



**RAILTEL CORPORATION OF INDIA LTD.**

**(A Govt. of India Enterprise)**

**6A, 6th Floor, Gumidelli Towers, Begumpet Airport Road,  
Opp. Shoppers Stop, Prakash Nagar, Begumpet, Hyderabad – 500016**

**ELECTRONIC TENDER DOCUMENT**

**For the work of**

**Design, Supply, Installation, Testing, Commissioning  
with 3-year Comprehensive Maintenance Support for  
Data Centre Expansion in 2<sup>nd</sup> & 3<sup>rd</sup> Floor Integration for  
RailTel, Rail Nilayam, Secunderabad**

**OPEN TENDER NO. RailTel/e-Tender/OT/SR/DC/2026-27/01**

**Dated: 05.05.2026**

**Two Packet System**

**Tender Processing fee to be paid as applicable at e-nivida portal**

## DISCLAIMER

While the document has been prepared in good faith, no representation or warranty, express or implied, is or will be made, and no responsibility or liability will be accepted by RailTel Corporation of India Ltd. (RAILTEL) or any of its employees, in relation to the accuracy or completeness of this document and any liability thereof expressly disclaimed. The TENDER is not an offer by RAILTEL, but an invitation for bidders' responses. No contractual obligation on behalf of RAILTEL, whatsoever, shall arise from the offer process unless and until a formal contract is signed and executed by duly authorized officers of RAILTEL and the Bidder.





# RailTel Corporation of India Limited

*A Government of India (Ministry of Railways) Undertaking*

Southern Region Head Quarters, 6A, Gumidelli Towers, Begumpet, Hyderabad, TG -500016

visit [www.railtelindia.com](http://www.railtelindia.com), Tel: 040-27821134 Fax: 27820682,

Regd.Office: Plate-A, 6th Floor, Office Tower-2, NBCC Building, East Kidwai Nagar, New Delhi-23.

## e-TENDER NOTICE

**Tender No. RailTel/e-Tender/OT/SR/DC/2026-27/01**

**Date: 05.05.2026**

RailTel Corporation of India Ltd. invites e-bids from the established and reliable contractors with proven experience for the work of "Design, Supply, Installation, Testing, commissioning with 3-year Comprehensive Maintenance Support for Data Centre Expansion in 2<sup>nd</sup> & 3rd Floor Integration for RailTel, Rail Nilayam, Secunderabad" as detailed below:

Tender No.	Section Details	Estimated Tender Value for three year incl. GST	Earnest Money
DC/2026-27/01	Design, Supply, Installation, Testing, commissioning with 3-year Comprehensive Maintenance Support for Data Centre Expansion in Second Floor and 3rd Integration for RailTel, Rail Nilayam, Secunderabad	Rs.144000000/-	Rs.2000000/-

Details of sections which are being tendered is as enclosed

a)	Commencement of Sale of Tender Documents	05.05.2026
b)	Pre-bid Meeting / queries submission/ design submission closing time	12.05.2026 at 11:00 hrs
c)	Last date and time for submission of tender documents.	26.05.2026 at 15:00 hrs
d)	Opening date and time of tender documents.	26.05.2026 at 15.30 hrs.
e)	Validity of offer	60 days from the date of opening of tender.
f)	Address for correspondence	The Principal Executive Director, RailTel Corporation of India Limited, 6A, 6th Floor, Gumidelli Towers, Begumpet Airport Road, Opp. Shoppers Stop, Prakash Nagar, Begumpet, Hyderabad - 500016
g)	Web address for availability of tender document	Detailed tender notice and tender document <a href="https://railtel.enivida.com/">https://railtel.enivida.com/</a> _ also available at our website <a href="http://www.railtel.in">www.railtel.in</a>

**Eligibility Criteria:** As per para no.5 in the preamble of Tender document

**\* Note:**

1. Firms registered with **UDYAM** under Ministry of MSME and **Startup** as registered and recognized by Department of Promotion of Industry and Internal Trade (DPIIT) are exempted from submission of cost of tender (if applicable) & EMD and no other exemptions will be given.
2. **Firms claiming for the above exemptions under UDYAM/Startup, have to submit supporting documents as per clause no 10 of Preamble i.e. current and valid Udyam certificate or Startup registration certificate and Bid Security declaration as per Form-14, without which their offers will be considered as invalid and liable for rejection.**
3. The bidder shall bear all costs associated with the preparation, submission/participation in the bid. Purchaser in no way will be responsible or liable for these costs regardless of the conduct or outcome of the bidding process

**Tender Notice and Tender Document are available on RailTel's website and can be downloaded from [www.railtel.in](http://www.railtel.in) or from the e-Tendering portal <https://railtel.enivida.com/> . For online bid submission the tenderer will have to necessarily download an official online copy of the tender documents from IREPS's e-portal. All future Information viz. corrigendum /addendum/ amendments etc. for this Tender shall be posted on the e-Tendering Portal & RailTel website.**

**Printed copy of Tender document will not be sold from RailTel office.**

The offers shall be opened on above said date in the presence of those bidders who choose to be present online (refer section: **e-Tendering/Bid Receipt (Online)**). If the above said date happens to be a holiday the same shall be opened on the next working day.

Sd/-

**JGM/DC&TP/SC**

**For RailTel Corporation of India Ltd.,**

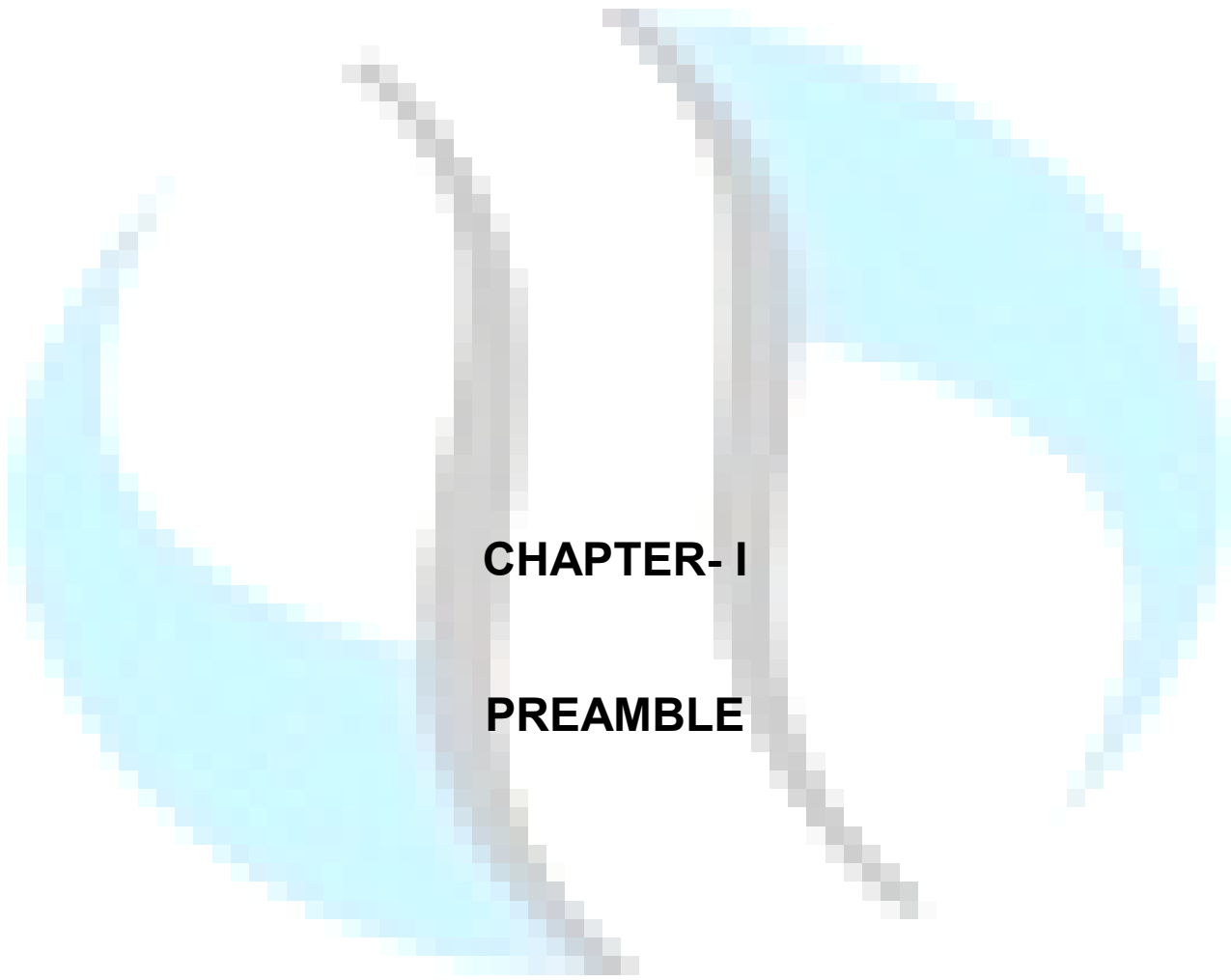


## INDEX

<b>CHAPTER</b>	<b>SUBJECT</b>
<b>I</b>	<b>Preamble</b>
<b>II</b>	<b>Schedule of Requirements</b>
<b>III</b>	<b>Technical Specifications</b>
<b>IV</b>	<b>Drawings</b>
<b>V</b>	<b>Instructions to Tenderer's and conditions of tendering</b>
<b>VI</b>	<b>Special Conditions of Contract</b>
<b>VII</b>	<b>Forms of Tender</b>
<b>VIII</b>	<b>Guidelines for participation in e-tender.</b>
<b>IX</b>	<b>Service Level Agreements and Penalties</b>

---

**RAILTEL**



**CHAPTER- I**

**PREAMBLE**

रेलवे  
RAILTEL

## PREAMBLE

### 1. NAME OF WORK:

Design, Supply, Installation, Testing, Commissioning with 3-year Comprehensive Maintenance Support for Data Centre Expansion in 2nd & 3rd Floor Integration for RailTel, Rail Nilayam, Secunderabad

### 2. SCOPE OF WORK:

The Scope for the proposed Data Centre expansion includes the design, supply, installation, testing, commissioning and maintenance including the following works but not limited to:

1. Supply and installation of civil and interior works for the Data Centre such as fire-rated walls, fire rated doors, access flooring, false ceiling, fire retardant painting, etc.
2. Civil and Electrical works for accessing the existing lift in the second floor.
3. Upgradation of existing 2x400kVA UPS system with Lithium-ion batteries.
4. Supply, installation, testing and commissioning of electrical works such as Data Centre electrical panels, electrical cabling, UPS Systems, earthing, lighting for Data Centre area, point wiring for Data Centre, Floor Mount PDUs with isolation transformer, cable trays and pathways, etc.
5. Supply and installation, testing and commissioning of HVAC works such as Dx based in-row Precision ACs, High-wall split Air conditioners, exhaust fans, etc.
6. Supply, installation, testing and commissioning of addressable fire alarm system, aspiration system, NOVEC 1230/FK-5-1-12 based fire suppression system, access control system, IP based CCTV system, water leak detection system and rodent repellent system.
7. Upgradation of existing building management system and Integrating Second floor Building Management System.
8. Supply and installation of racks for the IT equipment in Server Rooms.
9. Supply and installation of network cable management system within the Data Centre.
10. Supply, installation and testing of network cabling within the Data Centre.
11. Provide necessary documents and obtain necessary approvals from the mandated approval authorities.
12. Operation and Maintenance of the Data Centre non-IT infrastructure for 3 years comprehensive maintenance support (1-year OEM warranty period + 2 year post warranty period) from the date of handing over of the Data Centre and sign-off.

This is turnkey project, and hence any additional supply/works, which are not explicitly mentioned in this Open Tender but required to complete the installation as per schedule of requirements, are in the scope of the bidder.

