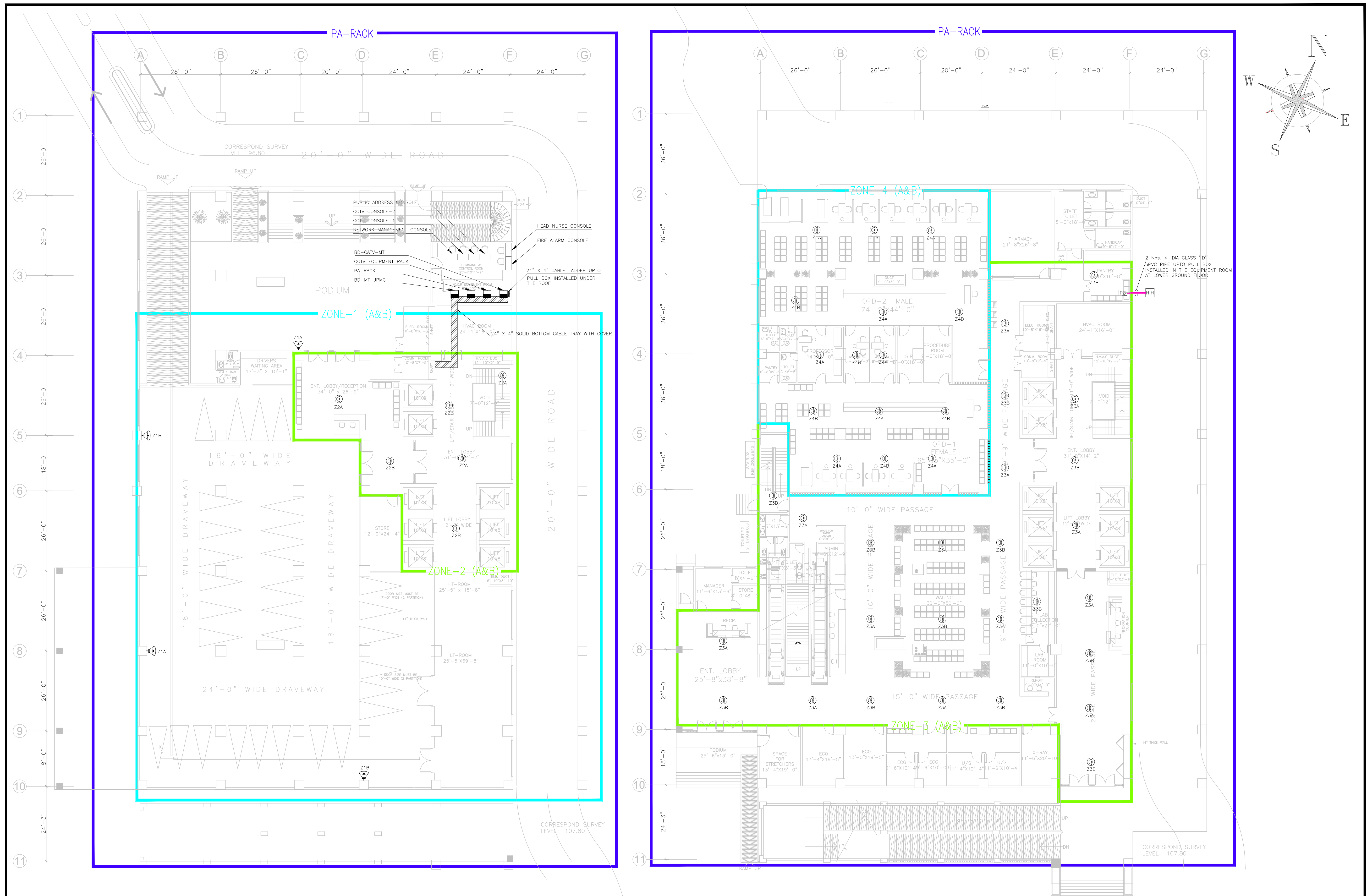
ROOF PLAN

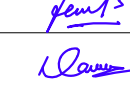
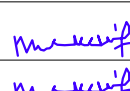


NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR ADDRESSABLE FIRE ALARM SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T005.

|                                                                            |  |  |                                                                                                                                                                                   |  |  |                                                            |  |  |                                                             |  |             |
|----------------------------------------------------------------------------|--|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|------------------------------------------------------------|--|--|-------------------------------------------------------------|--|-------------|
| CLIENT                                                                     |  |  | CONSULTANT                                                                                                                                                                        |  |  | PROJECT                                                    |  |  | 9th FLOOR & ROOF<br>ADDRESSABLE FIRE ALARM SYSTEM<br>LAYOUT |  | SCALE       |
|                                                                            |  |  |                                                                                                                                                                                   |  |  | MEDICAL TOWER AT JPMC KARACHI.                             |  |  | DATE                                                        |  | 3/64"=1'-0" |
| PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL<br>CENTER KARACHI |  |  | NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.<br>ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |  |  | DRAWN<br>SUBMITTED<br>RECOMMENDED<br>CHD./VER.<br>APPROVED |  |  | AUGUST, 2024                                                |  | REV.        |
| 04                                                                         |  |  | 01 AUG, 2024 ISSUED FOR BIDDING                                                                                                                                                   |  |  | APPROVED                                                   |  |  | DRAWING No.<br>4662/50B/BD/01T018                           |  | ✓           |
| REV.                                                                       |  |  | DATE DESCRIPTION                                                                                                                                                                  |  |  | APPROVED                                                   |  |  |                                                             |  |             |





|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       |                                               |                                                             |                                                                                       |                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------------------|----------|-------------|---------------------------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------|
| <div>CLIENT</div> <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</div> | <div>CONSULTANT</div> <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.<br/>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> | 04   |           |                    |          | DRAWN       |  | PROJECT<br><br>MEDICAL TOWER AT JPMC KARACHI. | LOWER GROUND & GROUND FLOOR<br>PUBLIC ADDRESS SYSTEM LAYOUT |                                                                                       | SCALE<br><br>3/64"=1'-0" |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 03   |           |                    |          | SUBMITTED   |  |                                               |                                                             |                                                                                       |                          |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 02   |           |                    |          | RECOMMENDED |  |                                               |                                                             |                                                                                       |                          |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 01   | AUG. 2024 | ISSUED FOR BIDDING |          | CHD./VER.   |  |                                               |                                                             |                                                                                       |                          |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED    |  |                                               |                                                             |                                                                                       |                          |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       | DATE                                          | DRAWING No.                                                 | REV.                                                                                  |                          |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       | AUGUST, 2024                                  | 4662/50B/BD/01T019                                          |  |                          |

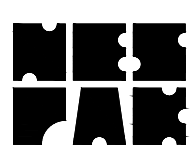




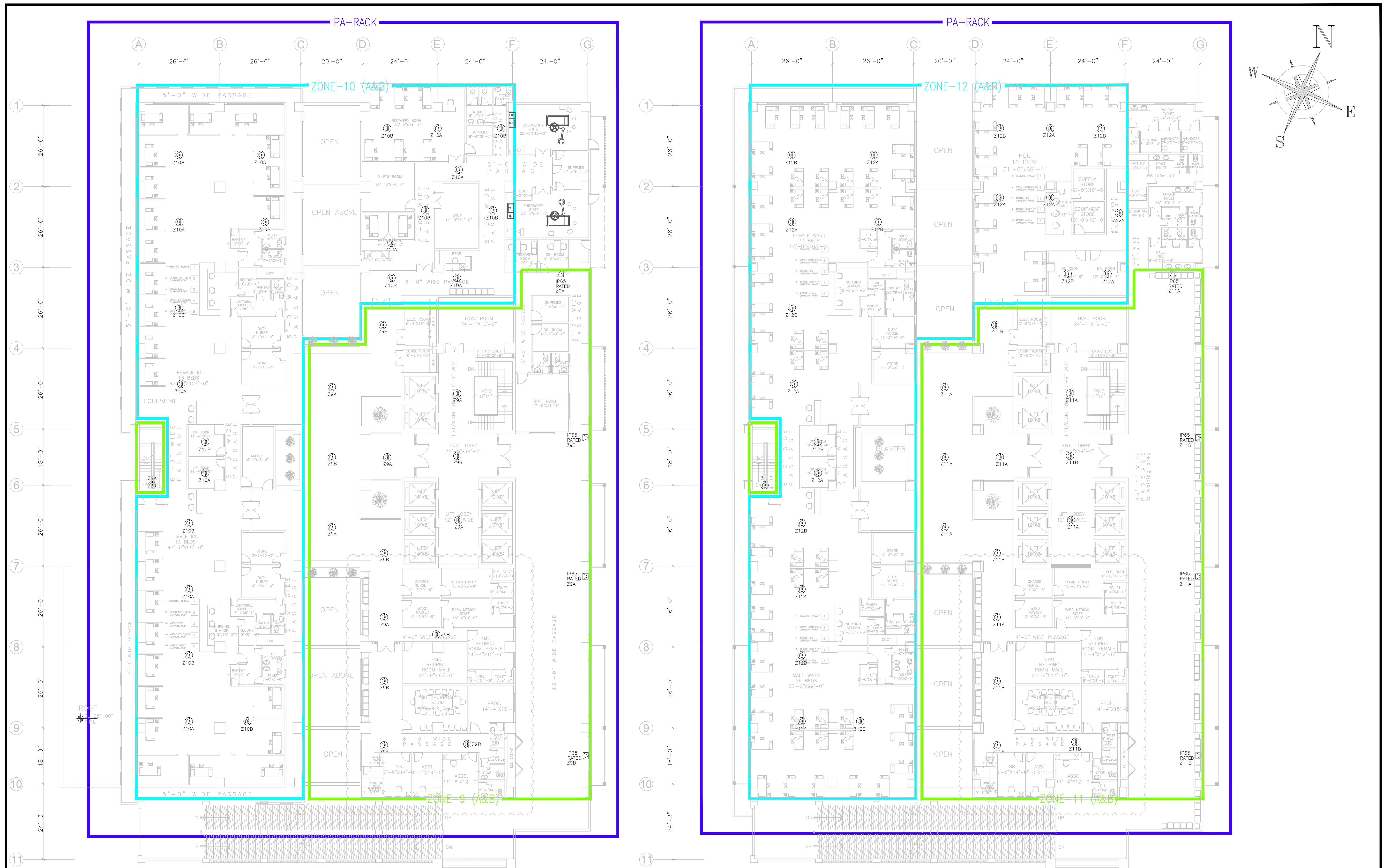
1st FLOOR PLAN  
SPECIAL CLINICS

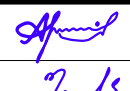
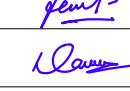
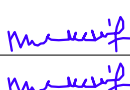
2nd FLOOR PLAN

NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR PUBLIC ADDRESS SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T006.

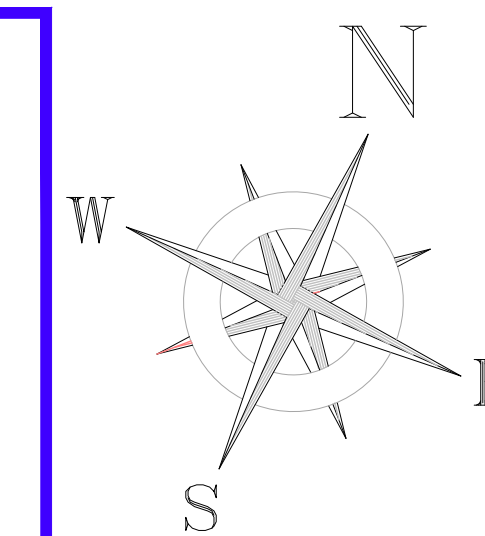
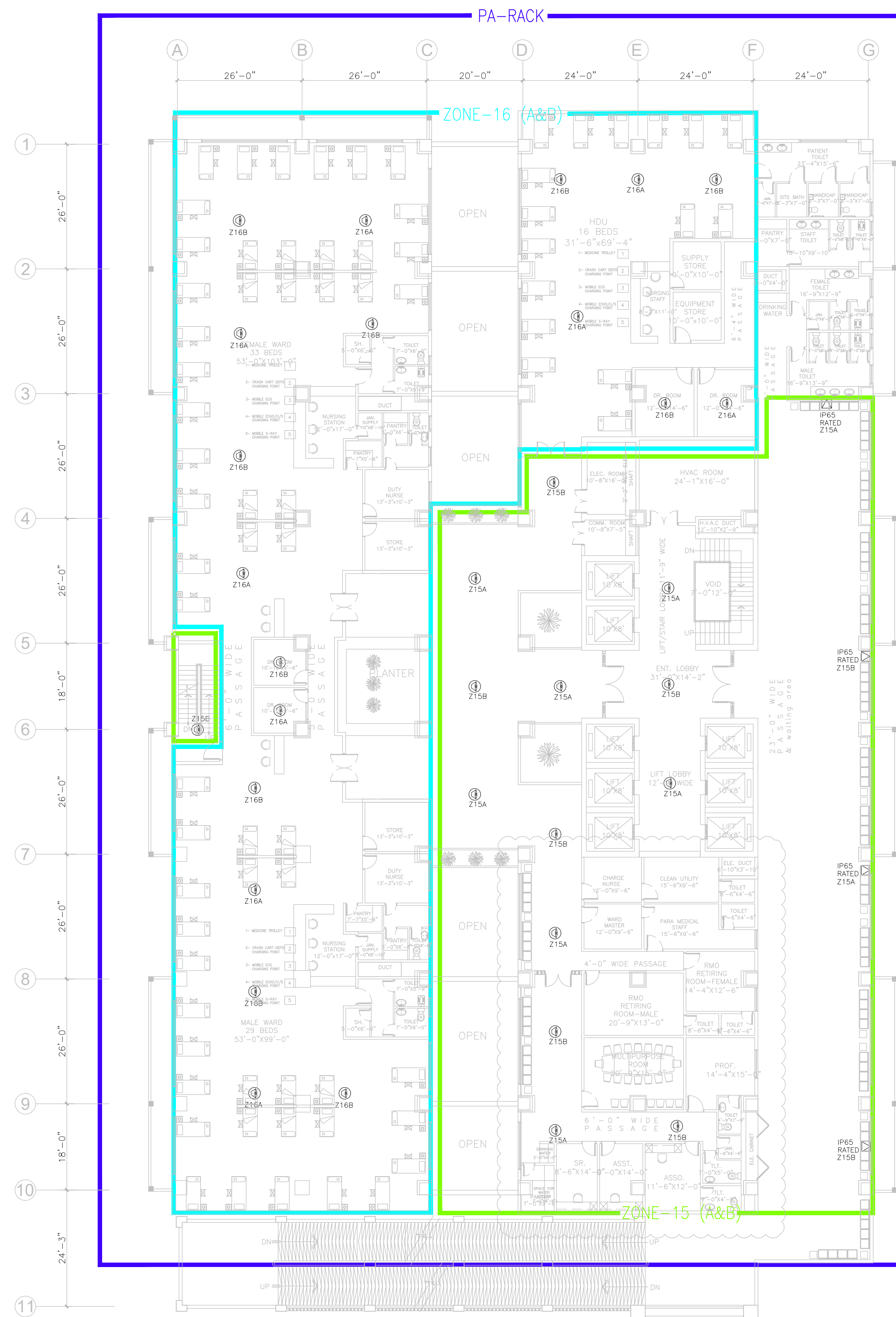
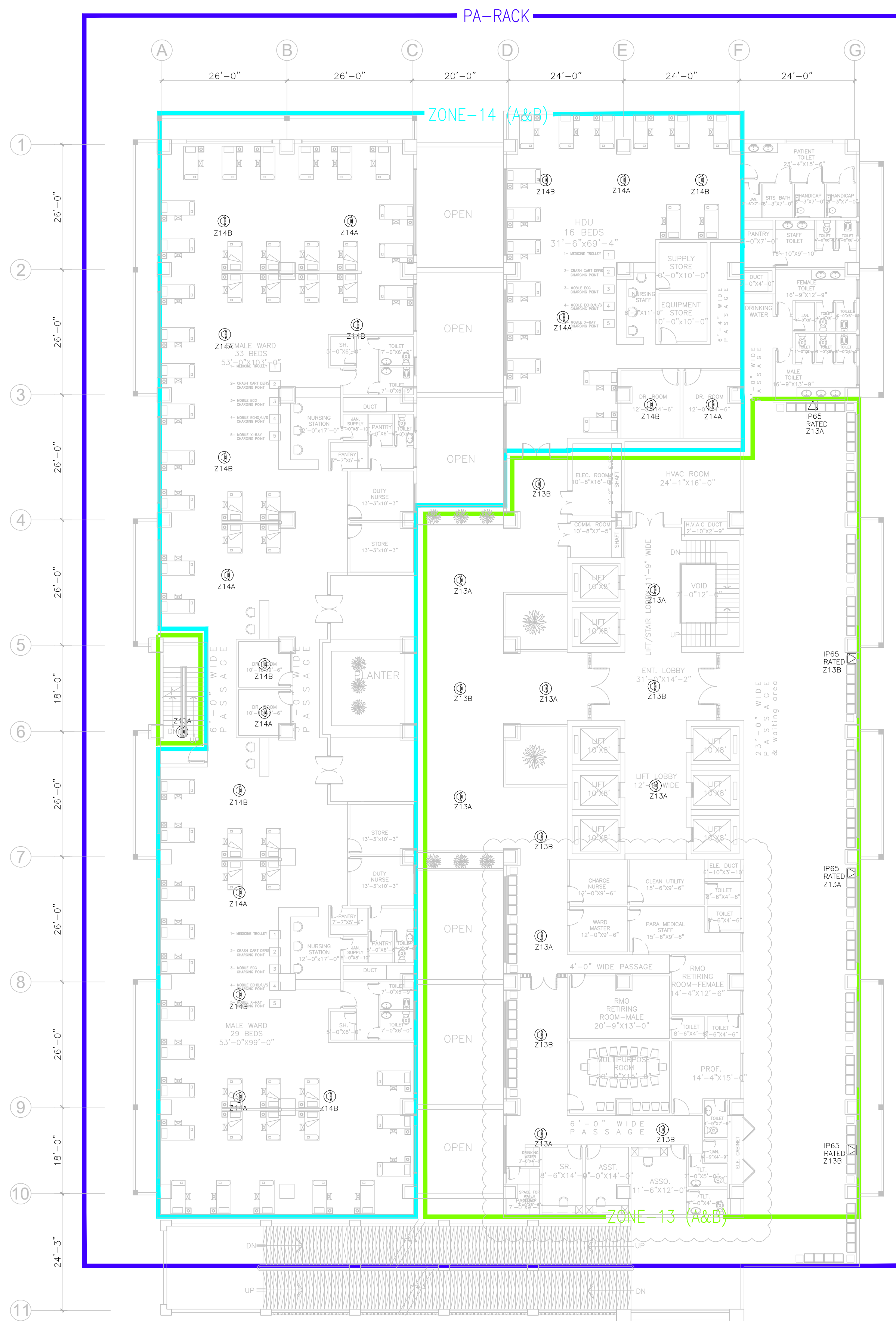
|                                                                                                                                                                |  |                                                                                                                                                                                                                                                                       |  |                    |  |                                |  |                              |  |             |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------|--|--------------------------------|--|------------------------------|--|-------------|--|
| CLIENT                                                                                                                                                         |  | CONSULTANT                                                                                                                                                                                                                                                            |  | DRAWN              |  | PROJECT                        |  | 1st & 2nd FLOOR              |  | SCALE       |  |
|  PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL CENTER<br>KARACHI |  |  NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.<br>ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |  | SUBMITTED          |  | MEDICAL TOWER AT JPMC KARACHI. |  | PUBLIC ADDRESS SYSTEM LAYOUT |  | 3/64"=1'-0" |  |
| 04                                                                                                                                                             |  | 03                                                                                                                                                                                                                                                                    |  | RECOMMENDED        |  | CHD/VER.                       |  | DATE                         |  | REV.        |  |
| 01                                                                                                                                                             |  | AUG. 2024                                                                                                                                                                                                                                                             |  | ISSUED FOR BIDDING |  | APPROVED                       |  | AUGUST, 2024                 |  | 0           |  |
| REV.                                                                                                                                                           |  | DATE                                                                                                                                                                                                                                                                  |  | DESCRIPTION        |  | APPROVED                       |  | DRAWING No.                  |  |             |  |
|                                                                                                                                                                |  |                                                                                                                                                                                                                                                                       |  |                    |  |                                |  | 4662/50B/BD/01T020           |  |             |  |





|                                                                                                                                                                          |  |                                                                                                                                                                                                                                                                                     |  |                                                                                                                                                                         |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 3rd FLOOR<br>ICU & ENDOSCOPY SUITE                                                                                                                                       |  | 4th FLOOR<br>MEDICAL UNIT - I,<br>GASTROENTEROLOGY                                                                                                                                                                                                                                  |  | NOTES:<br>1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.<br>2- FOR PUBLIC ADDRESS SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T006. |  |
| CLIENT<br> PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL CENTER<br>KARACHI |  | CONSULTANT<br> NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.<br>ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |  | PROJECT<br>MEDICAL TOWER AT JPMC KARACHI.                                                                                                                               |  |
| 3rd & 4th FLOOR<br>PUBLIC ADDRESS SYSTEM LAYOUT                                                                                                                          |  | DATE<br>AUGUST, 2024                                                                                                                                                                                                                                                                |  | DRAWING No.<br>4662/50B/BD/01T021                                                                                                                                       |  |
| SCALE<br>3/64"=1'-0"                                                                                                                                                     |  | REV.                                                                                                                                                                                           |  | REV.                                                                               |  |
| 04                                                                                                                                                                       |  | 03                                                                                                                                                                                                                                                                                  |  | DRAWN                                                                              |  |
| 02                                                                                                                                                                       |  | 01                                                                                                                                                                                                                                                                                  |  | SUBMITTED                                                                          |  |
| AUG. 2024                                                                                                                                                                |  | ISSUED FOR BIDDING                                                                                                                                                                                                                                                                  |  | RECOMMENDED                                                                        |  |
| REV. DATE DESCRIPTION                                                                                                                                                    |  | APPROVED                                                                                                                                                                                                                                                                            |  | CHD.VER.                                                                           |  |
|                                                                                                                                                                          |  |                                                                                                                                                                                                                                                                                     |  | APPROVED                                                                           |  |





NOTES:

NOTES:

1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.

2- FOR PUBLIC ADDRESS SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T006.

CLIENT



**PATIENTS' AID FOUNDATION  
JINNAH POST GRADUATE MEDICAL CENTER  
KARACHI**

CONSULTANT



ARCHITECTURE & PLANNING DIVISION KARACHI.  
4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34

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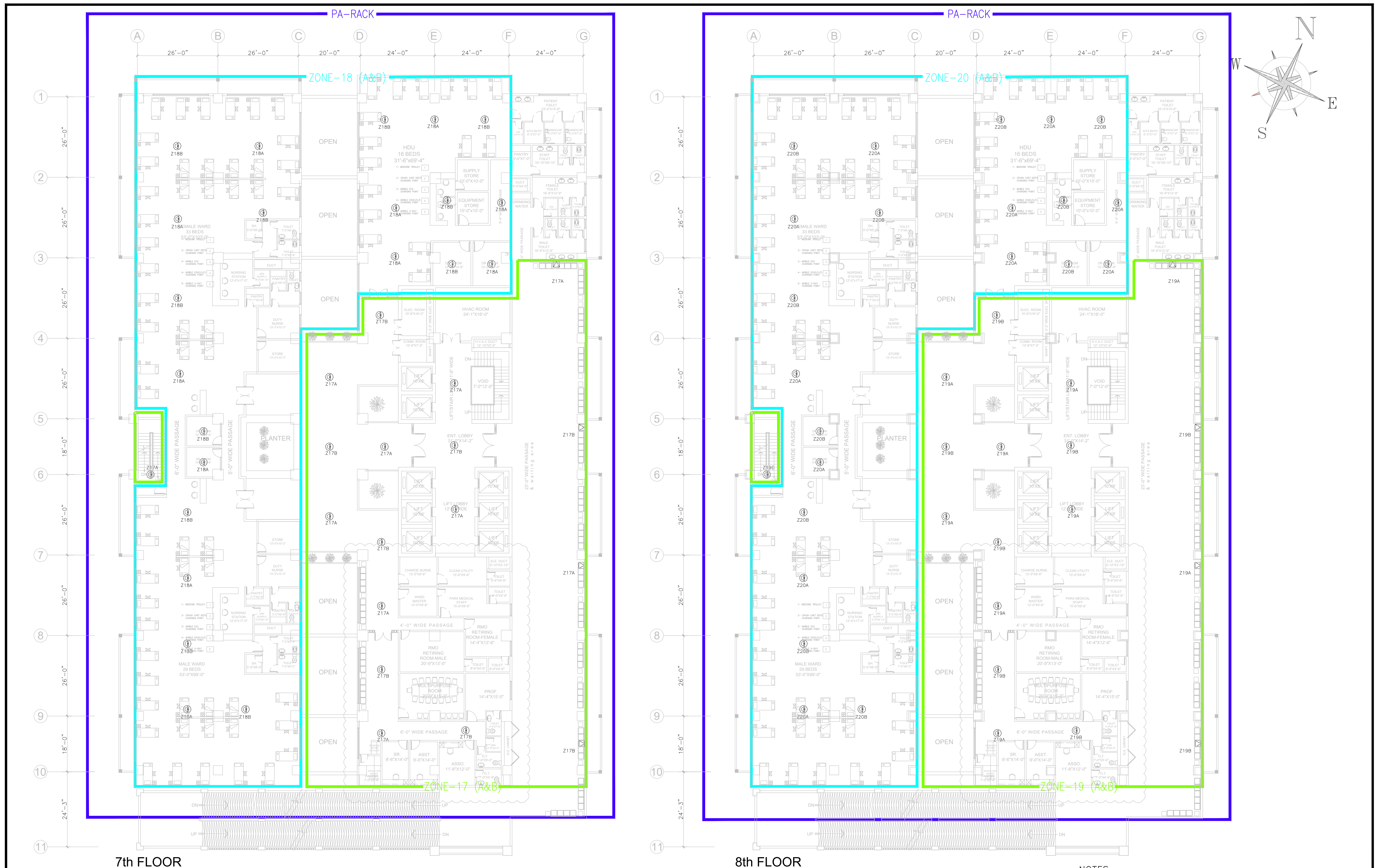
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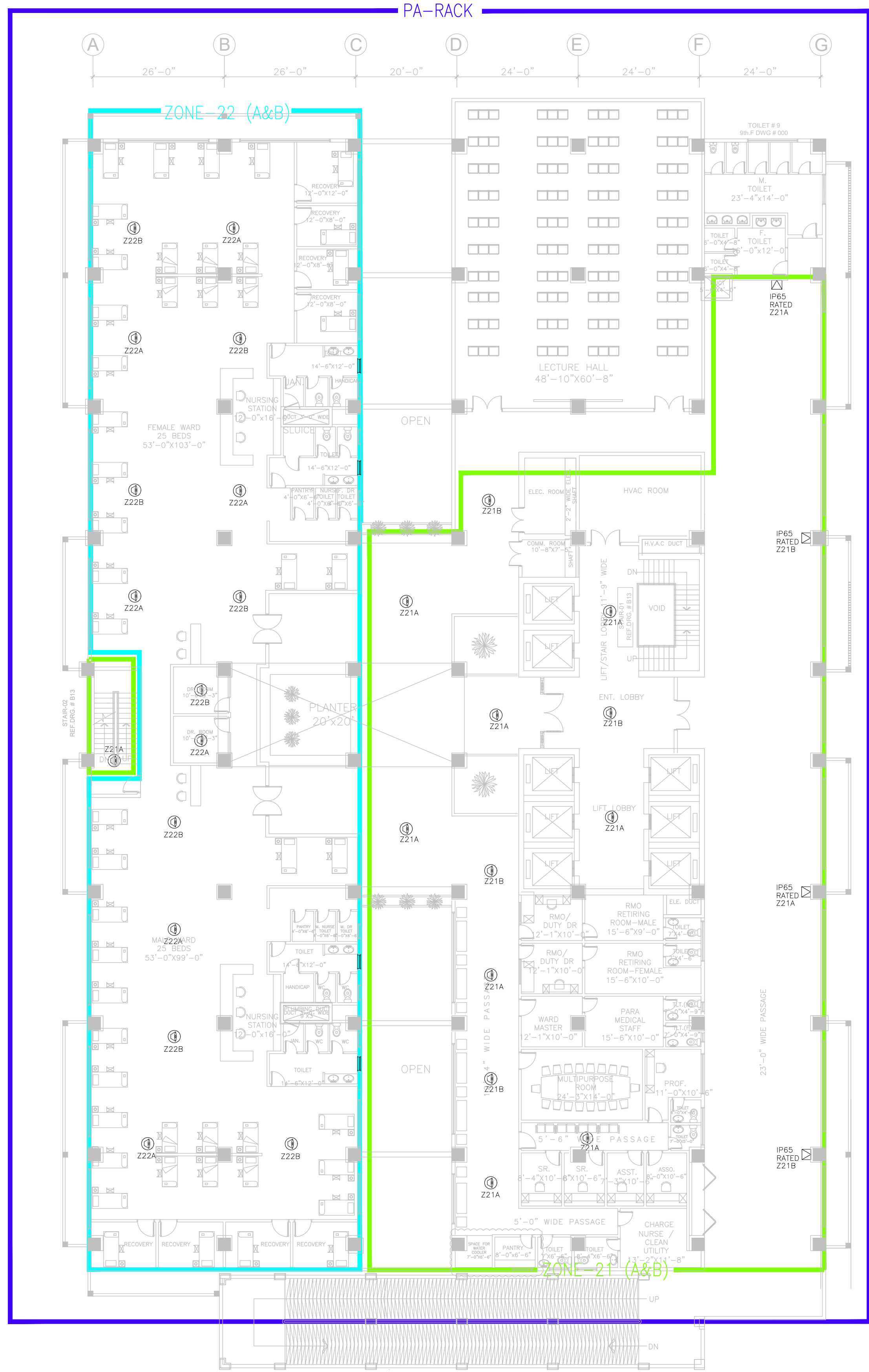




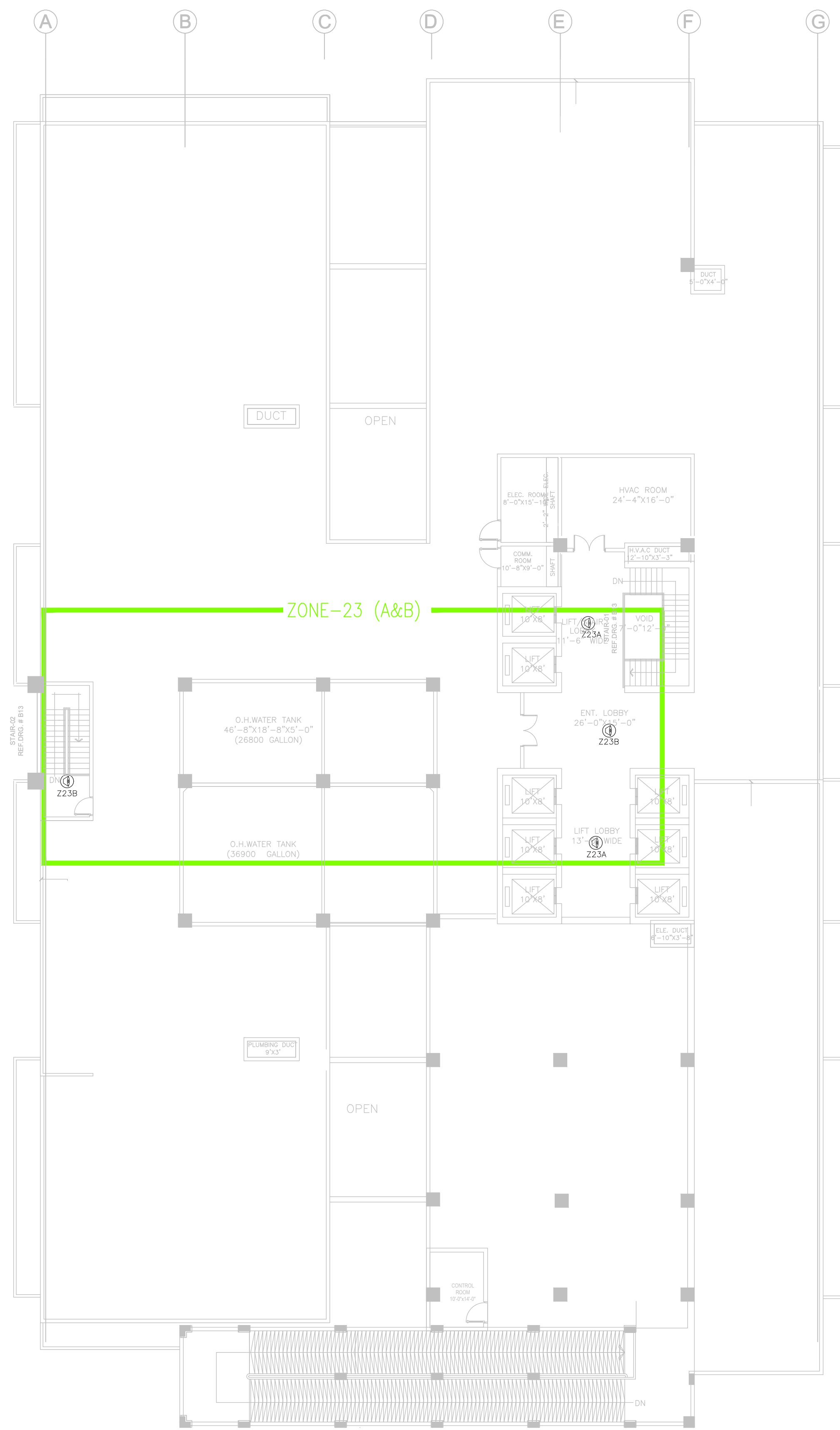
NOTES:  
1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.  
2- FOR PUBLIC ADDRESS SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T006.

|                                                                            |  |                                                                                                                                                                                   |  |             |  |                                |  |                              |  |             |  |
|----------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------|--|--------------------------------|--|------------------------------|--|-------------|--|
| CLIENT                                                                     |  | CONSULTANT                                                                                                                                                                        |  | DRAWN       |  | PROJECT                        |  | 7th & 8th FLOOR              |  | SCALE       |  |
|                                                                            |  |                                                                                                                                                                                   |  | SUBMITTED   |  | MEDICAL TOWER AT JPMC KARACHI. |  | PUBLIC ADDRESS SYSTEM LAYOUT |  | 3/64"=1'-0" |  |
| PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL CENTER<br>KARACHI |  | NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.<br>ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |  | RECOMMENDED |  | DATE                           |  | DRAWING No.                  |  | REV.        |  |
| 04                                                                         |  | 03                                                                                                                                                                                |  | 02          |  | AUG, 2024                      |  | AUGUST, 2024                 |  | 0           |  |
| REV.                                                                       |  | DATE                                                                                                                                                                              |  | DESCRIPTION |  | APPROVED                       |  | APPROVED                     |  | APPROVED    |  |

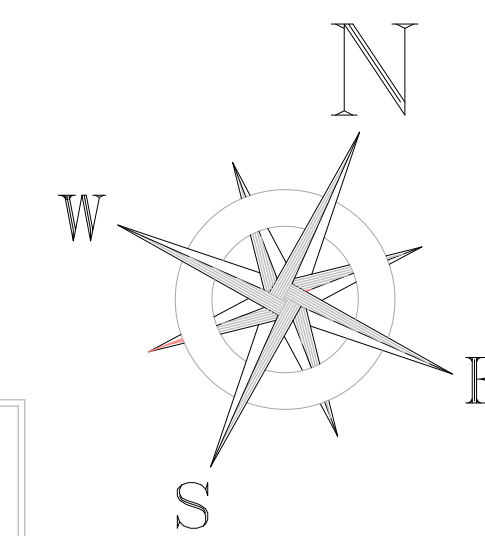




9th FLOOR PLAN  
DERMATOLOGY



ROOF PLAN



- NOTES:
- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
  - FOR PUBLIC ADDRESS SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T006.