### 3. PRE-BID CONFERENCE AND CLARIFICATION REQUESTS

- 3.1 Pre-bid conference for this tender will be held on **12.05.2026 at 11.00 Hrs.** at RailTel Corporation of India Ltd., Rail Nilayam, Secunderabad.
- 3.2 The queries/ request for clarifications may be sent to the RailTel's office latest by **12.05.2026 11:00 Hrs.**
- 3.3 The bidder is advised to restrict the number of persons attending the pre-bid meeting to maximum 2.
- 3.4 The bidder shall communicate the name and contact details of the persons who will be attending the pre-bid conference on or before **12.05.2026 11:00 Hrs.**

### 4. TENDER BID

The tender bid shall be submitted in **two separate sealed covers** as under:-

Part-I- Technical and commercial elements of the tender bid hereinafter called '**Credential Bid**'.

Part-II- Price element of the tender bid hereinafter called '**Price Bid**'.

The details to be included in Credential Bid and Price Bid is given in Para 6.7 of Instructions to Tenderers and Conditions of Tendering of the tender documents.

### 5. QUALIFYING CRITERIA

#### 5.1 General:

- 5.1.1 Qualifying criteria under this clause lays down minimum acceptable qualifications in various areas to ensure that qualified tenderer has necessary experience, technical expertise, equipment and financial and human resources to successfully complete the project.
- 5.1.2 If the tenderer proposes to buy any associated equipment/components from other suppliers/ sources, documents indicating the willingness to supply the equipment and provide technical support to the tenderer that may be required during installation, commissioning and warranty period and later on directly to RailTel, shall be included in the tender.
- 5.1.3 The tenderer should submit the details of experience of Data Centre design and implementation works or services in the projects executed, which should clearly bring out expertise in the equipment manufacture and installation etc. as per Form No. 11 Chapter-VII.

For supply of associated critical materials, the contractor, if he is not a manufacturer, shall submit a certificate from the manufacturer, whose material he intends to supply, to the effect that the manufacturer is willing and capable to supply the material in time so as to enable the contractor to complete the work within the time frame mentioned in the contract.

- 5.1.4 The tenderer must submit along with his / their tender, certificates from the original user for whom the project was undertaken certifying the date of award of contract, date of completion, date of commissioning and the present working state of the system so established. The tenderer shall submit these certificates for all the projects that he has executed which only satisfy the minimum requirements in each case. The certificates are to be submitted in original or their true copies duly signed by the tenderer, as per Form No. 2 of chapter-VII.
- 5.1.5 The bidder should be an Indian registered company having significant support presence in Hyderabad for providing datacenter design, implementation and maintenance services.
- 5.1.6 The bidder should be in the business of design, implementation, operation and maintenance of Data Centre in the last 7 years. Evidence with customer purchase orders, work completion (satisfactory) certificates and customer references has to be provided.

## **5.2 Technical**

- 5.2.1 The bidder shall be an OEM of major Datacenter components such as UPS, Precision AC and DG Sets or authorized system integrator of the OEM. In case the bidder is not an OEM of the products being offered, bidder has to submit an authorization letter from the respective OEMs.
- 5.2.2 The OEM shall also certify that the products offered are not end of life or end of service and they would provide support for these products for a period of 8 years minimum.
- 5.2.3 The bidder should have designed and executed project of a similar scale (as defined in para 18 of Chapter I Preamble) on a turnkey basis in his name. Evidence with customer purchase orders, work completion certificates and customer references has to be provided.
- 5.2.4 The tenderer must have successfully completed any of the following during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:
- i. Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, or
  - ii. Two similar works each costing not less than the amount equal to 40% of advertised value of the tender, or
  - iii. One similar work each costing not less than the amount equal to 60% of advertised value of the tender.

**Note-1:** Separate completed works of minimum required values for each component shall also be considered for fulfilment of technical eligibility criteria. In such cases, what constitutes a component in a composite work shall be clearly pre- defined with estimated tender cost of it, as part of the tender documents without any ambiguity. To evaluate the technical eligibility of tenderer, only components of work as stipulated in tender documents for evaluation of

technical eligibility, shall be considered. The scope of work covered in other remaining components shall be executed by tenderer himself.

**Note-2:** Work experience certificate from private individual shall not be considered. However, in addition to work experience certificates issued by any Govt. Organization, PSU or any reputed Telecommunications company (TELCO), work experience certificate issued by Public listed company having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange (NSE) or Bombay Stock Exchange (BSE), incorporated/registered at least 5 years prior to the date of opening of tender, shall also be considered provided the work experience certificate has been issued by a person authorized by the Public listed company to issue such certificates.

**RailTel reserves the right:-**

- a) To verify, if so desired, the correctness of documentary evidence furnished by the tenderer.
- b) To verify the successful operation and performance of qualifying projects and tenderer shall arrange permission for the same.
- c) To carry out capability assessment of the bidder(s) including referral to in-house information.
- d) RailTel shall not be responsible for any delay in the receipt of tenders and reserves the right to accept/reject any or all tenders without assigning any reason.

**5.2.5 WORK LOAD**

The tenderer to submit the present work load of the Datacenter Contracts in hand as per the format (Form No.9). The performance of the tenderer with regard to satisfactory execution of more than one contract simultaneously in the past shall be taken into account.

**5.3 Financial:**

- 5.3.1 The bidder should have minimum cumulative turnover from operation in the previous three financial years and the current financial year, at least 150% of the advertised value of the tender. The tenderers shall submit Certificates to this effect which may be an attested Certificate from the concerned department / client or Audited Balance Sheet duly certified by the Chartered Accountant/Certificate from Chartered Accountant duly supported by Audited Balance Sheet. The contact details of CA/Statutory Auditor along with UDIN No. shall be mandatorily mentioned on copy of certified Balance Sheet/Certificate.

**Note:** Client certificate from other than Govt. Organization should be duly supported by Form 16A/26AS generated through TRACES of Income Tax Department of India.

Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under:

The conversion rate of US Dollars into Rupees shall be the daily representative exchange rates published by the Reserve Bank of India for the relevant date. Where, relevant date shall be as on the last day of month previous to the one in which tender is invited. In case

of any other currency, the same shall first be converted to US Dollars as on the last day of month previous to the one in which tender is invited, and the amount so derived in US 106

Dollars shall be converted into Rupees at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the International Monetary Fund for the relevant date

5.3.2 The tenderer shall furnish such documents as to establish the financial soundness of his company. The latest balance sheet audited or certified by a neutral agency shall be furnished.

#### 5.4 Equipment / Material:

5.4.1 The tenderer shall clearly identify the sources from which the equipment / material to be supplied under this tender will be obtained. The tenderer should also enclose an undertaking from the sources, from where he is procuring the material, to the effect that the material shall be supplied in time so as to enable the tenderer to complete the work within the completion period.

5.4.2 All equipment/materials proposed to be used shall be of proven design and performance.

5.4.3 The equipment/materials shall be covered by the performance guarantee of the original manufacturer.

5.4.4 The tenderer shall submit a declaration from the original equipment manufacturers regarding the service support available within the country.

5.4.5 The purchaser or his representative may undertake type tests to determine the compliance to the specification and accord type approval before the equipment are manufactured, inspected and supplied.

#### 5.5 Engineering Organisation

The tenderers shall depute the required technical and project management personnel for design and implementation of the Data centre as per the specifications. The project organization chart shall be enclosed as part of the tender.

The bidder shall depute certified Data Centre engineers with at least 3-year Data Centre experience. The list and CV of proposed technical personnel shall be included in the tender.

The qualification and experience of these proposed personnel should be enclosed along with the bid.

#### 5.6 Constructions and Maintenance Machinery

The tenderer should furnish the details of the machinery and plants, test and measuring instruments to be deployed by him for installation & commissioning testing of work

5.7 It will be incumbent on the part of tenderer to list specifically the details in respect of each of the sub clauses of Clause 5 of preamble of the tender document as to how the tenderer fulfils the criteria. The details may be submitted in table as below:

S. No.	Paragraph/ Clause no. of eligibility criteria	Description of eligibility criteria	Remarks to whether complied or not	Folio no. of User Certificate as per Form 2 relevant in the offer against this compliance of the particular preamble.
1.	5.1 of Preamble (enclose for each sub clause separately)			
2.	5.2 of preamble (Enclose for each sub clause separately)			

**6. LAST DATE OF SUBMISSION AND DATE OF OPENING OF TENDER**

The tender shall be received up to 15:00 hrs. on 26.05.2026 at RailTel Corporation of India Limited, Begumpet bid) will be opened at 15:30 hrs. on 26.05.2026 at the same address.

**7. COMPLETION PERIOD OF WORK:**

The works is to be completed within 180 days from the date of issue of "Letter Of Acceptance" of the tender with due cognizance to intermediate stages of completion of work.

**8. VALIDITY OF OFFER:**

The tenderer shall keep the offer open for 60 days from the date of opening of tender. Within that period the tenderer cannot withdraw his offer subject to the period being extended further, if required, by mutual agreement from time to time. Any contravention of the above condition will lead to forfeiture of his Earnest Money.

**9. THE LIST OF ADDRESS TO WHICH CORRESPONDENCE AND DOCUMENTS RELATING TO THE CONTRACT SHOULD BE SENT:**

In the initial phase of the project, communication has to be done with:

Shri A Naga Hari, AGM/DC  
 RailTel Corporation Of India Ltd.,  
 Rail Nilayam, Secunderabad.  
 Phone : 9701725906  
 Email : nagaharikrishna@railtel.in

For site related queries and arranging site visits, the bidders shall contact.

Shri Sai Ram T  
 RailTel Corporation Of India Ltd.,  
 Rail Nilayam, Secunderabad.  
 Phone : 9666646679  
 Email : [sairamthota@railtelindia.com](mailto:sairamthota@railtelindia.com)

Shri A Subba Rayudu, AGM/DC  
RailTel Corporation Of India Ltd.,  
Rail Nilayam, Secunderabad.  
Phone : 9494208999  
Email : asrayudu@railtel.in

10. **EARNEST MONEY**

**Rs. 20,00,000/-** through payment online through RTGS / internet banking in Beneficiary name RailTel Corporation of India Limited Account No. 33946516594, IFSC Code SBIN0020299, Bank Name: State Bank of India, Branch address: Veer Chambers, Ranga Reddy District, Begumpet – 500016. The Bid received without EMD will be summarily rejected.

EMD/Bid security to be submitted by all tenderers, subject to the following exemptions:

- a) Tender cases of value up to Rs. 5 Lakhs.
- b) Micro and Small Enterprises (MSEs) registered under UDYAM Registration.
- c) Startups recognized by Department of Promotion of Industry and Internal Trade (DPIIT).

No bank guarantee for EMD is accepted. Earnest Money of unsuccessful Tenderers shall be returned & that of successful tenderer after supply and acceptance of the material and upon submission of valid SD/PBG. **Tenders without earnest money will be summarily rejected.**

However, Firms registered with UDYAM under Ministry of MSME are exempted from submission of EMD and they are valid and in currency. Copy of certificate to be submitted along with tender bid.

These exemptions shall be applicable provided Tenderer registered with UDYAM and registration is current and valid. Firms claiming these exemptions are required to submit along with their offer, a copy of their current and valid UDYAM registration certificate, otherwise their offer would not be considered, will be treated as invalid and summarily rejected.

As mentioned in Section 7(4) of Ministry of MSME's Notification No. S.O2119 (E) dated 26th June, 2020, an enterprise registered with any other organization under the Ministry of MSME shall register itself under Udyam Registration. With effect from 01.07.2020, MSEs registered under Udyam Registration are eligible to avail the benefits under the Policy.

However, traders/ distributors/ sole agent/ Works Contract are excluded from the purview of Public Procurement Policy for MSEs Order, 2012. Further, as mentioned in O.M. No. 5/2(2)/2021-E/P & G/Policy dated 02.07.2021, Retail and Wholesale traders can register on Udyam Registration Portal for the purpose of Priority Sector Lending (PSL) only. Accordingly, in Udyam site if it is mentioned as below:

**RAILTEL**



Reference of specifications of the important equipment's and materials required for execution of the contract is given in the chapter-II (system requirement and SOR) and chapter-III (Technical specifications) of tender document. The work shall be executed in compliance with all the technical requirements given therein.

**13. SCHEDULE OF REQUIREMENT**

The various items to be supplied and services to be provided by the tenderer are indicated in chapter –II (system requirement & SOR) of tender document. The tenderer is advised to quote for all the items. The make and model of all the equipment's proposed to be supplied must be indicated by the tenderer/s.

**14. WORK TO BE DONE BY RAILTEL.**

Following shall be arranged by RailTel: -

- i) Open space will be provided by RailTel. The bidder shall arrange the required shelter/safety measures at their own cost for safely storing equipment.
- ii) Amenities such as temporary power and water shall be arranged by RailTel on chargeable basis as per the prevailing norms.

The bidder to clearly mention any specific requirements to be done by RailTel for successful execution of the project. RailTel reserves to right accept/reject any such requests.

**15. MATERIALS TO BE SUPPLIED BY RAILTEL**

Tenderer's special attention is invited to the fact that no material is required to be arranged / supplied by RailTel for commissioning of the Data Centre.

**16. MATERIALS TO BE SUPPLIED BY CONTRACTOR**

All materials including the materials not covered under the Schedule of Requirement and those required to achieve the end objective including cable trays, connectors, termination accessories, patch cables, connectors/ adaptors Ladders/ Runway, using and any special protection materials etc. as required are to be supplied by the contractor.

- 17.** The tenderer shall submit their bid by giving all the information in the relevant forms attached as Annexure to this document and suitably numbering each page of the bid documents with a content list indicating availability of various documents with their serial numbers. In the absence of numbering of pages and the content list, there is a likelihood of any important document going unnoticed for which the tenderer shall be solely responsible.

**18. SIMILAR WORK-**

Similar work for shall be as under –  
Construction for tier-3 data center.

Turnkey implementation of datacenter consisting of supply, installation and commissioning of HT and LT power distribution, DG Sets, UPS and Batteries, Precision cooling systems, safety & security systems, building management system, datacenter infrastructure management systems and networking.

The above datacenter should have at least N+1 power redundancy and N+1 cooling redundancy with concurrent maintainability. The bidder shall provide design documents for the required evidence. If required, RailTel may visit the implemented site to ascertain the bidder's claim. The bidder shall make arrangements for the site visits.

The work should have been carried out in India.

The bidder should have executed all the above in a single order.

**19. LOAD DISTRIBUTION:**

Bidder should ensure that rack deployment should have equal load distribution throughout the floor.

**20. SPLITTING OF QUANTITY:** Not Applicable.

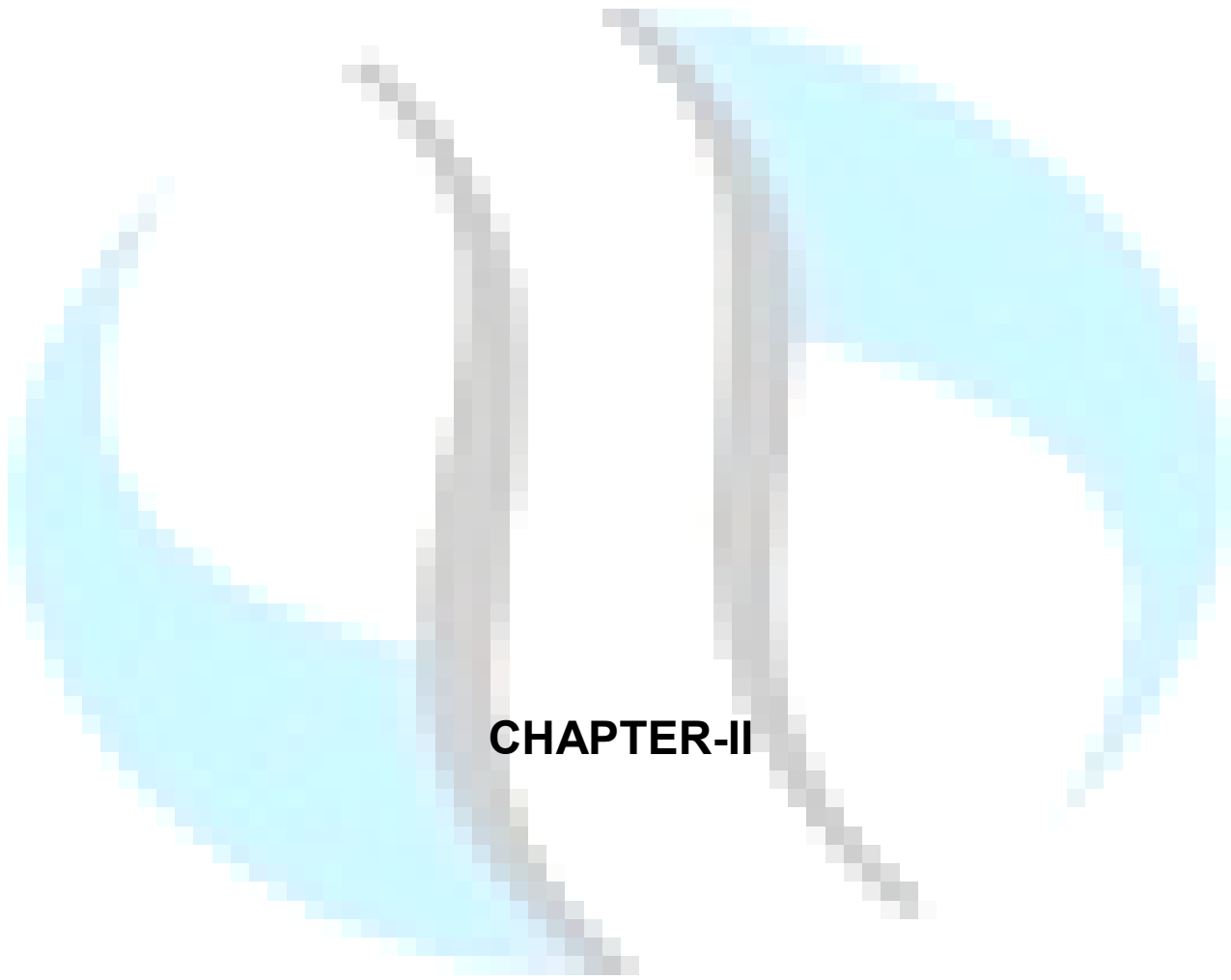
**21. Make in India:**

The provisions of the Public Procurement (Preference to Make in India) Order 2017 dated June 15, 2017 (or subsequent revisions, if any) by Department of Industrial Policy and Promotion, GoI shall apply to this tender to the extent feasible. Minimum Local Content for SOR Items shall be 50% for purchase preference as per the Notification No. 18-10/2017-IP dated 29th August 2018 issued by Department of Telecommunications, Ministry of Communications or as per the latest notification. Bidder shall be required to give a self-certification in his bid that the item offered meets the local content and shall give details of the location(s) at which the local value addition is made. Further the bidder shall provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

In case of any false declaration, action shall be taken in line with the provisions of the PPP-MIII order.

\*\*\*\*





## CHAPTER-II

SYSTEM REQUIREMENT & SOR

RAILTEL

## Contents

- 1 Introduction
- 2 Data Centre Design Requirements
- 3 Power Utilization from existing infrastructure
- 4 Scope of Work
- 5 Design Considerations and Capacity Planning
- 6 Tentative Layout
  - 6.1 Interior Floor Layout
  - 6.2 Isometric View of Proposed Data Centre
- 7 Scope of RailTel
- 8 Design Requirements
  - 8.1 Civil and Interior
  - 8.2 Electrical System
    - 8.2.1 High Level SLD
    - 8.2.2 Estimated Electrical Load Calculations
  - 8.3 Cooling System
    - 8.3.1 Cooling Summary:
  - 8.4 Safety and Security Systems
  - 8.5 Passive Networking Infrastructure
    - 8.5.1 Passive Networking Schematic
- 9 Schedule of Requirements
- 10 Technical Specification
  - 10.1 Civil and Interior Works
    - 10.1.1 Partitions and Walls
    - 10.1.2 Doors
    - 10.1.3 False Ceiling
    - 10.1.4 Vinyl Flooring
    - 10.1.5 Painting
    - 10.1.6 Thermal Insulation
    - 10.1.7 Pest Control
    - 10.1.8 Miscellaneous Works

## **10.2 Electrical works**

### **10.2.1 Raw Power/HVAC Panels**

### **10.2.2 Electrical Circuit Breakers**

### **10.2.3 Multi-Function Meters**

### **10.2.4 Earthing**

### **10.2.5 LT cables**

### **10.2.6 Automatic Transfer Switches**

### **10.2.7 UPS System**

### **10.2.8 Lithium Ion Battery**

### **10.2.9 Floor Mount PDUs with Isolation Transformers**

### **10.2.10 Lighting**

### **10.2.11 Receptacle with plug**

### **10.2.12 Terminals**

### **10.2.13 Grounding**

### **10.2.14 Cable Trays and Raceways**

### **10.2.15 Cable tray**

### **10.2.16 Cable ladder**

### **10.2.17 GI Raceways & Junction Boxes**

### **10.2.18 Data Centre Earthing**

## **10.3 HVAC System**

### **10.3.1 In Row Cooling Units**

## **10.4 Safety and Security Systems**

### **10.4.1 Fire Alarm System**

### **10.4.2 Very Early Detection System (VESDA) & Aspiration System**

### **10.4.3 Fire Suppression Systems**

### **10.4.4 Access Control System**

### **10.4.5 IP Based CCTV Surveillance System**

### **10.4.6 Rodent Repellent System**

### **10.4.7 Water Leak Detection System**

### **10.4.8 Building Management System (BMS)**

## **10.5 Passive Networking & Racks**

### **10.5.1 Server Rack**

**10.5.2 Network Rack**

**10.5.3 Aisle Containment**

**10.5.4 Network Cabling**

**10.5.5 Copper Cat6A Cabling specification**

**10.5.6 Fiber Guiding System**

**11 Installation, Testing and Commissioning**

**11.1 Engineering**

**11.2 Procurement**

**11.3 Testing**

**11.3.1 Test Categories**

**11.3.2 Test Report**

**11.3.3 Failure of Components**

**11.3.4 Readjustments**

**11.3.5 Sample Approvals**

**11.3.6 Pre Factory Acceptance Testing**

**11.3.7 Factory Acceptance Testing (FAT)**

**11.3.8 Installation**

**11.3.9 Pre-Commissioning**

**11.3.10 Integrated Site Acceptance Testing (ISAT)**

**11.3.11 Spares**

**11.3.12 Protection**

**11.3.13 Quality Assurance**

**11.3.14 Maintenance**

**11.3.15 Operation & Maintenance**

**11.3.16 Submittals**

**12 Approved Makes List**

**RAILTEL**

# 1 Introduction

RailTel, a "Navaratna" Central Public Sector Enterprise is an ICT provider and one of the largest neutral telecom infrastructure providers in the country owning a Pan-India optic fiber network. The OFC network covers important towns & cities of the country and several rural areas.

RailTel was incorporated on September 26<sup>th</sup>, 2000 with the aim of modernizing the existing telecom system for train control, operation, and safety and to generate additional revenues by creating nationwide broadband and multimedia network, laying optical fiber cable using the right of way along railway tracks. Presently, the optic fiber network of RailTel covers over 61000+ route kilometers and covers 6108+ railway stations across India. Our citywide access across the country is 21000+ kms.

RailTel is proposing for upgradation of expansion of the Data Centre in Second Floor of RailTel building at Secunderabad to house 33 IT racks and upgradation of existing UPS system.

RailTel invites proposals from prospective bidders for the turnkey implementation of the Data Centre as per the scope and specifications outlined in this OPEN TENDER document.

## 2 Data Centre Design Requirements

RailTel is proposing expansion of Data Centre meeting Tier III or Rated-3 guidelines in a space of Approx. 4,320 Sft and upgradation of existing UPS system. The Data Centre shall have the following functional areas:

S. No.	Room Name	Length (m)	Width (m)	Area in Sq. ft.
1.	Server Room -1	6.5	4.5	320
2.	Server Room -2	11.4	9.9	1,220
3.	Electrical Room	6.5	3.3	240
4.	Conference Room	5.1	3.6	200
5.	Manager Cabin -1	2.7	2.7	80
6.	Manager Cabin -2	2.7	2.3	70
7.	Office Area	8.1	5.1	450
8.	Office Area - 1	2.8	1.9	60
9.	Office Area -2	2.7	1.9	60
10.	Tech Support Room	4.0	3.2	140
11.	FSS. Cylinder Room	5.5	0.7	50
12.	Corridor			1,000
<b>Total</b>				<b>4,320</b>

Total Area of Rail Nilayam Second floor is Approx. 9,750 sq.ft. including lifts, staircase, equipment room, battery, toilets and office setup. Allocated approx. 4,320 sq.ft. of area for new Data Centre expansion in second floor along with office setup and utility rooms required as per layout.