CLIENT  
**PATIENTS' AID FOUNDATION**  
**JINNAH POST GRADUATE MEDICAL CENTER**  
**KARACHI**

CONSULTANT  
**NATIONAL ENGINEERING SERVICES**  
**PAKISTAN (PVT.) LTD.**  
ARCHITECTURE & PLANNING DIVISION KARACHI.  
4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34

|      |           |                    |          |          |  |
|------|-----------|--------------------|----------|----------|--|
| 04   |           |                    |          |          |  |
| 03   |           |                    |          |          |  |
| 02   |           |                    |          |          |  |
| 01   | AUG. 2024 | ISSUED FOR BIDDING |          |          |  |
| REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED |  |

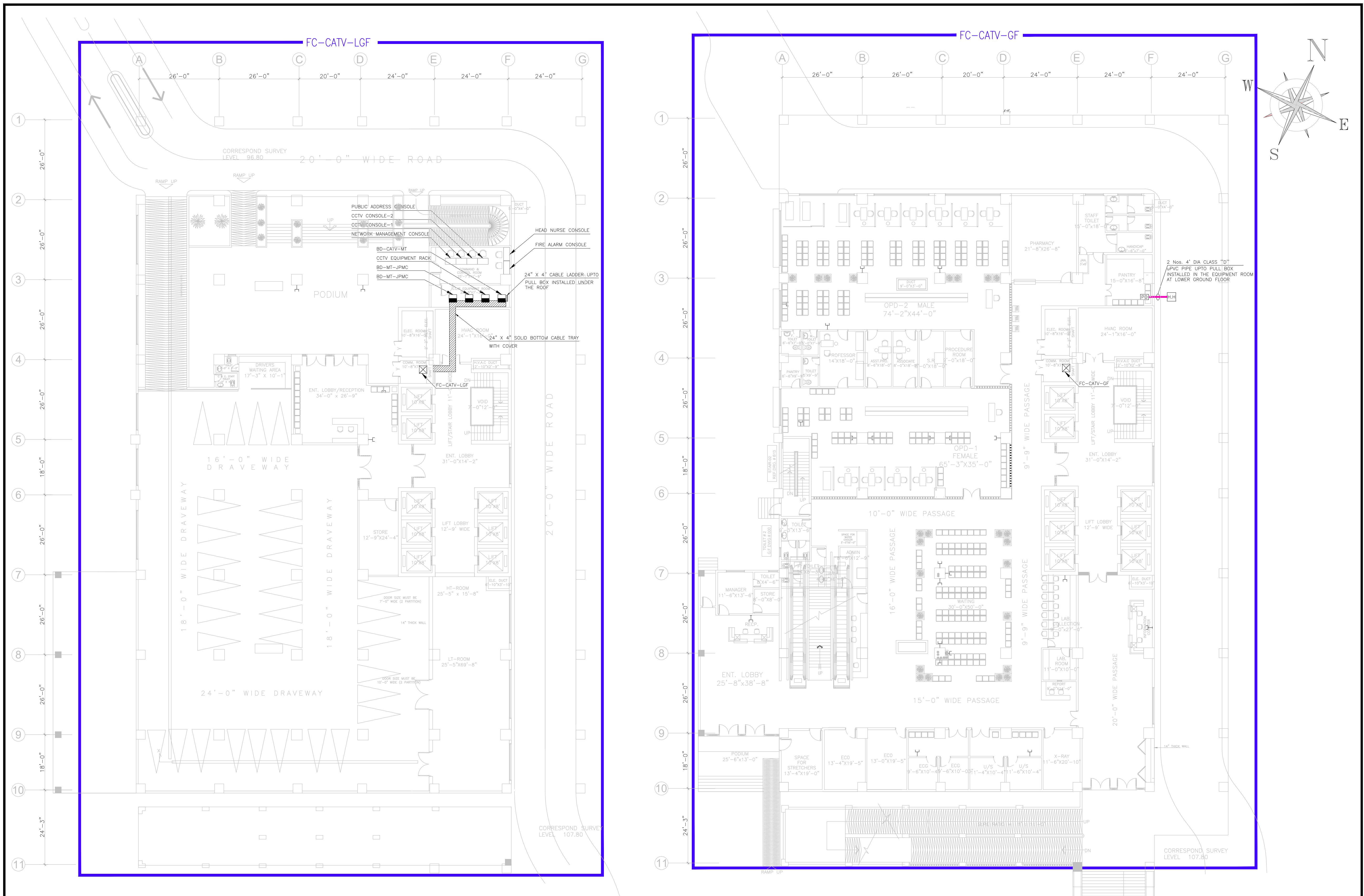
|             |                    |
|-------------|--------------------|
| DRAWN       | <i>[Signature]</i> |
| SUBMITTED   | <i>[Signature]</i> |
| RECOMMENDED | <i>[Signature]</i> |
| CHD./VER.   | <i>[Signature]</i> |
| APPROVED    | <i>[Signature]</i> |

PROJECT  
**MEDICAL TOWER AT JPMC KARACHI.**

|                                                  |                                   |
|--------------------------------------------------|-----------------------------------|
| 9th FLOOR & ROOF<br>PUBLIC ADDRESS SYSTEM LAYOUT |                                   |
| DATE<br>AUGUST, 2024                             | DRAWING No.<br>4662/50B/BD/01T024 |

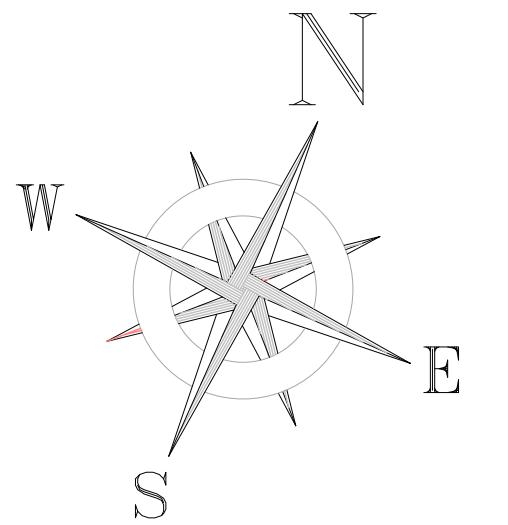
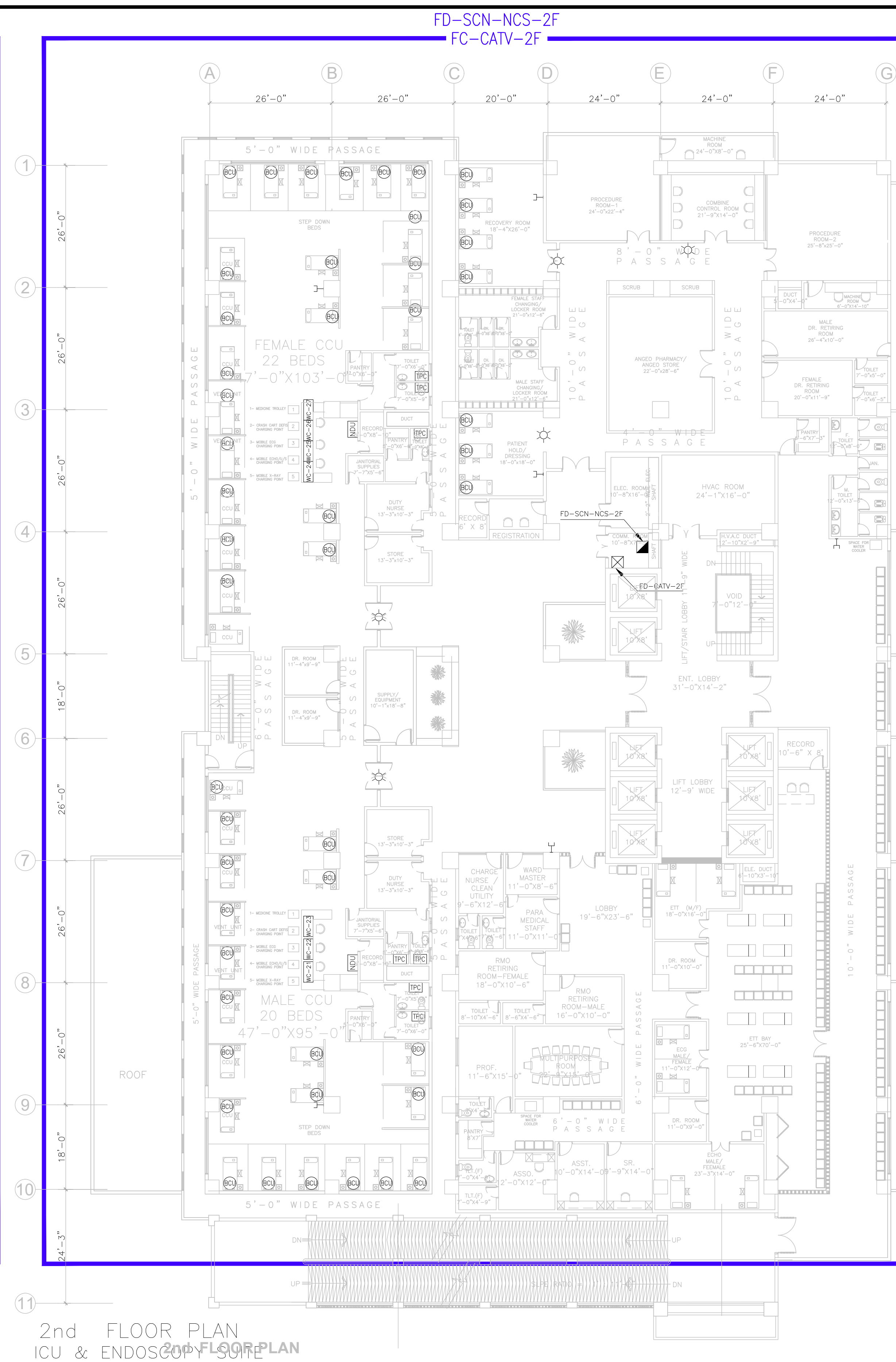
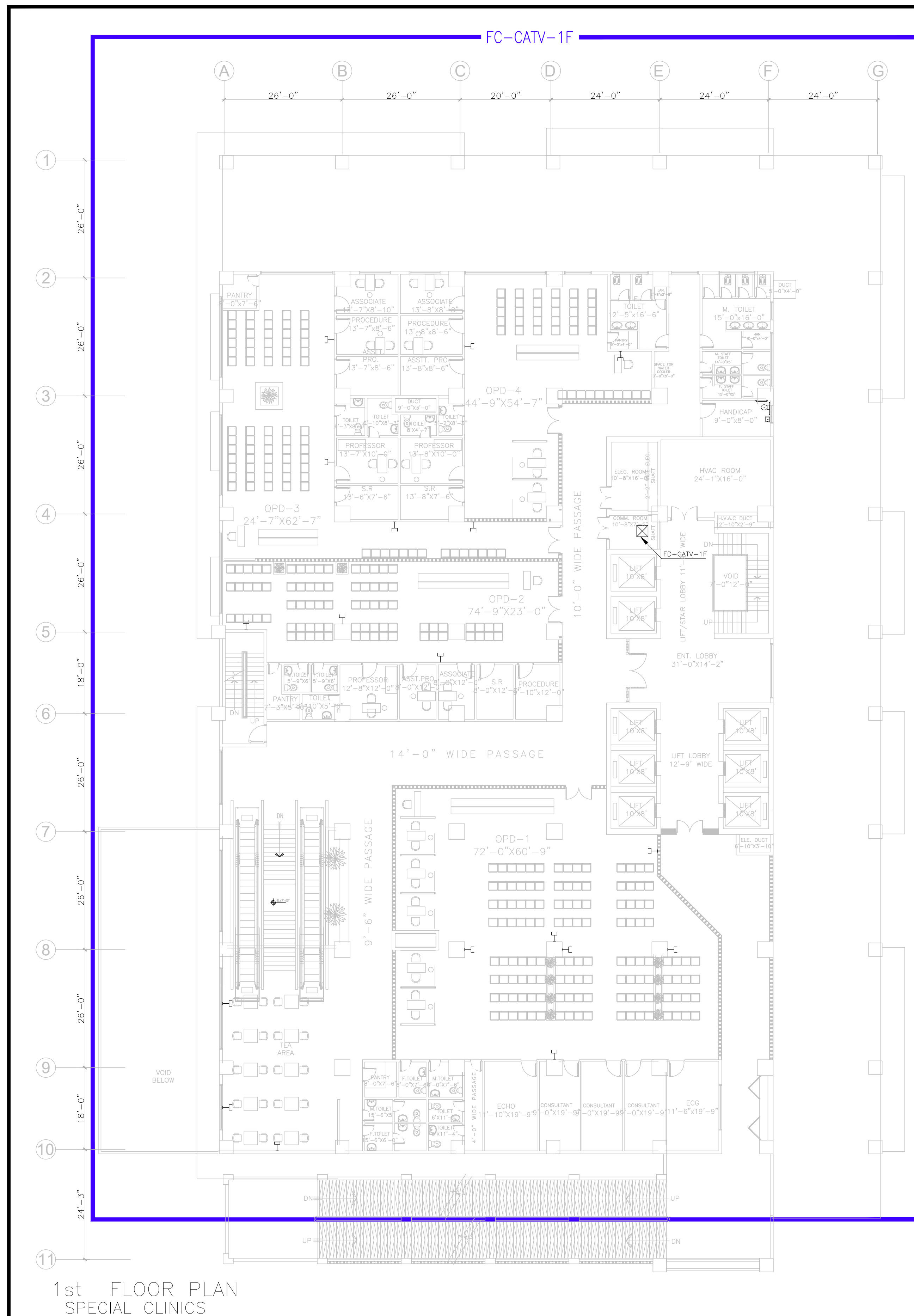
|                      |
|----------------------|
| SCALE<br>3/64"=1'-0" |
| REV.<br>0            |





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|----------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------|--|--------------------------------|--|-------------------------------------------------------------------|--|-------------|
| CLIENT                                                                     |  | CONSULTANT                                                                                                                                                                        |  | DRAWN              |  | PROJECT                        |  | LOWER GROUND & GROUND FLOOR<br>IP NURSE CALL & CATV SYSTEM LAYOUT |  | SCALE       |
|                                                                            |  |                                                                                                                                                                                   |  | 04                 |  | MEDICAL TOWER AT JPMC KARACHI. |  | DATE                                                              |  | 3/64"=1'-0" |
| PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL CENTER<br>KARACHI |  | NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD.<br>ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |  | 03                 |  | SUBMITTED                      |  | DRAWING No.                                                       |  | REV.        |
| 02                                                                         |  | 01                                                                                                                                                                                |  | RECOMMENDED        |  | CHD/VER.                       |  | AUGUST, 2024                                                      |  | 0           |
| 01                                                                         |  | AUG. 2024                                                                                                                                                                         |  | ISSUED FOR BIDDING |  | APPROVED                       |  | 4662/50B/BD/01T025                                                |  |             |
| REV.                                                                       |  | DATE                                                                                                                                                                              |  | DESCRIPTION        |  | APPROVED                       |  |                                                                   |  |             |

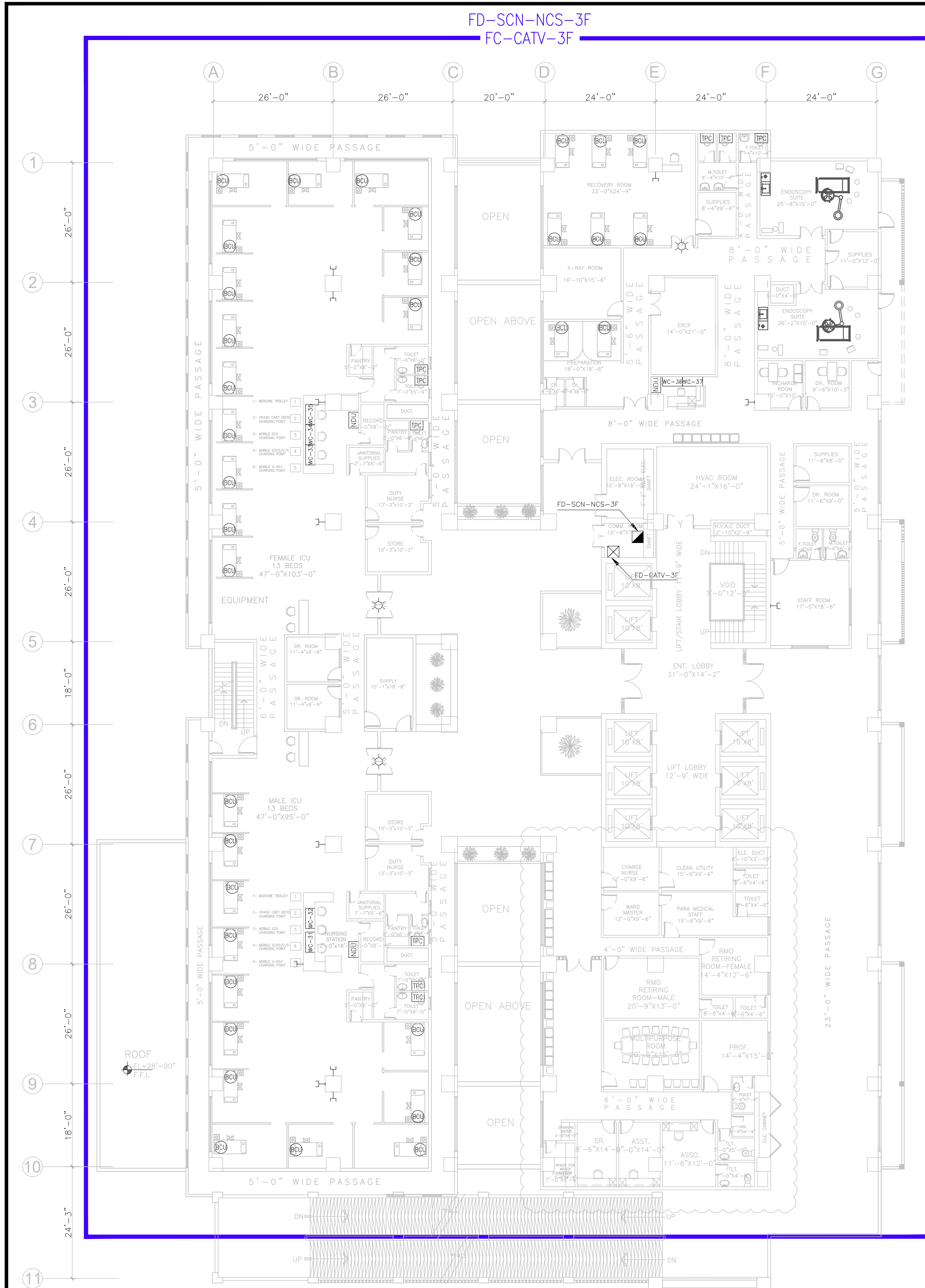




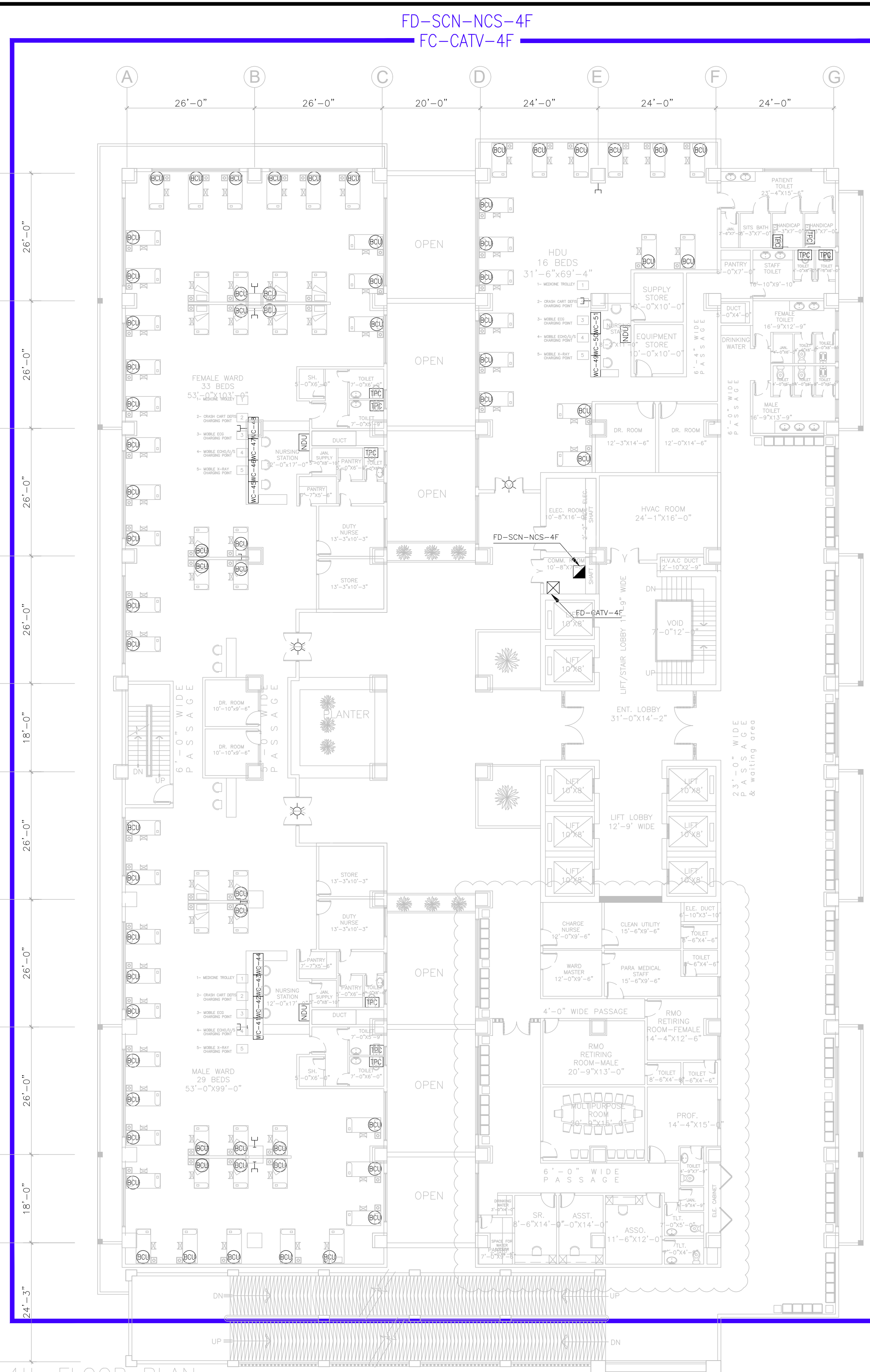
# NOTES:

- 1- FOR LEGEND & GENERAL NOTES,  
REFER DRAWING NO.  
4662/50B/BD/00T001.
- 2- FOR IP NURSE CALL SYSTEM  
SCHEMATIC DIAGRAM, REFER  
DRAWING NO. 4662/50B/BD/00T003
- 3- FOR CATV SYSTEM SCHEMATIC  
DIAGRAM, REFER DRAWING NO.  
4662/50B/BD/00T007.

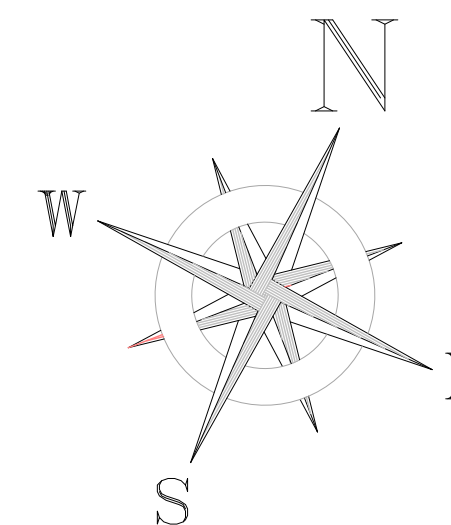




3rd FLOOR PLAN  
ICU & ENDOSCOPY SUITE



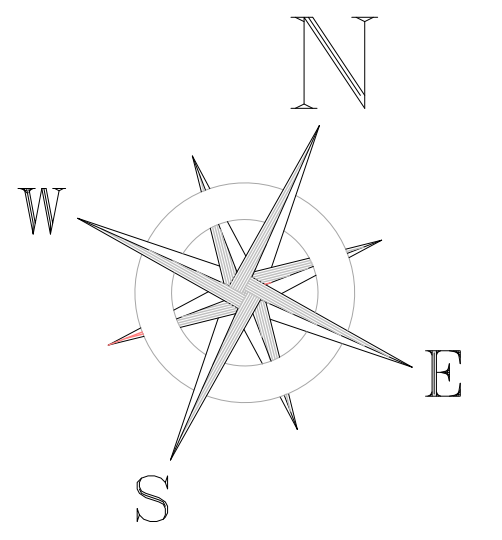
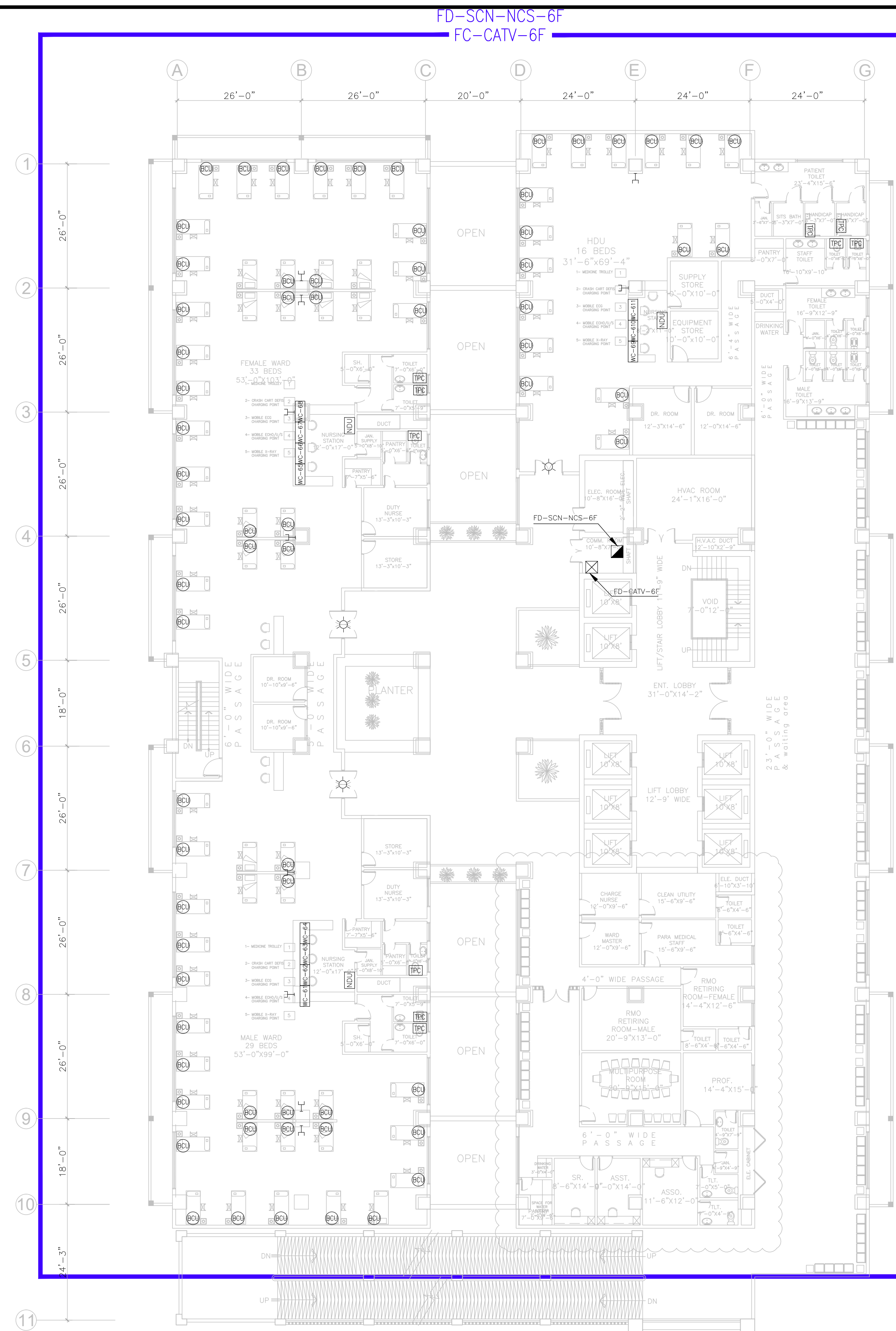
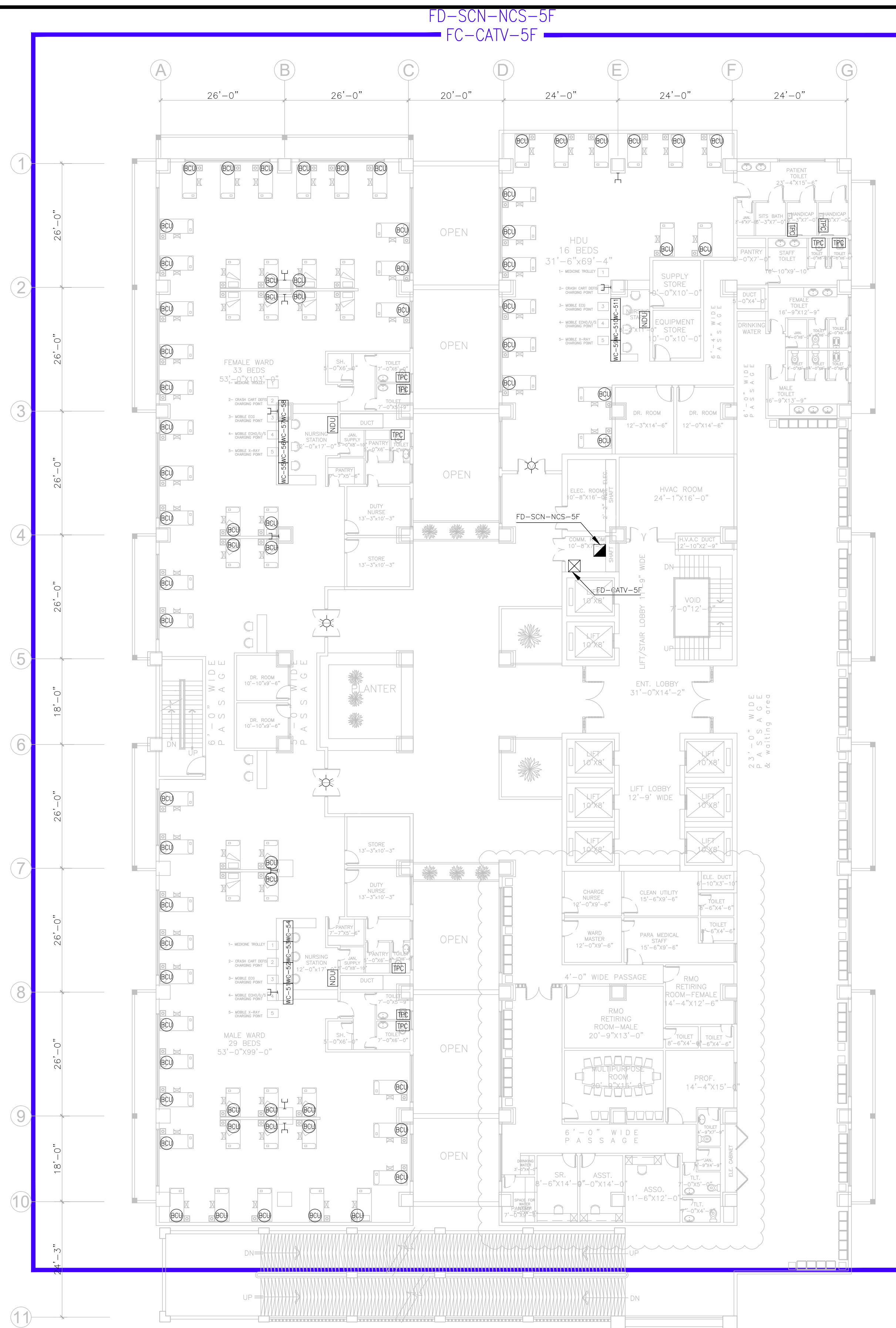
4th FLOOR PLAN  
MEDICAL UNIT - I,  
GASTROENTEROLOGY



- NOTES:**
- 1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
  - 2- FOR IP NURSE CALL SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T003.
  - 3- FOR CATV SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T007.

|                                                                                                                                                                                                         |  |                                                                                                                                                                                                                                                                                                                                |  |  |  |                                                                                                                                    |                                                                                                    |                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                              |                                                                                                                                                          |                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <div>CLIENT</div> <div><div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</div></div> |  | <div>CONSULTANT</div> <div><div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div></div> <div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> |  |  |  | <div>04</div> <div>03</div> <div>02</div> <div>01</div> <div>REV.</div> <div>DATE</div> <div>DESCRIPTION</div> <div>APPROVED</div> | <div></div> <div></div> <div></div> <div>AUG. 2024</div> <div>ISSUED FOR BIDDING</div> <div></div> | <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> | <div>DRAWN</div> <div>SUBMITTED</div> <div>RECOMMENDED</div> <div>CHD./VER.</div> <div>APPROVED</div> <div></div> <div></div> <div></div> <div></div> <div></div> <div></div> | <div>PROJECT</div> <div>MEDICAL TOWER AT JPMC KARACHI.</div> | <div>3rd &amp; 4th FLOOR<br/>IP NURSE CALL &amp; CATV SYSTEM LAYOUT</div> <div>DATE<br/>AUGUST, 2024</div> <div>DRAWING No.<br/>4662/50B/BD/01T027</div> | <div>SCALE<br/>3/64"=1'-0"</div> <div>REV.<br/>0</div> |
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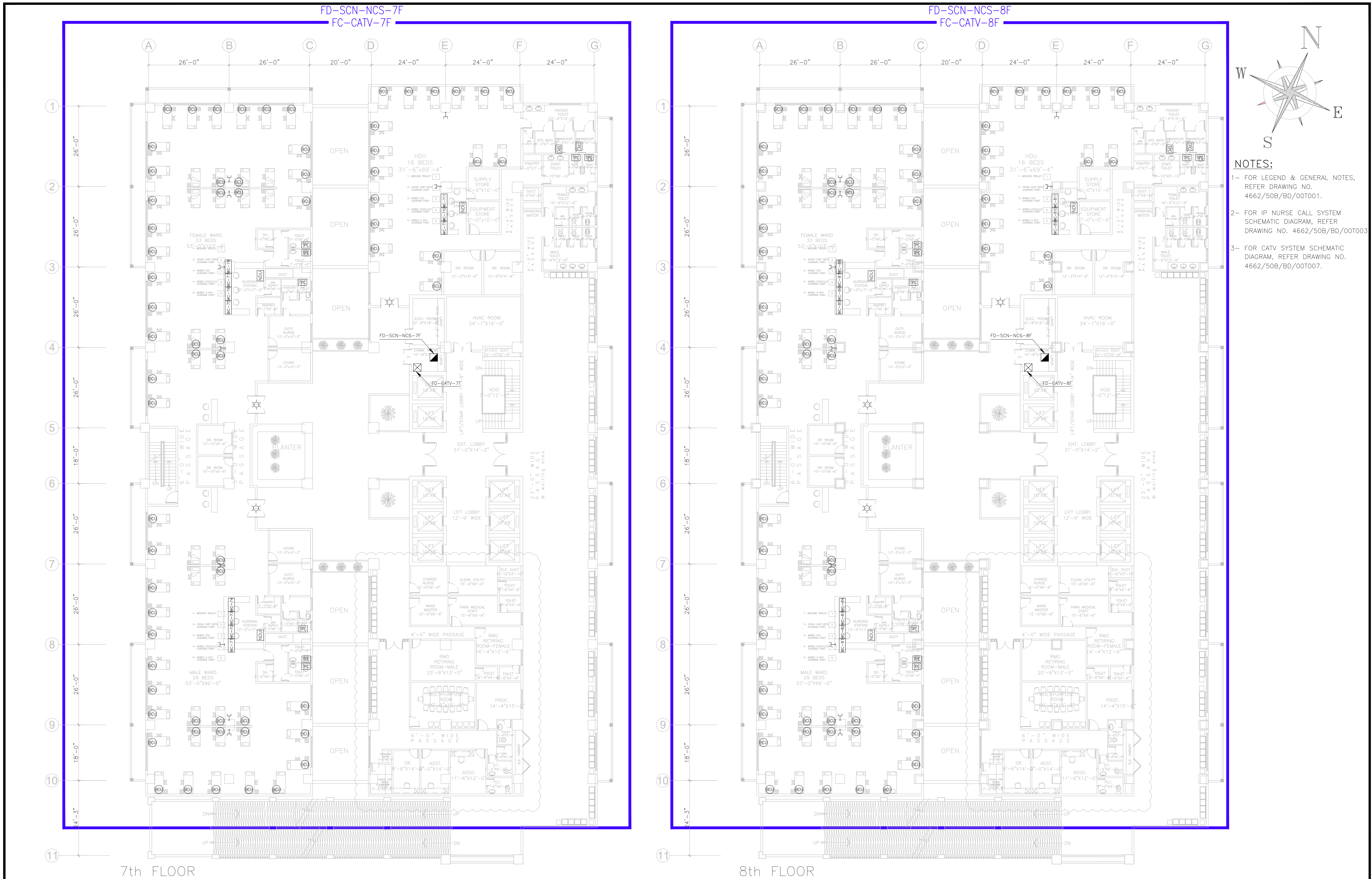