S. No.	Description	Area (Sq. Ft.)
1	Total Second Floor	9,750
2	Proposed Data Centre	4,320
3	Existing Facilities occupied	5,430

The proposed Data Centre shall be for a capacity of 33 racks. It is to be built in the second floor by using existing UPS capacities.

This proposal outlines the design aspects of subsystems of the Data Centre, especially:

- Civil and Interiors
- Electrical system
- HVAC System
- Safety and Security Systems
- Passive Networking Solution

The following are the design considerations:

- High Availability (Tier III)
- Energy Efficiency
- Scalability
- Modular Design

The total IT load for the new proposed Data Centre is 328kW for 33 racks.

### 3 Power Utilization from existing infrastructure

Existing Equipment Capacity Details				
Electrical Equipment	Rating	Usable Capacity	Usable Capacity per path	UoM
Transformer	1 x 2000kVA	$2\text{MVA} * 0.8 * 0.85 = 1360$ kW per source	1360	kW
DG Set	2 x 1250kVA	$1250 * 0.56 = 700$ kW const. power * 2 = 1400 kW per source	1400	kW
UPS System	2 x 400kVA	$800 \text{ kw} * 0.9 = 720$ kW	720	kW

<b>Existing Load in 3rd floor Data Centre</b>					
S. No	Load	Present Load for 90 racks (kW)	Balance 10 racks in 3rd floor (kW)	Total for 3rd floor (kW)	Balance load available (kW)
1	IT Load	250	60	310	410
2	DC Total Load	502	90	592	768
<b>Proposed Data Centre load in 2nd floor</b>					
S. No.	Type of IT Rack	No. of Racks	Avg. Load in KW per Rack	Total IT Load in kW	
1	High Density	5	20	100	
2	Medium Density	16	10	160	
3	Low Density	8	10	80	
4	Network Racks	4	2	8	
<b>Total</b>		<b>33</b>		<b>3</b>	
S. No.	Description	Load	UoM		
1	<b>UPS Requirement in 2nd floor</b>	<b>348</b>	<b>kW</b>		
2	<b>Total Estimated Power Requirement in 2nd floor</b>	<b>661.93</b>	<b>KW</b>		
<b>Balance load available after catering to 2nd floor</b>					
1	<b>Available UPS Power after Utilisation</b>	<b>62</b>	<b>kW</b>		
2	<b>Avitable Total Power after Utilisation</b>	<b>106</b>	<b>kW</b>		

## 4 Scope of Work

The Scope for the proposed Data Centre expansion includes the design, supply, installation, testing and commissioning including the following works but not limited to:

- Supply and installation of civil and interior works for the Data Centre such as fire-rated walls, fire rated doors, access flooring, false ceiling, fire retardant painting, etc.
- Civil and Electrical works for accessing the existing lift in the second floor.
- Upgradation of existing 2x400kVA UPS system with Lithium-ion batteries.

- Supply, installation, testing and commissioning of electrical works such as Data Centre electrical panels, electrical cabling, UPS Systems, earthing, lighting for Data Centre area, point wiring for Data Centre, Floor Mount PDUs with isolation transformer, cable trays and pathways, etc.
- Supply and installation, testing and commissioning of HVAC works such as Dx based in-row Precision ACs, High-wall split Air conditioners, exhaust fans, etc.
- Supply, installation, testing and commissioning of addressable fire alarm system, aspiration system, NOVEC 1230/FK-5-1-12 based fire suppression system, access control system, IP based CCTV system, water leak detection system and rodent repellent system.
- Upgradation of existing building management system
- Supply and installation of racks for the IT equipment in Server Rooms.
- Supply and installation of network cable management system within the Data Centre.
- Supply, installation and testing of network cabling within the Data Centre.
- Provide necessary documents and obtain necessary approvals from the mandated approval authorities.
- Operation and Maintenance of the Data Centre non-IT infrastructure for 3 years from the date of handing over of the Data Centre and sign-off.

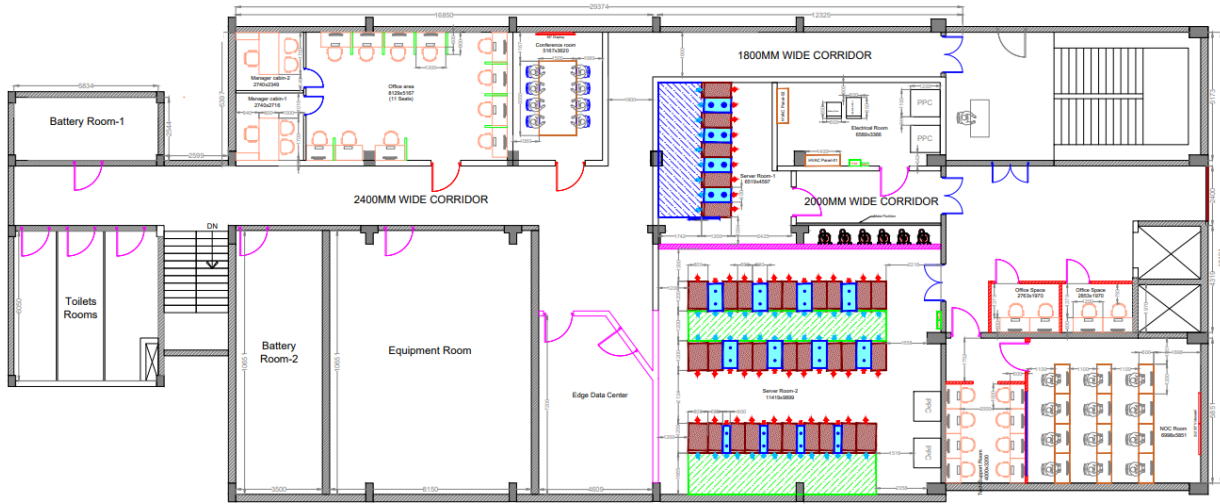
This is turnkey project, and hence any additional supply/works, which are not explicitly mentioned in this OPEN TENDER but required to complete the installation as per schedule of requirements, are in the scope of the bidder.

## 5 Design Considerations and Capacity Planning

Room	POD	Type of IT Rack	No. of IT Racks	Avg. Load in KW per Rack	Total IT Load in kW
Server Room-1	POD-1	High Density	5	20	100
Server Room-2	POD-2	Medium Density	16	10	160
		Low Density	0	7.5	0
		Network Racks	2	2	4
	POD-3	Medium Density	8	10	80
		Low Density	0	7.5	0
		Network Racks	2	2	4
<b>Total</b>			<b>33</b>		<b>348</b>

# 6 Tentative Layout

## 6.1 Interior Floor Layout

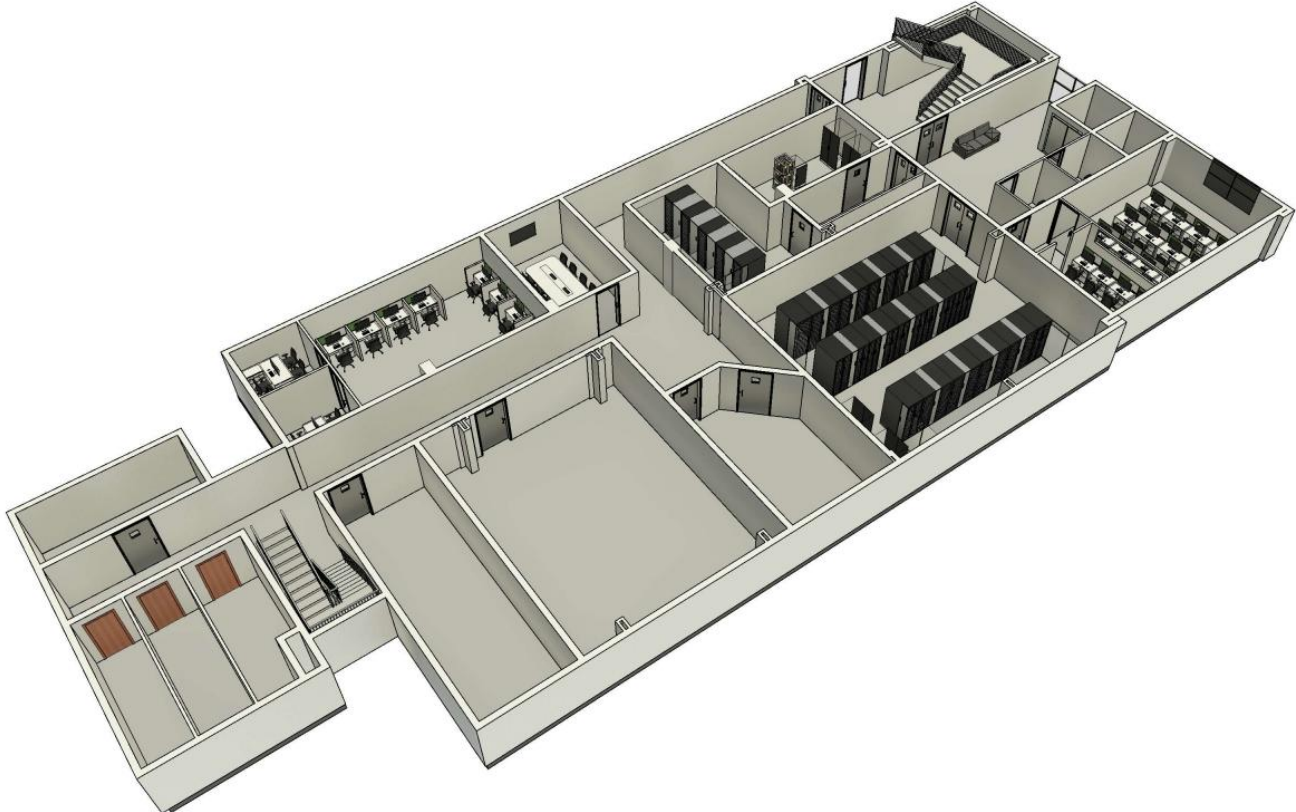


Note:  
Server room-1 IT racks and cooling units are subjected to change with respect to considering the requirements for GPU based servers for AI requirement. Maximum IT load shall be limited to 100 kw

RAILTEL OFFICE 2ND FLOOR RAIL NILAYAM SECUNDERABAD



6.2 Isometric View of Proposed Data Centre



## 7 Scope of RailTel

RailTel will provide the following for the expansion of the Data Centre:

- i. Supply and installation of Workstation PCs for CCTV and BMS system.
- ii. Supply and installation of Workstation PCs for Office Setup.
- iii. Providing approval for use of 1 No. of breaker (800A TPN MCCB) in each Main LT panel (1 & 2). This panel shall be supported by utility power with existing DG set power backup for 2<sup>nd</sup> floor proposed DC.
- iv. Space provisioning or route clearance for Electrical system cabling from 3<sup>rd</sup> floor to 2<sup>nd</sup> Floor
- v. Space provisioning or route clearance for HVAC Copper piping from 2<sup>nd</sup> Floor to terrace.
- vi. Drain point shall be provided at 2<sup>nd</sup> Floor for Data Centre
- vii. Space for the Outdoor units will be accommodated on terrace or beside server room area (ground floor).
- viii. Network Ports on the Core/Distribution Switch for connectivity to the proposed Data Centre in 2<sup>nd</sup> floor. Cabling from these Network racks to the 2<sup>nd</sup> Floor Data Centre will be in the scope of the contractor.
- ix. Soft water provisioning for the PAC units. Storage tank of the appropriate capacity will be in Contractor's scope.
- x. Space provision for earth pits. Location of Earth pits will be provided in front of Canara Bank in ground floor or inside the park.

## 8 Design Requirements

### 8.1 Civil and Interior

Following are the design requirements for the Civil and Interior works.

Space required for the Data Centre in 2<sup>nd</sup> floor is presently being used as office. All the interiors in this area have to be removed and area redesigned for the new requirement. There are 4 windows in this area.

Dismantling of existing furniture, panels & false ceiling in the second-floor area and removal of the debris will be in the scope of system integrator.

Lift opening to be provided in the second floor for staff and material movement to the Data Centre. Wall to be dismantled for the Lift access. Civil works for the Lift entry area to be considered.

S. No.	Parameter	Design Criteria / Details
1.	Location	Second floor of Rail Nilayam, Secunderabad
2.	Total built-up area	Approx. 4,320 sq. ft.
3.	Facility areas required	<ul style="list-style-type: none"><li>• Server Rooms</li><li>• Electrical room</li></ul>

S. No.	Parameter	Design Criteria / Details
		<ul style="list-style-type: none"> <li>• Manager Cabins</li> <li>• Meeting Room</li> <li>• Office Area as per layout</li> </ul>
4.	Data Centre Rooms	Server Rooms are designed for 33 racks. Server Room-1: 5 Racks Server Room-2: 28 Racks
5.	False Ceiling	2'x2' metal grid ceiling in Corridors and office areas. False ceiling not required in Server Room and Electrical Room in 2 <sup>nd</sup> Floor
6.	Thermal Insulation	12mm thick thermal insulation on true ceiling for Server rooms and Electrical Room.
7.	Access Flooring	No Access flooring for the proposed rooms. Existing vitrified flooring will be used.
8.	Partitioning and Painting	Fire rated partitioning as per the drawing and fire-retardant painting for all Interior walls of the Data Centre area. Existing windows in Data Centre area will be closed
9.	Doors	<ul style="list-style-type: none"> <li>• All doors for the Critical Room will be 1-hour fire rated metal doors with glass windows of 200mm x 300mm.</li> <li>• Office areas will have non-fire rated toughened glass doors</li> </ul>
10.	Furniture for office areas	<ul style="list-style-type: none"> <li>• Table, chairs and storages as per the drawing (excluding NOC room furniture)</li> </ul>

## 8.2 Electrical System

Following are the design requirements for the Electrical system.

S. No.	Parameter	Design Criteria/Details
1.	Total IT Load	348kW when operated at full capacity for the proposed Data Centre.
2.	Service Input	3 $\phi$ 415V dual LT power supply will be taken from existing LT panels on the 3 <sup>rd</sup> floor to 2 <sup>nd</sup> floor. New cables will be laid.

S. No.	Parameter	Design Criteria/Details
3.	UPS System Replacement (In 3 <sup>rd</sup> floor)	<ul style="list-style-type: none"> <li>Only 1 set of UPS systems and Batteries will be replaced with equivalent capacities of modular UPS systems and Lithium-Ion batteries.</li> <li>Backup sizing shall be 12 minutes for end of life.</li> <li>The proposed new Data Centre on the 2nd floor will have feed from existing 3rd floor UPS systems.</li> </ul>
4.	UPS Redundancy	N+N
5.	Tiering	Tier III
6.	UPS for Inrow Cooling Units	1 x 100kVA UPS is considered for High Density in-row cooling units for continuous colling requirement with 10minutes battery backup by using lithium-ion batteries.
7.	Power distribution to the racks	<p>Redundant Floor mount PDUs with K13 Isolation transformer and branch circuit monitoring.</p> <p>Redundant Copper Flexible Cable with Mobile Industrial Sockets.</p>
8.	Lighting	<p>500 lux in the Server Room LED Lights)</p> <p>300 lux in all other rooms.</p> <p>Occupancy Sensors will be provided in Server room and Electrical room.</p>
9.	Earthing	As per the international/national standards
10.	Protection and safety	As per national and international electrical codes
11.	Efficiency	Target to achieve approximately 1.6 PUE at full load
12.	Energy monitoring	Branch circuit monitoring in floor mount PDUs for monitoring power to each IT rack

RAILTEL

**Tentative Earth pit's location:**

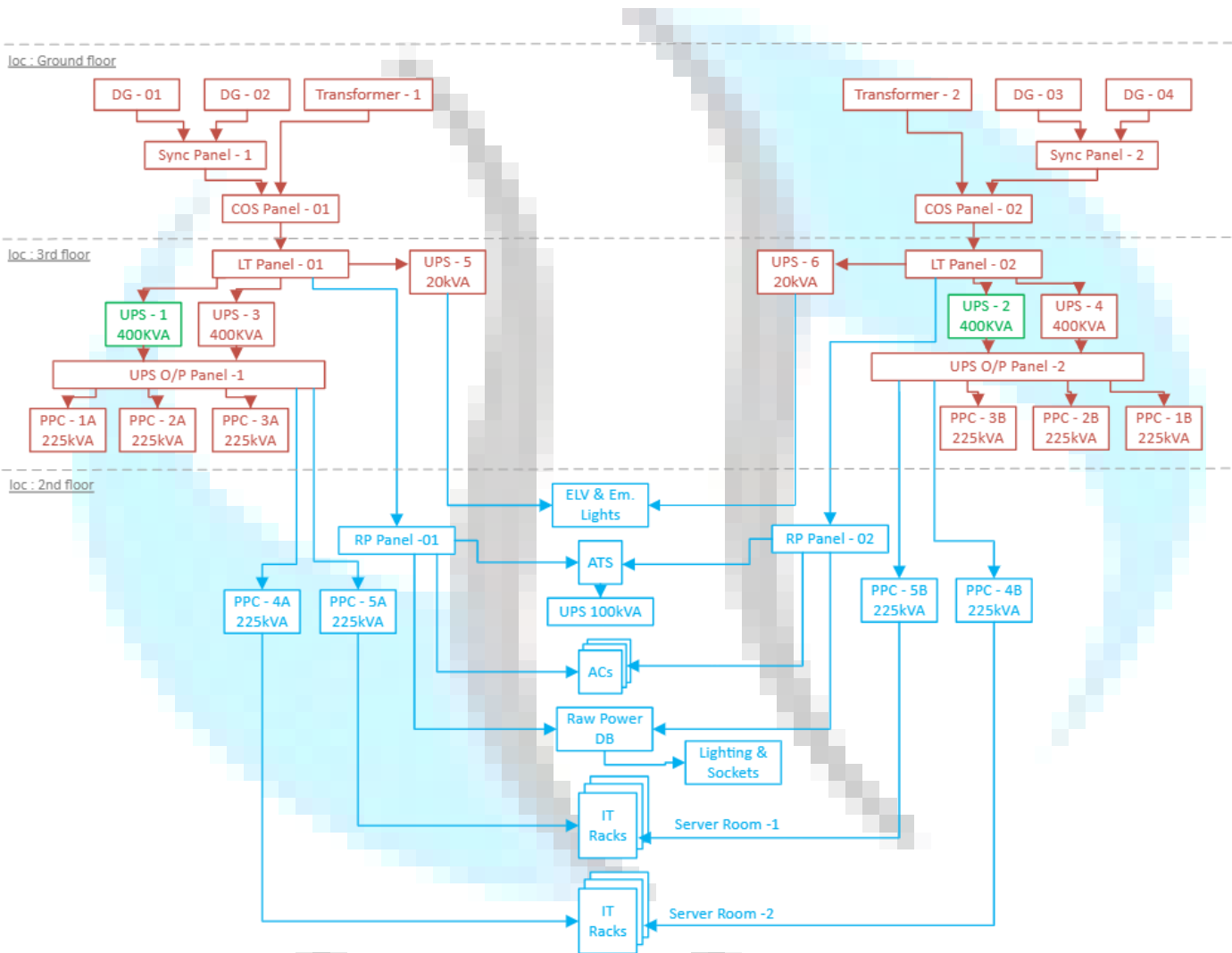
Earth pits location (tentative) for the new Data Centre is identified on the ground floor beside the existing Data Centre earth pits. Road/path has to be utilised for placement earth pits and routing of copper/aluminium strips has to be planned accordingly. It should be finalized after taking approval from Railway.



Image: Panoramic view of road/paths in front of Canara Bank

RAILTEL

## 8.2.1 Proposed High Level SLD



### Color Coding:

Brown Indicates Existing Infrastructure

Green Indicates Infrastructure to be replaced

Blue Indicates proposed infrastructure for Data Centre Expansion in 2<sup>nd</sup> floor

RAILTEL

## 8.2.2 Estimated Electrical Load Calculations

Detailed Load Calculation						
S. No.	Equipment Description	Qty	Load per Unit (kW)	Connected Load (kW)	Operating Load (kW)	Load Factor
<b>A</b>	<b>IT Load</b>					
1	SF- High Density Server Racks	5	20.0	100.00	100.00	1
2	SF- Medium Density Server Racks	16	10.0	160.00	160.00	1
3	SF- Low Density Server Racks	8	10	80.00	80.00	1
4	SF- Network Racks	4	2.0	8.00	8.00	1
	<b>Total IT Load in kW</b>			<b>348.00</b>	<b>348.00</b>	
<b>B</b>	<b>Non-Critical IT Load</b>					
1	Em. Lights (0.25w/Sq.Ft)	1780	0.00025	0.45	0.45	1
2	Safety and Security systems	1	3.00	3.00	3.00	1
	<b>Total Non-critical IT load</b>			<b>3.45</b>	<b>3.45</b>	
<b>C</b>	<b>Cooling Load (HVAC)</b>					
1	Server Room 1-Inrow Cooling Units-45kW (12.8TR)	4	23.92	95.68	71.76	0.75
2	Server Room 1-Inrow Cooling Units-35kW (9.8TR)	8	17.00	136.00	102.00	0.75
3	Server Room 2-Inrow Cooling Units-25kW (7.1TR)	4	13.10	52.40	39.30	0.75
4	Electrical & Electrical Room-2TR HWU	3	2.6	7.80	5.20	0.67
	<b>Total cooling load in kW</b>			<b>291.88</b>	<b>218.26</b>	
<b>D</b>	<b>Other loads</b>					
1	Raw Power Lighting (Area in sft) 0.75w/Sq.ft	1780	0.001	1.34	1.34	1
2	Raw Power Sockets (Area in sft) 0.5w/Sq.ft	1780	0.001	0.89	0.89	1
3	100 kVA UPS losses (50% loading)	1	6	6.38	6.38	1
4	Battery charging current for 100 kVA UPS	1	7	7.00	7.00	1
5	Exhaust Fans for Battery Room	1	1.00	1.00	1.00	1
6	Misc. building load	1	2.00	2.00	2.00	1
	<b>Total other load in kW</b>			<b>18.61</b>	<b>18.61</b>	
	<b>Total Data Centre Load in kW</b>			<b>661.93</b>	<b>588.31</b>	

**Office Area Electrical Load (from existing power distribution system)**

S. No.	Equipment Description	Qty	Load per Unit (kW)	Connected Load (kW)	Operating Load (kW)	Load Factor
	<b>DC support &amp; Conference Room Setup Load</b>					
<b>E</b>	<b>DC support &amp; Conference Room UPS load</b>					
1	SF-Office Workstations	2	0.25	0.50	0.50	1
2	SF-DC Manager Room-1 Workstations	1	0.25	0.25	0.25	1
3	SF-DC Manager Room-2 Workstations	1	0.25	0.25	0.25	1
4	SF-NOC Room Workstations	12	0.25	3.00	3.00	1
5	SF-Office Area Room Workstations	10	0.25	2.50	2.50	1
6	SF- Office Space for Vendor Workstations	2	0.07	0.14	0.14	1
7	SF-Conference Room Laptops	8	0.07	0.56	0.56	1
8	SF-Conference Room 55" LED Display	1	0.30	0.30	0.30	1
9	NOC Room 55" LCD Displays	4	0.18	0.72	0.72	1
10	SF-Printers	3	0.30	0.90	0.90	1
	<b>Total Office and NOC setup-UPS load in kW</b>			<b>9.12</b>	<b>9.12</b>	
<b>F</b>	<b>Other loads</b>					
1	Raw Power Lighting (Area in sft) 0.75w/Sq.ft	2540	0.001	1.91	1.91	1
2	Raw Power Sockets (Area in sft) 0.5w/Sq.ft	2540	0.001	1.27	1.27	1
3	VRF Outdoor Unit-20HP	1	19.2	19.20	19.20	1
4	Conference Room-2TR Cassette	1	0.8	0.80	0.80	1
5	Manager Cabin-1 -0.8TR HWU	1	0.5	0.50	0.50	1
6	Manager Cabin-2 -0.8TR HWU	1	0.5	0.50	0.50	1
7	Office Area -2TR Cassette	2	0.8	1.60	1.60	1
8	Office Space -1 (Vendor)-0.8TR HWU	1	0.5	0.50	0.50	1
9	Office Space -2 (Vendor)-0.8TR HWU	1	0.5	0.50	0.50	1
10	Tech Support Room-2TR Cassette	1	0.8	0.80	0.80	1
	<b>Total Other load in Office and NOC setup load in kW</b>			<b>27.58</b>	<b>27.58</b>	
	<b>Total Approximated NOC &amp; Office load in kW</b>			<b>36.70</b>	<b>36.70</b>	