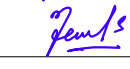
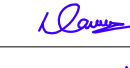
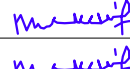


NOTES:

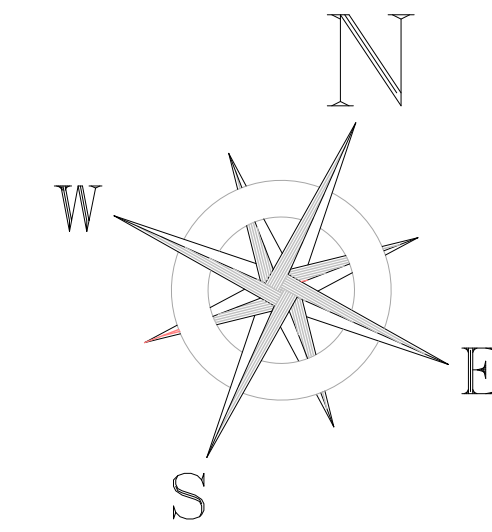
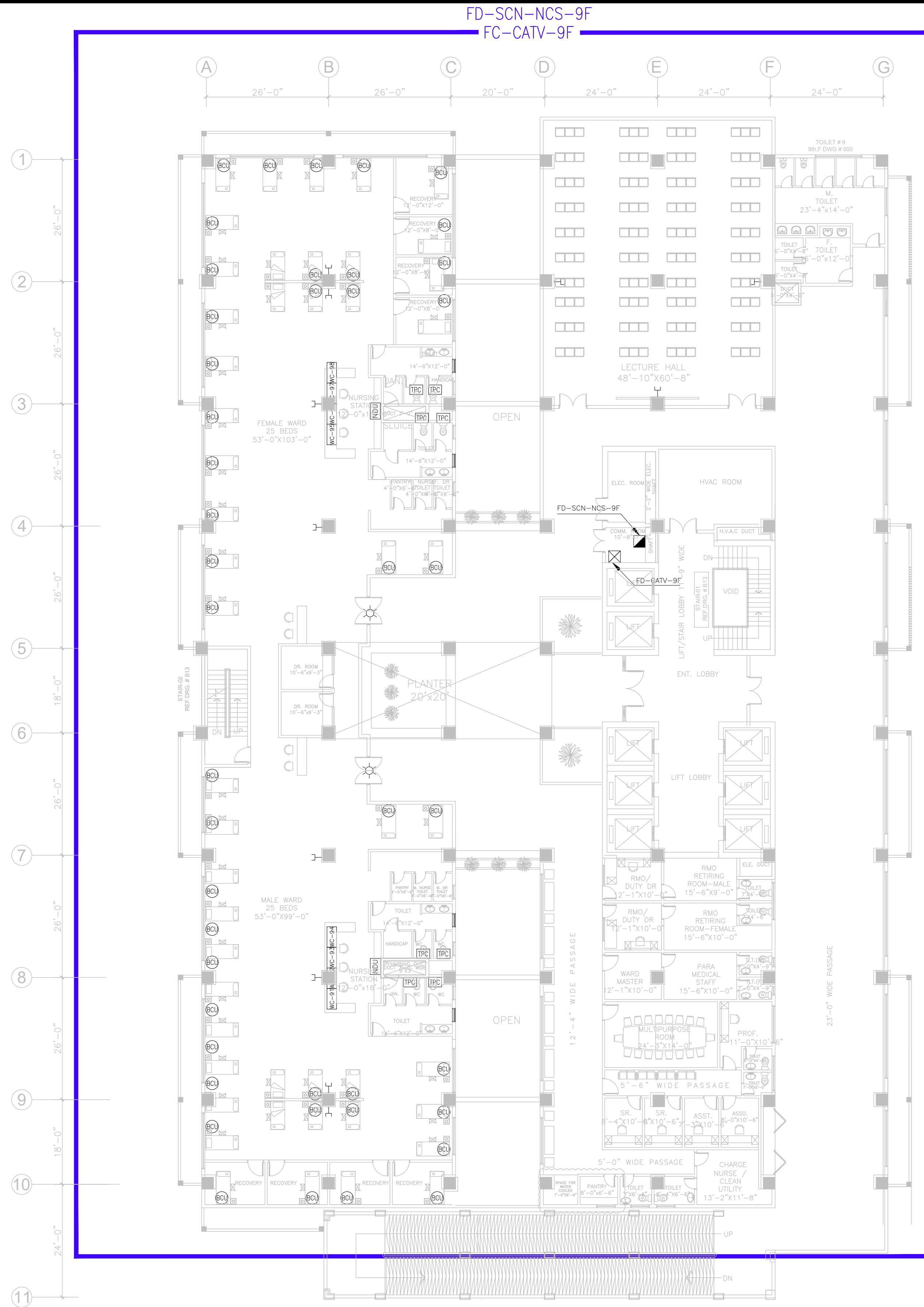
- 1- FOR LEGEND & GENERAL NOTES,  
REFER DRAWING NO.  
4662/50B/BD/00T001.
- 2- FOR IP NURSE CALL SYSTEM  
SCHEMATIC DIAGRAM, REFER  
DRAWING NO. 4662/50B/BD/00T003
- 3- FOR CATV SYSTEM SCHEMATIC  
DIAGRAM, REFER DRAWING NO.  
4662/50B/BD/00T007.





|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       |         |                                                       |                      |                                   |             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------|--------------------|----------|-------------|---------------------------------------------------------------------------------------|---------|-------------------------------------------------------|----------------------|-----------------------------------|-------------|
| <div>CLIENT</div> <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</div> | <div>CONSULTANT</div> <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.<br/>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> | 04   |           |                    |          | DRAWN       |  | PROJECT | 7th & 8th FLOOR<br>IP NURSE CALL & CATV SYSTEM LAYOUT |                      | SCALE                             |             |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 03   |           |                    |          | SUBMITTED   |  |         | MEDICAL TOWER AT JPMC KARACHI.                        | DATE<br>AUGUST, 2024 | DRAWING No.<br>4662/50B/BD/01T029 | 3/64"=1'-0" |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 02   |           |                    |          | RECOMMENDED |  |         |                                                       |                      |                                   |             |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | 01   | AUG. 2024 | ISSUED FOR BIDDING |          | CHD./VER.   |  |         |                                                       |                      |                                   |             |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          | REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED    |  |         |                                                       |                      |                                   |             |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       |         |                                                       |                      |                                   |             |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |      |           |                    |          |             |                                                                                       |         |                                                       |                      | 0                                 |             |





- NOTES:
- 1- FOR LEGEND & GENERAL NOTES, REFER DRAWING NO. 4662/50B/BD/00T001.
  - 2- FOR IP NURSE CALL SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T003.
  - 3- FOR CATV SYSTEM SCHEMATIC DIAGRAM, REFER DRAWING NO. 4662/50B/BD/00T007.

9th FLOOR PLAN  
DERMATOLOGY  
LECTURE HALL

|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |  |  |  |      |           |                    |          |             |                                                                                       |         |                                |  |                                    |                    |             |      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|------|-----------|--------------------|----------|-------------|---------------------------------------------------------------------------------------|---------|--------------------------------|--|------------------------------------|--------------------|-------------|------|
| <div>CLIENT</div> <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL CENTER<br/>KARACHI</div> | <div>CONSULTANT</div> <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.<br/>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> |  |  |  | 04   |           |                    |          | DRAWN       |  | PROJECT | MEDICAL TOWER AT JPMC KARACHI. |  | 9th FLOOR                          |                    | SCALE       |      |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |  |  |  | 03   |           |                    |          | SUBMITTED   |  |         |                                |  | IP NURSE CALL & CATV SYSTEM LAYOUT |                    | 3/64"=1'-0" |      |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |  |  |  | 02   |           |                    |          | RECOMMENDED |  |         |                                |  | DATE                               |                    | DRAWING No. | REV. |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |  |  |  | 01   | AUG. 2024 | ISSUED FOR BIDDING |          | CHD./VER.   |  |         |                                |  | AUGUST, 2024                       | 4662/50B/BD/01T030 | 0           |      |
|                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                          |  |  |  | REV. | DATE      | DESCRIPTION        | APPROVED | APPROVED    |  |         |                                |  |                                    |                    |             |      |



**PATIENTS' AID FOUNDATION  
JINNAH POST GRADUATE MEDICAL  
CENTER (JPMC) KARACHI  
RABIA RASHID SOORTY COMPLEX**



# COMMUNICATION DRAWINGS

GENERAL NOTES:

- 1- CO-ORDINATE AT SITE WITH OTHER SERVICES FOR EXACT LOCATION AND POSITION OF CONDUITS AND COMMUNICATION EQUIPMENT/DEVICES.
- 2- ALL COMMUNICATION DRAWINGS SHALL BE READ IN CONJUNCTION WITH SPECIFICATIONS, BOQ, ARCHITECTURE, ELECTRICAL, STRUCTURE, HVAC, PLUMBING DRAWINGS AND ALL OTHER RELEVANT DETAILS.
- 3- DIMENSIONS/MEASUREMENTS GIVEN IN LAYOUTS ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALCULATE ACTUAL DIMENSIONS/MEASUREMENTS ACCORDING TO STRUCTURE AND ARCHITECTURE DRAWINGS.
- 4- THE ROUTES OF EXTERNAL CABLE AND PIPES SHALL BE FOLLOWED AS SHOWN ON THE DRAWING, ANY CHANGE IN ROUTES REQUIRED DUE TO SITE CONDITIONS SHALL BE MADE IN CO-ORDINATION WITH OTHER SERVICES, AFTER OBTAINING ENGINEER'S APPROVAL
- 5- WHERE CABLES ENTER BUILDINGS, THESE SHALL BE LAID IN PROTECTIVE PIPES. HAND HOLE SHALL BE PROVIDED OUTSIDE THE BUILDING.
- 6- ALL UNDERGROUND PIPES SHALL BE LAID MINIMUM 1.5 FEET BELOW THE TOP OF PAVEMENT THE DEPTH MAY BE INCREASED / DECREASED DUE TO THE SITE CONDITIONS AFTER OBTAINING ENGINEERS APPROVAL
- 7- ALL UNDERGROUND PIPES, MAN HOLES & HANDHOLES SHALL BE PROPERLY SEALED WATER TIGHT AT ENDS/JOINTS AFTER INSTALLATION.
- 8- SPARE PIPES SHALL HAVE THEIR ENDS PROPERLY PLUGGED WITH CAP AND MADE WATER TIGHT. BOTH ENDS OF PIPES SHALL BE MARKED BY PIPE END MARKERS FOR IDENTIFICATION.
- 9- CABLE MARKERS SHALL BE PROVIDED AT 30 METER INTERVALS ALONG STRAIGHT RUNS OF CABLE DUCT / ROUTE AND AT EACH BEND.
- 10- ALL ROUTING OF PIPES, PIPE DUCTS & CONNECTION DETAILS SHALL BE CARRIED OUT WITH THE APPROVAL OF THE ENGINEER.
- 11- MANUFACTURER'S RECOMMENDATION SHALL BE FOLLOWED FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF ALL COMMUNICATION SYSTEMS.
- 12- THE CONTRACTOR SHALL TAKE THE RESPONSIBILITIES OF GENERAL INTEGRATOR FOR ALL THE SUB-SYSTEMS AND EQUIPMENT WITHIN THE SCOPE OF WORK INCLUDING INTERFACES WITH OTHER SYSTEMS.
- 13- ALL COMMUNICATION SYSTEMS SHALL BE FED FROM UNINTERRUPTED POWER SUPPLY (UPS).
- 14- CONDUIT SHALL BE SIZED ACCORDING TO CLAUSE 4.4.2.4 OF EIA/TIA 569 STANDARD AS GIVEN BELOW.

| CONDUIT<br>TRADE<br>SIZE |         | CONDUIT SIZING<br>MAX.NUMBER OF CABLES BASED UPON ALLOWABLE FILL |       |       |       |       |       |       |       |       |       |
|--------------------------|---------|------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                          |         | CABLE OUTSIDE DIAMETER,mm (in)                                   |       |       |       |       |       |       |       |       |       |
|                          |         | 3.3                                                              | 4.6   | 5.6   | 6.1   | 7.4   | 7.9   | 9.4   | 13.5  | 15.8  | 17.8  |
| mm.                      | inch    | (.13)                                                            | (.18) | (.22) | (.24) | (.29) | (.31) | (.37) | (.53) | (.62) | (.70) |
| 21                       | (3/4)   | 6                                                                | 5     | 4     | 3     | 2     | 2     | 1     | 0     | 0     | 0     |
| 27                       | (1)     | 8                                                                | 8     | 7     | 6     | 3     | 3     | 2     | 1     | 0     | 0     |
| 35                       | (1 1/4) | 16                                                               | 14    | 12    | 10    | 6     | 4     | 3     | 1     | 1     | 1     |
| 41                       | (1 1/2) | 20                                                               | 18    | 16    | 15    | 7     | 6     | 4     | 2     | 1     | 1     |
| 53                       | (2)     | 30                                                               | 26    | 22    | 20    | 14    | 12    | 7     | 4     | 3     | 2     |
| 63                       | (2 1/2) | 45                                                               | 40    | 36    | 30    | 17    | 14    | 12    | 6     | 3     | 3     |
| 78                       | (3)     | 70                                                               | 60    | 50    | 40    | 20    | 20    | 17    | 7     | 6     | 6     |
| 91                       | (3 1/2) | —                                                                | —     | —     | —     | —     | —     | 22    | 12    | 7     | 6     |
| 103                      | (4)     | —                                                                | —     | —     | —     | —     | —     | 30    | 14    | 12    | 7     |

- 15- EN 50174-2 RECOMMENDATIONS SHALL BE FOLLOWED FOR SEPARATION DISTANCE BETWEEN POWER AND VOICE/LAN NETWORK CABLES IN GIVEN BELOW TABLE.

| TYPE OF<br>INSTALLATION                                               | MINIMUM SEPERATION<br>DISTANCE (mm.) |                             |                          |
|-----------------------------------------------------------------------|--------------------------------------|-----------------------------|--------------------------|
|                                                                       | WITHOUT<br>METALLIC<br>DIVIDER       | WITH<br>METALLIC<br>DIVIDER | WITH<br>STEEL<br>DIVIDER |
| UNSCREENED POWER<br>CABLE AND<br>UNSCREENED<br>COMMUNICATION<br>CABLE | 200                                  | 100                         | 50                       |
| UNSCREENED POWER<br>CABLE AND<br>SCREENED<br>COMMUNICATION<br>CABLE   | 50                                   | 20                          | 5                        |

- 16- MOUNTING HEIGHT OF FOLLOWING DEVICES SHALL BE INSTALLED AT THE INDICATED HEIGHT FROM FINISHED FLOOR LEVEL (F.F.L) TO THE BOTTOM OF DEVICE UNLESS OTHERWISE MENTIONED OR INSTRUCTED:
- TELECOMMUNICATION OUTLET FOR TELEPHONE/DATA----- 10 INCH/AS PER SITE
  - TELECOMMUNICATION OUTLET FOR WIFI----- 87 INCH/AS PER SITE
  - TELECOMMUNICATION OUTLET FOR ACCESS DOOR----- 87 INCH/AS PER SITE
  - FLOOR DISTRIBUTOR----- 56 INCH
  - BUILDING DISTRIBUTOR----- FLOOR STANDING/56 INCH
  - MAIN DISTRIBUTION FRAME----- 56 INCH
  - ADDRESSABLE FIRE ALARM CONTROL PANEL----- 56 INCH
  - ADDRESSABLE CONTROL/MONITOR MODULE----- 87 INCH/AS PER SITE
  - ADDRESSABLE MANUAL CALL POINT ----- 56 INCH
  - ADDRESSABLE SOUNDER----- 87 INCH
  - IP CAMERA----- 95 INCH / AS PER SITE
  - MICRO PHONE SOCKET OUTLET----- 10 INCH
  - HORN SPEAKER----- 95 INCH / AS PER SITE
  - DOOR CONTROLLER ----- 87 INCH / ABOVE DOOR
  - CARD READER/EXIT PUSH BUTTON----- 56 INCH
  - TV OUTLET----- 56 INCH
- 17- COLOUR, SHAPE & MOUNTING HEIGHT OF FACE PLATE OF TELECOM SOCKET OUTLETS SHALL MATCH WITH ELECTRICAL SOCKET OUTLET
- 18- DETECTORS SHALL BE INSTALLED 1 FEET AWAY FROM ANY PART OF ANY LIGHT FIXTURE AND 3 FEET AWAY FROM DIFFUSER OF HVAC SYSTEM.
- 19- WHERE MANUAL CALL POINT AND SOUNDER ARE SHOWN SIDE, BY SIDE THEY SHALL BE INSTALLED IN SAME VERTICAL LINE.
- 20- CONTRACTOR SHALL SUBMIT CO-ORDINATION DRAWING SHOWING MOUNTING DETAIL AND HEIGHT OF EACH COMMUNICATION FIXTURE IN PROPER CO-ORDINATION WITH LIGHTS, FANS ETC. AND OTHER RELEVANT ITEMS.
- 21- AT LEAST 30 DAYS OF RECORDING CAPACITY SHALL BE PROVIDED FOR ALL CCTV CAMERAS WITH 25% EXPANSION CAPACITY.
- 22- ALL COMMUNICATION RACKS SHALL BE FED FROM UNINTERRUPTED POWER SUPPLY (UPS) TO AVERT ANY INTERRUPTION IN SECURITY SYSTEM.
- 23- CONTRACTOR SHALL SUBMIT SOUND PRESSURE LEVEL (SPL) CALCULATION OF SPEAKERS ON THE LAYOUT DRAWINGS FOR REVIEW AND APPROVAL OF ENGINEER.
- 24- CONTRACTOR SHALL CO-ORDINATE WITH THE CLIENT FOR EXACT LOCATION OF ACCESS CONTROL SYSTEM AT ENTRANCE OF THE BASEMENT.
- 25- CONTRACTOR SHALL SUBMIT CO-ORDINATION SHOP DRAWING OF COMMUNICATION LAYOUT WITH POWER LAYOUT BEFORE EXECUTION OF WORKS.
- 26- CONTRACTOR SHALL CO-ORDINATE WITH HVAC LAYOUT FOR PLACEMENT OF RACKS IN COMMUNICATION EQUIPMENT ROOM.
- 27- CONTRACTOR TO PROPOSE/SHOW CABLE TRAY IN SHOP DRAWING AS PER NEED IN EACH FLOOR.

LEGEND:

STRUCTURED CABLING NETWORK

- ONE GANG ONE PORT RJ45 CAT7 S/FTP TELECOMMUNICATION OUTLET FOR TELEPHONE, FLUSHED IN WALL/SURFACE MOUNTED
- TWO GANG TWO PORT RJ45 CAT7 S/FTP TELECOMMUNICATION OUTLET FOR TELEPHONE, FLUSHED IN WALL/SURFACE MOUNTED
- ONE GANG ONE PORT RJ45 CAT7 S/FTP TELECOMMUNICATION OUTLET FOR STENO, FLUSHED IN WALL/SURFACE MOUNTED
- ONE GANG ONE PORT RJ45 CAT7 S/FTP TELECOMMUNICATION OUTLET FOR DATA, FLUSHED IN WALL/SURFACE MOUNTED
- TWO GANG TWO PORT RJ45 CAT7 S/FTP TELECOMMUNICATION OUTLET FOR DATA, INSTALLED IN WALL/SURFACE MOUNTED
- TWO GANG TWO PORT RJ45 CAT 7 S/FTP TELECOMMUNICATION OUTLET ONE FOR DATA & ONE FOR VOICE INSTALLED IN WALL/SURFACE MOUNTED
- TELECOMMUNICATION OUTLET FOR DATA & TELEPHONE, INSTALLED IN FLOOR BOX/ TECHNOLOGY BOX
- ONE GANG ONE PORT RJ45 CAT7 S/FTP TELECOMMUNICATION OUTLET FOR WIFI, FLUSHED IN WALL/SURFACE MOUNTED
- ONE PORT RJ45 CAT7 S/FTP TELECOMMUNICATION OUTLET FOR IPTV, INSTALLED IN WALL/SURFACE MOUNTED
- DATA RACK (AS SPECIFIED IN DRAWING & BOQ)
- MAIN DISTRIBUTION FRAME (MDF)
- INTERMEDIATE DISTRIBUTION FRAME (IDF)
- TELEPHONE JUNCTION BOX

ADDRESSABLE FIRE ALARM SYSTEM

- INTELLIGENT ADDRESSABLE LOOP POWERED OPTICAL SMOKE & HEAT DETECTOR WITH BASE & BUILT-IN ISOLATOR.
- INTELLIGENT ADDRESSABLE LOOP POWERED OPTICAL HEAT DETECTOR WITH BASE & BUILT-IN ISOLATOR.
- INTELLIGENT ADDRESSABLE LOOP POWERED OPTICAL SMOKE DETECTOR WITH BASE & BUILT-IN ISOLATOR.
- INTELLIGENT ADDRESSABLE LOOP POWERED SMOKE & HEAT DETECTOR WITH BASE & BUILT-IN ISOLATOR, ABOVE/UNDER FALSE CEILING/RAISED FLOOR.
- INTELLIGENT ADDRESSABLE LOOP POWERED HEAT DETCTOR WITH BASE & BUILT-IN ISOLATOR, ABOVE/UNDER FALSE CEILING/RAISED FLOOR.
- ADDRESSABLE LOOP POWERED MANUAL CALL POINT WITH BASE & BUILT-IN ISOLATOR.
- ADDRESSABLE LOOP POWERED AUDIO VISUAL SOUNDER WITH BASE BUILT-IN ISOLATOR.
- ADDRESSABLE LOOP POWERED MONITOR/INPUT MODULE
- ADDRESSABLE LOOP POWERED CONTROL/OUTPUT MODULE
- INTELLIGENT ADDRESSABLE FIRE ALARM CONTROL PANEL WITH BACKUP BATTERIES, BATTERIES CHARGER & NETWORK CARD COMPLETE IN ALL RESPECT
- INTELLIGENT ADDRESSABLE FIRE ALARM REPEATOR PANES-L

CLOSED CIRCUIT TELEVISION SYSTEM (CCTV):

- IP COLOR CAMERA, DOME TYPE, CEILING MOUNTED
- IP COLOR CAMERA, BULLET TYPE, WALL MOUNTED
- IP FIXED COLOR CAMERA, BULLET TYPE, WALL MOUNTED WITH WEATHER PROOF CANOPY WITH VIPER SYSTEM
- IP COLOR CAMERA, PTZ DOME TYPE, WALL MOUNTED WITH WEATHER PROOF CANOPY WITH VIPER SYSTEM

ACCESS CONTROL SYSTEM

- PROXIMITY & BAR CODE MULTI READER
- EXIT PUSH BUTTON
- BIOMETRIC SCAN DEVICE
- SINGLE DOOR CONTROLLER

CABLE ANTENNA TV SYSTEM (CATV)

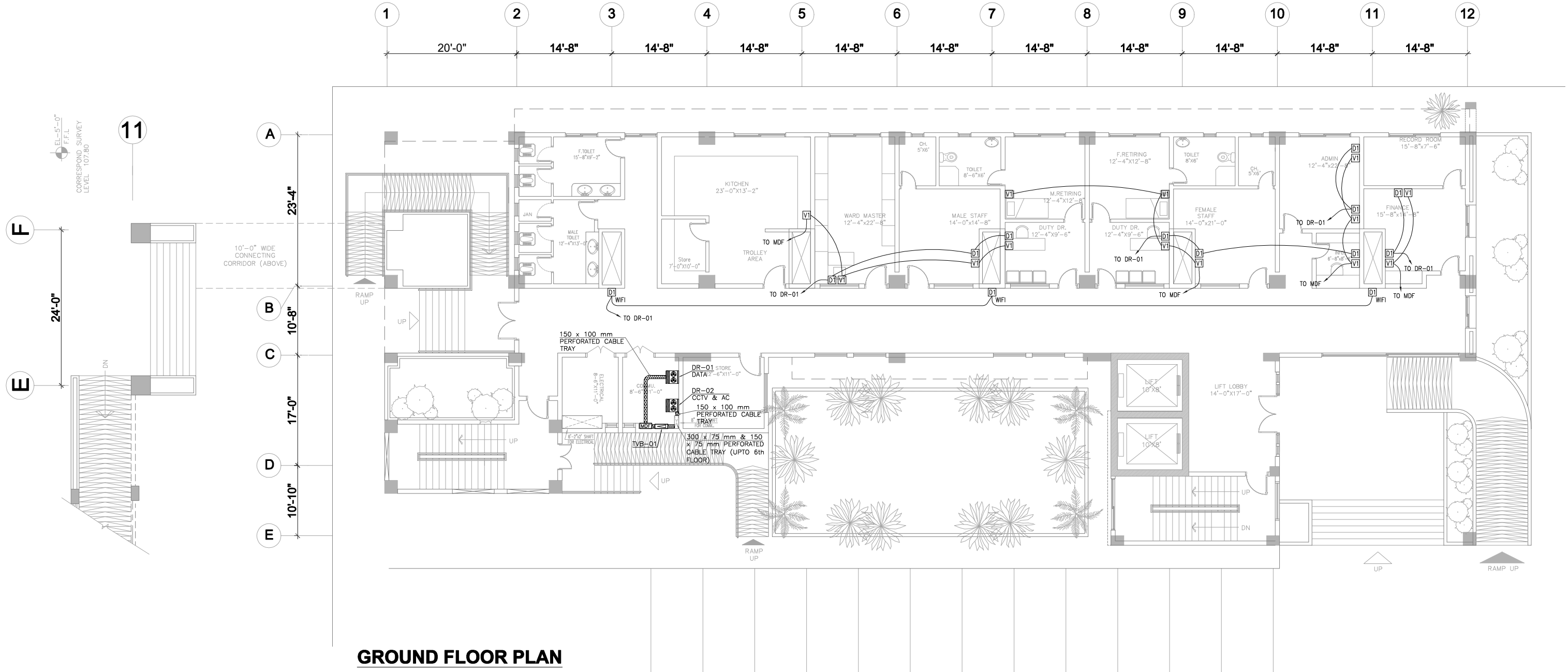
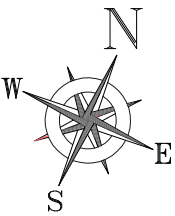
- TV SIGNAL SPLITTER
- TV SIGNAL TAPOFF
- TV AMPLIFIER
- TV OUTLET

CABLE SHEDULE

- 4 PAIR CAT6A S/FTP LSZH CABLE
- 4 PAIR CAT6A UTP LSZH CABLE
- 4 PAIR CAT5E UTP LSZH CABLE
- 25 PAIR CAT5 UTP LSZH CABLE.
- 100 PAIR CAT5 UTP LSZH CABLE
- 12 CORE FIBER OPTICS CABLE SINGLE MODE OUTDOOR TYPE WITH UNITUBE SHEATH HEAVY ARMoured WITH PE JACKET 2 CORE 1.5 Sq.mm (120 min) FIRE RESISTANT ENHANCED LSZH CABLE COMPLYING BS 5839, BS 6387, EN50200. BS 8434-2:2003 + A2:200 CABLE
- RG-7 CO-AXIAL CABLE
- RG-11 CO-AXIAL CABLE

CONSTRUCTION DRAWINGS

|                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                            |  |      |                |                         |          |             |     |                                             |                                                              |           |                     |
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| <div><div>CLIENT.</div><div><div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL<br/>CENTER KARACHI</div></div></div> |  | <div><div>CONSULTANT.</div><div><div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div></div></div> <div><div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.</div><div>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div></div> |  | 03   |                |                         |          | DRAWN       | TM  | PROJECT.<br><br>RABIA RASHID SOORTY COMPLEX | TITEL.<br><br>LIST OF ELECTRICAL &<br>COMMUNICATION DRAWINGS |           | SCALE.<br><br>N.T.S |
|                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                            |  | 02   |                |                         |          | SUBMITTED   | SA  |                                             |                                                              |           |                     |
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|                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                            |  | 00   | FEBRUARY, 2026 | ISSUED FOR CONSTRUCTION |          | CHD./VER.   | AMS |                                             |                                                              |           |                     |
|                                                                                                                                                                                                                   |  |                                                                                                                                                                                                                                                                                                                                                            |  | REV. | DATE           | DESCRIPTION             | APPROVED | APPROVED    | AMS |                                             |                                                              |           |                     |
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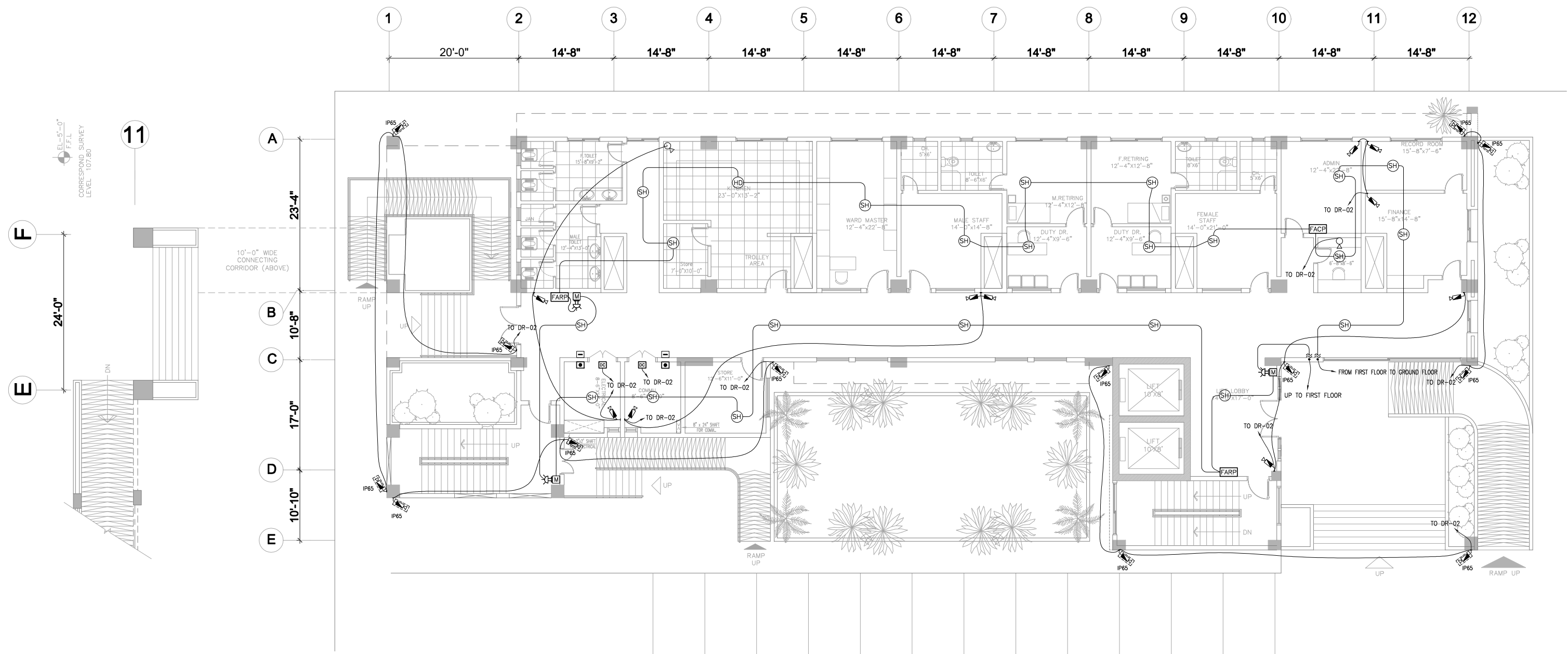
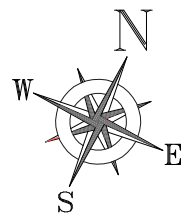
**GROUND FLOOR PLAN**

**DRAWING NOTES**

- FOR LEGEND & GENERAL NOTES REFER DRAWING NO. E001.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER'S NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
- COORDINATED DRAWING(S) AND RELEVANT SECTION(S) WITH OTHER TRADE/SERVICES/SITE CONDITIONS SHALL BE DEVELOPED BY THE CONTRACTOR AND SUBMITTED FOR THE ENGINEER'S APPROVAL BEFORE EXECUTION OF WORK(S).
- ARCHITECTURAL & STRUCTURAL LAYOUT/PLAN CHANGES SHALL BE BROUGHT TO THE ENGINEER'S NOTICE FOR ISSUANCE OF REVISED CONSTRUCTION DRAWINGS.
- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH ALL RELEVANT DETAILS TO THE ENGINEER FOR APPROVAL ACCORDING TO THE GENERAL CONDITIONS OF CONTRACT WELL IN TIME BEFORE COMMENCEMENT OF THAT WORK.
- MARKED SOCKETS/POINTS LOCATION ARE TENTATIVE, CONTRACTOR SHALL COORDINATE ON SITE WITH ARCHITECT APPROVED FURNITURE LAYOUT. READ THIS WITH POINT 3 & 4 ABOVE.
- ALL ELECTRICAL WORK(S)/EQUIPMENT(S) AS DESCRIBED IN HVAC/PLUMBING BOQ, SPACES & DRAWINGS SHALL BE COORDINATED BY THE CONTRACTOR DURING EXECUTION OF WORK(S). ELECTRICAL BOQ AND DRAWINGS NOTES / SPECIFICATION SERIES 8000 SHALL PREVAIL AND APPLICABLE IN CASE OF ANY DISCREPANCY & SHORTCOMINGS.
- DATA POINTS SHALL BE PROVIDED FOR FIRE HYDRANT, FIRE SPRINKLER SYSTEM, LIFT SYSTEM, HVAC SYSTEM, BMS, CCTV SYSTEM AND ACCESS CONTROL WHERE REQUIRED. READ THIS WITH POINT 3 & 4 ABOVE.