### 8.3 Cooling System

Following are the design requirements for the cooling system

S. No.	Parameter	Design Criteria/Details
1.	Cooling System type	<ol style="list-style-type: none"> <li>To consider DX based precision in-row cooling system for Server Rooms.</li> <li>To consider DX based comfort cooling system for Electrical Room.</li> <li>Other non-critical rooms such as office areas &amp; manager cabins shall be with DX based VRF solution</li> </ol>
2.	Indoor Unit Type	As per cooling summary below
3.	Environment characteristics design	Server Room: 22°C ± 1°C Temp. & 50±5% Relative Humidity inside the cold aisle containment. Electrical Room: 25°C Temperature Other office rooms: 25°C Temperature
4.	Standards	As per ASHRAE-2021

- Comfort cooling system required for UPS Rooms, NOC, staging room, LT Panel room, BMS Rooms.
- At least N+1 Redundancy required for all the cooling systems.
- Outside Ambient Temperature to be considered for the design is 43° Celsius.
- The Precision cooling system shall be designed for Cold Aisle temperature of at least 22° ± 1° C
- Humidity shall be maintained at 50% +/- 5% RH for server farms, network and telecom rooms.
- Nominal room temperature for comfort cooling system shall be 24° Celsius.
- Cold Aisle containment shall be provided for the server farm area.
- The cooling system shall be compliant to TIER III specifications of Uptime Institute/TIA942
- The cooling system shall be designed considering the external ambient temperature as per latest ASHRAE's n=20 extreme temperature conditions for Hyderabad.
- Redundancy and concurrent maintainability shall be ensured for the cooling system complying to Tier-III requirements.

### 8.3.1 Cooling Summary:

#	Description of Rooms	Area (Sq ft)	Occupancy	Redundancy Level	Preferred Type of unit	Preferred Cooling Technology
1.	Server Room 1	346	0	N+1	Inrow Units cooling	DX based
2.	Server Room 2	1175	0	N+1	Inrow Units cooling	DX based
3.	Electrical & Electrical Room	241	0	N+1	High Wall Mount Split AC	DX based
4.	Conference Room	247	9	N	Cassette Unit	DX based VRF System
5.	Manager Cabin-1	78	3	N	High Wall Mount Split AC	
6.	Manager Cabin-2	67	3	N	High Wall Mount Split AC	
7.	Office Area	431	11	N	Cassette Unit	
8.	Office Space -1 (Vendor)	56	2	N	High Wall Mount Split AC	
9.	Office Space -2 (Vendor)	60	2	N	High Wall Mount Split AC	
10.	Tech Support Room	203	8	N	Cassette Unit	



## 8.4 Safety and Security Systems

Following are the design requirements for Safety and Security Systems.

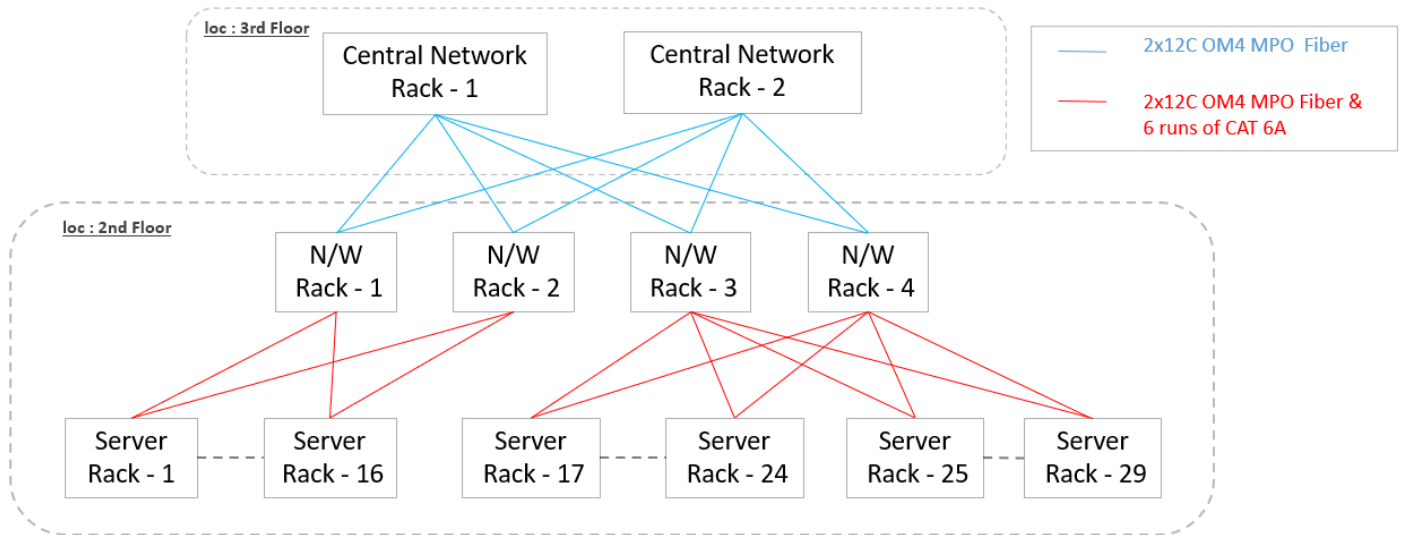
S. No.	Parameter	Design Criteria/Details
1.	Fire Alarm System	Dedicated Addressable fire alarm system with Multi sensors (heat & smoke). This panel shall have provision for integration with 3 <sup>rd</sup> floor FACP.
2.	Fire Suppression System	NOVEC1230 or FK5112 or equivalent gas-based fire suppression system for Server Room-1 & Server Room-2.
3.	Fire Extinguishers	Clean agent type manual fire extinguishers- 4Kg in critical rooms.
4.	Access Control System	Access control system for the Data Centre. Server Rooms: Card cum biometric reader as entry and card reader as exit. Electrical and other rooms: Smart card reader as entry and push button as exit. System shall integrate with 3 <sup>rd</sup> floor ACS system.
5.	Surveillance System	Considered 2MP indoor dome cameras. All existing cameras in the 3 <sup>rd</sup> floor will be replaced, and new camera systems will be installed in the 2 <sup>nd</sup> floor. Cameras will be connected to new NVR with 90 days backup at DC and at DR (Gurugram).
6.	Rodent Repellant System	Rodent Repellent System for DC facility to be provided.
7.	Water Leakage Detection System	2-Zone water leakage detection for Server rooms.
8.	Building Management System	Existing Building Management System to be upgraded. Additionally for the third floor, <b>53</b> rack-mounted Temp and RH sensors and <b>7</b> ceiling-mounted Temp, RH, and CO <sub>2</sub> sensors to be supplied and integrated with the upgraded BMS.  Second Floor: Proposed to integrate with upgraded BMS. BMS Hardware & Software with required licenses for integrating the following systems but not limited to: UPS, Floor PDUs, In-Row Cooling Units, VRV System, FAS, ACS, RRS & WLD. Existing BMS room will be used.

## 8.5 Passive Networking Infrastructure

Following are the design requirements for the Racks and Network Cabling System:

S. No.	Parameter	Design Criteria/Details
1.	Racks	Network Rack: 800x1200mm 42U Server Rack: 600x1200mm 42U Each rack shall have 2 numbers of non-intelligent PDUs.
2.	Cabling pathway	1. Fiber runners shall be provided for fiber cables in Server Rooms 2. Cablofil or wire basket for copper cabling in Server Rooms
3.	Network Cabling	1. 12C OM4 MPO indoor fiber cable solution. 2. Cat6A based copper cabling solution. 3. Cat6A based copper cabling solution for office setup.

### 8.5.1 Passive Networking Schematic



RAILTEL

## 9 Schedule of Requirements

**Name of work/Stores:** Design, Supply, Installation, Testing, Commissioning with 3-year Comprehensive Maintenance Support for Data Centre Expansion in 2<sup>nd</sup> & 3<sup>rd</sup> Floor Integration for RailTel, Rail Nilayam, Secunderabad

**Tender no.** RailTel/e-Tender/OT/SR/DC/2026-27/01

SI No	Description	UoM	Qty	Price including all taxes in Rs.	Amount including all taxes in Rs.
<b>A</b>	<b>CIVIL WORK</b>				
1	Dismantling and removal of existing office furniture, partitions, ceiling and infra etc in second floor	Lot	1		
2	Supply, construction of 200mm thick 2 hours fire rated partition wall using below material, 1. 600x200x200 mm thick partition walls using Aerocon blocks 2. Masonry work using cement based adhesive	Sqm	266		
3	Supply and applying material for 12mm thick Plastering and with sngle coat punning	Sqm	532		
4	Supply, construction of 125mm thick 2 hours fire rated gypsum partition wall using 12.5mm thick gypsum boards and aluminium channels.	Sqm	126		
5	Supply, construction of 12mm thick toughned glass partition with supports required as per approved layout.	Sqm	12		
6	Supply and Installation of powder coated fire rated door of size 1500 x 2400 mm double leaf, fire rated steel door (One hours) with vision panels of 200x300mm, SS ball bearing butt hinges, mortice lock, SS handle, heavy duty door closer of approved make and all other accessories.	Nos	3		
7	Supply and Installation of powder coated fire rated door of size 1200 x 2400 mm Single leaf, fire rated steel door (One hours) with vision panels of 200x300mm, SS ball bearing butt hinges, mortice lock, SS handle, heavy duty door closer of approved make and all other accessories.	Nos	3		

8	Supplying and installation of frameless Glass door Single Door (1200x2400mm) using 12mm thick toughened glass mounted for swing using patch fittings of Dorma make and operated using Dorma make floor spring and pivot ,etc. .complete. The door is fitted with 450 mm high H profile SS handle of Dorma make.	Nos	1		
9	Supplying and installation of frameless Glass door Single Door (1000x2400mm) using 12mm thick toughened glass mounted for swing using patch fittings of Dorma make and operated using Dorma make floor spring and pivot ,etc. .complete. The door is fitted with 450 mm high H profile SS handle of Dorma make.	Nos	2		
10	Supplying and installation of frameless Glass door Single Door (800x2400mm) using 12mm thick toughened glass mounted for swing using patch fittings of Dorma make and operated using Dorma make floor spring and pivot ,etc. .complete. The door is fitted with 450 mm high H profile SS handle of Dorma make.	Nos	2		
11	Supply and fixing RCC lintel beam for all the doors	Nos	11		
12	Supply and Installation of GI Regular lay-in panel of 0.5mm thickness having standard perforation of 2.5 mm dia 600x600 metal ceiling with soundtex fleece hot pressed to achieve NRC upto 0.7 and fire performance of class 0 / Class 1 as per BS 476 part 6&7.with required accessories with 3mm supporting GI wire at every 1.2 mtr distance with 1mm SS butterfly clip.	Sqm	250		
13	Supply and applying of painting of interior walls of the Data Centre using Fire Retardant Paint (with primer, putty and 2 coats of Fire based paint).	Sqm	1021		
14	Supplying and fixing of 2mm thick Vinyl flooring-tile type for Electrical room	Sqm	25		
15	Supply and installation of Roller Blinds	Sq.Ft	120		
16	Signage's for doors and rooms, emergency exit signage's, lettering etc.	Lot	1		
17	Supply and laying of 12mm thick nitrile rubber for Server room & Electrical room where false ceiling is not available	sqm	190		

18	Caging for FSS Cylinders	Lot	1		
19	2mm thick anti-static vinyl flooring for Electrical room	Sqm	22		
20	Wall opening for lifts in second floor and finishing works with granite with following works 1. Access Buttons in second floor for lift 2. Programming/ configuration of existing lift software to stop at second floor. 3. Marble/granite finishing around the wall opening	Lot	1		
21	Removing of Tiles, Cutting & Chipping of existing floors	Lot	1		
22	Pest Control	Lot	1		
<b>B</b>	<b>Furniture</b>				
1	Supply and installation of 600mm x 1200mm worktable with CPU stand, slat wall, pedestal, metal partition and modesty as required for Office areas as per drawing	Set	16		
2	Supply and installation of 1700mm x 800mm Manager table with required storage, modesty, pedestal and side table of size 1200mm x 450mm complete with premium quality high back chair along with head rest as required for Manager cabin - 1 & 2	Set	2		
3	Supply and installation of Conference room table of size 1500mm x 3000mm with cable cubbies and required accessories as per drawing.	Set	1		
4	Executive Chairs	set	37		
5	Supply of wooden shoe rack for 12 pairs of shoes-(Min rack depth - 450mm)	Set	1		
<b>C</b>	<b>Electrical works</b>				
1	Supply and installation of UPS Outgoing Isolator with enclosure with required MCCB as per SLD	Nos	4		

AVAILABLE

2	Supply, installation, Testing and commissioning of indoor HVAC panel with required MCCBs, MCBs, MFM with RS485 compactability for BMS integration complete as required as per SLD	Nos	2		
3	Supply, installation, Testing and commissioning of indoor 100kVA UPS outgoing panel with required MCCBs, MCBs, MFM with RS485 compatibility for BMS integration complete as required as per SLD	Nos	1		
4	Supply and installation of UPS Server room PDUs with enclosure with required MCCB as per SLD with K-13 Isolator Transformer and branch circuit monitoring.	Nos	4		
5	Supply, installation, Testing and commissioning of 100kVA UPS with 10minutes battery backup using lithium-Ion batteries.	Nos	1		
6	Supply and installation of 200A 3 phase ATS for UPS Output panel 7 with required accessories	Nos	1		
7	Supply and installation of 63A ATS with enclosure DB with required accessories	No	1		
8	Supply and installation of 32A 3-phase ATS with enclosure DB with required accessories	No	2		
9	Supply and installation of 32A 1-phase ATS with enclosure DB with required accessories	No	1		
10	Supply and install of indoor type Raw Power DB with 63A ATS along with enclosure and required accessories	No	1		
11	Supply and installation of three phase distribution boards with required MCB as required with accessories	Nos	5		
12	Supply and installation of single phase distribution boards with required MCB as required with accessories	Nos	7		

	Supply and laying of 1.1kV grade, XLPE/PVC insulated, aluminum/Copper conductor, galvanized steel tape armored/unarmored power cable as per specifications. The cable shall be laid in indoor/outdoor trenches (RCC/Buried) / cable trays as required.				
13	4CX10 Sqmm Cu Flexible FRLS Cable	Mtrs	400		
14	4CX300 Sqmm Aluminium Armored Cable	Mtrs	160		
15	3CX6 Sqmm Cu Flexible FRLS Cable	Mtrs	500		
16	4CX6 Sqmm Cu Flexible FRLS Cable	Mtrs	1,680		
17	1CX 6Sqmm Cu Flexible FRLS Cable	Mtrs	800		
18	3CX2.5 Sqmm Cu Flexible FRLS Cable	Mtrs	2,600		
19	3CX10 Sqmm Cu Flexible FRLS Cable	Mtrs	480		
20	1CX95 Sqmm Cu Flexible FRLS Cable	Mtrs	120		
21	1CX240 Sqmm Cu Flexible FRLS Cable	Mtrs	640		
22	Termination of above mentioned cables with glands etc.	Lot	1		
	Supply and Installation GI Ladder / Perforated type cable trays factory fabricated out of 14 G sheet steel, supporting angle frame at every 1.2 m or as approved, bottom angle fasteners, anchor grip bolts, synthetic enameled painting for support structure (2 coats of primer red oxide + 2 coats of synthetic enameled painting), etc. The tray shall be suspended from ceiling using anchor bolt and angle iron supports or mounted from wall. Hot Dip Galvanizing shall meet the applicable IS standard.				
23	600 mm x 50 mm GI ladder type tray	Mtrs	160		
24	300 mm x 50 mm GI Perforated tray	Mtrs	300		
25	150 mm x 50 mm GI Perforated tray	Mtrs	250		

	Supply and laying of 2 mm thick rigid PVC conduit in conduit system using conduit accessories like junction boxes, collars, bends, elbows, binding wires, etc. including cutting, chasing wherever required in wall/ ceiling/ flooring and making same good all complete as per technical specifications and relevant standards,				
26	25 mm dia conduit	Mtrs	2,500		
27	32 mm dia conduit	Mtrs	1,000		
28	150 mm x 50 mm GI raceway with cover and junction boxes.	Mtrs	100		
29	Supply and installation of copper rod earth pits with required accessories with 3mtrs long 70mm dia copper rods and chemicals	Nos	10		
30	Supply and laying of 50mm x 6mm copper bus bars with insulation	Mtrs	450		
31	Supply and laying of 50mm x 6mm GI bus bars with insulation	Mtrs	80		
32	Supply and laying 1C x 16Sqmm copper cable -green	Mtrs	300		
33	Supply and laying 1C x 6Sqmm copper cable -green	Mtrs	500		
34	Supply and installation of 36W 2x2 LED light fixtures with accessories including emergency lighting fixtures along with cables, conduits, switches and sockets	Nos	50		
35	Supply and installation of 3 Nos of 6A sockets controlled by a 20A Switch with required backbox and cabling	Nos	30		
36	Supply and installation of 1 No. of 6A sockets controlled by a 6A Switch with required backbox and cabling	Nos	15		
37	Supply and installation of 1 No. of 6/16A sockets controlled by a 16A Switch with required backbox and cabling	Nos	20		
38	Supply and installation of 63A 5 pin mobile industrial sockets with plug and top (for Server Racks-High Density)	Nos	10		

39	Supply and installation of 32A 5 pin mobile industrial sockets with plug and top (for Server Racks-Medium & Low Density)	Nos	48		
40	Supply and installation of 32A 3 pin mobile industrial sockets with plug and top (for Network Racks)	Nos	8		
41	Supply of first aid kit, safety charts and rubber mats in front of all electrical panels	Lot	1		
42	Supply and installation of exhaust fan with timer control with necessary cabling, ducting and other accessories	No	1		
<b>D</b>	<b>HVAC</b>				
1	SITC of In Row Cooling system 45kW (3 Working + 1 Standby) for Server Room - 1	Nos	4		
2	SITC of In Row Cooling 35kW ( 6 Working + 2 Standby) for Server Room-2	Nos	8		
3	SITC of In Row Cooling 25kW ( 3 Working + 1 Standby) for Server Room-2	Nos	4		
4	SITC of CPVC pipes cut to required lengths and installed with all joints.	Mtrs	320		
5	SITC of 2TR Dx based split ACS ( 2 Working + 1 Standby) for Electrical Room	Nos	3		
6	Supply and installation of 20HP VRF cooling system with required Kits, Accessories	Nos	1		
7	SITC of 2TR VRF Based <b>Cassette</b> air-conditioned unit for Conference room and Tech Support room and Office Areas with required Kits, Accessories.	Nos	4		
8	SITC of 2TR VRF Based High <b>Wall Mount</b> air-conditioned unit for Electrical room and UPS room in N+1 (2 Working + 1 Standby) Redundancy with required Kits, Accessories.	Nos	3		

9	SITC of 0.8TR VRF Based High <b>Wall Mount</b> air-conditioned unit for Manager Cabin-1 & 2 and Office Space-1 & 2 in N Redundancy with required Kits, Accessories.	Nos	4		
10	Low side works for VRF systems comprising of copper piping, control cables, power cables and CPVC drain pipes	Lot	1		
11	Exhaust fan and damper required for Data Centre area	Lot	1		
<b>E</b>	<b>Fire Alarm System</b>				
1	SITC of Fire Alarm Panel with required loop card mentioned below and backup power supply for 2hours	Nos	1		
2	Multi-sensor Detector (Heat +Smoke)	Nos	52		
3	Addressable Manual Call point complete with back boxes	Nos	7		
4	Response Indicators	Nos	32		
5	Hooters cum strobes	Nos	6		
6	Addressable control module /Relay module	Nos	24		
7	Addressable monitor modules	Nos	5		
8	Fire Extinguisher - Clean Agent 4 kg	Nos	11		
9	Supply and laying of of 2 Core x 1.5Sqmm FRLS armoured copper cable	Mtrs	1260		
<b>F</b>	<b>Fire Suppression System</b>				
1	Supply and Installation of 120 Ltr. Novec 1230 Cylinder with manifold and accessories	Nos	3		
2	Supply and Installation of 80 Ltr. Novec 1230 Cylinder with manifold and accessories	No.	2		
3	Novec 1230 Agent/ FK-5-1-12	KG	370		

4	MASTER Cylinder Adaptor Kit : Electric Control Head, 24 V DC, Discharge Hose, 2" x 31"Warning Sign - Novec	Lot	3		
5	Mid Slave / End slave Cylinder Complete Kit : Pressure Operated Control Head, Actuation Hose, 30"Male Branch Tee, 5/16" Flare x 1/8"NPT,Discharge Hose, 2" x 31",	Lot	2		
6	Discharge Nozzles-360°	Nos.	9		
7	120/80 Liters Cylinder Strap	Nos.	10		
8	Pressure Switch	Nos.	5		
9	Electronic Hooter	Nos.	3		
10	Manual Abort Switch	Nos.	3		
11	Manual Release Switch	Nos.	3		
12	2 Zone Fire Alarm Control Panel with One Gas Release Module with Battery Backup & Battery Charger	Nos.	3		
13	Supply and installation of Piping confirming to ASTM A 106 Gr. B Sch. 40 Seamless pipe standards (inclusive of accessories,supports, fittings including pressure testing.	Lot	1		
14	Novec-1230/FK-5-1-12 Release Audio-Visual Indicationa Panel with engraived as "Donot Enter Gas Discharged"-Outside, "Evacuate Gas Discharged"-Inside	Nos.	3		
15	2Core X 1.5 Sqrmm Armoured FRLS Copper Cable	Mtrs	225		
16	Testing and commissioning of Fire Suppression System	Lot	1		
<b>G</b>	<b>Very Early Stage Smoke Detection System (VESDA)</b>				

1	SITC of VESDA controller for Server Rooms & Electrical room with required nozzles at all voids and inside the cold aisle containment. The system shall have an independent hooter with power supply and integrate to BMS system. The system shall be design as per NFPA requirements as per design layout	Nos	3		
2	Supply and laying of 25mm dia FRLS HDPE Pipe with accessories	Mtrs	500		
3	Supply and laying of 2 core 1.5 Sqmm armoured cable with accessories	Mtrs	80		
<b>H</b>	<b>Access Control System</b>				
1	Supply, Installation, Testing & Commissioning of IP based 2-Door Controller with TCP/IP Connectivity	Nos	2		
2	Supply, installation, testing and commissioning of Push Button for Exit with accessories as required	Nos	2		
3	Supply, Installation, Testing and Commissioning of Emergency Break Glass unit with complete accessories as required	Nos	4		
4	Electromagnetic Locks Single leaf- 1200lbs with DPS	Nos	2		
5	Electromagnetic Locks Double leaf- 1200lbs with DPS	Nos	2		
6	Supply, installation, Testing and Commissioning of enclosure for each Two Door Control controller with one number of each 12V and 24V DC 10 Amps Power Supply with necessary accessories	Nos	2		
7	SITC of Biometric Reader-Finger Print	Nos	2		
8	SITC of Card reader	Nos	4		
9	iClass Smart Cards	Nos	100		
10	Supply and laying of 2 Core x 1.0 Sqmm Unarmoured Flexible Bare Copper Conductor, PVC Insulated, Cross Laid Up, Overall Aluminium Mylar Tape Shielded along with ATC Drain Wire PVC Outer Sheath Cable.	Mtrs	60		