**CONSTRUCTION DRAWINGS**

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| <div>CLIENT.</div> <div></div> | <div>CONSULTANT.</div> <div> NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.</div> | 03 |                |                         |             | DRAWN       | TM       | PROJECT. <div>RABIA RASHID SOORTY COMPLEX</div> | TITEL. <div>GROUND FLOOR TELEPHONE, DATA &amp; CATV LAYOUT</div> |  | SCALE. <div>N.T.S</div> |
|                                                                                                                  |                                                                                                                                                                          | 02 |                |                         |             | SUBMITTED   | SA       |                                                 |                                                                  |  |                         |
|                                                                                                                  |                                                                                                                                                                          | 01 |                |                         |             | RECOMMENDED | SA       |                                                 |                                                                  |  |                         |
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|                                                                                                                  | ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34                                                 |    | REV.           | DATE                    | DESCRIPTION | APPROVED    | APPROVED |                                                 | AMS                                                              |  |                         |
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**GROUND FLOOR PLAN**

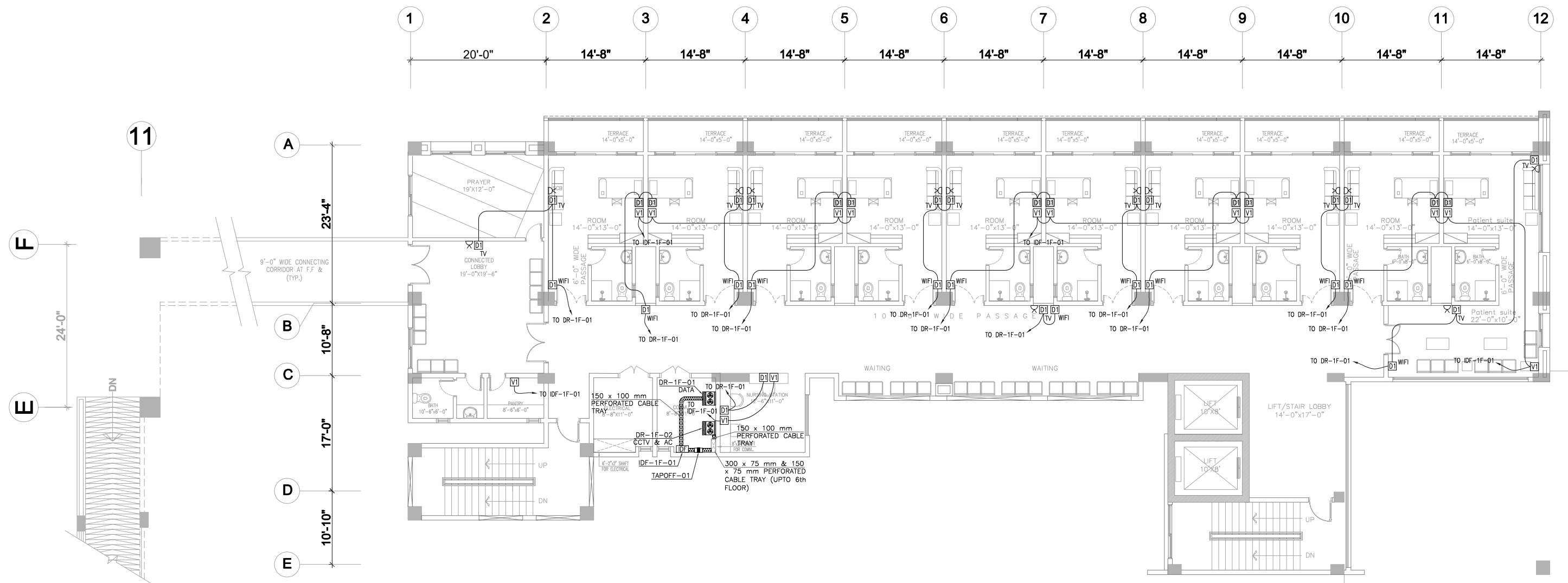
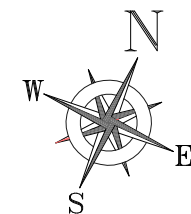
**DRAWING NOTES**

1. FOR LEGEND & GENERAL NOTES REFER DRAWING NO. E001.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER'S NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
3. COORDINATED DRAWING(S) AND RELEVANT SECTION(S) WITH OTHER TRADE/SERVICES/SITE CONDITIONS SHALL BE DEVELOPED BY THE CONTRACTOR AND SUBMITTED FOR THE ENGINEER'S APPROVAL BEFORE EXECUTION OF WORK(S).
4. ARCHITECTURAL & STRUCTURAL LAYOUT/PLAN CHANGES SHALL BE BROUGHT TO THE ENGINEER'S NOTICE FOR ISSUANCE OF REVISED CONSTRUCTION DRAWINGS.
5. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH ALL RELEVANT DETAILS TO THE ENGINEER FOR APPROVAL ACCORDING TO THE GENERAL CONDITIONS OF CONTRACT WELL IN TIME BEFORE COMMENCEMENT OF THAT WORK.
6. MARKED SOCKETS/POINTS LOCATION ARE TENTATIVE, CONTRACTOR SHALL COORDINATE ON SITE WITH ARCHITECT APPROVED FURNITURE LAYOUT. READ THIS WITH POINT 3 & 4 ABOVE.
7. ALL ELECTRICAL WORK(S)/EQUIPMENT(S) AS DESCRIBED IN HVAC/PLUMBING BOQ, SPACES & DRAWINGS SHALL BE COORDINATED BY THE CONTRACTOR DURING EXECUTION OF WORK(S). ELECTRICAL BOQ AND DRAWINGS NOTES / SPECIFICATION SERIES 8000 SHALL PREVAIL AND APPLICABLE IN CASE OF ANY DISCREPANCY & SHORTCOMINGS.
8. FIRE ALARM SYSTEM SHALL BE INTERFACE WITH FIRE HYDRANT, FIRE SPRINKLER SYSTEM, LIFT SYSTEM, HVAC SYSTEM, CCTV SYSTEM AND ACCESS CONTROL.
9. CONTRACTOR SHALL COORDINATE & FINALIZE WITH THE CLIENT SECURITY DEPARTMENT THE LOCATION AND HEIGHT OF CCTV CAMERAS AND ACCESS CONTROL POINTS. THE SAME IS COMMUNICATED TO THE ENGINEERS FOR RECORD & NECESSARY COORDINATION/ACTION.

**CONSTRUCTION DRAWINGS**

|                                                                                                                                                                                                         |                |                                                                                                                                                                                                                                                                                                                                 |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |                              |  |  |  |    |  |  |  |       |    |    |  |  |  |           |    |    |  |  |  |             |    |    |                |                         |  |           |     |      |      |             |          |          |     |                                                            |  |                                                                                                   |  |                                    |
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| <div>CLIENT.</div> <div><div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL<br/>CENTER KARACHI</div></div> |                | <div>CONSULTANT.</div> <div><div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div></div> <div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> |          | <table><tr><td>03</td><td></td><td></td><td></td><td>DRAWN</td><td>TM</td></tr><tr><td>02</td><td></td><td></td><td></td><td>SUBMITTED</td><td>SA</td></tr><tr><td>01</td><td></td><td></td><td></td><td>RECOMMENDED</td><td>SA</td></tr><tr><td>00</td><td>FEBRUARY, 2026</td><td>ISSUED FOR CONSTRUCTION</td><td></td><td>CHD./VER.</td><td>AMS</td></tr><tr><td>REV.</td><td>DATE</td><td>DESCRIPTION</td><td>APPROVED</td><td>APPROVED</td><td>AMS</td></tr></table> |     |                              |  |  |  | 03 |  |  |  | DRAWN | TM | 02 |  |  |  | SUBMITTED | SA | 01 |  |  |  | RECOMMENDED | SA | 00 | FEBRUARY, 2026 | ISSUED FOR CONSTRUCTION |  | CHD./VER. | AMS | REV. | DATE | DESCRIPTION | APPROVED | APPROVED | AMS | <div>PROJECT.</div> <div>RABIA RASHID SOORTY COMPLEX</div> |  | <div>TITLE.</div> <div>GROUND FLOOR ACCESS CONTROL,<br/>FIRE ALARM &amp; CCTV SYSTEM LAYOUT</div> |  | <div>SCALE.</div> <div>N.T.S</div> |
| 03                                                                                                                                                                                                      |                |                                                                                                                                                                                                                                                                                                                                 |          | DRAWN                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TM  |                              |  |  |  |    |  |  |  |       |    |    |  |  |  |           |    |    |  |  |  |             |    |    |                |                         |  |           |     |      |      |             |          |          |     |                                                            |  |                                                                                                   |  |                                    |
| 02                                                                                                                                                                                                      |                |                                                                                                                                                                                                                                                                                                                                 |          | SUBMITTED                                                                                                                                                                                                                                                                                                                                                                                                                                                                | SA  |                              |  |  |  |    |  |  |  |       |    |    |  |  |  |           |    |    |  |  |  |             |    |    |                |                         |  |           |     |      |      |             |          |          |     |                                                            |  |                                                                                                   |  |                                    |
| 01                                                                                                                                                                                                      |                |                                                                                                                                                                                                                                                                                                                                 |          | RECOMMENDED                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SA  |                              |  |  |  |    |  |  |  |       |    |    |  |  |  |           |    |    |  |  |  |             |    |    |                |                         |  |           |     |      |      |             |          |          |     |                                                            |  |                                                                                                   |  |                                    |
| 00                                                                                                                                                                                                      | FEBRUARY, 2026 | ISSUED FOR CONSTRUCTION                                                                                                                                                                                                                                                                                                         |          | CHD./VER.                                                                                                                                                                                                                                                                                                                                                                                                                                                                | AMS |                              |  |  |  |    |  |  |  |       |    |    |  |  |  |           |    |    |  |  |  |             |    |    |                |                         |  |           |     |      |      |             |          |          |     |                                                            |  |                                                                                                   |  |                                    |
| REV.                                                                                                                                                                                                    | DATE           | DESCRIPTION                                                                                                                                                                                                                                                                                                                     | APPROVED | APPROVED                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | AMS |                              |  |  |  |    |  |  |  |       |    |    |  |  |  |           |    |    |  |  |  |             |    |    |                |                         |  |           |     |      |      |             |          |          |     |                                                            |  |                                                                                                   |  |                                    |
| <div>DATE.</div> <div>FEBRUARY, 2026</div>                                                                                                                                                              |                | <div>DRAWING No.</div> <div>4662/08/CD/T004</div>                                                                                                                                                                                                                                                                               |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     | <div>REV.</div> <div>0</div> |  |  |  |    |  |  |  |       |    |    |  |  |  |           |    |    |  |  |  |             |    |    |                |                         |  |           |     |      |      |             |          |          |     |                                                            |  |                                                                                                   |  |                                    |





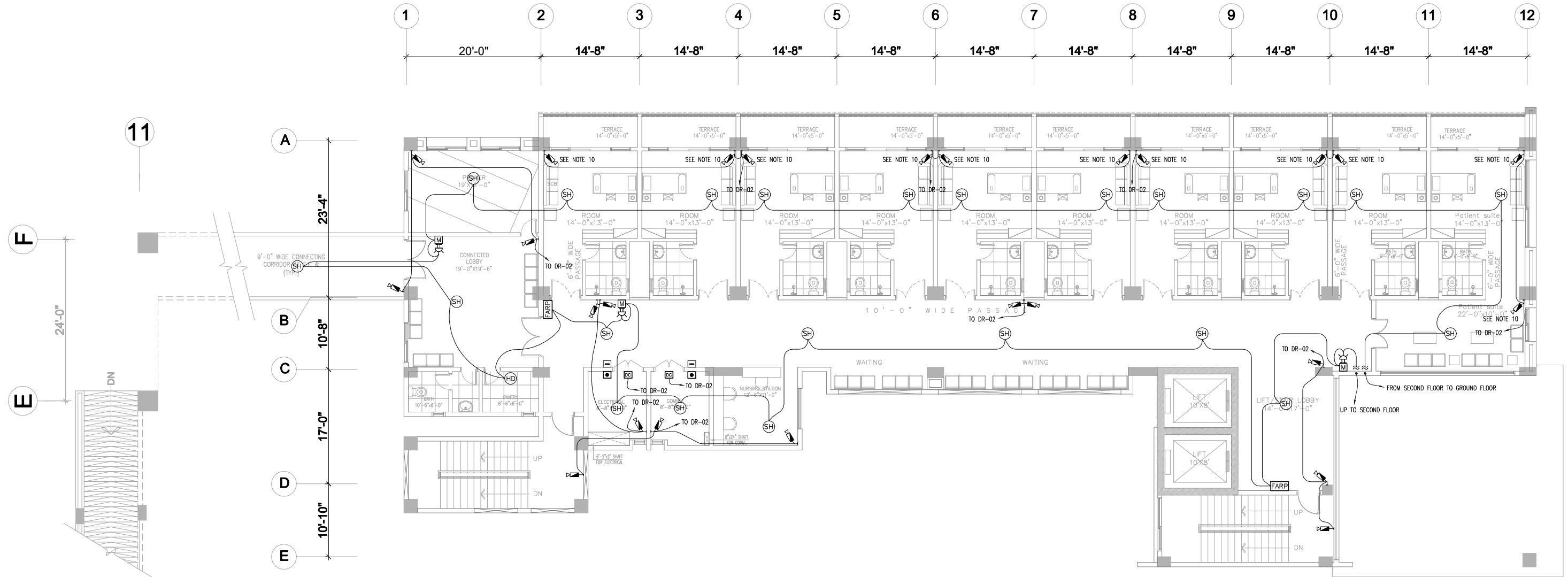
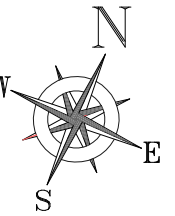
1st & 6th TYP. FLOOR PLAN

DRAWING NOTES

- FOR LEGEND & GENERAL NOTES REFER DRAWING NO. T001.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
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- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH ALL RELEVANT DETAILS TO THE ENGINEER FOR APPROVAL ACCORDING TO THE GENERAL CONDITIONS OF CONTRACT WELL IN TIME BEFORE COMMENCEMENT OF THAT WORK.
- MARKED SOCKETS/POINTS LOCATION ARE TENTATIVE, CONTRACTOR SHALL COORDINATE ON SITE WITH ARCHITECT APPROVED FURNITURE LAYOUT. READ THIS WITH POINT 3 & 4 ABOVE.
- ALL ELECTRICAL WORK(S)/EQUIPMENT(S) AS DESCRIBED IN HVAC/PLUMBING BOQ, SPES & DRAWINGS SHALL BE COORDINATED BY THE CONTRACTOR DURING EXECUTION OF WORK(S). ELECTRICAL BOQ AND DRAWINGS NOTES / SPECIFICATION SERIES 8000 SHALL PREVAIL AND APPLICABLE IN CASE OF ANY DISCREPANCY & SHORTCOMINGS.
- DATA POINTS SHALL BE PROVIDED FOR FIRE HYDRANT, FIRE SPRINKLER SYSTEM, LIFT SYSTEM, HVAC SYSTEM, BMS, CCTV SYSTEM AND ACCESS CONTROL WHERE REQUIRED. READ THIS WITH POINT 3 & 4 ABOVE.

CONSTRUCTION DRAWINGS

|                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                              |                |                         |          |             |     |       |    |          |                             |                |                 |                                                                  |  |        |
|------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------|----------|-------------|-----|-------|----|----------|-----------------------------|----------------|-----------------|------------------------------------------------------------------|--|--------|
| <div>CLIENT.</div> <div></div> |  | <div>CONSULTANT.</div> <div></div> <div>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.</div> <div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> |                | 03                      |          |             |     | DRAWN | TM | PROJECT. | RABIA RASHID SOORTY COMPLEX | TITLE.         |                 | FIRST AND SIXTH FLOOR (TYPICAL)<br>TELEPHONE, DATA & CATV LAYOUT |  | SCALE. |
|                                                                                                                  |  | 02                                                                                                                                                                                                                                                                                                                           |                |                         |          | SUBMITTED   | SA  |       |    |          |                             |                |                 | N.T.S                                                            |  |        |
|                                                                                                                  |  | 01                                                                                                                                                                                                                                                                                                                           |                |                         |          | RECOMMENDED | SA  |       |    |          |                             |                |                 |                                                                  |  |        |
|                                                                                                                  |  | 00                                                                                                                                                                                                                                                                                                                           | FEBRUARY, 2026 | ISSUED FOR CONSTRUCTION |          | CHD./VER.   | AMS |       |    |          |                             |                |                 |                                                                  |  |        |
|                                                                                                                  |  | REV.                                                                                                                                                                                                                                                                                                                         | DATE           | DESCRIPTION             | APPROVED | APPROVED    | AMS |       |    |          |                             |                |                 |                                                                  |  |        |
|                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                              |                |                         |          |             |     |       |    |          |                             | DATE.          | DRAWING No.     | REV.                                                             |  |        |
|                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                              |                |                         |          |             |     |       |    |          |                             | FEBRUARY, 2026 | 4662/08/CD/T005 | 0                                                                |  |        |



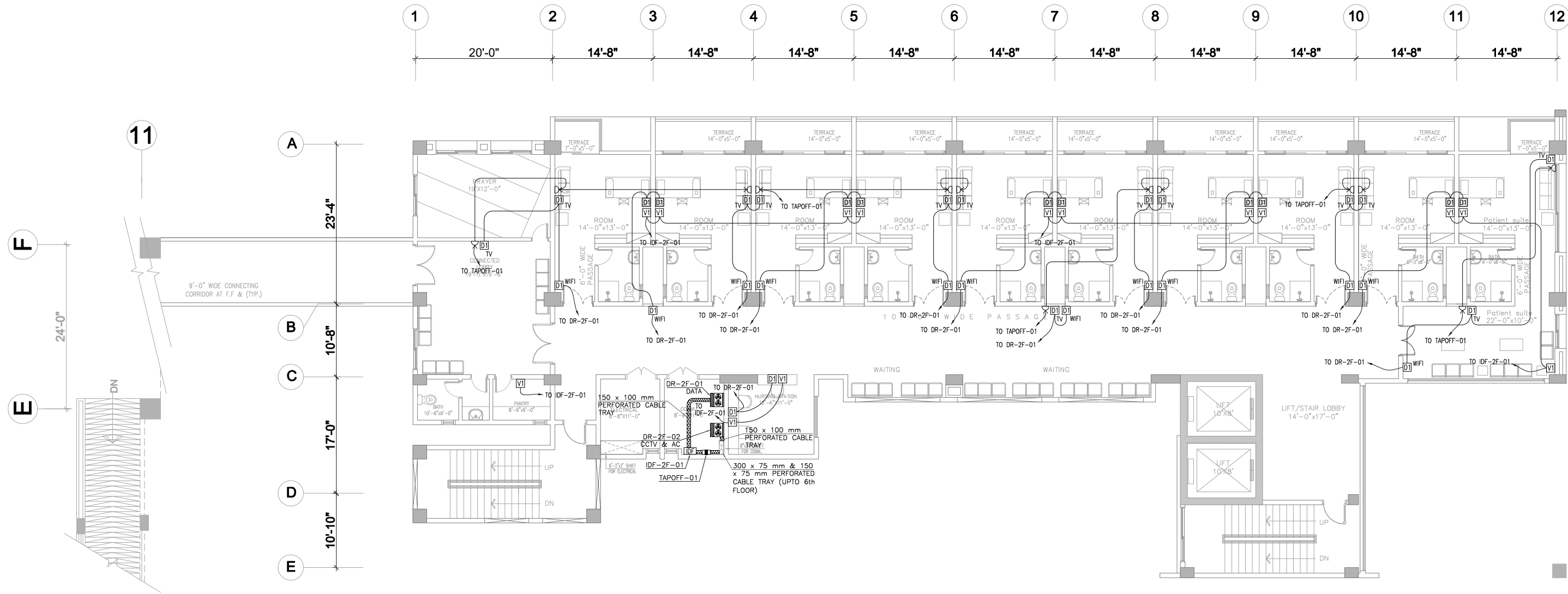
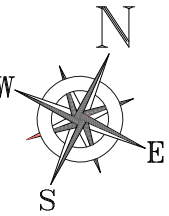
## 1st & 6th TYP. FLOOR CCTV SYSTEM LAYOUT

### DRAWING NOTES

- FOR LEGEND & GENERAL NOTES REFER DRAWING NO. T001.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
- COORDINATED DRAWING(S) AND RELEVANT SECTION(S) WITH OTHER TRADE/SERVICES/SITE CONDITIONS SHALL BE DEVELOPED BY THE CONTRACTOR AND SUBMITTED FOR THE ENGINEER'S APPROVAL BEFORE EXECUTION OF WORK(S).
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- ALL ELECTRICAL WORK(S)/EQUIPMENT(S) AS DESCRIBED IN HVAC/PLUMBING BOQ, SPES & DRAWINGS SHALL BE COORDINATED BY THE CONTRACTOR DURING EXECUTION OF WORK(S). ELECTRICAL BOQ AND DRAWINGS NOTES / SPECIFICATION SERIES 8000 SHALL PREVAIL AND APPLICABLE IN CASE OF ANY DISCREPANCY & SHORTCOMINGS.
- FIRE ALARM SYSTEM SHALL BE INTERFACE WITH FIRE HYDRANT, FIRE SPRINKLER SYSTEM, LIFT SYSTEM, HVAC SYSTEM, CCTV SYSTEM AND ACCESS CONTROL.
- SYSTEM AS PER LIFE SAFETY LOCAL / INTERNATIONAL STANDARDS. POINT OF INTERFACE SHALL BE COORDINATED ON SITE AND NECESSARY SHOP DRAWINGS / WIRING & EQUIPMENT LAYOUTS ALONG WITH TECHNICAL DATA SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL.
- CONTRACTOR SHALL COORDINATE & FINALIZE WITH THE CLIENT SECURITY DEPARTMENT THE LOCATION AND HEIGHT OF CCTV CAMERAS AND ACCESS CONTROL POINTS. THE SAME IS COMMUNICATED TO THE ENGINEERS FOR RECORD & NECESSARY COORDINATION/ACTION.
- CCTV CAMERAS MARKED IN INDIVIDUAL PATIENT ROOM SHALL BE DISCUSSED WITH HOSPITAL MANAGEMENT.

### CONSTRUCTION DRAWINGS

|                                                                                                                                                                                      |  |                                                                                                                                                                 |  |      |  |  |                |  |                         |  |                             |  |                                                                                       |  |                 |  |      |  |
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| CLIENT.                                                                                                                                                                              |  | CONSULTANT.                                                                                                                                                     |  | 03   |  |  | DRAWN          |  | TM                      |  | PROJECT.                    |  | TITEL.                                                                                |  | SCALE.          |  |      |  |
| <div><div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL<br/>CENTER KARACHI</div></div> |  | <div><div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div></div> |  | 02   |  |  | SUBMITTED      |  | SA                      |  | RABIA RASHID SOORTY COMPLEX |  | FIRST AND SIXTH FLOOR (TYPICAL)<br>ACCESS CONTROL, FIRE ALARM &<br>CCTV SYSTEM LAYOUT |  | N.T.S           |  |      |  |
|                                                                                                                                                                                      |  |                                                                                                                                                                 |  | 01   |  |  | RECOMMENDED    |  | SA                      |  |                             |  |                                                                                       |  |                 |  |      |  |
|                                                                                                                                                                                      |  |                                                                                                                                                                 |  | 00   |  |  | CHD./VER.      |  | AMS                     |  |                             |  |                                                                                       |  |                 |  |      |  |
|                                                                                                                                                                                      |  |                                                                                                                                                                 |  | REV. |  |  | APPROVED       |  | AMS                     |  |                             |  |                                                                                       |  |                 |  |      |  |
|                                                                                                                                                                                      |  | ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34                                        |  | 00   |  |  | FEBRUARY, 2026 |  | ISSUED FOR CONSTRUCTION |  |                             |  | DATE.                                                                                 |  | DRAWING No.     |  | REV. |  |
|                                                                                                                                                                                      |  |                                                                                                                                                                 |  |      |  |  |                |  |                         |  |                             |  | FEBRUARY, 2026                                                                        |  | 4662/08/CD/T006 |  | 0    |  |



**2nd, 3rd, 4th & 5th FLOOR PLAN**

**DRAWING NOTES**

- FOR LEGEND & GENERAL NOTES REFER DRAWING NO. T001.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
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**CONSTRUCTION DRAWINGS**

CLIENT.



**PATIENTS' AID FOUNDATION**  
**JINNAH POST GRADUATE MEDICAL**  
**CENTER KARACHI**

CONSULTANT.



**NATIONAL ENGINEERING SERVICES**  
**PAKISTAN (PVT.) LTD.**

ARCHITECTURE & PLANNING DIVISION KARACHI.  
4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34

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PROJECT.

**RABIA RASHID SOORTY COMPLEX**

TITLE.

**SECOND TO FIFTH FLOOR (TYPICAL)**  
**TELEPHONE, DATA & CATV LAYOUT**

DATE.

FEBRUARY, 2026

DRAWING No.

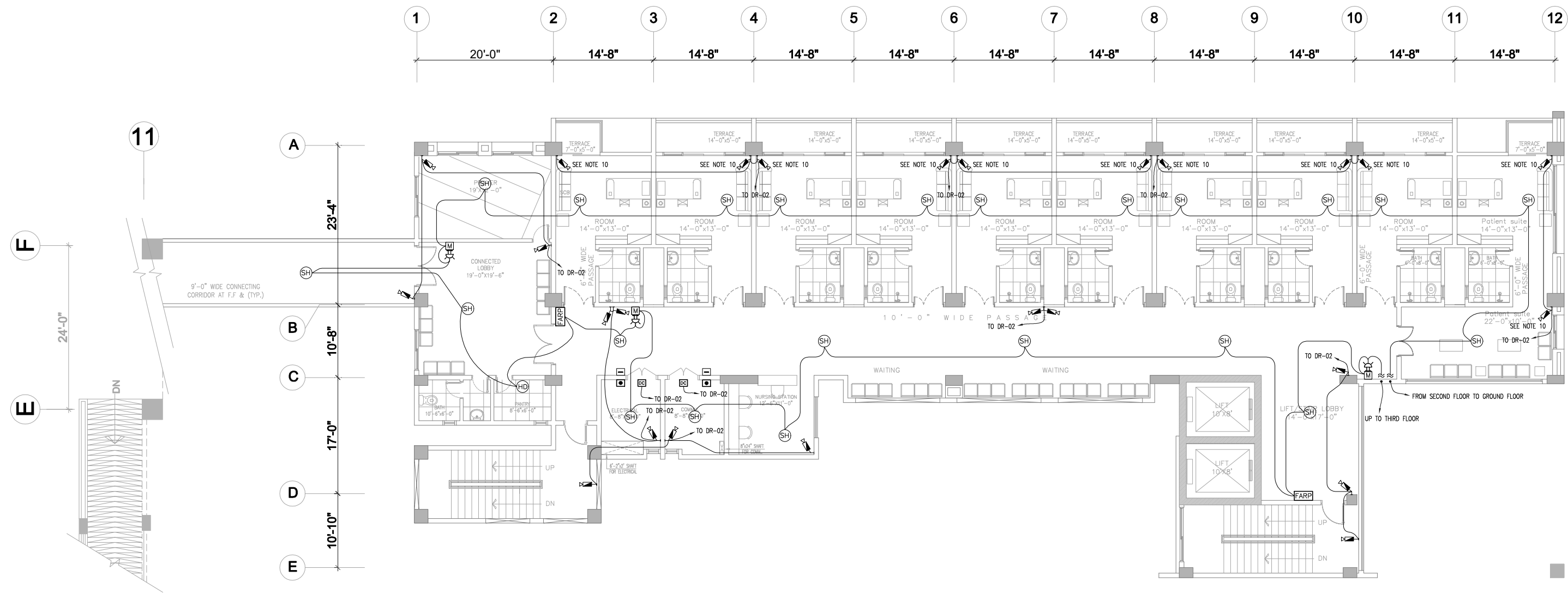
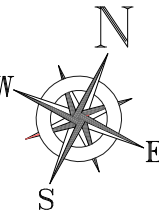
**4662/08/CD/T007**

SCALE.

N.T.S

REV.

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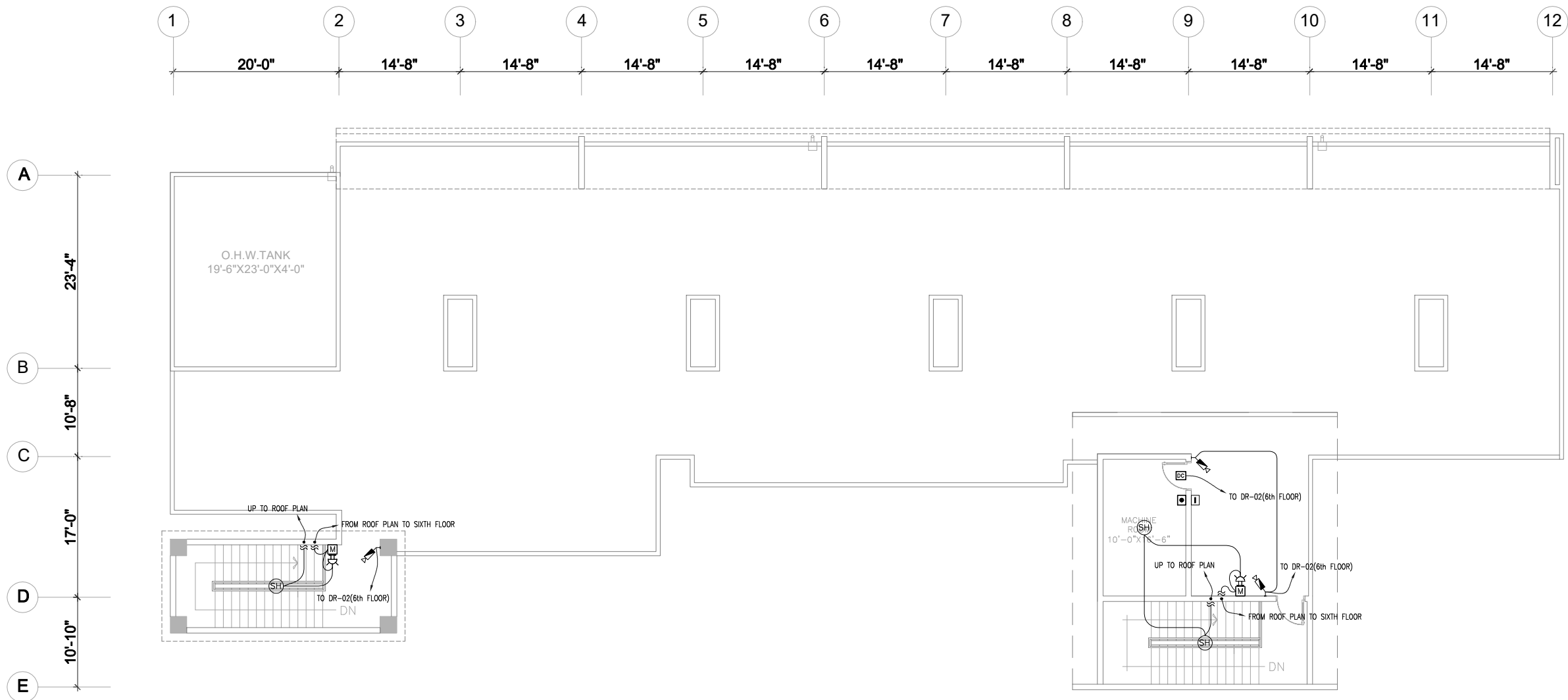
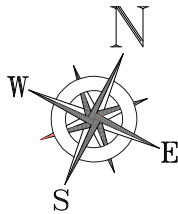
**2nd, 3rd, 4th & 5th FLOOR PLAN**

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- FOR LEGEND & GENERAL NOTES REFER DRAWING NO. T001.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER'S NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
- COORDINATED DRAWING(S) AND RELEVANT SECTION(S) WITH OTHER TRADE/SERVICES/SITE CONDITIONS SHALL BE DEVELOPED BY THE CONTRACTOR AND SUBMITTED FOR THE ENGINEER'S APPROVAL BEFORE EXECUTION OF WORK(S).
- ARCHITECTURAL & STRUCTURAL LAYOUT/PLAN CHANGES SHALL BE BROUGHT TO THE ENGINEER'S NOTICE FOR ISSUANCE OF REVISED CONSTRUCTION DRAWINGS.
- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH ALL RELEVANT DETAILS TO THE ENGINEER FOR APPROVAL ACCORDING TO THE GENERAL CONDITIONS OF CONTRACT WELL IN TIME BEFORE COMMENCEMENT OF THAT WORK.
- MARKED SOCKETS/POINTS LOCATION ARE TENTATIVE, CONTRACTOR SHALL COORDINATE ON SITE WITH ARCHITECT APPROVED FURNITURE LAYOUT. READ THIS WITH POINT 3 & 4 ABOVE.
- ALL ELECTRICAL WORK(S)/EQUIPMENT(S) AS DESCRIBED IN HVAC/PLUMBING BOQ, SPECS & DRAWINGS SHALL BE COORDINATED BY THE CONTRACTOR DURING EXECUTION OF WORK(S). ELECTRICAL BOQ AND DRAWINGS NOTES / SPECIFICATION SERIES 8000 SHALL PREVAIL AND APPLICABLE IN CASE OF ANY DISCREPANCY & SHORTCOMINGS.
- FIRE ALARM SYSTEM SHALL BE INTERFACE WITH FIRE HYDRANT, FIRE SPRINKLER SYSTEM, LIFT SYSTEM, HVAC SYSTEM, CCTV SYSTEM AND ACCESS CONTROL.
- SYSTEM AS PER LIFE SAFETY LOCAL / INTERNATIONAL STANDARDS. POINT OF INTERFACE SHALL BE COORDINATED ON SITE AND NECESSARY SHOP DRAWINGS / WIRING & EQUIPMENT LAYOUTS ALONG WITH TECHNICAL DATA SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL.
- CONTRACTOR SHALL COORDINATE & FINALIZE WITH THE CLIENT SECURITY DEPARTMENT THE LOCATION AND HEIGHT OF CCTV CAMERAS AND ACCESS CONTROL POINTS. THE SAME IS COMMUNICATED TO THE ENGINEERS FOR RECORD & NECESSARY COORDINATION/ACTION.
- CCTV CAMERAS MARKED IN INDIVIDUAL PATIENT ROOM SHALL BE DISCUSSED WITH HOSPITAL MANAGEMENT.

| CONSTRUCTION DRAWINGS                                                                                                                                                                                    |  |  |  |                                                                                                                                                                                         |  |  |  |      |                | BROUGHT TO THE ENGINEER'S NOTICE FOR ISSUANCE OF REVISED CONSTRUCTION DRAWINGS. |          |             |     |                                             |  |  |  |                                                                                              |  | 6. FIRE ALARM SYSTEM SHALL BE INTERFACE WITH FIRE HYDRANT, FIRE SPRINKLER SYSTEM, LIFT SYSTEM, HVAC SYSTEM, CCTV SYSTEM AND ACCESS CONTROL |  |                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
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| <div>CLIENT.</div> <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL<br/>CENTER KARACHI</div> |  |  |  | <div>CONSULTANT.</div> <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div> |  |  |  | 03   |                |                                                                                 |          | DRAWN       | TM  | PROJECT.<br><br>RABIA RASHID SOORTY COMPLEX |  |  |  | TITLE. SECOND TO FIFTH FLOOR (TYPICAL)<br>ACCESS CONTROL, FIRE ALARM &<br>CCTV SYSTEM LAYOUT |  |                                                                                                                                            |  | SCALE.<br><br>N.T.S |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                                                                                                                          |  |  |  |                                                                                                                                                                                         |  |  |  | 02   |                |                                                                                 |          | SUBMITTED   | SA  |                                             |  |  |  |                                                                                              |  |                                                                                                                                            |  |                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                                                                                                                          |  |  |  |                                                                                                                                                                                         |  |  |  | 01   |                |                                                                                 |          | RECOMMENDED | SA  |                                             |  |  |  |                                                                                              |  |                                                                                                                                            |  |                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                                                                                                                          |  |  |  |                                                                                                                                                                                         |  |  |  | 00   | FEBRUARY, 2026 | ISSUED FOR CONSTRUCTION                                                         |          | CHD./VER.   | AMS |                                             |  |  |  |                                                                                              |  |                                                                                                                                            |  |                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                                                                                                                          |  |  |  |                                                                                                                                                                                         |  |  |  | REV. | DATE           | DESCRIPTION                                                                     | APPROVED | APPROVED    | AMS |                                             |  |  |  |                                                                                              |  |                                                                                                                                            |  |                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |    |
|                                                                                                                                                                                                          |  |  |  | ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34                                                                |  |  |  |      |                |                                                                                 |          |             |     |                                             |  |  |  |                                                                                              |  |                                                                                                                                            |  |                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | </ |

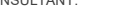


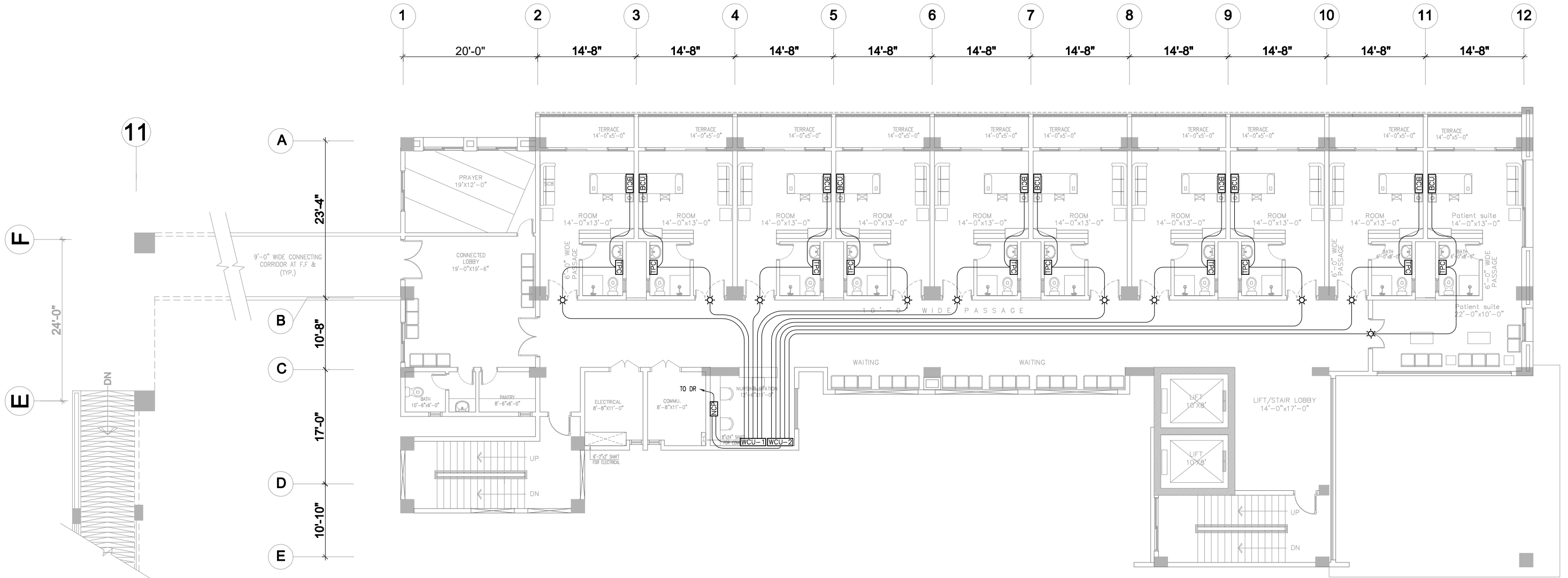
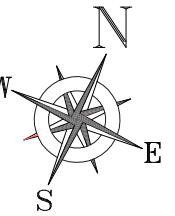


DRAWING NOTES

- FOR LEGEND & GENERAL NOTES REFER DRAWING NO. T001.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
- COORDINATED DRAWING(S) AND RELEVANT SECTION(S) WITH OTHER TRADE/SERVICES/SITE CONDITIONS SHALL BE DEVELOPED BY THE CONTRACTOR AND SUBMITTED FOR THE ENGINEER'S APPROVAL BEFORE EXECUTION OF WORK(S).
- ARCHITECTURAL & STRUCTURAL LAYOUT/PLAN CHANGES SHALL BE BROUGHT TO THE ENGINEER'S NOTICE FOR ISSUANCE OF REVISED CONSTRUCTION DRAWINGS.
- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS WITH ALL RELEVANT DETAILS TO THE ENGINEER FOR APPROVAL ACCORDING TO THE GENERAL CONDITIONS OF CONTRACT WELL IN TIME BEFORE COMMENCEMENT OF THAT WORK.
- MARKED SOCKETS/POINTS LOCATION ARE TENTATIVE, CONTRACTOR SHALL COORDINATE ON SITE WITH ARCHITECT APPROVED FURNITURE LAYOUT. READ THIS WITH POINT 3 & 4 ABOVE.
- ALL ELECTRICAL WORK(S)/EQUIPMENT(S) AS DESCRIBED IN HVAC/PLUMBING BOQ, SPECS & DRAWINGS SHALL BE COORDINATED BY THE CONTRACTOR DURING EXECUTION OF WORK(S). ELECTRICAL BOQ AND DRAWINGS NOTES / SPECIFICATION SERIES 8000 SHALL PREVAIL AND APPLICABLE IN CASE OF ANY DISCREPANCY & SHORTCOMINGS.
- FIRE ALARM SYSTEM SHALL BE INTERFACE WITH FIRE HYDRANT, FIRE SPRINKLER SYSTEM, LIFT SYSTEM, HVAC SYSTEM, CCTV SYSTEM AND ACCESS CONTROL.
- SYSTEM AS PER LIFE SAFETY LOCAL / INTERNATIONAL STANDARDS. POINT OF INTERFACE SHALL BE COORDINATED ON SITE AND NECESSARY SHOP DRAWINGS / WIRING & EQUIPMENT LAYOUTS ALONG WITH TECHNICAL DATA SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL.
- CONTRACTOR SHALL COORDINATE & FINALIZE WITH THE CLIENT SECURITY DEPARTMENT THE LOCATION AND HEIGHT OF CCTV CAMERAS AND ACCESS CONTROL POINTS. THE SAME IS COMMUNICATED TO THE ENGINEERS FOR RECORD & NECESSARY COORDINATION/ACTION.
- CCTV CAMERAS MARKED IN INDIVIDUAL PATIENT ROOM SHALL BE DISCUSSED WITH HOSPITAL MANAGEMENT.

CONSTRUCTION DRAWINGS

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| <div><div></div><div><div>PATIENTS' AID FOUNDATION</div><div>JINNAH POST GRADUATE MEDICAL CENTER KARACHI</div></div></div>                                |  | <div><div></div><div><div>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.</div><div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.</div><div>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div></div></div> |  | 03   |                |                         |          | DRAWN       | TM  | PROJECT. <div>RABIA RASHID SOORTY COMPLEX</div> | TITEL. <div>ROOF PLAN ACCESS CONTROL, FIRE ALARM &amp; CCTV SYSTEM LAYOUT</div> |  | SCALE. <div>N.T.S</div> |
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| <div><div>DATE.</div><div>FEBRUARY, 2026</div></div> <div><div>DRAWING No.</div><div>4662/08/CD/T009</div></div> <div><div>REV.</div><div></div></div> |  |                                                                                                                                                                                                                                                                                                                                 |  |      |                |                         |          |             |     |                                                 |                                                                                 |  |                         |



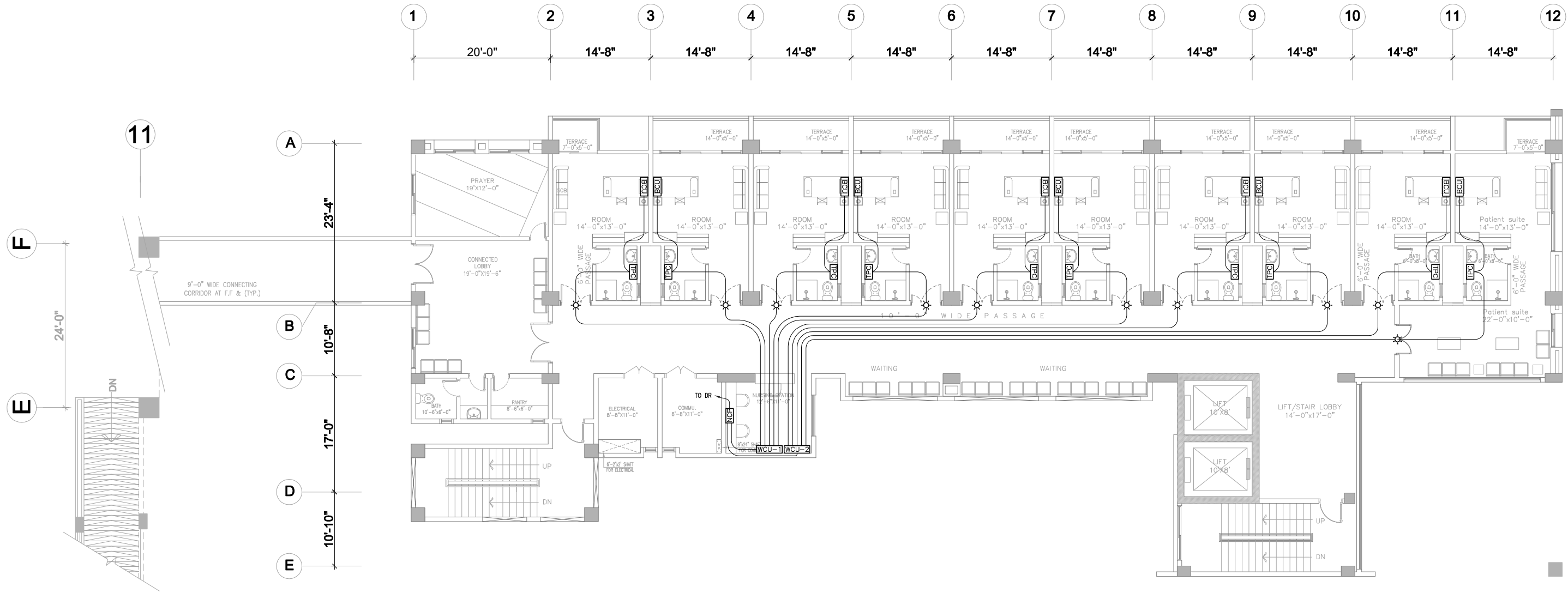
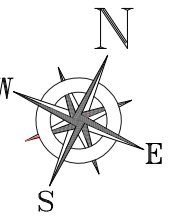
1st & 6th TYP. FLOOR PLAN

DRAWING NOTES

- FOR LEGEND & GENERAL NOTES REFER DRAWING NO. T001.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
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- ALL ELECTRICAL WORK(S)/EQUIPMENT(S) AS DESCRIBED IN HVAC/PLUMBING BOQ, SPES & DRAWINGS SHALL BE COORDINATED BY THE CONTRACTOR DURING EXECUTION OF WORK(S). ELECTRICAL BOQ AND DRAWINGS NOTES / SPECIFICATION SERIES 8000 SHALL PREVAIL AND APPLICABLE IN CASE OF ANY DISCREPANCY & SHORTCOMINGS.
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CONSTRUCTION DRAWINGS

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| CLIENT.                                                                            |                                                                            | CONSULTANT.                                                                                                              |                                                       | 03   |                |                         |          | DRAWN       | TM  | PROJECT. | TITEL.                                                      |  | SCALE.                         |                                                                                               |
|  | PATIENTS' AID FOUNDATION<br>JINNAH POST GRADUATE MEDICAL<br>CENTER KARACHI |                                       | NATIONAL ENGINEERING SERVICES<br>PAKISTAN (PVT.) LTD. | 02   |                |                         |          | SUBMITTED   | SA  |          | FIRST AND SIXTH FLOOR (TYPICAL)<br>NURSE CALL SYSTEM LAYOUT |  | N.T.S                          |                                                                                               |
|                                                                                    |                                                                            |                                                                                                                          |                                                       | 01   |                |                         |          | RECOMMENDED | SA  |          |                                                             |  |                                |                                                                                               |
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|                                                                                    |                                                                            | ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |                                                       |      |                |                         |          |             |     |          | DATE.<br>FEBRUARY, 2026                                     |  | DRAWING No.<br>4662/08/CD/T011 | REV.<br> |



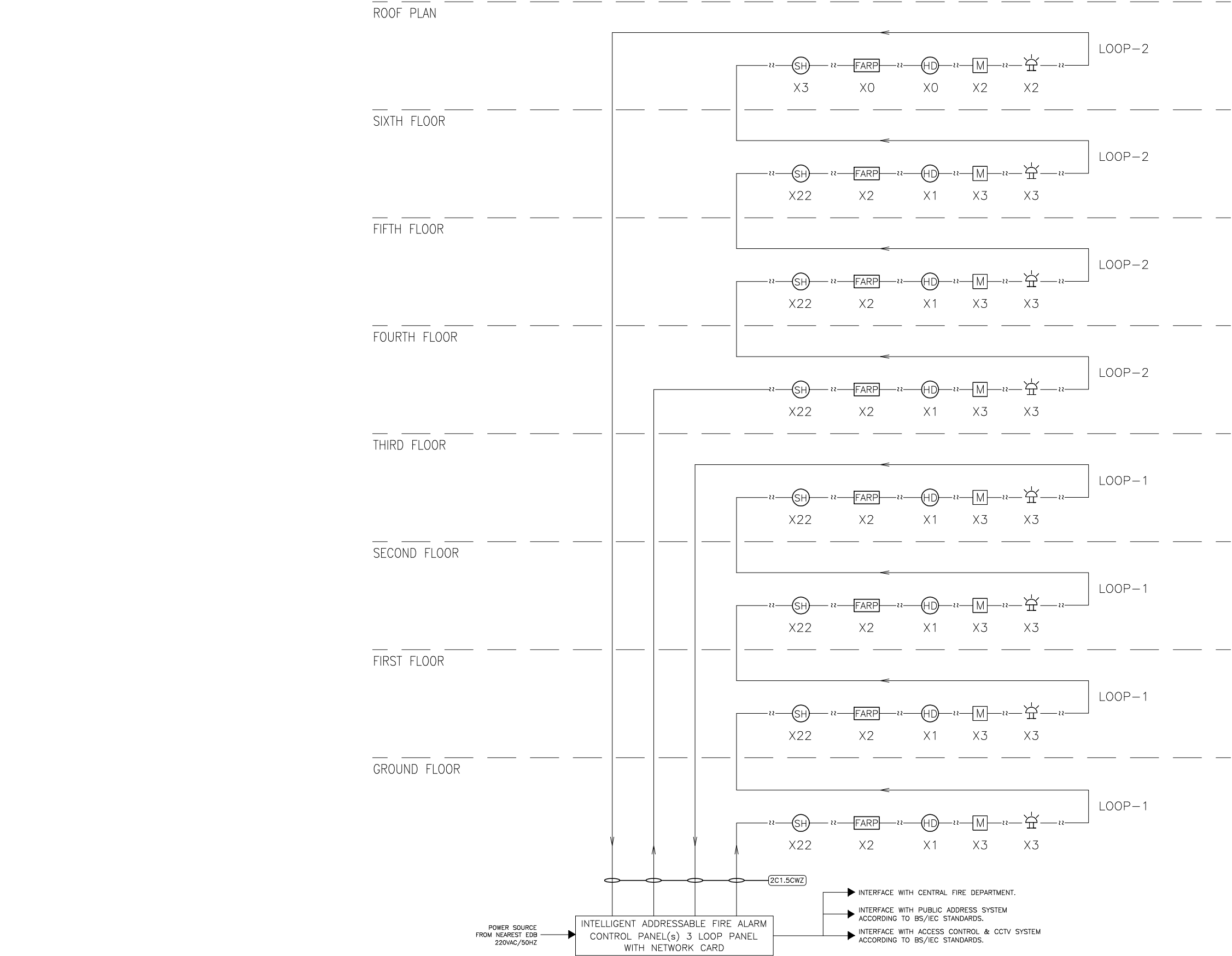
**2nd, 3rd, 4th & 5th FLOOR PLAN**

**DRAWING NOTES**

- FOR LEGEND & GENERAL NOTES REFER DRAWING NO. T001.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
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**CONSTRUCTION DRAWINGS**

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| <div><div>CONSULTANT.</div><div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div></div> | ARCHITECTURE & PLANNING DIVISION KARACHI.<br>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34 |  | 03   |                |                         | DRAWN          | TM        | <div>PROJECT.</div> <div>RABIA RASHID SOORTY COMPLEX</div> | TITLE.<br>SECOND TO FIFTH FLOOR (TYPICAL)<br>NURSE CALL SYSTEM LAYOUT |           | SCALE.<br>N.T.S |
|                                                                                                                                                                                       |                                                                                                                          |  | 02   |                |                         | SUBMITTED      | SA        |                                                            |                                                                       |           |                 |
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FIRE ALARM NETWORK DIAGRAM

- DRAWING NOTES**
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  - THIS DRAWING SHALL BE READ IN CONJUNCTION WITH OTHER TENDER/CONSTRUCTION DRAWINGS. ANY CONTRADICTION, CLASHES, COORDINATION ISSUES ETC., WITH OTHER TRADES/SERVICES/SITE CONDITIONS SHALL BE BROUGHT TO THE ENGINEER'S NOTICE FOR NECESSARY ACTION(S) BEFORE EXECUTION OF WORK(S).
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CONSTRUCTION DRAWINGS

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| <div>CLIENT.</div> <div></div> <div>PATIENTS' AID FOUNDATION<br/>JINNAH POST GRADUATE MEDICAL<br/>CENTER KARACHI</div> |  | <div>CONSULTANT.</div> <div></div> <div>NATIONAL ENGINEERING SERVICES<br/>PAKISTAN (PVT.) LTD.</div> <div>ARCHITECTURE &amp; PLANNING DIVISION KARACHI.<br/>4th Floor, N.I.C.L Building, Abbasi Shaheed Road, Karachi, Tel: 99225430-34</div> |  |  |  | 03   |                |                         |          | DRAWN       | TM  | PROJECT.<br><br>RABIA RASHID SOORTY COMPLEX |  | TITEL.<br>COMMUNICATION RISER DIAGRAM<br>SHEET 03 OF 03 |  | SCALE.          |  |                                                                                            |
|                                                                                                                                                                                                          |  |                                                                                                                                                                                                                                                                                                                                  |  |  |  | 02   |                |                         |          | SUBMITTED   | SA  |                                             |  |                                                         |  | N.T.S           |  |                                                                                            |
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## SECTION – 8003

### GENERAL TECHNICAL REQUIREMENTS FOR STRUCTURED CABLING AND ACTIVE EQUIPMENT

#### 1.0 SCOPE OF WORKS

This section states the general technical conditions and requirements applicable to the design, manufacture, supply, installation, testing, commissioning and training of equipment and material related to the structured cabling and active equipment in this Contract. This specification shall be read in conjunction with the Technical Specifications, Schedule of Prices/BoQ, Drawings, etc. and other relevant provision of the Contract.

The Contractor shall supply and execute the installation of the Structured Cabling and Active Equipment in such a manner that all requirements of the technical specifications and drawings are fully met for proper and satisfactory operation of the systems as intended. The Contractor shall carryout all work in skilled and workmanlike manner in compliance with modern methods of engineering. The Structured Cabling and Active Equipment's shall broadly include but not limited to the following.

- Copper Cabling
- Fiber Optic Cabling
- Firewall Equipment
- Core Switches
- Aggregation Switches
- Access Switches
- Controllers
- Access Points

The Contractor/Bidder shall take the responsibilities of Configuration and Deployment of the proposed Solution and equipment within the Scope of Work.

The Contractor is free to offer any design of equipment which in his opinion will be equal to or better than the requirement in this specification without any additional cost and time. Whereas alternative offer is proposed, the Contractor shall furnish details of such alternatives to enable their merits to be assessed. Contractor shall submit to Engineer detailed calculations and layout drawings for approval.

#### 2.0 AMBIENT CONDITIONS

All material and equipment supplied and installed shall be designed, manufactured and tested to meet the following ambient conditions unless specifically stated otherwise for any material/equipment.

|                                     |   |            |                |
|-------------------------------------|---|------------|----------------|
| Maximum indoor ambient temperature  | : | 50         | Degree Celsius |
| Minimum indoor ambient temperature  | : | Zero       | Degree Celsius |
| Maximum outdoor ambient temperature | : | 50         | Degree Celsius |
| Minimum outdoor ambient temperature | : | Zero       | Degree Celsius |
| Maximum Relative humidity           | : | 95         | Percent        |
| Minimum Relative humidity           | : | 5          | Percent        |
| Maximum Altitude of project         | : | 6          | meters         |
| Design basic wind speed             | : | 80miles/hr |                |

Seismic Zone : Fastest mile wind velocity as  
Per UBC 1997  
2A as per UBC 1997

### **3.0 STANDARDS**

The latest standards, codes and recommendations of reputable institutions shall be applicable for the material and equipment specified herein and for installation work. Such institutions to be BSS, VDE, IEC, NEC, NFPA, HTM, IETF, IEEE, ISO, DIN, NEMA, NEC, ISO, ITU, MEF, CENELAC, TIA, INCITS, MSAs etc. In case the Specifications laid down herein differ from those given in the standards, then the equivalent or better specifications shall govern. Wherever applicable the equipment shall also conform to the requirements of Pakistan Standards and Quality Control Authority (PSQCA) and Pakistan Standard Institution (PSI).

Contractor shall Provide PDF Copy of Standards and Codes applicable to the works and will furnish the same as and when required by the Engineer / Employer.

### **4.0 EXECUTION OF THE WORKS**

The Contractor / Vendor shall bear full and total responsibility for all systems and products selected, designed, furnished, and installed under this Contract.

The design shall take into account all site and environmental factors.

The works shall be performed by workmen skilled in the particular trades involve and shall include all works necessary to complete the installation in a professional manner so as to present a neat and finished appearance.

The Contractor shall supply all accessories and other items essential for the proper performance and completion of the works.

### **5.0 EQUIPMENT**

#### **5.1 Equipment Manufacturer**

The OEM shall have minimum of 10 years presence in Pakistan with established office. The OEM has to be registered with SECP and other Government of Pakistan agencies as required.

For imported equipment, required for the project, only authorized Partners Minimum Silver Partners of the Original Equipment Manufacturer (OEM) shall be considered. Manufacturer Authorization Letter (MAL) / Manufacturer Authorization Foam (MAF) required from the Principal. Bidder must submit the Partnership Certificate for last 5 years along with the MAF.

For all Original Equipment Manufacturer (OEM) equipment, the Contractor shall clearly identify the brand of the equipment, the country where the equipment has been manufactured, as well as the partner who is able to provide local maintenance assistance.

Authorized Partner reference shall include at least (but not limited to)

- Company name,
- Address in Pakistan,
- Contact persons,

- Phone numbers,
- Valid Email,
- Reference of the company in similar fields.
- Authorized Distribution Certificate from OEM.
- Certified Engineer's Certificate After sales, service, spare and support of the proposed solution shall be available with the authorized Partner. Partner technical staff shall be based in Pakistan (list of staff along with CV's to be provided).

Authorized Partner shall also have minimum technical staff with advance level network certifications as follows:

- One number CCIE or HCIE or equivalent
- One number S3 presales or equivalent

Partner failing the above-mentioned requirements are liable not to be considered.

#### 5.2. Country of Origin

Equipment manufactured in **Israel** and **India** are not acceptable. The Contractor shall clearly mention in his bid the origin of the equipment that he is proposing. In case any subassembly or part assembly is from any country other than that the country where the equipment has been manufactured, the Contractor shall disclose this information with his bid. No relaxation/acceptance of equipment from the non-listed countries will be entertained after award of Contract.

#### 5.3. Quality Assurance

All materials and equipment shall be of latest model brand new, unused and of best quality. Standard components of suppliers regularly engaged in their manufacture shall be offered. All equipment and components shall have been thoroughly tested and proven in actual use. Equipment shall have current year of manufacturing.

Manufacturers quality control shall be in accordance with the ISO 9000 - series recommendations. Manufacturers whose quality control has been certified according to ISO 9000 – series will only be acceptable. Certified copy shall be attached to bid.

#### 5.4. IP Degree of Protection

The equipment shall have IP degree of protection as follows, unless mentioned otherwise:

- IP 20 for outdoor areas

#### 5.5 Standard Products

Materials furnished under these specifications shall be standard product of manufacturers regularly engaged in the production of such equipment and shall be the manufacturers latest standard design and latest available model. The proposed product should be the latest and have at least five (05) years of roadmap, documentary evidence is mandatory. Contractor shall submit end of line (EOL) / end of sales (EOS) of each proposed product with its material submittal for engineer's review and approval. Outdated products and products near to end of line (EOL) / end of sales (EOS) shall not be considered.

## 5.6 Licenses

Latest version of all type software / hardware Licenses shall be included the proposed solution and quoted amount. No extra payment shall be made.

## 5.7 Equipment List

The Contractor shall submit to the Engineer for approval a complete list of materials and equipment to be incorporated in the work. This list shall include at least the manufacturers name, catalogue numbers, dimensions, and other descriptive data as may be required. No consideration will be given to partial lists submitted from time to time.

Approval of material will be based on manufacturer's published data submitted with the list approval of the materials and equipment will be tentative subject to submission of complete shop drawings indicating compliance with the Contract documents.

## 5.8 Name Plate

All equipment shall be provided with stainless steel name plates which shall be mounted in a visible position. The entries on the name plate shall be indelibly marked in English by engraving and shall include the data in accordance with relevant IEC and other relevant standard applicable to each equipment. In addition, any specified requirement stated in these specifications shall also be complied.

The Contractor shall also supply all labels, instruction and warning plates necessary for the identification and safe operation of the plant and all instructions shall be in English and where specified in Urdu languages. All labels, nameplates, instructions and warning plates shall be securely fixed to items of plant and equipment with stainless steel rivets, plated self-tapping screws or by other approved means. The use of adhesives will not be permitted

## 5.9 Identification & Labeling

All devices, cabling, wiring and auxiliaries shall be properly labeled for identification. Labeling of equipment shall be done by means of flameproof material using indelible ink/markings. The labeling shall be such as to ensure uniformity and shall facilitate study of control diagrams/ drawings during operation and maintenance.

All labeling shall be of suitable size to be visible from the operating conditions/positions at site.

## 5.10 Shop Drawings

The Contractor shall prepare the detailed shop, coordination, sectional and installation drawings, as well as manufacturer's recommended calculations and obtain approval of the Engineer prior to execution.



## **6.0 UNITS OF MEASUREMENTS**

The units to be followed for indication of dimensions in drawings for any kind of measurements shall be in accordance with the FPS system.

## **7.0 GUARANTEES, TOLERANCES AND REJECTION**

### **7.1 Certificate of Compliance**

The Contractor shall submit to the Engineer a Certificate of Compliance for each item of Plant and Materials, signed by both the Contractor and the Manufacturer, confirming that:

- The Equipment and Materials comply with the Contract (including Specifications / Employer's Requirements);
- They meet applicable standards and Laws;
- They achieve the guaranteed performance stated in the Contract.
- The Contractor and Manufacturer shall be jointly responsible for such compliance.

The Manufacturer's representative shall visit the Site, if required, to confirm proper installation. All related costs shall be borne by the Contractor / Vendor.

### **7.2 Standards and Tolerances**

All Equipment and Materials shall be designed (where applicable), manufactured, installed and tested in accordance with the Contract requirements and applicable Standards and Law. Compliance shall be demonstrated through factory tests and Tests on Completion. Permissible tolerances under the applicable standards shall apply. Exceeding such tolerances shall constitute non-compliance.

### **7.3 Failure to Meet Guarantees**

If any Plant, Materials or part of the Works fails to meet the guaranteed performance during Tests on Completion or during the Defects Notification Period. The Contractor / Vendor shall, at his own cost, promptly repair, modify, or replace the defective item(s). All costs of removal, replacement, reinstallation and retesting shall be borne by the Contractor / Vendor.

### **7.4 Rejection**

If the guaranteed performance is still not achieved after remedial work. The Employer may reject the Equipment, Materials or the relevant part of the Works. The Contractor shall replace the rejected item at his own cost. Minor defects that do not affect safety, operation or integrity shall not justify rejection, provided they are remedied within 28 days of notice.

### **7.5 Completion and Taking-Over**

The Contractor shall complete the Works so they are ready for Taking-Over within the Time for Completion stated in the Contract.

## 7.6 Engineer's Decision

The decision regarding the acceptability or otherwise of the equipment and material offered shall be made by the Employer / Engineer whose decision shall be final.

## 8.0 LANGUAGE

The language for general correspondence, technical information and data, instruction manuals, literature, pamphlets, drawings, standards and test data shall be exclusively in English. All markings on equipment, dials, name plates and other items shall also be legible in English and also in Urdu where specified. Shipping marks, addresses and instruction on individual packages shall also be printed in capital letters in English only.

The Contractor shall be responsible for replacing at his own cost any item lost or misplaced due to inadequate labeling or marking in any language other than English.

## 9.0 STATEMENT OF COMPLIANCE

Bidders shall confirm para wise in writing their compliance with the items of these specifications in the form of a qualified Statement of Compliance at the time of material submittal stage. No consideration will be given to the bid without this important document.

## 10 DOCUMENTATION:

The Contractor / Vendor shall supply after award of contract, three sets of the following information, along with the information specified for each equipment in these specifications. Bids with incomplete information are liable to be rejected.

- a. Fully dimensioned and detailed drawings of the communication systems equipment complete with all information necessary for the evaluation of design by the Engineer. These drawings shall be based on the technical requirements and shall specifically include, but not be limited to the following:
  - i. General Arrangement plan, elevations and sections, complete with all dimensions.
  - ii Reference and descriptive literature pertaining to above drawings and equipment furnished.
- b. All schematic drawings, technical data, literature and information to facilitate proper evaluation of the equipment and material.
- c. Lists of supplies made by Contractor and manufacturer of equipment similar to the equipment to be furnished under this Contract. The lists shall indicate models, type, quantities, and years of supply and names of the purchasers.

## 11 DRAWINGS AND TECHNICAL DATA AFTER AWARD OF WORK

- a) The Contractor shall submit four copies of detailed shop drawings, coordination drawings, technical data, calculations and schedules to the Engineer for review and obtain approval at least 15 working days prior to execution of work. In general, these detailed shall include, but not be limited to the following:

- General Wiring and Cabling Routing Diagrams
- Rack Wiring and Equipment Diagrams
- Conduit and Cable Schedule and Diagrams
- Grounding Layout and Details
- Foundation and Trench Arrangement Drawings
- Plans, Elevations and Sections.
- Manufacturer's Catalogues
- Heat Map Coverage pattern for all proposed Wireless Access Point
- Testing and commissioning protocols / procedures

- b) The purpose of having drawings and other data checked and approved by the Engineer is to assist the Contractor in interpreting the technical specifications so as to eliminate mistakes in the equipment or material actually installed for the work.

#### 11.1 Test plans

The Contractor shall provide test plans that define all the tests required to ensure that the systems meet the technical, operational and performance specifications. The test plans shall identify the capabilities and functions to be tested, including the values and situations that will comprise the test. The Contractor shall submit for Engineer's approval complete details of tests / test plans (testing and commissioning protocols / procedures) at least one week prior to testing. These shall also include details of testing method, testing equipment, diagrams, etc.

The contractor shall develop test procedures from the test plan and design documents. The procedure shall consist of detailed instructions for test set up, execution, and evaluation of test results. The test report shall document the results of the tests.

The Contractor shall furnish all labour, materials, tools and equipment required to install, connect, test and commission all communication equipment specified herein, whether or not such equipment is furnished by him or by others. No separate payment shall be made for any tools and cost shall be deemed to be included in the cost of the Contract.

For all equipment to be installed by the Contractor, the Contractor shall supply and install all erection materials such as foundation bolts, washers, nuts, etc. as required and without any additional costs.

The Contractor shall set out the works himself as per Specifications and Drawings and shall properly position the equipment on specified foundation/location. In general, the manufacturer's instructions for installation shall be followed. Any defect or faulty operation of equipment due to the Contractor not following the manufacturer's instructions shall be corrected and repaired by the Contractor at his own cost.

#### 11.2 Operational and Maintenance Manuals

The Contractor shall provide copies of the manuals bound in hardback, loose leaf binders to Engineer. Provide a draft copy with the Performance Verification Test Procedure for use during site tests and update with any changes required prior to final acceptance.

The Contractor shall identify each manual's contents on the cover. The manuals shall include the names, addresses, and telephone numbers of each sub-contractor installing equipment and systems, and of the nearest service representative for each item of equipment and each system. The manuals shall have a table of contents and tab sheets. The contractor shall update all manuals to include modifications made during installations check out, and acceptance. Manuals provided shall include:

- Functional Design Manual Hardware Manual
  - Operator's Manual
  - Software Manual
  - Maintenance Manual
- a) Functional Design Manuals: The Functional Design Manuals shall identify the operational requirements for the system and explain the theory of operation, and specific functions.
- Hardware and software functions, interfaces and requirements shall be provided for all system operating models.
- b) Hardware Manuals: The Hardware Manuals shall describe all equipment provided, including:
- general description and specifications
  - installation and check-out procedures
  - electrical schematics and layout drawings
  - alignment and calibration procedures
  - manufacturers repairs parts list indicating source of supply
  - interface definition
  - signal identification and timing diagrams
- c) Software Manual: The Software Manual shall describe programming and testing, starting with a system overview and proceeding to a detailed description of each software module. The manual shall be oriented to programmers and shall describe all information necessary to enable proper integration, loading, testing and program execution.
- d) Operator's Manual: The Operator's Manual shall provide all procedures and instructions for operation of the system, including:
- use of the systems, command and application details
  - alarm presentation
  - alarm dictionary
  - recovery and re-start procedures
  - command directory
  - preventive maintenance schedule
  - operator's consoles
- e) Maintenance Manual: The Maintenance Manual shall provide description of maintenance for all equipment including inspection, periodic preventive maintenance, fault diagnosis, and repair or replacement of defective equipment.

## 12.0 SPECIAL TOOLS AND EQUIPMENT



Special tools and equipment for the maintenance, inspection and repair of the individual equipment shall be supplied by the Contractor in sufficient quantity to equip the maintenance personnel for routine work. No separate payment shall be made for any special tools and cost shall be deemed to be included in the cost of the Contract.

### **13.0 INSTALLATION**

The Contractor shall install all system components and appurtenance in accordance with manufacturer's recommendation and provide all necessary interconnections, services and adjustments required for a complete operable system.

The Contractor shall provide instrumentation and communication grounding as necessary. All equipment installed outdoors shall be housed in a minimum IP65 enclosure, unless otherwise shown. All penetrations shall be sealed to preclude the entry of water using a silicone material.

### **14.0 WARRENTY OF GOODS**

The Contractor shall provide Five (05) year complete comprehensive warranty from his proposed Original Equipment Manufacturer (OEM) for any of the equipment furnished in this Contract as well as local support for the proposed Solution.

### **15.0 AFTER – SALE SERVICE**

The Contractor shall be able to provide Principal Backed support. For 05 years following the substantial acceptance of the related equipment/system. Partner shall have the capability to provided next day parts replacement support for up to 05 years and 24/7 remote support. Bidder must ensure to propose in the BOQ.

### **16.0 SITE TESTING**

The Contractor shall provide field testing of the Communication Systems and on-site operational acceptance test of the complete operational systems in the presence of the Engineer and Employer.

### **17.0 MAINTENANCE AND SERVICES**

The Contractor shall provide all services, materials, and equipment necessary for successful operations of the entire system during Warranty period. Provide necessary material required for the work. Minimize impacts on facility operations when performing scheduled adjustments and non-scheduled work. All equipment/system shall have the provision of tele maintenance / trouble shooting by the manufacturer of the equipment from their factory/service facility. The necessary modem/Connectivity mechanism shall be incorporated in the equipment supplied and it shall be totally free during Warranty Period.

### **18.0 MEASUREMENT AND PAYMENT**

Unless specifically stated otherwise, the cost of all material, equipment, labour, services, etc. required to complete the work shall be considered to be included in the amounts stated against each item of the Schedule of Prices.

For items with specified quantities as given in the Schedule of prices, adjustment shall be made in the amount payable to the Contractor in accordance with the actual quantity of work acceptably completed by the Contractor. The payment shall be

made at the unit rates stated in the Schedule of Prices. No such adjustments shall be made for items specified in 'Lot' and 'Job' units.

Unless specifically provided for in the Schedule of Prices and Quantities, no payment shall be made for the works stated in this section. Cost shall be deemed to be included in the cost of the Contract.

The rates quoted shall be inclusive of all works and services required for completion of each item as a complete job of work also including surveys, investigations, associated civil works, co-ordinations, etc.

The measurement and payment of items under Schedule of Prices shall be made as under:

**18.1 Items with Unit of Measurement as Number (No.)**

- a) Measurement: Measurement of acceptably completed works of these items will be made on the basis of actual number provided, installed in position, tested and commissioned.
- b) Payment: Payment will be made for acceptable measured quantity of respective items on the basis of unit rate per number quoted in the Schedule of Prices. The unit rate shall include all cost of providing and installing associated accessories, installation materials, etc. and shall constitute full compensation for all the works related to these items.

**18.2 Items with Unit of Measurement as Lot / Job'**

- a) Measurement: Measurement of acceptably completed works of items stated in the unit of Lot / Job, provided and wherever required installed in position, tested and commissioned.
- b) Payment: Payment will be made for acceptable measured quantity of respective items on the basis of lump-sum price per Lot / Job quoted in the Schedule of Prices and shall constitute full compensation for all the works related to these items.

**18.3 Items with Unit of Measurement as "Running feet" (Rft.)**

- a) Measurement: Measurement of acceptably complete works of this item will be made on the basis of actual length in feet as measured along the centre line of respective work acceptably provided, installed in position, tested and commissioned. No measurement shall be made of sag in overhead conductors and slack in underground cables.
- b) Payment: Payment will be made for acceptable measured quantity of overhead conductor/cable on the basis of unit rate per feet length quoted in the Schedule of Prices. The unit rate shall include all cost of equipment, material and accessories and shall constitute full compensation for all the works related to the above items. No payment shall be made for sag in overhead conductors and slack in underground cables.

\*\*\* End of Section 8003 \*\*\*

## SECTION – 8312

### STRUCTURED CABLING NETWORK

#### 1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, connecting, testing, commissioning and training of all material and services for Structured Cabling Network as specified herein, as shown on the Contract Drawings and stated in the Bill of Quantities.

The Contractor shall discuss the Structured Cabling Network Layout with the Engineer and co-ordinate at site with other services for exact route, location and position of the system.

The Structured Cabling Network work with accessories shall also comply with the General Specifications for 8003 and with other relevant provisions of the Contract Document.

#### 2.0 GENERAL

To ensure optimum performance, passive equipment (cabling, patch panel, patch cord etc.) of the structured cabling network and CCTV system etc. shall be sourced from the one manufacturer. This shall eliminate potential problems such as electrical and mechanical mismatch between different manufacturers.

The characteristics of the cabling system shall support all application including Gigabit and 10 Gigabit Ethernet.

The system shall be of 'star' topology and shall consist of the following:

- Horizontal cable.
- Consolidation point cable (CP cable)
- Multi-user Telecommunications Outlet (MUTO);
- Telecommunication outlet (TO).

This will support analogue and digital applications, data, local area network, and video on a common platform.

#### 3.0 APPLICABLE STANDARDS AND CODES

The following standards and all “normative addendums” shall be applicable to this document and must be adhered to for any installation work performed.

|                    |                                                                                                                                                                                                                                                                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO/IEC 11801      | Information technology – Generic cabling for customer premises.                                                                                                                                                                                                    |
| ISO/IEC/TR3 8802-1 | Information technology – Telecommunication and information exchange between systems – local and metropolitan area networks – Specific requirements – Part 1 overview of Local Area Network Standard.                                                               |
| ISO/IEC 8802-3     | Information technology – Telecommunication and information exchange between systems – local and metropolitan area networks – Specific requirements – Part 3 Carrier sense multiple access with collision detection access method and physical layer specifications |

|                  |                                                                                                                        |
|------------------|------------------------------------------------------------------------------------------------------------------------|
| ISO/IEC 61935-1  | Generic specification for the testing of generic cabling in accordance with ISO/IEC 11801 – Part 1: Installed cabling. |
| IEC 60364-1      | Electrical installation of buildings – Part 1: Scope, object and fundamental principles.                               |
| IEC 60950        | Safety of information technology equipment, including electrical business equipment.                                   |
| EN50173          | Information technology – Generic cabling for customer premises.                                                        |
| EN50174-1        | Information technology – Cabling installation. Specification and quality assurance.                                    |
| EN50174-2        | Information technology – Cabling installation. Installation panning practices inside buildings.                        |
| ANSI/TIA/EIA-568 | Commercial Building Telecommunications Cabling Standard.                                                               |
| ANSI/TIA/EIA-569 | Commercial Building Standard for Telecommunications Pathways and Spaces.                                               |
| TIA/EIA TSB-72   | Centralized Optical Fibre Cabling Guidelines.                                                                          |
| TIA/EIA TSB-75   | Additional Horizontal Cabling Practices for Open Offices.                                                              |

This list is not restrictive. The contractor shall have to take account of the new standards which could come into effect during the progress of design and installation.

## 4.0 MATERIALS

### 4.1 Telecommunication Wall Outlets

Wall outlets must be available with RJ45 sockets. The wall outlets should be fully shuttered. The copper outlets must be capable of being flush mounted. Wall outlets must have space for visibly labelling each jack or socket.

The Face Plate shall have the following specifications:

|                                 |                                                           |
|---------------------------------|-----------------------------------------------------------|
| Environment                     | Indoor                                                    |
| Halogen-free                    | Yes                                                       |
| RoHS                            | Free of hazardous substances according to RoHS 2011/65/EU |
| Environmental compatibility     | Recyclable                                                |
| Temperature range, installation | 0 °C to 50 °C                                             |
| Temperature range, operation    | -20 °C to 60 °C                                           |
| Colour                          | White                                                     |
| Number of ports                 | As specified                                              |
| Footprint                       | -                                                         |
| Height                          | 86 mm                                                     |
| Width                           | 86 mm                                                     |
| Label Holder                    | Yes                                                       |



|                    |                    |
|--------------------|--------------------|
| Suitable for Cable | CAT 6A             |
| Protection         | Jacks with Shutter |

## 4.2 Copper Patch Panels (CAT 6A Loaded)

19" panels must be available to take a minimum of 24 copper loaded RJ45 jacks other connection densities must be available.

The panels will be designed for keystone fitting of the jacks / sockets (as specified in this specifications).

The copper panels will have cable management and tie down points (where required) for copper cable.

Panels must have the facility to label each socket/jack.

Colored identifiers should be available in at least 4 colours to allow visible identification of jacks / sockets.

Blanking plugs for unused ports must be available to suit the patch panel colour.

The Copper Patch Panels shall also have the following specifications:

|                                 |                                                           |
|---------------------------------|-----------------------------------------------------------|
| Environment                     | Indoor                                                    |
| Halogen-free                    | Yes                                                       |
| RoHS                            | Free of hazardous substances according to RoHS 2011/65/EU |
| Environmental compatibility     | Recyclable                                                |
| Temperature range, installation | 0 °C to 50 °C                                             |
| Temperature range, operation    | -20 °C to 60 °C                                           |
| Colour                          | To be decided at Submittal Approval Stage                 |
| Number of ports                 | As specified                                              |
| Footprint                       | -                                                         |
| Height                          | 1U                                                        |
| Width                           | 19 inches                                                 |
| Label Holder                    | Yes                                                       |
| Suitable for Cable              | CAT 6A                                                    |
| Protection                      | Jacks with Shutter                                        |
| Earth / Grounding               | Earth point to be provided                                |
| Mounting                        | 19inch Rack Mount                                         |
| Cable Termination Mechanism     | For each cable                                            |
| Material                        | Aluminum / High Grade Steel                               |

### 4.3 Patch Cord Management

1U Patch cord management panels should have a minimum of 5 rings to accommodate up to 72 patch cords.

The Patch Cord Management shall also have the following specifications:

|                                 |                                                           |
|---------------------------------|-----------------------------------------------------------|
| Environment                     | Indoor                                                    |
| Halogen-free                    | Yes                                                       |
| RoHS                            | Free of hazardous substances according to RoHS 2011/65/EU |
| Environmental compatibility     | Recyclable                                                |
| Temperature range, installation | 0 °C to 50 °C                                             |
| Temperature range, operation    | -20 °C to 60 °C                                           |
| Colour                          | To be decided at Submittal Approval Stage                 |
| Number of Rings                 | 05 Minimum                                                |
| Height                          | 1U                                                        |
| Width                           | 19 inches                                                 |
| Mounting                        | Mount in Rack                                             |
| Material                        | Aluminum / High Grade Steel                               |

### 4.4 Patch Cables

RJ-45 copper patch cords shall be Category 6A. The copper patch cords must be made from stranded wires for full flexibility. They must comply with ISO 11801. The patch cords must be available in a range of lengths to facilitate easy patch cord management.

The cable shall have the following performance:

|                                 |                                                                        |
|---------------------------------|------------------------------------------------------------------------|
| Area/Range of Application       | 1000Base-T; 2,5GBase-T; 5GBase-T; 10GBase-T/FDDI; ATM                  |
| Category                        | 6A                                                                     |
| Cable Type                      | UUTP                                                                   |
| Halogen-free                    | Yes                                                                    |
| Third Party Certificate         | Yes                                                                    |
| Third Party Certificate         | PVP Certificate                                                        |
| Flame Retardance                | Flame retardant according to IEC 60332-1-2 (single cable)              |
| RoHS                            | Free of hazardous substances according to RoHS 2011/65/EU              |
| Design and Test Criteria        | Compliant with PoE / PoE++ IEEE 802.3af, IEEE 802.3at and IEEE 802.3bt |
| Halogen content test            | Low smoke according to IEC 61034                                       |
| Level of corrosion              | Non-corrosive according to IEC 60754-2                                 |
| Temperature Range, Installation | 0 °C to 50 °C ( 32 °F to 122 °F)                                       |
| Temperature Range, Operation    | -20 °C to 60 °C ( -4 °F to 140 °F)                                     |
| Transport and Indoor Storage    | Dry environment, no direct sunlight, room temperature ≤ 40 °C          |
| Conductor Insulation            | Halogen-free foam-skin material                                        |
| Twisting                        | 2 cores to a pair                                                      |
| Pair screen                     | Al-laminated foil around each pair                                     |
| Overall screen                  | Copper braid, tinned                                                   |

|                                             |                                            |
|---------------------------------------------|--------------------------------------------|
| Outer Jacket Material                       | LSZH/FRNC                                  |
| Outer Jacket Color                          | To be approved                             |
| Outer Diameter                              | 5.9 mm                                     |
| Fire Load                                   | 0.43 MJ/m                                  |
| Min. Bend Radius Installation               | 47 mm                                      |
| Connector Type                              | RJ45 - 8/8                                 |
| Durability Cycles                           | 750 N/A                                    |
| Connector Material                          | Pin gold plated 50μ inch                   |
| Mutual capacity                             | 1600 pF/km                                 |
| Max. loop resistance                        | 290 Ω/km                                   |
| DC resistance unbalance                     | 4.3 %                                      |
| Insulation Resistance                       | 5000 MΩ*km                                 |
| Impedance Zo at 1-100 MHz                   | 100 Ω ± 5% at 100 MHz                      |
| Minimum Surface Transfer Impedance of Cable | <10 mΩ/m at 10 MHz                         |
| Length                                      | As specified in BoQ                        |
| Latch Protection                            | Additional latch protection to be provided |

#### 4.5 Copper Cable (CAT-6A)

Copper cable will be 100 Ohm impedance. The cable will be Category 6A to match the system specification. The cables will be available in 4 pair or 2 x 4 pair.

The cable shall have the following performance:

|                                 |                                               |
|---------------------------------|-----------------------------------------------|
| Temperature Range, Installation | 0 °C to 50 °C                                 |
| Temperature Range, Operation    | -20 °C to 60 °C                               |
| Environment                     | Indoor                                        |
| Category                        | 6A                                            |
| Cable Type                      | U/UTP                                         |
| Bandwidth                       | 550 MHz                                       |
| Halogen-free                    | Yes                                           |
| Construction                    | Simplex, 4P                                   |
| Reaction to fire                | Eca                                           |
| Conductor                       | Copper Wire, AWG 24                           |
| Conductor Insulation            | Halogen-free foam-skin material               |
| Twisting                        | 2 cores to a pair                             |
| Outer Jacket Material           | LSZH™                                         |
| Outer Jacket Color              | Green                                         |
| Fire Load                       | 1260 MJ/m                                     |
| Nominal Outer Diameter          | 7.3 mm x 15 mm                                |
| Min. Bend Radius Installation   | 8x Cable-Ø (over flat side)                   |
| Maximum Tensile Strength        | 160 N                                         |
| Conductor resistance unbalance  | 2 %                                           |
| Delay skew                      | 45 ns/100 m                                   |
| Max. loop resistance            | 190 MΩ*km                                     |
| Propagation delay               | 545 ns/100 m                                  |
| Voltage rating                  | Less than 75 V d.c max and less than 50 V a.c |

|                                         |                                                                                            |
|-----------------------------------------|--------------------------------------------------------------------------------------------|
|                                         | max                                                                                        |
| Insulation Resistance                   | 5000 MΩ*km                                                                                 |
| Surface transfer impedance              | 10 mΩ                                                                                      |
| Propagation Velocity at >10 MHz (NVP*c) | 69 %                                                                                       |
| Coupling Attenuation                    | 40 dB                                                                                      |
| Approvals and Listings                  | IEC 61156-5; EN 50288-11-1, ISO/IEC 11801 Ed. 2.2; EN 50173-1, ANSI/TIA -568-C-2; IEC60304 |
| Design and Test Criteria                | IEEE 802.3 an 1000 Base-TCompliant with PoE / PoE++ IEEE 802.3af, IEEE 802.3at             |
| Flame propagation test                  | Flame retardant according to IEC 60332-1-2 (single cable)                                  |
| Smoke density                           | Low Smoke to IEC 61034                                                                     |
| Halogen content test                    | Zero Halogen to IEC 60754-1                                                                |
| Level of corrosion                      | Non-corrosive according to IEC 60754-2                                                     |

| Electrical Characteristics                   |      |      |      |      |      |      |       |      |
|----------------------------------------------|------|------|------|------|------|------|-------|------|
| Frequency [MHz]                              | 4    | 10   | 20   | 63   | 100  | 250  | 500   | 550  |
| Attenuation according to Standard [db/ 100m] | 3.8  | 5.9  | 8.4  | 15.0 | 19.1 | 31.1 | 45.3  |      |
| Typical attenuation [db/ 100m]               | 3.6  | 5.7  | 8.3  | 14.8 | 19.0 | 31.0 | 43.0  | 50.0 |
| NEXT according to Standard [db/ 100m]        | 66.3 | 60.3 | 55.8 | 48.4 | 45.3 | 39.3 | 34.8  |      |
| Typical NEXT Values [db/100m]                | 71.0 | 65.0 | 61.0 | 53.0 | 50.0 | 44.0 | 40.0  | 39.0 |
| ACR-N according to Standard [db/ 100m]       | 62.5 | 54.4 | 47.4 | 33.4 | 26.2 | 8.3  | -10.4 |      |
| Typical ACR-N Values [db/100m]               | 68.0 | 60.0 | 38.2 | 38.2 | 13.0 | 13.0 | 40.0  | 39.0 |

#### 4.6 Copper Jack / Connector (CAT-6A)

The copper cable jack shall have the following performance:

|                                 |                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------|
| Dust Protection                 | Yes                                                                                  |
| Category                        | 6A                                                                                   |
| Halogen-free                    | Yes                                                                                  |
| Bandwidth                       | 550 MHz                                                                              |
| Flame Retardance                | Class UL94 V-0                                                                       |
| RoHS                            | Free of hazardous substances according to RoHS 2011/65/EU                            |
| Transmission Performance Link   | Class EA (ISO/IEC 11801 Ed. 2.2 2011), 10 Gigabit Ethernet according to IEEE 802.3an |
| Component Standard              | IEC 60603-7-51 (Edition 1.0 2010)                                                    |
| Environmental Compatibility     | Recyclable and free of heavy metal                                                   |
| Temperature Range, Installation | -40 °C to 70 °C ( -40 °F to 158 °F)                                                  |
| Jack Type                       | RJ45 - 8/8                                                                           |



|                                               |                                                                                                                |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Number of Pieces                              | 2                                                                                                              |
| Housing Material                              | Metal                                                                                                          |
| Insulation diameter max.                      | 9 mm                                                                                                           |
| Wire Conductor+Insulation diameter max.       | 12 mm                                                                                                          |
| Durability of RJ45 Jack (PoE)                 | ≥ 750 mating cycles under load (52 volt, 860 mA, 90 watt) in compliance with technical transmission parameters |
| Durability of RJ45 Jack                       | ≥ 750 mating cycles possible, EN 186000-1, test 4.5.32                                                         |
| Cable Entry                                   | 0° to 360° Shield contact and strain relief                                                                    |
| IDC Contacts                                  | Suitable for AWG 27 - AWG 26 flex wires                                                                        |
| Contact surface                               | Gold pad in contact area                                                                                       |
| Reproducibility                               | Several times reusable                                                                                         |
| Housing Material                              | Metal                                                                                                          |
| Input to output DC Resistance Unbalance       | < 50 MΩ                                                                                                        |
| Ampacity                                      | ≤ 1250 mA (DC)                                                                                                 |
| Input to output DC Resistance                 | < 200 MΩ                                                                                                       |
| Electric strength DC (conductor/conductor)    | ≥ 1000 V DC/AC peak                                                                                            |
| Electrical strength DC (conductor/test plate) | ≥ 1500 V DC/AC peak                                                                                            |
| Insulation Resistance                         | ≥ 500 MΩ*km                                                                                                    |
| Transfer Impedance                            | ≤ 200 MΩ at 10 MHz                                                                                             |
| Third Party Certificate                       | PVP Certificate                                                                                                |
| Cable Termination                             | Tool less                                                                                                      |

#### 4.7 LC Duplex Adaptor and Connector

|       |                                                                                                                                                                                                                                                                              |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Specs | <p>Variety of colors</p> <p>Supports TIA/EIA-568-B.3</p> <p>Allows for customization</p> <p>Available with ceramic alignment</p> <p>Variety of applications</p> <p>RoHS Free of hazardous substances according to RoHS 2011/65/EU</p> <p>Intermateability TIA/EIA-604-10</p> |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### 4.8 Fiber Patch Cables (LC duplex to LC Duplex)

Fiber patch cords shall be Category LC duplex to LC Duplex.

The cable shall have the following performance:

|                         |                                                           |
|-------------------------|-----------------------------------------------------------|
| Flame Rating            | Plenum (OFNP)                                             |
| Fiber Category          | 50 µm MM (OM4)                                            |
| Cable Assembly Type     | Two Fiber                                                 |
| Cable Type              | Tight-Buffered                                            |
| Installation Methods    | General Building Applications, Horizontal, Plenum         |
| RoHS                    | Free of hazardous substances according to RoHS 2011/65/EU |
| Fiber Count             | 2                                                         |
| Outer Jacket Color      | Yellow                                                    |
| Fiber Type              | Multi-Mode Ultra-Bendable Fiber                           |
| Nominal Outer Diameter  | 3 mm (0.12 in )                                           |
| Fiber Code              | E                                                         |
| Performance Option Code | 31                                                        |
| Fiber Category          | OS2                                                       |
| Fiber Type              | Single-mode (OS2) / 250 µm                                |
| Fiber Name              | Single-mode (OS2)                                         |
| Maximum Attenuation     | 0.4 dB/km / 0.4 dB/km / 0.4 dB/km                         |
| Wavelengths             | 1310 nm / 1383 nm / 1550 nm                               |
| Fiber Compliance        | ITU-T G.652.D                                             |
| Reflectance, Typical    | ≤ -58 dB                                                  |
| Polish                  | UPC                                                       |
| Insertion Loss, Typical | 0.15 dB                                                   |
| Boot Color              | To be decided at Submittal Approval Stage                 |
| Connector Type          | LC duplex                                                 |
| Ferrule Material        | Ceramic                                                   |
| Housing Color           | To be decided at Submittal Approval Stage                 |
| Housing Material        | Composite                                                 |
| Length                  | As specified                                              |

# **Single Mode Cable:**

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Specs | <p>General Specifications</p> <p>Environment Outdoor</p> <p>Application Direct Buried, Duct</p> <p>Cable Type Single Tube</p> <p>Product Type Corrugated Steel Armor</p> <p>Fiber Category SM (OS2)</p> <p>Temperature Range</p> <p>Installation -5 °C to 50 °C</p> <p>Operation -20 °C to 60 °C</p> <p>Storage -25 °C to 70 °C</p> <p>Cable Design</p> <p>Fiber Count 12</p> <p>Fiber Coloring Blue, Orange, Green, Brown, Slate, White, Red, Black, Yellow, Violet, Rose, Aqua</p> <p>Buffer Tube Diameter 3 mm</p> <p>Buffer Tube Color Yellow</p> <p>Number of Ripcords 2</p> <p>Tensile Strength Elements and/or Armoring - Layer 1 Corrugated steel tape armor with dielectric strength elements (aramid yarns) and swellable elements</p> <p>Outer Jacket Material Linear Low Density Polyethylene (LLDPE)</p> <p>Outer Jacket Color Black</p> <p>Outer Jacket Nominal Thickness 1.5 mm</p> <p>Mechanical Characteristics Cable</p> <p>Nominal Outer Diameter 7.5 mm</p> <p>Min. Bend Radius Installation 150 mm</p> <p>Min. Bend Radius Operation 110 mm</p> <p>Max. Tensile Strength for Installation 1000 N</p> <p>Crush Resistance 2000 N/10 cm</p> <p>Chemical Characteristics</p> <p>RoHS Free of hazardous substances according to RoHS 2011/65/EU</p> |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### 4.9 Rack Mount Multimode Fiber Patch Panels (OM4 Loaded)

19" panels must be available to take a minimum of 12 & 24 LC duplex shuttered fiber connections per 1U. Other connection densities must be available

The fiber panels will have cable management, fiber management and slack storage for fiber cables and ensure that the minimum bend radius is not exceeded.

Fiber panels must be able to manage a range of cable sizes from 2 fiber cables to 96 fiber cables. They must be sliding or front loading to ensure easy access to the fiber.

Panels must have the facility to label each socket/jack.

Colored identifiers should be available in at least 4 colours to allow visible identification of jacks / sockets.

Blanking plugs for unused ports must be available to suit the patch panel colour.

The Fiber Patch Panels shall also have the following specifications:

|                                 |                                                           |
|---------------------------------|-----------------------------------------------------------|
| Environment                     | Indoor                                                    |
| Halogen-free                    | Yes                                                       |
| RoHS                            | Free of hazardous substances according to RoHS 2011/65/EU |
| Environmental compatibility     | Recyclable                                                |
| Temperature range, installation | 0 °C to 50 °C                                             |
| Temperature range, operation    | -20 °C to 60 °C                                           |
| Colour                          | To be decided at Submittal Approval Stage                 |
| Access Type                     | Front, Top and rear access, slidable                      |
| Lockable                        | Yes                                                       |
| Number of Modules               | 12                                                        |
| Number of Panels                | 12                                                        |
| Cable Entry Type                | Side brush entry                                          |
| Fiber Capacity                  | 144                                                       |
| Lock Position                   | Rear                                                      |
| Mounting Type                   | Rack mount 19"                                            |
| Height                          | 1U                                                        |
| Adaptor Type Front              | Shuttered LC Duplex                                       |
| Number of Adaptors per Panel    | 6                                                         |
| Polarity                        | To be decided at Submittal Approval Stage                 |
| Module Insertion Loss           | 0.5 db                                                    |
| Wavelengths                     | 850 nm / 1300 nm                                          |
| Fiber Category                  | OM4                                                       |
| Connector A Type                | LC duplex                                                 |
| Connector A Polish              | PC                                                        |
| Connector A Ferrule Material    | Composite                                                 |
| Connector A End Face Type       | PC                                                        |
| Connector B Type                | MTP (Pinned)                                              |



|                              |         |
|------------------------------|---------|
| Connector A Polish           | PC      |
| Connector A Ferrule Material | Ceramic |

#### 4.10 Multimode Optical Fiber Cable (OM4)

50um/125um Multimode mode (OM4) LSZH fiber optic cable shall be provided for indoor/outdoor use. The multimode cable must operate at both 850 nm and 1300 nm. The cable design shall be dry, gel free with water blocking technology.

Optical performance of the Cable shall be as following:

|                                                       |                                                                                                                                                          |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cable type                                            | Loose tube                                                                                                                                               |
| Product type                                          | Dielectric                                                                                                                                               |
| Fibre category                                        | 50 µm MM (OM4)                                                                                                                                           |
| Flame rating                                          | LSZH/FRNC                                                                                                                                                |
| Coding according to EN 60794-1-1 (DIN VDE 0888-100-1) | U-BQ(ZN)BH                                                                                                                                               |
| Cable geometry                                        | Round                                                                                                                                                    |
| Reaction to Fire                                      | B2ca-s1b, d1, a1                                                                                                                                         |
| RoHS                                                  | Free of hazardous substances according to RoHS 2011/65/EU                                                                                                |
| Waterblocking                                         | IEC 60794-1-22 Method F5B                                                                                                                                |
| Flame propagation test                                | Flame retardant according to IEC 60332-1-2 (single cable) and IEC 60332-3-24 (bunch of cables)                                                           |
| Reaction to Fire Requirements                         | Reaction to fire according to EN 50575 and EN 13501-6                                                                                                    |
| Smoke density                                         | Low Smoke to IEC 61034                                                                                                                                   |
| Halogen content test                                  | Zero Halogen according to IEC 60754-1                                                                                                                    |
| Level of corrosion                                    | Non-corrosive according to IEC 60754-2                                                                                                                   |
| Temperature range, installation                       | -5 °C to 60 °C                                                                                                                                           |
| Temperature range, operation                          | -40 °C to 70 °C                                                                                                                                          |
| Temperature range, storage                            | -40 °C to 70 °C                                                                                                                                          |
| Cable marking                                         | Metre - Handset - CE 23 EN 50575 B2ca-s1b,d1,a1 - Sine - CORNING - Fibre Optic Cable - Year - U-BQ(ZN)BH 2x12 MMF ClearCurve® OM4 LT 2.0 - LSZH(TM)/FRNC |
| Central element                                       | Dielectric with FRNC/LSZH coating                                                                                                                        |
| Fibre count                                           | As Specified                                                                                                                                             |
| Outer jacket colour                                   | Black                                                                                                                                                    |
| Outer jacket material                                 | Flame-retardant, non-corrosive/low-smoke, zero-halogen (FRNC/LSZH) material                                                                              |
| Outer jacket nominal thickness                        | 1.4 mm                                                                                                                                                   |
| Buffer tube diameter                                  | 1.95 mm                                                                                                                                                  |
| Number of active tubes                                | 2                                                                                                                                                        |
| Number of filling elements                            | 4                                                                                                                                                        |
| Number of tube positions                              | 6                                                                                                                                                        |
| Fibre colouring                                       | To be decided at Submittal Approval Stage                                                                                                                |
| Fibres per tube                                       | 12                                                                                                                                                       |
| Colour Code Standards                                 | Telcordia                                                                                                                                                |
| Crush resistance                                      | 2200 N/10 cm                                                                                                                                             |
| Max. tensile strength for installation                | 3000 N                                                                                                                                                   |

|                                         |                          |
|-----------------------------------------|--------------------------|
| Min. bend radius installation           | 190 mm                   |
| Min. bend radius operation              | 190 mm                   |
| Nominal outer diameter                  | 9.5 mm                   |
| Fibre code                              | T                        |
| Performance option code                 | 98                       |
| Fibre category                          | OM4                      |
| Fibre Type                              | Multimode                |
| Fibre name                              | 50 µm MM (OM4)           |
| Maximum Attenuation                     | 2.8 dB/km / 1.0 dB/km    |
| Wavelengths                             | 850 nm / 1300 nm         |
| Fibre compliance                        | IEC 60793-2-10           |
| Fibre core diameter                     | 50 µm                    |
| Cladding diameter                       | 125 µm                   |
| Coating diameter                        | 242 µm                   |
| Serial 1 gigabit ethernet               | 1000 m / 600 m           |
| Serial 10 gigabit ethernet              | 550 m / -                |
| Minimum effective modal bandwidth (EMB) | 4700 MHz*km / -          |
| Min. overfilled launch (OFL) bandwidth  | 3500 MHz*km / 500 MHz*km |

#### 4.11 19" Cabinet

Cabinet shall be 19 inch, with tie and retainers for cabling system and 600mm x 600mm, 600mm x 800mm and 800mm x 1000mm cabinet shall be suitable to install:

- Color of rack: Black / as required by architect.
- Plexiglass door.
- Frame thickness 2mm, mounting rail thickness 2mm, roof thickness 1.63mm, rear door thickness 1.63mm and side panels thickness 1.2mm.
- Two / Four cooling fans (As Required).
- Cable entries from both top and bottom panel with brush strips.
- Cabling guide system vertical and horizontal in each internal side of cabinet for front and back side.
- Earthing / grounding point.
- Front and Back Door lock with key locking capacities
- Side panels shall have lockable features
- Right or left opening of door of rack shall be provided as per requirement of room.
- A cabling guide system in each internal side of the cabinet for the front side;
- A cabling guide system in each internal side of the cabinet for the backside;
- An earthing point, multi-socket strip for supply power to the active equipment;
- Metallic door shall be provided with key locking capabilities.
- A surface finish featuring Degrease, Acid Pickling, Rust Prevention and Parkerizing, Pure Water Cleaning and a Static Electricity Powder Coating

Power distribution unit (PDU) must have following specification:

- At least two extra sockets as per requirement of active equipment installed inside rack.

- PDU with sockets compatible with active equipment / data switches.
- Industrial male plug / compatible with power socket.
- Two PDUs in each rack for active equipments that have dual power supply.

## **5.0 INSTALLATION**

### **5.1 Conformance of the Installation to Specification**

The Contractor will:

Install all the cable plant in accordance with the manufacturer's guidelines and relevant specification.

Ensure all the steps have been taken to ensure that the terminal equipment can be installed to specification and mount any equipment or electronics as close to the wiring wall fields (if appropriate) as possible, taking into consideration future growth, to facilitate administration and service.

Provide a test report to ensure that the cabling meets the required specification (Class E):

Ensure that the patch cables or cross connections must have the same impedance characteristics as the cable.

Not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus.

Ensure that the maximum pulling tensions of the cables are not exceeded at any time during the placement of the facilities.

Use correct cable basket or tray work according to IEC 50174-1.

Use appropriate installation equipment, specified by the equipment manufacturer, or equivalent, to install all cables, panels, Telecom Sockets and patch cords.

Plug conduits and entrance holes where the cabling has been installed by the installation contractor in the main equipment room, manholes, riser and other cable entrance locations with re-unutterable duct seal or flame retardant putty.

Provide an approved ground at all newly distribution frames and other locations insuring proper bonding to any existing facilities. The contractor shall also be responsible for ensuring ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes and framework. All grounds shall consist of appropriate gauge copper wire and shall be supplied from an approved building ground and bonded to the main electrical ground.

### **5.2 Installation Handover**

The cabling system will be handed over to the purchaser or the purchaser representative. A manufacturer's system warranty shall be applied for:

Where appropriate, the documentation supplied includes component acceptance test documentation. Such documentation includes:

- a. Evidence of conformance of cables, connectors, cable assemblies etc.
- b. Cable acceptance test records and other information;

- c. Cable assembly acceptance test records and other information;
- d. Delivery information (e.g. dates of receipt and batch numbers or other unique product identifiers of cables and accessories).

### 5.3 Final Cable Documentation

On completion, the contractor will provide final cabling documentation which will include:

- Site plans to include the identifications and locations of nodes, pathways, cables, termination points, closures, patch panels, protection devices;
- As-built information to include nodal, route and cable connectivity, closures (in a schematic or report based format);
- Installed cabling acceptance test records;
- Evidence of conformance to the installation specification from cabling installer or main contractor;
- Handover certificate;
- Earthing and equipotential bonding details.

## 6.0 TESTING AND COMMISSIONING

### 6.1 System Tests

All permanent links shall be tested. Acceptance is in accordance with standard ISO 11801:

The horizontal copper cabling system must be tested in accordance with the procedure described below. Tests shall be performed using a level II filed tester as defined in ISO/IEC 11801 – an automatic tester or scanner. The following parameters of the link shall be verified:

- Headroom report (The worst-case margin for a parameter determined by the selected standard (this may be NEXT, ACR, PSNEXT or another measurement).
- Wire map
- Resistance
- Link length
- Insertion loss
- Return loss
- Near end crosstalk (NEXT)
- Power sum near end crosstalk (PSNEXT)
- Equal level far end crosstalk (ELFEXT)
- Power sum equal level far end crosstalk (PSELFEXT)
- Attenuation to crosstalk ratio (ACR)
- Power sum attenuation to crosstalk ratio (PS ACR)
- Delay skew
- Impedance
- DC loop resistance

The insertion loss of fibre permanent links shall be tested using either a light source and power meter or an OTDR. Tests shall be performed at either 850 nm and / or 1300 nm. When tests are conducted using a power meter and stabilized light source, testing in one direction is sufficient. When tests are conducted using an OTDR, testing in both directions is required. In both cases, 100% of installed links shall be tested.



The following shall also be confirmed:

- Continuity
- The link length does not exceed the authorized maximum value;
- Radius of curvature of the cables conforms to values in the design guide;
- Cable preparation and the assembly of the jacks is to the manufacturer's instructions
- Cables ties and confinement are tight enough without squeezing the cable
- The insulation of the copper wires is continuous.
- The earthing and bonding of all metallic pathway systems is undertaken according to the installation specification.
- The metal racking, distribution panels and patch panels are bonded at both ends.
- The metal continuity of the farms of the same distributor is carried out.
- The screens of the cables (where applicable) are connected to earth at both ends.
- The main earthing and bonding is to EN 50174-1.

All cables and cords, distribution frames and outlet locations must be labeled according to industry standards. Labels should be computer generated or typewritten.

## 6.2 Commissioning

After handover the installation will be commissioned and brought into service.

A probationary period may be defined, during which the installer will be expected to correct any defects appearing in the installation.

All components of the Structured Cabling Network should be sourced from one manufacturer to ensure minimal impedance mismatch and best possible NEXT performance and to guarantee the Category-6A performance from end to end.

The Structured Cabling Network should operate without introducing or being affected by electromagnetic radiation from other sources. Maintaining segregation from other services or screenings are to be ensured to achieve acceptable immunity.

## 7.0 MEASUREMENT AND PAYMENT

### 7.1 Wiring of RJ45 Telecommunication outlet with Cat-6A UTP LSZH cable

**7.1.1 Measurement:** Measurement shall be made for the total number of RJ45 Telecommunication outlet with Cat-6A UTP LSZH acceptably supplied and installed by the Contractor.

**7.1.2 Payment:** Payment shall be made for the total number of wiring of RJ45 Telecommunication outlet measured as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, connecting, laying, testing, commissioning and completion of the Wiring of RJ45 Telecommunication outlet upto relevant Building/Floor Distributor / MDF with Cat-6A UTP LSZH cable in already installed conduit / cable trunking.

**7.2 Cat 6A UTP LSZH Giga Speed / Fiber Optic Patch Cord**

**7.2.1 Measurement:** Measurement shall be made for the total number Cat 6A UTP LSZH Giga Speed / Fiber Optic Patch Cord of each type acceptably carried out by the Contractor as a complete unit.

**7.2.2 Payment:** Payment shall be made for the total no. of units of Cat 6A UTP LSZH Giga Speed / Fiber Optic Patch Cord measured as provided above at the Contract unit prices each and shall constitute for supplying, installing, testing, commissioning and completion of the Cat 6A UTP LSZH Giga speed Patch Cord with RJ45 connectors at both ends / Duplex Fiber Optic Patch Cord with required connectors at both ends.

**7.3 Cat-6A UTP RJ45 Telecommunication Outlet**

**7.3.1 Measurement:** Measurement shall be made for the total number of Cat-6A UTP RJ45 Telecommunication Outlet of each type acceptably carried out by the Contractor as a complete unit.

**7.3.2 Payment:** Payment shall be made for the total no. of units of Cat-6A UTP RJ45 Telecommunication Outlet measured as provided above at the Contract unit prices each and shall constitute for supplying, installing connecting, testing, commissioning and completion of the Cat-6A UTP RJ45 Telecommunication Outlet with faceplate and sheet steel back box including all installation and mounting accessories.

**7.4 16/24 port RJ45 loaded Cat 6A UTP Giga Speed Patch Panel / Front Cable Management / Intermediate Disconnection Module (IDC)**

**7.4.1 Measurement:** Measurement shall be made for the total number of 16/ 24 port RJ45 loaded Cat 6A UTP Giga Speed Patch Panel with built-in rear cable management / Front Cable Management / Intermediate Disconnection Module (IDC) of each type acceptably supplied and installed by the Contractor as a complete unit.

**7.4.2 Payment:** Payment shall be made for the total no. of units of 16/24 port RJ45 loaded Cat 6A UTP Giga Speed Patch Panel with built-in rear cable management / Front Cable Management / Intermediate Disconnection Module (IDC) measured, as provided above at the Contract unit prices each and shall constitute full compensation for supplying, installing connecting, testing, commissioning and completion of the 16/24 port RJ45 loaded Cat 6A UTP Giga Speed Patch Panel with built-in rear cable management / Front Cable Management / Intermediate Disconnection Module (IDC) with mounting frame including all installation and mounting accessories.

**7.5 Cat-6A UTP LSZH Cable / Multipair Cat-3 LSZH Telephone Backbone Cable / Fiber Optic Backbone Cable**

**7.6.1 Measurement:** Measurement shall be made for total running feet of Cat-6A UTP LSZH Cable / Multipair Cat-3 LSZH Telephone Backbone Cable / Fiber Optic Backbone Cable acceptably supplied and installed by the Contractor.

**7.6.2 Payment:** Payment shall be made for total running feet of Cat-6A UTP LSZH Cable / Multipair Cat-3 LSZH Telephone Backbone Cable / Fiber

Optic Backbone Cable as provided above at the contract unit prices each and shall constitute full compensation for supplying, installing, connecting, laying, testing, commissioning and completion of Cat-6A UTP LSZH Cable / Multipair Cat-3 LSZH Telephone Backbone Cable / Fiber Optic Backbone Cable in already installed PVC conduit / Cable Trunking / Cable Tray.

**7.6 12 / 24 / 48 port Duplex LC loaded Fiber Optic Patch Panel**

**7.6.1 Measurement:** Measurement shall be made for the total number of 12 / 24/48 ports Duplex LC loaded Fiber Optic Patch Panel of each acceptably supplied and installed by the Contractor as a complete unit.

**7.6.2 Payment:** Payment shall be made for the total no. of units of 12 / 24/48 port Duplex LC loaded Fiber Optic Patch Panel measured as provided above at the Contract unit prices each and shall constitute full compensation for supplying, installing connecting, testing, commissioning and completion of the 12/24/48 port Duplex LC loaded Fiber Optic Patch Panel with pigtails and splice tray including all installation and mounting accessories.

**7.7 Racks / Cabinets**

**7.7.1 Measurement:** Measurement shall be made for the total number of Racks / Cabinets acceptably supplied and installed by the Contractor as a complete unit.

**7.7.2 Payment:** Payment shall be made for the total no. of units of Racks / Cabinets, measured, as provided above at the Contract unit prices each and shall constitute full compensation for supplying, installing and completion of the Racks / Cabinets including hoops, side management, cable trays, required nos. of fans, fan trays, required power sockets, interconnecting cables from UDB to Rack. Complete in all respect.

\*\*\* End of Section 8312 \*\*\*

## Technical BOQ:

| S.No | Item Description                                                                                                                                                                                                                                 | Unit | Medical Tower | RSSB  | Total Qty |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------|-------|-----------|
| 1    | Wiring of RJ45 telecommunication wall outlet for IP Telephone, Data, Wireless Access Point, Nurse Display Unit & Ward Controller from relevant Building / Floor Distributor with CAT-6A UTP LSZH cable                                           | RFT  | 197795        | 53500 | 251,295   |
| 2    | CAT-6A UTP RJ45 telecommunication wall outlet with sheet steel back box and face plate including all installation                                                                                                                                |      |               |       |           |
| a    | One Port                                                                                                                                                                                                                                         | Nos. | 745           | 332   | 1077      |
| b    | Two Port                                                                                                                                                                                                                                         | Nos. | 211           |       | 211       |
| 3    | Two Port CAT-6A UTP RJ45 telecommunication outlet to be installed in the Floor Outlet Box, The connector should be L Shape compatible with the floor Box with face plate but without sheet steel back box including all installation accessories | Nos. | 131           | 20    | 151       |
| 4    | Following type CAT-6A, UTP LSZH Giga Speed patch cord with RJ45 connectors at both ends.                                                                                                                                                         |      |               |       |           |
| a    | 1 meter (3ft.) long                                                                                                                                                                                                                              | Nos. | 1429          | 332   | 1761      |
| b    | 3 meter (10ft.) long                                                                                                                                                                                                                             | Nos. | 15            | 15    | 30        |
| 5    | Cat 6A UTP Giga Speed loaded port modular (RJ45) jack patch panels, 19" rack installed in floor/wall mounted cabinet including built-in rear cable management with all mounting and installation accessories.                                    |      |               |       |           |
| a    | 24 Port                                                                                                                                                                                                                                          | Nos. | 69            | 26    | 95        |
| 6    | 19" Rack mounted Front Cable Management with all installation accessories.                                                                                                                                                                       | Nos. | 69            | 26    | 95        |
| 7    | Following types Fiber Optic Duplex Multi Mode (OM4) Patch Cord with required connectors at both ends.                                                                                                                                            |      |               |       | 0         |
| a    | 1 meter (3ft.), Multi Mode (OM4)                                                                                                                                                                                                                 |      | 270           | 26    | 296       |
| b    | 3 meter (10ft.), Multi Mode (OM4)                                                                                                                                                                                                                |      | 5             | 5     | 10        |
| 8    | Following type LC loaded multimode (OM4) module rack mountable fiber optic patch panel with pigtails and splice trays including all installation and mounting accessories                                                                        |      |               |       | 0         |
| a    | 24 ports (12 Duplex ports)                                                                                                                                                                                                                       | Nos. | 11            | 7     | 18        |
| b    | 96 ports (48 Duplex ports)                                                                                                                                                                                                                       | Nos. | 4             | -0    | 4         |
| 9    | Following type 50um / 125um Multimode (OM4) LSZH optical fiber back bone cable in already installed PVC conduit / cable tray.                                                                                                                    |      |               |       |           |

|    |                                                                                                                                                                                                                                                                                                                                             |      |       |      |       |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|------|-------|
| a  | 12 Core                                                                                                                                                                                                                                                                                                                                     | RFT  | 200   | 3000 | 3200  |
| b  | 24 Core                                                                                                                                                                                                                                                                                                                                     | RFT  | 1086  | -0   | 1086  |
| 10 | Following sizes 19" Rack with plexiglass door including hoops, perforated panels, side management, cable trays, fan trays for cooling, required Power Distribution Units and power sockets, Power cabling in PVC concealed conduit from UDB to relevant Rack, complete in all respect. including all mounting and installation accessories. |      |       |      |       |
| a  | 15 U (600 mm x 600 mm) - (Loading Capacity 60 kg) Toten or equivalent and better Wall Mounted                                                                                                                                                                                                                                               | Nos. | 82    | 42   | 124   |
| b  | 24 U (600 mm x 600 mm) - (Loading Capacity 1000 kg) Toten or equivalent and better                                                                                                                                                                                                                                                          | No.  | 1     | 0    | 1     |
| c  | 27 U (600 mm x 600 mm) - (Loading Capacity 1000 kg) Toten or equivalent and better                                                                                                                                                                                                                                                          | No.  | 1     | 0    | 1     |
| d  | 42 U (600 mm x 1200 mm) - (Loading Capacity 1300 kg) Huawei equivalent or better                                                                                                                                                                                                                                                            | Nos. | 9     | 0    | 9     |
| 11 | Wiring from relevant CCTV & Access Control System Rack to IP Camera / Door Controller with CAT-6A, UTP LSZH cable in already installed conduit / cable tray.                                                                                                                                                                                | RFT  | 49005 | 6800 | 55805 |
| 12 | CAT-6A UTP Giga Speed loaded 24 port modular (RJ45) jack patch panels, 19" rack installed in floor/wall mounted cabinet including builtin rear cable management with all mounting accessories                                                                                                                                               | Nos. | 20    | 4    | 24    |
| 13 | 19" Rack mounted Front Cable Management with all installation accessories.                                                                                                                                                                                                                                                                  | Nos. | 20    | 4    | 24    |
| 14 | 1 meter (3ft.) long CAT-6A UTP LSZH Giga Speed patch cord with RJ45 connectors at both ends.                                                                                                                                                                                                                                                | Nos. | 297   | 75   | 372   |
| 15 | 12 Port Duplex LC loaded multimode (OM4) module rack mountable fiber optic patch panel with pigtails and splice trays including all installation accessories                                                                                                                                                                                | Nos. | 12    | 4    | 16    |
| 16 | 12 core 50um / 125um Multimode (OM4) LSZH optical fiber back bone cable in already installed conduit / cable tray.                                                                                                                                                                                                                          | Rft  | 1250  | 500  | 1750  |
| 17 | 1 meter (3ft.), Fiber Optic Duplex Multi Mode (OM4) Patch Cord with required connectors at both ends.                                                                                                                                                                                                                                       | Nos. | 24    | 8    | 32    |
| 18 | 15U (600 mm x 600 mm) 19" Rack, plexiglass door including hoops, side management, cable trays, fans for cooling and exhaust, required Power Distribution Unit and power sockets, Power cabling in PVC concealed conduit from UDB to relevant Rack. Complete in all respect. Toten or equivalent or better                                   | Nos. | 20    | 4    | 24    |



|    |                                                                                                                                                                                                                                                                                                       |     |      |   |      |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|---|------|
| 19 | 42U (600 mm x 1200 mm) 19" Rack plexiglass door including hoops, side management, cable trays, fan for cooling and exhaust, required Power Distribution Unit and power sockets, Power cabling in PVC concealed conduit from UDB to relevant Rack. Complete in all respect Huawei equivalent or better | No. | 1    | 0 | 1    |
| 20 | 42U (800 mm x 1200 mm) 19" Rack, plexiglass door including Hoops, side management, cable trays, fans for cooling and exhaust, required Power Distribution Unit and power sockets, Power cabling in PVC concealed conduit from UDB to relevant Rack. Complete in all respect.                          | No. | 1    | 1 | 2    |
| 21 | CAT-6A, UTP LSZH Cable laying for Inter rack Connectivity at Medical Tower DC                                                                                                                                                                                                                         | RFT | 7686 | 0 | 7686 |
| 22 | CAT-6A UTP Giga Speed loaded 24 port modular (RJ45) jack patch panels, 19" rack installed in floor/wall mounted cabinet including built-in rear cable management with all mounting accessories                                                                                                        | No  | 16   | 0 | 16   |
| 23 | 19" Rack mounted Front Cable Management with all installation accessories.                                                                                                                                                                                                                            | No  | 16   | 0 | 16   |
| 24 | 1 meter (3ft.) long CAT-6A UTP LSZH Giga Speed patch cord with RJ45 connectors at both ends.                                                                                                                                                                                                          | No  | 384  | 0 | 384  |
| 25 | 6 Core Single Mode (OM4) LSZH outdoor armored optical fiber                                                                                                                                                                                                                                           | MTR | 7500 | 0 | 7500 |
| 26 | 12 Core Single Mode Multi tube (OM4) LSZH outdoor armored optical fiber                                                                                                                                                                                                                               | MTR | 4500 | 0 | 4500 |
| 27 | 24 Core Single Mode Multi tube (OM4) LSZH outdoor armored optical fiber                                                                                                                                                                                                                               | MTR | 2500 | 0 | 2500 |
| 28 | 96 port SC connector type loaded single mode (OM4) module rack mountable fiber optic patch panel with pigtails and splice trays including all installation and mounting accessories                                                                                                                   | NOS | 1    | 0 | 1    |
| 29 | 24 port SC loaded single mode (OM4) module rack mountable fiber optic patch panel with pigtails and splice trays including all installation and mounting accessories                                                                                                                                  | NOS | 1    | 0 | 1    |
| 30 | 12 port SC loaded single mode (OM4) module rack mountable fiber optic patch panel with pigtails and splice trays including all installation and mounting accessories                                                                                                                                  | NOS | 1    | 0 | 1    |
| 31 | 4 port SC loaded single mode (OM4) module rack mountable fiber optic patch panel with pigtails and splice trays including all installation and mounting accessories                                                                                                                                   | NOS | 21   | 0 | 21   |
| 32 | 1 meter Fiber Optic Single mode SC to SC (OM4) Patch Cord with required connectors at both ends.                                                                                                                                                                                                      | NOS | 60   | 0 | 60   |

|    |                                                                                                                                                                                                                                                                                                                                             |     |    |   |    |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|---|----|
| 33 | 3-meter Fiber Optic Single mode SC to SC (OM4) Patch Cord with required connectors at both ends.                                                                                                                                                                                                                                            | NOS | 60 | 0 | 60 |
| 34 | 1 meter (3ft.), Fiber Optic SC to LC single mode (OM4) Patch Cord with required connectors at both ends.                                                                                                                                                                                                                                    | NOS | 50 | 0 | 50 |
| 35 | 3-meter (9ft.), Fiber Optic SC to LC single mode (OM4) Patch Cord with required connectors at both ends.                                                                                                                                                                                                                                    | NOS | 50 | 0 | 50 |
| 36 | 9U Rack with PDU                                                                                                                                                                                                                                                                                                                            | NOS | 12 | 0 | 12 |
| 37 | 19" Cable manager                                                                                                                                                                                                                                                                                                                           | NOS | 21 | 0 | 21 |
| 38 | KVM Switch Rack Mount 8 Port USB KVM Switch with IP remote Access Support 1080P Resolution and dual Console access with all essential interconnecting cables including all installation and mounting accessories as required for system operations. 5 Years Complete support Services +replacement Warranty Vertiv or equivalent or better. | No  | 4  | 0 | 4  |
|    |                                                                                                                                                                                                                                                                                                                                             |     |    |   |    |

All Fiber laying must be through digging, including main hole chamber with jointer and splicing in scope of vendor

## **SECTION – 8312**

### **DATA NETWORK SWITCHES**

#### **1.0 SCOPE OF WORK**

The work under this section consists of supplying, installing, connecting, testing, commissioning and training of all material and services for Data Network Switches as specified herein, as shown on the Contract Drawings and stated in the Bill of Quantities.

The Data Network Switches with accessories shall also comply with the Communication Works Section – 8003 and with other relevant provisions of the Contract Document.

#### **2.0 GENERAL**

The Data Network Switch shall be a high-performance managed Ethernet switch designed for enterprise LAN, campus network, or data center applications. The switch shall support Layer 2 and Layer 3 features, high availability, security, and scalability.

The switch shall be manufactured by a reputable vendor such as Cisco Systems, Juniper Networks, Hewlett Packard Enterprise, Huawei, or equivalent.

To ensure optimum performance the Equipment shall be sourced from the one manufacturer. This will support analogue and digital applications, data, local area network, and FDH video on a common platform.

#### **3.0 APPLICABLE STANDARDS AND CODES**

The following standards and all “normative addendums” shall be applicable to this document and must be adhered to for any installation work performed.

- IEEE 802.3 Ethernet
- IEEE 802.3ab Gigabit Ethernet
- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 802.3z Fiber Ethernet
- IEEE 802.1Q VLAN
- IEEE 802.1p QoS
- IEEE 802.1D Spanning Tree
- IEEE 802.1w Rapid Spanning Tree
- IEEE 802.1s Multiple Spanning Tree
- IEEE 802.3ad Link Aggregation

This list is not restrictive. The contractor shall have to take account of the new standards which could come into effect during the progress of design and installation.

#### **4.0 MATERIALS:**

#### 4.1 Core Switch:

| ITEM # 01                     | Description                                                                                                                                                                                                                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MPUs</b>                   | Ports on the MPU can be configured in four port combination modes, service ports can be used as stack ports, Two MPUS can be configured in different modes<br>G1: 1x100GE; G2: 2*40GE; G3:4*25GE; G4: 8*10GE                                                                                         |
| <b>Interfaces</b>             | Chassis switch supporting 144*10G & 8*40G interfaces                                                                                                                                                                                                                                                 |
| <b>SRU</b>                    | Dual                                                                                                                                                                                                                                                                                                 |
| <b>Interface Cards</b>        | 3x 100M/1G/10G Base-X Interface Card<br>2x 40G Base-X Interface Card                                                                                                                                                                                                                                 |
| <b>Ip Protection/Rating</b>   | 20                                                                                                                                                                                                                                                                                                   |
| <b>Service Slot</b>           | Ports on 10GE SFP+ or GE line cards can be compatible with FE optical modules.<br>52-port (24 x GE RJ45 + 12 x 10GE (SFP+) + 16 x GE SFP) hybrid interface card<br>For 25GE interface card, at least 32 x 25GE ports on a device.<br>72 x 10GE SFP+ line card, with 50% higher port density per slot |
| <b>Hardware</b>               | Pluggable and replaceable SFU<br>Dual pluggable fan modules<br>To adapt to the side-by-side deployment of cabinets, the chassis (including the service card area) adopts the front-to-rear airflow design.                                                                                           |
| <b>Installation Materials</b> | Extension Guide Rail                                                                                                                                                                                                                                                                                 |
| <b>Switching Capacity</b>     | 8 Tbps                                                                                                                                                                                                                                                                                               |
| <b>User management</b>        | Unified user management<br>802.1X, MAC, Portal authentication<br>Traffic- and duration-based accounting<br>User authorization based on user groups,<br>HTTP/HTTPS Access<br>domains, and time ranges                                                                                                 |
| <b>MAC</b>                    | Maximum number of MAC entries, 384K-Automatic MAC address learning and aging-Static, dynamic, and blackhole MAC address entries-Source MAC address filtering- MAC address learning limiting based on ports and VLANs                                                                                 |
| <b>VLAN</b>                   | 4K VLANs-Access mode, Trunk mode and Hybrid mode-Default VLAN-VLAN stacking-QinQ and enhanced selective QinQ-Dynamic VLAN assignment based on MACaddresses-VLAN mapping                                                                                                                              |
| <b>ARP</b>                    | ARP Snooping                                                                                                                                                                                                                                                                                         |
| <b>IP Routing</b>             | IPv4 dynamic routing protocols such as RIP, OSPF, IS-IS, and BGP-IPv6 dynamic routing protocols such as RIPng,OSPFv3, ISISv6, and BGP4+                                                                                                                                                              |
| <b>Segment Routing</b>        | SRv6 BE (L3 EVPN)-BGP EVPN-SRv6 configuration through NETCONF                                                                                                                                                                                                                                        |

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Multicast</b>      | <p>IGMPv1/v2/v3, IGMP v1/v2/v3 Snooping and MLD Snooping</p> <p>PIM-DM, PIM-SM, PIM-SSM and PIMv6</p> <p>Fast-leave mechanism</p> <p>Multicast traffic control</p> <p>Multicast querier</p> <p>Multicast protocol packet suppression</p> <p>Multicast VLAN</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>MPLS</b>           | MPLS-LDP-MPLS-L3VPN -MPLS QoS-MPLS TE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>VXLAN</b>          | Centralized gateway-Distributed gateway-BGP-EVPN-Configures VxLANs through NETCONF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>QoS</b>            | <p>Traffic classification based on Layer 2 headers, Layer 3 protocols, Layer 4 protocols, and 802.1p priority-Actions such as ACL, Committed Access Rate (CAR), re-marking, and scheduling-Queuing algorithms, such as PQ, DRR, WDRR, and PQ+DRR, PQ+WDRR-Congestion avoidance mechanisms such as WRED and tail drop-Traffic shaping -Network Slicing(VxLAN/SRv6/VLAN)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Native-IP IFIT</b> | <p>Marks the real service packets to obtain real-time count of dropped packets and packet loss ratio-The statistical period can be modified - Two-way frame delay measurement</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Reliability</b>    | <p>M-LAG-CSS-Link Aggregation Control Protocol (LACP) and Etrunk-Virtual Router Redundancy Protocol (VRRP) and Bidirectional Forwarding Detection (BFD) forVRRP-BFD for BGP/IS-IS/OSPF/static routes-Eth-OAM 802.1ag-Smart Link</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Management</b>     | <p>SNMPv1/v2/v3, Telnet, RMON, and SSHv2</p> <p>Configuration and management using CLI and GUI-based configuration software</p> <p>Openness: script-based O&amp;M programming</p> <p>Network-wide E2E quality detection, in-band flow measurement, and fault demarcation for services</p> <p>Packet loss visualization is supported and coupled with the network analysis platform to quickly locate faults and visualize network packet loss.</p> <p>The Telemetry technology is supported to collect device data in real time and send the data to the network analysis component platform. The intelligent fault identification algorithm is used to analyze network data, accurately display the real-time network status, demarcate faults and fault causes in a timely manner, and accurately guide user operations.</p> <p>Intelligent application identification and scheduling (SAC)</p> |



|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Security and management</b> | MACsec-NAC -RADIUS and HWTACACS authentication for login users-<br>Command line authority control based on user levels, preventing unauthorized users from using command configurations-Defense against DoS attacks, Transmission Control Protocol (TCP) SYN Flood attacks, User Datagram Protocol (UDP) Flood attacks, broadcast storms, and heavy traffic attacks-IPv6 RA Guard-CPU hardware queues to implement hierarchical scheduling and protection for protocol packets on-the control plane-Remote Network Monitoring (RMON)-Secure boot (need to use MPU that supports secure boot)-ND snooping |
| <b>PSU</b>                     | Dual 1500W AC&240VDC Power Module (Front to Back, Power panel side intake)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>License</b>                 | N1-CloudCampus, Foundation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Vendor Criteria</b>         | Vendor must possess 1x CCIE or HCIE Networks & 1x S3 presales or equivalent certification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Rating</b>                  | <b>Must be a Leader in Gartner Magic Quadrant for Enterprise wired &amp; wireless LAN infrastructure from the last consecutive four Years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Warranty</b>                | The proposed product should be the latest and have at least five (05) years of roadmap. Documentary evidence is mandatory. (no nearing end of life product shall be quoted)<br>OEM Presence in Pakistan be More than 10 Years, OEM Technical staff be based in Pakistan, MAL/MAF required against the partnership<br>All Licenses required for solution be included<br>05 Years Next Business Day part replacement be provided & 24/7 Remote Support.                                                                                                                                                    |

#### 4.2 Aggregation Switches:

| ITEM # 02              | Description                                                                                                                                                                                                                                                                                     |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interfaces             | 48 x 1/10 Gig SFP+, 6 x 40/100 Gig QSFP28                                                                                                                                                                                                                                                       |
| CPU                    | 1.4 Ghz                                                                                                                                                                                                                                                                                         |
| Cores                  | 4                                                                                                                                                                                                                                                                                               |
| RAM                    | 4GB                                                                                                                                                                                                                                                                                             |
| IP Protection/Rating   | 20                                                                                                                                                                                                                                                                                              |
| Flash                  | 2GB                                                                                                                                                                                                                                                                                             |
| Forwarding Performance | 490 Mpps                                                                                                                                                                                                                                                                                        |
| Switching Capacity     | 2.16Tbps/2.4Tbps                                                                                                                                                                                                                                                                                |
| Layer 2                | <p>≥ 384K MAC address entries with an authoritative third-party test report</p> <p>4K VLANs, voice VLAN, and MAC address-based VLAN assignment</p> <p>Static routing, RIPv1/v2, OSPF, IS-IS, BGP, RIPvng, OSPFv3, BGP4+, and IS-ISv6</p>                                                        |
| Layer 3                | <p>≥ 256K IPv4 routing entries with an authoritative third-party test report</p> <p>≥ 80K IPv6 routing entries with an authoritative third-party test report</p>                                                                                                                                |
| User management        | Unified user management 802.1X authentication MAC authentication Traffic- and duration-based accounting                                                                                                                                                                                         |
| MAC                    | Automatic MAC address learning and aging 384K MAC entries (MAX) Static, dynamic, and blackhole MAC address entries Source MAC address filtering MAC address learning limiting based on ports and VLANs                                                                                          |
| VLAN                   | <p>4K VLANs simultaneously/ ACTIVE VLAN</p> <p>4K VLANif interface simultaneously</p> <p>Access mode, Trunk mode and Hybrid mode</p> <p>Default VLAN</p> <p>Private VLAN</p> <p>QinQ and enhanced selective QinQ</p> <p>VLAN Stacking</p> <p>Dynamic VLAN assignment based on MAC addresses</p> |
| ARP                    | ARP Snooping                                                                                                                                                                                                                                                                                    |
| DHCP                   | DHCPv4 Client, DHCPv4 Relay, DHCPv4 Server, DHCPv4 Snooping DHCPv6 Client, DHCPv6 Relay, DHCPv6 Server,                                                                                                                                                                                         |

|                                 |  |                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |  | DHCPv6 Snooping                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>IP Routing</b>               |  | IPv4 dynamic routing protocols such as RIP v1/v2, OSPF v1/v2, IS-IS, and BGP<br>IPv6 dynamic routing protocols such as RIPng, OSPFv3, ISISv6, and BGP4+<br>Routing Policy, Policy-Based Routing<br>VRF<br>IPv4 routes: 256K(Max)<br>IPv6 routes: 80K(Max)                                                                                                                                                            |
| <b>Segment Routing</b>          |  | SRv6 BE (L3 EVPN) BGP EVPN SRv6 configuration through NETCONF                                                                                                                                                                                                                                                                                                                                                        |
| <b>Multicast</b>                |  | IGMPv1/v2/v3 and IGMP v1/v2/v3 Snooping PIM-DM, PIM-SM, and PIM-SSM Fast-leave mechanism Multicast traffic control Multicast querier Multicast protocol packet suppression                                                                                                                                                                                                                                           |
| <b>MPLS</b>                     |  | MPLS-LDP MPLS-L3VPN MPLS Qos                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>VXLAN</b>                    |  | VXLAN, BGP EVPN, and distributed anycast gateways; VXLAN fabric configuration on the controller web page and delivery to switches. An authoritative third-party test report is provided.<br>≥ 16,000 VXLAN IPv4 tunnels, with an authoritative third-party test report                                                                                                                                               |
| <b>QoS</b>                      |  | Traffic classification based on Layer 2 headers, Layer 3 protocols(IP), Layer 4 protocols(TCP/UDP), and 802.1p priority Actions such as ACL, Committed Access Rate (CAR), re-marking, and scheduling Queuing algorithms, such as PQ, DRR, WDRR, and PQ+DRR, PQ+WDRR Congestion avoidance mechanisms such as WRED and tail drop Traffic shaping 8 queues on each interface Network Slicing                            |
| <b>Virtualization</b>           |  | Horizontal stacking, number of stacked hosts ≥ 9                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Native-IP IFIT</b>           |  | Marks the real service packets to obtain real-time count of dropped packets and packet loss ratio The statistical period can be modified Two-way frame delay measurement                                                                                                                                                                                                                                             |
| <b>Ethernet loop protection</b> |  | STP (IEEE 802.1d), RSTP (IEEE 802.1w), and MSTP (IEEE 802.1s). MSTP instance: 64 VLAN-based Spanning Tree (VBST) BPDU protection, root protection, and loop protection G.8032 Ethernet Ring Protection Switching (ERPS)                                                                                                                                                                                              |
| <b>Reliability</b>              |  | M-LAG Service interface-based stacking Maximum number of stacked devices Stack bandwidth (Bidirectional) Link Aggregation Control Protocol (LACP) and E-Trunk Number of E-Trunks Group: 1024 Number of Interface in one Group:128 Virtual Router Redundancy Protocol (VRRP) and Bidirectional Forwarding Detection (BFD) for VRRP BFD for BGP/IS-IS/OSPF/static routes Eth-OAM 802.1ag(CFM) Smartlink LLDP, LLDP-MED |

|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management              | <p>Console terminal service</p> <p>Total buffer of the device: 18 MB</p> <p>Telnet/IPv6 Telnet terminal service</p> <p>SSH v1.5</p> <p>SSH v2.0</p> <p>SNMP v1/v2c/v3</p> <p>FTP、TFTP、SFTP</p> <p>BootROM upgrade and remote in-service upgrade</p> <p>Hot patch</p> <p>User operation logs</p> <p>Open Programmability System (OPS)</p> <p>Streaming Telemetry</p> <p>JSON/XML/GPB encoding</p> <p>CRUD(create, read, update, and delete) Operations</p> <p>1588V2</p>                                                                                                                                                                                                                                                                                                                                                    |
| Security and management | <p>NAC</p> <p>Port security</p> <p>RADIUS and HWTACACS authentication for login users</p> <p>MACsec-256 (IEEE 802.1ae)</p> <p>Management by Command Line Interface(CLI)</p> <p>Command line authority control based on user levels, preventing unauthorized users from using command configurations</p> <p>Defense against DoS attacks, Transmission Control Protocol (TCP) SYN Flood attacks, User, Datagram Protocol (UDP) Flood attacks, broadcast storms, and heavy traffic attacks</p> <p>IPv6 RA Guard</p> <p>CPU hardware queues to implement hierarchical scheduling and protection for protocol packets on the control plane</p> <p>Remote Network Monitoring (RMON)</p> <p>Secure boot</p> <p>Netstream</p> <p>Port mirroring</p> <p>Dynamic ARP Inspection</p> <p>IP Source Guard</p> <p>Auto MDI and MDI-X</p> |
| PSU                     | Dual-600W AC Power Module (Back to Front, Power panel side exhaust)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| License                 | N1-CloudCampus, Foundation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Vendor Criteria         | Vendor must possess 1x CCIE or HCIE Networks & 1x S3 presales or equivalent certification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Rating                  | <b>Must be a Leader in Gartner Magic Quadrant for Enterprise wired &amp; wireless LAN infrastructure from the last consecutive four Years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Warranty</b> | <p>The proposed product should be the latest and have at least five (05) years of roadmap. Documentary evidence is mandatory. (no nearing endof life product shall be quoted)</p> <p>OEM Presence in Pakistan be More than 10 Years, OEM Technical staff be based in Pakistan, MAL/MAF required against the partnership</p> <p>All Licenses required for solution be included</p> <p>05 Years Next Business Day part replacement be provided &amp; 24/7 Remote Support.</p> |
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#### 4.3 Access Switches for LAN & CCTV:

| ITEM # 03                | Description                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interfaces               | 24*10/100/1000BASE-T ports, 4*10GE SFP+ ports, 2*stack ports, PoE+, AC power                                                                                                                                                                                                                                                                                        |
| CPU                      | 1.1 GHz                                                                                                                                                                                                                                                                                                                                                             |
| Cores                    | 2                                                                                                                                                                                                                                                                                                                                                                   |
| RAM                      | 2GB                                                                                                                                                                                                                                                                                                                                                                 |
| IP protection/Ratio      | 20                                                                                                                                                                                                                                                                                                                                                                  |
| Forwarding Performance   | 132 Mpps                                                                                                                                                                                                                                                                                                                                                            |
| Switching Capacity       | 176 Gbps/520 Gbps                                                                                                                                                                                                                                                                                                                                                   |
| Layer 2                  | 32K MAC address entries with an authoritative third-party test report<br>4K VLANs, voice VLANs, port VLANs, protocol VLANs, and IP subnet VLANs<br>IEEE 802.1D (STP), IEEE 802.1w (RSTP), and IEEE 802.1s (MSTP)"<br>Policy VLANs, PVLANS, and MUX VLANs<br>IGMPv1, IGMPv2, IGMPv3, PIM-SM, PIM-DM, and PIM-SSM                                                     |
| Layer 3                  | Static routing, RIP, OSPF, RIPng, and OSPFv3. An authoritative third-party test report is provided.<br>≥ 2K ARP entries with an authoritative third-party test report<br>≥ 4K IPv4 routing entries with an authoritative third-party test report<br>≥ 1K IPv6 routing entries with an authoritative third-party test report<br>VRRP, IPv6, and IPv4/IPv6 dual stack |
| User management          | Hierarchical user management and password protection                                                                                                                                                                                                                                                                                                                |
| MAC                      | 32K MAC entries (MAX)                                                                                                                                                                                                                                                                                                                                               |
| VLAN                     | 4096                                                                                                                                                                                                                                                                                                                                                                |
| ARP                      | 4000 ARP forwarding entries                                                                                                                                                                                                                                                                                                                                         |
| DHCP                     | DHCP client, DHCP relay, DHCP server, DHCP snooping                                                                                                                                                                                                                                                                                                                 |
| IP Routing               | Static route/Routing Policy/Policy-Based Routing                                                                                                                                                                                                                                                                                                                    |
| Multicast                | PIM DM, PIM SM, PIM SSM                                                                                                                                                                                                                                                                                                                                             |
| QoS/ACL                  | 2K rules per IPv4 ACL                                                                                                                                                                                                                                                                                                                                               |
| Ethernet loop protection | Smart Link tree topology and Smart Link multi-instance, providing millisecond-level protection switchover                                                                                                                                                                                                                                                           |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Management &amp; maintenance</b> | iStack, stack bandwidth: 80Gbps<br>Fast stack upgrade<br>Cloud management based on Netconf/Yang<br>Virtual Cable Test (VCT)<br>Remote configuration and maintenance using Telnet<br>SNMPv1/v2c/v3<br>RMON/SMON*<br>eSight and web-based NMS<br>HTTPS<br>LLDP/LLDP-MED<br>System logs and multi-level alarms<br>802.3az EEE<br>IFIT<br>Port Mirroring                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Security</b>                     | Hierarchical user management and password protection<br>DoS attack defense, ARP attack defense, and ICMP attack defense<br>Binding of the IP address, MAC address, interface number, and VLAN ID<br>Port isolation, port security, and sticky MAC<br>Blackhole MAC address entries<br>Limit on the number of learned MAC addresses<br>IEEE 802.1x authentication and limit on the number of users on an interface<br>Portal authentication<br>AAA authentication, RADIUS authentication, HWTACACS authentication, and NAC<br>SSH V2.0<br>Hypertext Transfer Protocol Secure (HTTPS)<br>CPU defense<br>Blacklist and whitelist<br>DHCP client, DHCP relay, DHCP server, DHCP snooping<br>DHCPv6 client, DHCPv6 relay, DHCPv6 snooping |
| <b>PSU</b>                          | Built-in AC power supply                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>License</b>                      | N1-CloudCampus, Foundation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Vendor Criteria</b>              | Vendor must possess 1x CCIE or HCIE Networks & 1x S3 presales or equivalent certification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Rating</b>                       | <b>Must be a Leader in Gartner Magic Quadrant for Enterprise wired &amp; wireless LAN infrastructure from the last consecutive four Years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Warranty</b>                     | The proposed product should be the latest and have at least five (05) years of roadmap. Documentary evidence is mandatory. (no nearing end of life product shall be quoted)<br>OEM Presence in Pakistan be More than 10 Years, OEM Technical staff be based in Pakistan, MAL/MAF required against the partnership<br>All Licenses required for solution be included<br>05 Years Next Business Day part replacement be provided & 24/7 Remote Support.                                                                                                                                                                                                                                                                                |

#### 4.4 NGFW Firewalls:

| ITEM # 04                        | Description                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interfaces                       | 1. 2x USB-A 3.0 Port<br>2. 1x RJ45 Console Port<br>3. 1x 2.5/GE RJ45 HA and 1x GE Management Ports<br>4. 8x 5/2.5/GE RJ45 Ports<br>5. 16x 1GE SFP Slots<br>6. 4x 10GE SFP+ Forti-Link slots<br>7. 4x 25/10GE SFP28/SFP+ slots                                                                                                                           |
| Optical Transceivers             | 6x 25G Multi Mode                                                                                                                                                                                                                                                                                                                                       |
| High Availability Configurations | Active-Active, Active-Passive, Clustering                                                                                                                                                                                                                                                                                                               |
| CPU                              | Network processor NP7, Content processor CP10                                                                                                                                                                                                                                                                                                           |
| IP protection/rating             | 20                                                                                                                                                                                                                                                                                                                                                      |
| IPS Throughput                   | 38 Gbps                                                                                                                                                                                                                                                                                                                                                 |
| NGFW Throughput                  | 29 Gbps                                                                                                                                                                                                                                                                                                                                                 |
| Threat Protection                | 26 Gbps                                                                                                                                                                                                                                                                                                                                                 |
| IPv4 Firewall Throughput         | 164 / 163 / 145 Gbps                                                                                                                                                                                                                                                                                                                                    |
| Packet Per Second                | 217.5 Mpps                                                                                                                                                                                                                                                                                                                                              |
| Concurrent Sessions              | 16 million                                                                                                                                                                                                                                                                                                                                              |
| Firewall Policies                | 10 000                                                                                                                                                                                                                                                                                                                                                  |
| SSL-VPN Throughput               | 8 Gbps                                                                                                                                                                                                                                                                                                                                                  |
| Concurrent SSL-VPN Users         | 10000                                                                                                                                                                                                                                                                                                                                                   |
| USB                              | 2x USB-A 3.0 Port                                                                                                                                                                                                                                                                                                                                       |
| Console                          | 1x Console                                                                                                                                                                                                                                                                                                                                              |
| TPM                              | Yes                                                                                                                                                                                                                                                                                                                                                     |
| Features                         | AI-Powered Security Services                                                                                                                                                                                                                                                                                                                            |
| PSU                              | (Default dual non-swappable AC PSU for 1+1 Redundancy)                                                                                                                                                                                                                                                                                                  |
| License                          | Required licenses for NGFW                                                                                                                                                                                                                                                                                                                              |
| Vendor Criteria                  | Vendor must possess 2x NSE4 certifications                                                                                                                                                                                                                                                                                                              |
| Rating                           | <b>Must be a Leader in 2025 Gartner Magic Quadrant for Hybrid Mesh Firewall</b>                                                                                                                                                                                                                                                                         |
| Warranty                         | The proposed product should be the latest and have at least five (05) years of roadmap. Documentary evidence is mandatory. OEM Presence in Pakistan be More than 05 Years; OEM Technical staff be based in Pakistan<br>All Licenses required for solution be included<br>05 Years Next Business Day part replacement be provided & 24/7 Remote Support. |

#### 4.5 Agile Controller:

| ITEM # 5                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Platform architecture</b>                         | The product can be deployed on PMs and VMs. It can be deployed in single-node or cluster mode. Services are not interrupted in the event of any node failure in the cluster. All models support remote DR deployment. If the primary system fails, services are automatically switched to the remote backup system. The bidder must provide a third-party test report.                                                                                                                                                                                |
| <b>Cross-domain convergence</b>                      | The product supports one set of software to centrally manage wired and wireless devices on a single campus network, multi-branch campus networks, and WANs. Wizard-style menus are supported to configure cross-scenario services in an end-to-end manner.                                                                                                                                                                                                                                                                                            |
| <b>Management, control, and analysis convergence</b> | The product supports single-node deployment and provides a host of functions such as user authentication, automatic rollout, user group policy definition, centralized management of virtual networks, and big data-based intelligent analysis and O&M. The bidder must provide function screenshots.                                                                                                                                                                                                                                                 |
| <b>Management scale</b>                              | The product supports one set of software to manage at least 2 million NEs and 7 million online terminals. A single cluster can manage at least 200,000 NEs and 700,000 online terminals. A single cluster can be smoothly expanded to a multi-cluster system.                                                                                                                                                                                                                                                                                         |
| <b>Intent-driven deployment</b>                      | The product supports scenario-specific template-based network construction, GUI-based and drag-and-drop configuration template definition, and flexible variable definition. The configuration template can be used for batch creation of network services. The bidder must provide a third-party test report.                                                                                                                                                                                                                                        |
| <b>SD-Branch</b>                                     | The product supports configuration provisioning in preset scenarios, such as mini-branches, small branches, and large branches. In addition, the product must allow users to customize scenario workflows, adjust parameter variables based on branch conditions, execute service provisioning tasks in batches, and retry or roll back tasks. The bidder must provide function screenshots.                                                                                                                                                          |
| <b>Wireless network planning</b>                     | The product supports self-developed or third-party network planning tools. Users can import network planning files to view the wireless layout on the platform. The third-party network planning tool Ekahua is supported.                                                                                                                                                                                                                                                                                                                            |
| <b>Device onboarding/ZTP</b>                         | The product supports multiple plug-and-play (PnP) technologies, including DHCP Option-based, barcode scanning-based, and email-based deployment methods, allowing for batch device registration and onboarding without manual ESN collection. This streamlines the provisioning process, eliminating the need for CLI, configuration files, and scripts. Devices can be deployed via VLANs with IDs other than 1. Devices can be configured before installation or installed before configuration. The bidder must provide a third-party test report. |

|                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hierarchical batch deployment</b>      | The product provides multiple configuration templates to implement batch configuration. The templates support hierarchical configuration. Lower-level templates can inherit the general configurations of upper-level templates. Configuration customs are also supported. Different branch networks can be quickly deployed and modified based on templates so as to rapidly complete service deployment. The bidder must provide a third-party test report. |
| <b>Faulty device replacement</b>          | Supports automatic configuration of switch stacking and one-click replacement of faulty devices without manual configuration.                                                                                                                                                                                                                                                                                                                                 |
| <b>MAC Wireless network configuration</b> | Supports Wi-Fi radio profile configuration (such as 2.4 GHz and 5 GHz radio planning and automatic configuration, WMM, smart roaming, access terminal threshold setting, and automatic radio calibration policy). After APs are onboarded, they can directly obtain configurations and policies to provide Wi-Fi network services immediately.                                                                                                                |
| <b>Wireless network security</b>          | Can detect rogue APs and terminals in WIDS/WIPS mode and force them to go offline. Can collect statistics on rogue APs and terminals, defend against attacks, and suppress wireless storms. The bidder must provide a third-party test report.                                                                                                                                                                                                                |
| <b>Networking scenarios</b>               | Supports VXLAN networking of both centralized and distributed gateways. VXLAN can be deployed at the aggregation layer or the edge. Supports pure Layer 2 VXLAN-based virtual networks without gateways.                                                                                                                                                                                                                                                      |
| <b>QoS</b>                                | Supports QoS that meets the bandwidth allocation requirements of multiple departments and dynamic QoS for bandwidth allocation and rate limiting between a hub site and multiple spoke sites.                                                                                                                                                                                                                                                                 |
| <b>Internet access policy</b>             | Provides application QoS policies. Supports flexible Internet access policies for branch users, such as centralized Internet access and local breakout.                                                                                                                                                                                                                                                                                                       |
| <b>Remote O&amp;M</b>                     | Supports online health monitoring and inspection for network-wide devices, provides professional handling suggestions, generates inspection reports, and automatically sends the inspection reports to administrators or periodically archives the reports. The bidder must provide a third-party test report.                                                                                                                                                |
| <b>Agile report</b>                       | Supports flexible report function definition in multiple dimensions, such as network performance (resource usage, traffic, and link quality), alarms, access authentication, and terminal type statistics. Users can customize the report content, including chart types, data dimensions, and measurement indicators, export reports online, sent them by email at a scheduled time, or display them on the home page.                                       |
| <b>Vendor Criteria</b>                    | Vendor must possess 1x CCIE or HCIE Networks & 1x S3 presales or equivalent certification                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Rating</b>                             | <b>Must be a Leader in Gartner Magic Quadrant for Enterprise wired &amp; wireless LAN infrastructure from the last consecutive four Years</b>                                                                                                                                                                                                                                                                                                                 |



**Warranty**

The proposed product should be the latest and have at least three (05) years of roadmap. Documentary evidence is mandatory. (no nearing end of life product shall be quoted)

OEM Presence in Pakistan be More than 10 Years, OEM Technical staff be based in Pakistan, MAL/MAF required against the partnership

All Licenses required for solution be included

05 Years Next Business Day part replacement be provided & 24/7 Remote Support.

#### 4.6 Access Points:

| ITEM # 6             | Description                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wi-Fi Type           | Next-generation indoor access point (AP) in compliance with Wi-Fi 7 (802.11be)                                                                                                                                                                                                                                                                                                                |
| MIMO                 | 2.4 GHz (2x2 MIMO) and 5 GHz (4x4 MIMO)                                                                                                                                                                                                                                                                                                                                                       |
| Rate                 | Provides services simultaneously on both the 2.4 GHz (2x2) and 5 GHz (4x4) frequency bands, at a rate of up to 689 Mbps at 2.4 GHz, 5.76 Gbps at 5 GHz, and 6.45 Gbps for the device                                                                                                                                                                                                          |
| Antenna              | Built-in smart antenna                                                                                                                                                                                                                                                                                                                                                                        |
| IP Protection/Rating | 20                                                                                                                                                                                                                                                                                                                                                                                            |
| Supporting Protocols | ZigBee and RFID                                                                                                                                                                                                                                                                                                                                                                               |
| Working Modes        | Supports Fit, Fat and cloud management working modes                                                                                                                                                                                                                                                                                                                                          |
| Wi-Fi Shield         | Yes                                                                                                                                                                                                                                                                                                                                                                                           |
| Leader AP            | Can be used to manage Fit APs in small- and medium-sized enterprises                                                                                                                                                                                                                                                                                                                          |
| WLAN Features        | Compliance with IEEE 802.11be and compatibility with IEEE 802.11a/b/g/n/ac/ax<br>Maximum ratio combining (MRC)<br>Space time block code (STBC)<br>Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD)<br>Beamforming<br>Multi-user multiple-input multiple-output (MU-MIMO)<br>Orthogonal frequency division multiple access (OFDMA)<br>Preamble puncturing<br>BSS Color<br>TxBF<br>TWT |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Compliance with 4096-quadrature amplitude modulation (QAM) and compatibility with 1024-QAM, 256-QAM, 64-QAM, 16-QAM, 8-QAM, quadrature phase shift keying (QPSK), and binary phase shift keying (BPSK)</p> <p>Low-density parity-check (LDPC)-Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)</p> <p>802.11 dynamic frequency selection (DFS)</p> <p>Short guard interval (GI) in 20 MHz, 40 MHz, 80 MHz, 160 MHz modes</p> <p>Wi-Fi multimedia (WMM) for priority-based data processing and forwarding</p> <p>WLAN channel management and channel rate adjustment</p> <p>NOTE</p> <p>For detailed management channels, see the Country Codes &amp; Channels Compliance.</p> <p>Automatic channel scanning and interference avoidance</p> <p>Service set identifier (SSID) hiding configuration for each AP, supporting Chinese SSIDs</p> <p>Signal sustain technology (SST)</p> <p>Unscheduled automatic power save delivery (U-APSD)</p> <p>Multi-user call admission control (CAC)</p> <p>Advanced cellular coexistence (ACC), minimizing the impact of interference from cellular networks</p> <p>802.11k and 802.11v smart roaming</p> <p>802.11r fast roaming (<math>\leq 50</math> ms)</p> <p>Spectrum analysis</p> <p>Terminal location</p> <p>FTM (Fine Timing Measurement) location</p> <p>ASFN (Advanced Same Frequency Network)</p> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Network Features</b>  | <p>Compliance with IEEE 802.3ab</p> <p>Auto-negotiation of the rate and duplex mode, and automatic switchover between Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X)</p> <p>Compatibility with IEEE 802.1Q</p> <p>SSID-based VLAN assignment</p> <p>Eth-Trunk function</p> <p>Management channel of the AP's uplink port in tagged and untagged modes</p> <p>DHCP client, obtaining IP addresses through DHCP</p> <p>Tunnel data forwarding and direct data forwarding</p> <p>STA isolation in the same VLAN</p> <p>IPv4/IPv6 access control list (ACL)</p> <p>Link Layer Discovery Protocol (LLDP)</p> <p>Service holding when CAPWAP link disconnection in direct data forwarding mode</p> <p>Unified authentication on the AC</p> <p>AC dual-link backup</p> <p>Telemetry, quickly collecting AP status and application experience parameters</p> <p>MESH</p> <p>HotSpot2.0</p> <p>IPv6 SAVI</p> |
| <b>QOS Features</b>      | <p>WMM power save</p> <p>Priority mapping for upstream packets and flow-based mapping for downstream packets</p> <p>Queue mapping and scheduling</p> <p>User-based bandwidth limiting</p> <p>Adaptive bandwidth management (automatic bandwidth adjustment based on the user quantity and radio environment) to improve user experience</p> <p>Application identification and QoS classification to improve voice quality for popular applications-such as Zoom, QQ, and WeChat</p> <p>Airtime scheduling</p> <p>Air interface HQoS scheduling</p> <p>Intelligent multimedia scheduling</p> <p>VIP bandwidth reservation</p> <p>VIP FastPass, per-packet power control</p>                                                                                                                                                                                                                                                           |
| <b>Security Features</b> | <p>Open system authentication</p> <p>WPA2-PSK authentication and encryption (WPA2-Personal)</p> <p>WPA2-802.1X authentication and encryption (WPA2-Enterprise)</p> <p>WPA3-SAE authentication and encryption (WPA3-Personal)</p> <p>WPA3-802.1X authentication and encryption (WPA3-Enterprise)</p> <p>WPA-WPA2 hybrid authentication</p> <p>WPA2-WPA3 hybrid authentication</p> <p>WPA/WPA2/WPA2-PPSK authentication and encryption</p> <p>WPA/WPA2/WPA2-DPSK authentication and encryption</p> <p>WAPI authentication and encryption</p>                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Vendor Criteria</b>   | Vendor must possess 1x CCIE or HCIE Networks & 1x S3 presales or equivalent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | certification                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Rating   | <b>Must be a Leader in Gartner Magic Quadrant for Enterprise wired &amp; wireless LAN infrastructure from the last consecutive four Years</b>                                                                                                                                                                                                                                                                                                                                |
| Warranty | <p>The proposed product should be the latest and have at least five (05) years of roadmap. Documentary evidence is mandatory. (no nearing end of life product shall be quoted)</p> <p>OEM Presence in Pakistan be More than 10 Years, OEM Technical staff be based in Pakistan, MAL/MAF required against the partnership</p> <p>All Licenses required for solution be included</p> <p>05 Years Next Business Day part replacement be provided &amp; 24/7 Remote Support.</p> |



#### 4.7 Optical Transceivers:

| 10G-SFP+ Optical Transceiver  |                   |                                                                                                                | Qty |
|-------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------|-----|
| 02313URC                      | OMXD30000         | Optical Transceiver,SFP+,10G,Multi-mode Module(850nm,0.3km,LC)                                                 | 165 |
| 02318170                      | OSX010000         | Optical Transceiver,SFP+,10G,Single-mode Module(1310nm,10km,LC)                                                | 235 |
| 25G-SFP28 Optical Transceiver |                   |                                                                                                                |     |
| 02311KNR                      | SFP-25G-SR        | 25GBase-SR Optical Transceiver-SFP28-25G Multi-mode(850nm,0.1km,LC)                                            | 4   |
| 40GE-QSFP+Optical Transceiver |                   |                                                                                                                |     |
| 02310MHR                      | QSFP-40G-iSR4     | 40GBase-iSR4 Optical Transceiver,QSFP+,40G,Multi-mode (850nm,0.15km,MPO)(connecting to one QSFP+ or four SFP+) | 14  |
| 02311YVB                      | QSFP-40G-LR4-Lite | 40GBase-LR4 Lite Optical Transceiver,QSFP+,40G,Single-mode Module(1310nm,2km,LC)                               | 4   |

**Server:**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Server:</b>         | <b>DL380 Gen12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Item</b>            | <b>Description of Requirement</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Chassis                | 2U Rack Mountable with Rack Rail kit and Cable Management Arm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| CPU                    | Two numbers of Intel® Xeon® 6 Processor with Performance Cores 12 Core with 2.2 Ghz or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GPU Options Support    | Up to 3x double-wide GPU (NVIDIA L40S/H200 NVL)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Memory                 | 32DIMM slots.<br>256 GB DIMMS scalable upto 2.0 TB using DDR5 Registered DIMM (RDIMM) 6400 MT/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Memory Protection      | Advanced ECC, Memory Mirroring, Fast Fault Tolerance, Memory scrubbing (Patrol and Demand)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Bus Slots              | Server should support upto eight PCI-Express 5.0 x16 slots.<br>Additional two x8/x16 or higher OCP slots                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| BOOT optimized storage | 2 x 960GB M.2 NVMe SED Hot Plug Boot Optimized Storage in RAID 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| HDD Bays Support       | Upto 24 SFF or 36 EDSFF NVMe direct-CPU NVMe drives, with 8SFF as standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Controller             | <p>Server should have below controller, must support Mixed Mode which combines RAID and HBA mode operation simultaneously :</p> <p>Embedded / PCIe based x16 RAID controller with 8GB with Battery, supporting RAID 0,1,10,5,50,6,60.<br/>Must support mix-and-match SAS, SATA, and NVMe drives to the same controller.</p> <p>Above mentioned controller must support following :</p> <ol style="list-style-type: none"><li>1. Hardware Root of Trust (HWRoT) protects against malicious firmware</li><li>2. Self-Encrypting Drives (SED) for data at rest encryption</li><li>3. Online Capacity Expansion (OCE)</li><li>3. Configurable stripe size up to 1 MB</li><li>4. Global and dedicated Hot Spare with Revertible Hot</li><li>5. Instant Secure Erase</li><li>6. Migrate RAID/Stripe Size</li><li>7. Modifying Cache Write Policy</li><li>8. Move Logical Drive</li><li>9. Re-enable Failed Logical Drive</li></ol> |
| Networking features    | Server should have below networking cards:<br><ol style="list-style-type: none"><li>1. 1Gb 4-port RJ-45 network adaptors with 15 meter cable</li><li>2. 10Gb 2-port SFP+ with Transceivers Ethernet adaptor and 15meter OM4 LC/LC cables</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Interfaces             | VGA ports 1 rear.<br>USB support with Up to 5 total: 1 front, 2 rear, 2 internal.<br>1GbE Dedicated management port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Power Supply           | Should have redundant 1600 watts hot plug power supplies with minimum 94% efficiency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Fans                   | Redundant hot-plug system fans                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Warranty               | 5 years 24x7 OEM warranty                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Industry Standard Compliance                          | ACPI 6.5 Compliant<br>PCIe 5.0 Compliant<br>WOL Support<br>Microsoft® Logo certifications<br>PXE Support<br>USB 3.2 Gen1 Compliant<br>UEFI (Unified Extensible Firmware Interface Forum) Class 3 Support<br>Embedded TPM Support<br>Energy Star 4.0<br>SMBIOS 3.7<br>Redfish API<br>IPMI 2.0<br>Advanced Encryption Standard (AES)<br>SNMP v3<br>TLS 1.2<br>DMTF Redfish support for Secure Boot Key Management<br>Active Directory v1.0<br>ASHRAE A3/A4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| System Security                                       | <p><b>Enhanced Server Data Security:</b> Encryption and key management, UEFI-managed encryption, and self-encrypting drives (SED) for enhanced data-at-rest protection.</p> <p><b>Sanitize Data with One-Button Erase:</b> Must be NIST SP 800-88 compliant. Must be <b>FIPS 140-3, NIST SP 800-53, NIST SP 800-171, and NIST SP 800-88</b> Compliant.</p> <p>Must provides an intuitive cloud operating experience, ensuring streamlined and highly secure operations from the edge to the cloud.</p> <p><b>Physical Security Options:</b> System maintenance switch, USB security, bezel lock, and chassis intrusion detection switch.</p> <p>Servers must be built using <b>trusted supply chain</b> to undergo rigorous inspections and checkpoints to detect and mitigate malicious microcode and counterfeit parts throughout the server build and lifecycle</p> <p>Server must be offered with Trusted Platform Module (TPM) 2.0.</p> <p>UEFI Secure Boot and Secure Start support</p> <p>Tamper-free updates - components digitally signed and verified</p> <p>Immutable Silicon Root of Trust</p> <p>Ability to rollback firmware</p> <p>Secure Recovery - recover critical firmware to known good state on detection of compromised firmware</p> |
| Operating Systems and Virtualization Software Support | Windows Server.<br>Red Hat Enterprise Linux (RHEL)<br>SUSE Linux Enterprise Server (SLES)<br>VMware ESXi.<br>Canonical Ubuntu<br>Oracle Linux and Oracle KVM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Firmware security          | <p>1. Should maintain repository for firmware and drivers recipes to aid rollback or patching of compromised firmware. Should also store Factory Recovery recipe preloaded to rollback to factory tested secured firmware</p> <p>2. Physically Tamper-Resistant independent security system outside remote management ASIC, designed to meet FIPS 140-3 Level 3 hardware protection requirements.</p> <p>3. Firmware verification and recovery—Run scheduled firmware verification scans and configure recovery actions to implement when an issue is detected.</p> <p>4. Security dashboard—View the status of important security features and evaluate your configuration for potential risks. When a risk is detected, you can view details and advice for how to improve system security</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Embedded Remote Management | <p>1. System remote management should support browser based graphical remote console along with Virtual Power button, remote boot using USB/CD/DVD Drive. It should be capable of offering upgrade of software and patches from a remote client using Media/image/folder; It should support server power capping and historical reporting and should have support for multifactor authentication</p> <p>2. Server should have dedicated 1Gbps remote management port</p> <p>3. Server should support agentless management using the out-of-band remote management port</p> <p>4. The server should support monitoring and recording changes in the server hardware and system configuration. It assists in diagnosing problems and delivering rapid resolution when system failures occur</p> <p>5. Two factor Authentication</p> <p>6. Local or Directory-based user accounts with Role based access control</p> <p>7. Remote console sharing upto 6 users simultaneously during pre-OS and OS runtime operation, Console replay - Console Replay captures and stores for replay the console video during a server's last major fault or boot sequence. Microsoft Terminal Services Integration, 128 bit SSL encryption and Secure Shell Version 2 support. Should provide support for AES on browser. Should provide remote firmware update functionality.</p> <p>8. Should support RESTful API integration</p> |
| Server Management          | <p>Software should support dashboard view to quickly scan the managed resources to assess the overall health of the data center. It should provide an at-a-glance visual health summary of the resources user is authorized to view.</p> <p>The Dashboard minimum should display a health summary of the following:</p> <ul style="list-style-type: none"> <li>• Server Profiles</li> <li>• Server Hardware</li> <li>• Appliance alerts</li> </ul> <p>The Systems Management software should provide Role-based access control</p> <p>Zero Touch Provisioning (ZTP) using SSDP with remote access</p> <p>Management software should support integration with popular virtualization platform management software like VMware vCenter &amp; vRealize Operations, and Microsoft System Center &amp; Admin Center</p> <p>Should help provide proactive notification of actual or impending component failure alerts on critical components like CPU, Memory and HDD.</p> <p>Should have dashboard for firmware baselines while performing minimum required firmware checks and highlighting out-of-compliance devices for updates with the selected firmware baseline</p> <p>The Server Management Software should be of the same brand as of the server supplier.</p>                                                                                                                                               |

|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cloud Enabled Monitoring and Management | <ul style="list-style-type: none"> <li>1. Delivers cloud operational agility by unifying compute operations as a service across the compute lifecycle from edge-to-cloud.</li> <li>2. Manages and controls servers regardless of physical location</li> <li>3. Subscription-based entitlement</li> </ul>                                                                                                                                                                |
|                                         | <b>Server Lifecycle Management</b> <ul style="list-style-type: none"> <li>1. Seamless firmware upgrades with Intelligent delta-only based updates.</li> <li>2. Group-based firmware management that can be scheduled or on-demand</li> <li>3. Serial and parallel firmware updates with 'Stop on failure' option</li> <li>4. Group based policy for configurations, OS installs, BIOS settings.</li> <li>5. OS Image deployment</li> <li>6. Rest API Support</li> </ul> |
|                                         | <b>Supportability</b> <ul style="list-style-type: none"> <li>1. Automatic creation of support cases for critical serviceable events.</li> <li>2. Notification of critical hardware alerts via in-app and email notifications</li> <li>3. On-demand firmware compliance reporting</li> <li>4. Remote console using a web browser with HTML5 support</li> </ul>                                                                                                           |
|                                         | <b>Identity &amp; Access Management</b> <ul style="list-style-type: none"> <li>1. Unified Identity &amp; Access Management</li> <li>2. Role-based Access Control (RBAC)</li> <li>3. Single Sign-on (SSO)</li> <li>4. Resource-level restriction policies (RRP)</li> </ul>                                                                                                                                                                                               |
|                                         | <b>Sustainability</b> - Carbon footprint reporting                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                         | <b>Predictive AI insights</b> to forecast future energy costs and carbon emissions. Threshold-based alerting.                                                                                                                                                                                                                                                                                                                                                           |
|                                         | AI-driven insights with workflow policy approvals                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                         | Software must support multi- tenancy                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                         | Software must offer map-based visibility with an intuitive view of server health via global map                                                                                                                                                                                                                                                                                                                                                                         |
|                                         | Multi-vendor server monitoring                                                                                                                                                                                                                                                                                                                                                                                                                                          |



**Workstation:**

| Description                                                                                     |
|-------------------------------------------------------------------------------------------------|
| Workstation                                                                                     |
| Windows 11 Pro 64 OEM pre installed                                                             |
| Intel Core Ultra7 265 vPro Enterprise 5.30G 30 MB 20 cores 65W CPU                              |
| 32GB (2x16GB) DDR5 5600 UDIMM ECC Memory                                                        |
| MiniDP-to-DP Adapter (4-pack)                                                                   |
| 1TB PCIe-4x4 2280 Value M.2 Solid State Drive                                                   |
| 4TB 7200RPM SATA 3.5in Enterprise                                                               |
| Multi-Device Rechargeable Wireless Keyboard and Mouse Combo                                     |
| 9.5mm SuperMulti DVDRW                                                                          |
| Intel BE200 Wi-Fi 7 +Bluetooth 5.4 vPro WW WLAN                                                 |
| Intel I226-T1 2.5GbE Ethernet Network Adapter                                                   |
| 500W EPA92 4x12V Power Supply                                                                   |
| C13 Power Cord                                                                                  |
| 5 YEARS WARRANTY                                                                                |
| 21 INCHES Monitor /LCD                                                                          |
| Bidder must be authorized partner , MAL needs to be submitted in the bid.                       |
| Bidder Must be Partner and should have the presence of office in Karachi, Islamabad and Lahore. |

**DATACENTER TECHNICAL SPECS:**

| Sr No. | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Qty |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1      | <b>Cabinet</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |     |
|        | <ul style="list-style-type: none"><li>- IT Rack 600 mm x 1350 mm x 2000 mm</li><li>- The cabinet complies with IEC 60297-2 and is compatible with the 19" rack international standard.</li><li>- Two horizontal line trays should be installed at the top of the front of the cabinet.</li><li>- The cabinet design complies with IEC 60297-2 and ANSI or EIA RS-310-D standards.</li><li>- The overall protection level must be greater than or equal to IP20</li><li>- The color of cabinet is black.</li><li>- The material must be high-intensity class A carbon cold rolled steel plate and zinc-coated steel plate</li><li>- Must have front and rear ventilation channels</li><li>- Space for installing the IT cabinet and network cabinet:</li><li>- Each cabinet must provide 42 U available space; the position of each U is marked on the vertical mounting bars.</li></ul> | 4   |
|        | <p>PDU's with Rack Level Monitoring 32(A), single phase</p> <ul style="list-style-type: none"><li>- Two vertical metered PDUs are installed in each cabinet. Each PDU provides 24 output ports (C13 x 20 + C19 x 4).</li><li>- The power distribution module must have at least 12 IT outputs</li><li>- Power distribution module: includes the power indicator, UPS input, UPS output, UPS maintenance bypass switch, surge protection switch, IT power distribution, and air conditioner power distribution</li></ul>                                                                                                                                                                                                                                                                                                                                                                 | 8   |
| 2      | <b>UPS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |     |
|        | <p>Supply and installation of 20KVA online mode with high efficiency high power factor UPS with installation cabinets for power modules.</p> <ul style="list-style-type: none"><li>-The module must use lead-acid batteries (VRLA) to provide backup power for 20 kW loads for 15 minutes.</li></ul> <p><b><u>UPS specifications:</u></b></p> <p><b>Rated capacity:</b> 20 kVA</p> <p><b>Output power factor:</b> 1</p> <p><b>Rated input voltage:</b> 380 V AC/400 V AC/415 V AC (three-phase input)</p> <p><b>Rated output voltage:</b> 220 V AC/230 V AC/240 V AC</p> <p><b>Output voltage precision:</b> ±1%</p> <p><b>System efficiency:</b> 95%</p> <p><b>ECO Efficiency:</b> 98%</p> <ul style="list-style-type: none"><li>-The UPS must work in redundancy mode and in N+1 mode.</li><li>-The rated capacity of the UPS should be 10kVA and must be installed in a</li></ul>    | 2   |

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|          | <p>19-inch rack and occupies only 2U space in the cabinet.</p> <ul style="list-style-type: none"> <li>-The power distribution cables, power distribution cabinets, and corresponding circuits must meet the design load of the power consumption.</li> <li>-The battery cabinet can be deployed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
| <b>3</b> | <b>Cooling</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |
|          | <p>Supply, installation, testing and commissioning of in-rack horizontal cooling precision air condition CRAC units with each having cooling capacity 12.5 KW with power supply<br/>208–240 V AC, 50 Hz/60 Hz,<br/>1Ph+N+PE/2Ph+PE</p> <p>along with copper pipe installation, gas filling, condensate drain piping, water tanks for humidifiers, team work function and all necessary controls complete in all respect.</p> <ul style="list-style-type: none"> <li>- Cooling mode: Air cooled</li> <li>- Refrigerant: R410A</li> <li>- Air supply mode: Horizontal flow</li> <li>- IP rating: IP20</li> <li>-To simplify maintenance and installation, the module must use rack-mounted air conditioner.</li> <li>-The space occupied by a single air conditioner is no more than 11 U.</li> <li>- Certification: Normal-temperature model: REACH, RoHS, CE, CCC, and CQC</li> </ul>                                                                                                                                      | 3 |
| <b>4</b> | <b>DCIM</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |
|          | <p>The data center must have an overall environment and power monitoring system. The built-in monitoring host can monitor the power supply and distribution, air conditioners, in the module as well as.</p> <ul style="list-style-type: none"> <li>- Temperature and Humidity sensor.</li> <li>- Smoke detection sensor.</li> <li>- Water leakage sensor.</li> <li>- Intelligent Lock.</li> <li>- Detect and display the input current.</li> <li>- Detect and display the total input current.</li> <li>- Detect and display the input voltage; display the voltage and current alternately.</li> <li>- Provide remote input management. Remotely query the input voltage, total input current, input power, and input energy through a serial port.</li> <li>- Remotely query the PDU status through a serial port. The status that can be queried includes normal input power, overcurrent, overvoltage, and undervoltage, as well as the communication status (normal or abnormal) of the monitoring board.</li> </ul> | 1 |

| 5 | Fire extinguishing module Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|   | <p>The module can automatically release fire extinguishing gas and extinguish fires in the module in an emergency. The fire extinguishing module must meet the following requirements:</p> <ul style="list-style-type: none"> <li>• The fire extinguishing module must be flushed with environment-friendly fire extinguishing gas (perfluorohexanone). The gas capacity is not less than 6 kg and the module height is not higher than 6 U.</li> <li>• The fire extinguishing module must be equipped with independent smoke sensors and temperature sensors. An independent power backup system must be configured for the sensors. The backup time must be no less than 24 hours.</li> </ul> <p>The fire extinguishing module must have monitoring ports, which can be connected to the monitoring system of the data center to detect the fire extinguishing module status.</p> <p><b>Bidder Criteria for Datacenter:</b></p> <p>OEM must have a registered office in Pakistan for at least 15 years (Distributors not applicable)</p> <p>OEM must have dedicated local teams for pre-sales, post-sales, and sales support Bidder Must Submit the profiles.</p> <p>OEM must hold at least 50 registered patents in relevant technologies</p> <p>Bidder must be OEM Partner, Bidder Must submit Manufacturer Authorization Letter (MAL) along with the bid.</p> <p>Bidder Must have atleast 1 HCSP or equivalent certified Resource.</p> | 1 |

## Technical BOQ :

**Bidder must compare Technical BOQ with Specification required in the Tender.**

| Active Network                                                                                                 |        |
|----------------------------------------------------------------------------------------------------------------|--------|
| Item                                                                                                           | Qty    |
| Core Switch Chassis                                                                                            | 1      |
| Aggregation Switches:                                                                                          | 4      |
| Access Switches for LAN and CCTV                                                                               | 106    |
| NGFW Firewalls                                                                                                 | 2      |
| Agile Controller                                                                                               | 1      |
| Access Points                                                                                                  | 150    |
| Servers                                                                                                        | 4      |
| Workstation                                                                                                    | 2      |
| Optical Transceiver,SFP+,10G,Multi-mode Module(850nm,0.3km,LC)                                                 | 165    |
| Optical Transceiver,SFP+,10G,Single-mode Module(1310nm,10km,LC)                                                | 235    |
| 25GBase-SR Optical Transceiver-SFP28-25G Multi-mode(850nm,0.1km,LC)                                            | 4      |
| 40GBase-iSR4 Optical Transceiver,QSFP+,40G,Multi-mode (850nm,0.15km,MPO)(connecting to one QSFP+ or four SFP+) | 14     |
| 40GBase-LR4 Lite Optical Transceiver,QSFP+,40G,Single-mode Module(1310nm,2km,LC)                               | 4      |
| Datacenter Solution as per the qty and specs Given in the Tender                                               | 1job   |
| Technical Support                                                                                              |        |
| Core Switch (5 Years Warranty/Support)                                                                         | 1      |
| Aggregation Switches (5 Years Warranty/Support)                                                                | 4      |
| Access Switches for LAN and CCTV (5 Years Warranty/Support)                                                    | 106    |
| NGFW Firewalls (5 Years Warranty/Support)                                                                      | 2      |
| Agile Controller (5 Years Warranty/Support)                                                                    | 1      |
| Access Points (5 Years Warranty/Support)                                                                       | 150    |
| Data Center Equipment 5 Years Warranty/ support)                                                               | bundle |
| Implementation                                                                                                 | 1Job   |
|                                                                                                                |        |