11	Supply and laying of 4 Core x 1.0 Sqmm Unarmoured Flexible Bare Copper Conductor, PVC Insulated, Cross Laid Up, Overall Aluminium Mylar Tape Shielded along with ATC Drain Wire PVC Outer Sheath Cable.	Mtrs	40		
12	Supply and laying of 8 Core x 1.0 Sqmm Unarmoured Flexible Bare Copper Conductor, PVC Insulated, Cross Laid Up, Overall Aluminium Mylar Tape Shielded along with ATC Drain Wire PVC Outer Sheath Cable.	Mtrs	60		
13	Expansion of existing ACS software with licenses	Lot	1		
<b>I</b>	<b>CCTV</b>				
1	Indoor Fixed Dome Cameras for internal surveillance	Nos	20		
2	Expansion of existing VMS & storage to suit to 20 Nos. of additional cameras	Lot	1		
<b>J</b>	<b>Rodent Repellent System</b>				
1	SITC of Master Console unit for Rodent Repellent system with accessories.	Nos	2		
2	SITC of Transducer satellites	Nos	78		
3	Supply and laying 2 Core 1 Sqmm unarmoured cable with pvc conduit	Mtrs	780		
<b>K</b>	<b>Water Leakage Detection System</b>				
1	SITC of Water Leakage Detection System with 4 zone detection module	Nos	2		
2	SITC of water leakage sensing cable 25 Mtrs	Nos	4		
3	SITC of water leakage sensing cable 15 Mtrs	Nos	2		
4	SITC of Hooters with cabling as per site conditions	Lot	2		
<b>L</b>	<b>BMS</b>				

1	Building Monitoring System - SITC of DDC Module for integration of: Electrical Panel Load Meter, UPS, cooling system, T&RH sensors, Hydrogen Sensor, Access Control System and Fire Alarm System with required Controllers/Integrators/Enclosure, cabling and accessories.	Lot	1		
2	SITC of T&RH sensors	Nos	14		
3	SITC of Hydrogen sensors	Nos	1		
4	Communication Cables	Lot	1		
<b>M</b>	<b>Passive</b>				
	Supply and installation of OM4 Fiber cabling system, MPO or equivalent termination with LC type connectors, 2x12 core fibre cabling, LIUs, and other accessories for server racks for connectivity from: i. each Server Rack to End-of- Row Network Rack ii. each Server Rack to neighbour End-of-Row Network Rack. 12-Fiber, LSZH				
1	MPOF to MPOF Patch Cord, 12F, Type B, OM4, 7M	Nos	16		
2	MPOF to MPOF Patch Cord, 12F, Type B, OM4, 10M	Nos	16		
3	MPOF to MPOF Patch Cord, 12F, Type B, OM4, 15M	Nos	28		
4	MPOF to MPOF Patch Cord, 12F, Type B, OM4, 20M	Nos	24		
5	MPOF to MPOF Patch Cord, 12F, Type B, OM4, 25M	Nos	12		
6	MPOF to MPOF Patch Cord, 12F, Type B, OM4, 30M	Nos	8		
7	MPOF to MPOF Patch Cord, 12F, Type B, OM4, 35M	Nos	8		
8	MPOF to MPOF Patch Cord, 12F, Type B, OM4, 70M	Nos	16		
	<b>Termination ends</b>				

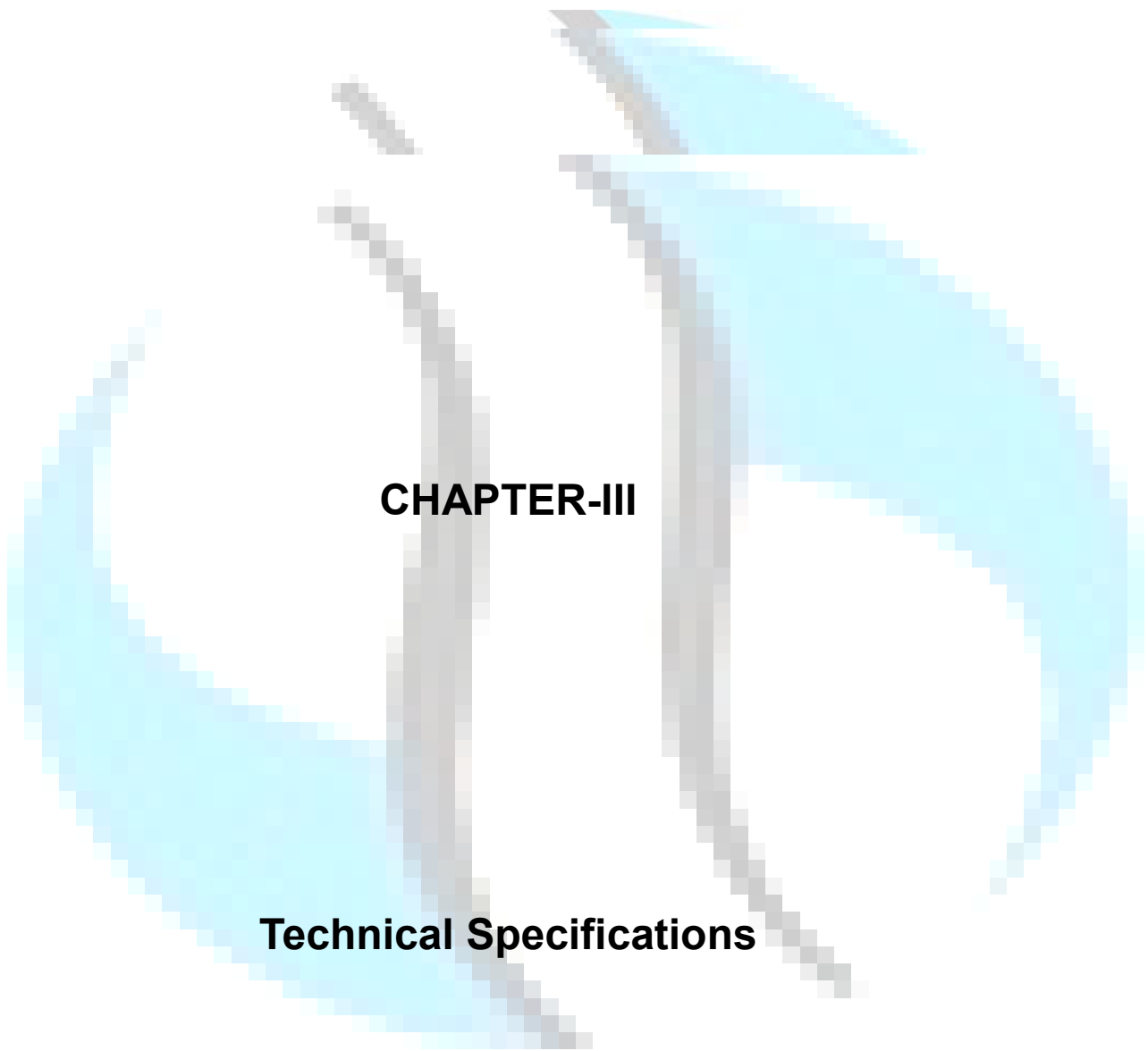
9	1U Panel, accepts four patch data modules with fibre management trough (LIU)	Nos	48		
10	Patch Module (Cassettes), 24 LC Fiber	Nos	120		
11	LC-LC Multimode 50/125 micron Duplex Patch Cord, LSZH, 2 Meter	Nos	150		
12	LC-LC Multimode 50/125 micron Duplex Patch Cord, LSZH, 3 Meter	Nos	200		
<b>CAT 6A Cabling for DC Server Farm Area</b>					
Supply and Installation of CAT 6A cabling system with connectors, 12 runs and other accessories for Connectivity between Racks as below requirement: i. Telco Room Rack to Central Network Rack ii. Central Network Rack to End-of-Row Network Rack iii. End-of-Row Network Rack to Network Rack iv. End-of-Row Network Rack to Neighbour End-of-Row Network Rack v. Central Network Rack to Staging Rack					
13	4-pair, Cat 6A, LSZH, 23 AWG, UTP Cable (305 mt. Roll)	Box	48		
14	Cat. 6A Shielded die-cast Jack without dust cover, 180° cable exit	Nos	672		
15	Cat 6A, 24-port unloaded, Angled Jack Panel, SL-Series with labels and clear label covers, Height, 1U for Active	Nos	42		
16	Cat 6A, 48-port unloaded, Angled Jack Panel, SL-Series with labels and clear label covers, Height, 1U for Active	Nos	12		
17	10G, Cat 6A STP, LSZH, Stranded Patchcord, 2 Meter	Nos	100		
18	10G, Cat 6A STP, LSZH, Stranded Patchcord, 3 Meter	Nos	150		
<b>Cable Management System</b>					
19	Supply and installation of overhead fiber ducting system using Fiber Runners of 4"x4" with all accessories.	Mtrs	80		
20	Supply and installation of overhead UTP cabling wire baskets of 500mmx105mm with all accessories.	Mtrs	80		

21	Elephant Cable Drop for DC Racks with all accessories	Nos	33		
22	SITC of 42U floor mount rack 600 x 1200mm with power managers and required accessories- High Density with 2 nos. of IP PDUs per rack	Nos	5		
23	SITC of 42U floor mount rack 600 x 1200mm with power managers and required accessories-Medium Density with 2 nos. of regular meter PDUs per rack	Nos	16		
24	SITC of 42U floor mount rack 600 x 1200mm with power managers and required accessories-Low Density with 2 nos. of regular meter PDUs per rack	Nos	8		
25	SITC of 42U Floor mount rack 800 x 1200mm with power managers and required accessories with 2 nos. of regular meter PDUs per rack	Nos	4		
<b>CAT 6A Cabling for Other Areas</b>					
26	4-pair, Cat6A, LSZH sheath, CMR rated) 23 AWG,UTP Cable (305 mt. Roll), Meets or exceeds ANSI/TIA-568-C.2	Box	20		
27	Cat 6A UTP RJ45 jacks	Nos	232		
28	24 port patch panel	Nos	5		
29	Cat 6A Equipment Patch Chord- 2Mtr	Nos	116		
30	Quad Port face plate	Nos	30		
31	Dual Port face plate	Nos	20		
32	Installation of above passive works	Lot	1		
<b>Total-Part-I</b>					
<b>PART-II REPLACING OF EXISTING &amp; ADDITIONAL SYSTEMS IN THIRD FLOOR</b>					
1	Removal of existing UPS & batteries with proper SOP approved by client without downtime.	Nos	2		
2	SITC of 400kVA Modular UPS with 12minutes battery backup using lithium-Ion batteries	Nos	2		

3	Upgradation of Existing BMS system. Second floor BMS shall integrate with 3rd floor BMS	Lot	1		
4	Replacement of Existing CCTV System with storage for 90days-43 No. of Cameras (Indoor Dome Camera: 30, Outdoor Bullet Camera:6, Indoor Bullet Camera:5, PTZ Camera:2), 24port PoE Switch-2 with VMS. Licenses to be factored for 64 including cabling and accessories	Lot	1		
5	SITC of Rack Mount T&RH Sensors with BMS communication provision	Nos	53		
6	SITC of Ceiling Mount CO2 + T&RH Sensors with BMS communication provision	Nos	7		
<b>Total-Part-II</b>					
<b>PART-III AMC after completion of warranty one year</b>					
1	CAMC for New Proposed Critical Equipment for 2 year after completing 1 year warranty	Lot	1		
<b>Total-Part-III</b>					
<b>Grand Total (Part-I + Part-I I+ Part-III) including GST</b>					

**Important Note:**

1. The bidder shall enclose detailed BOQ for each system with rates in the price bid for each component/subsystem as per their design (in-line with the design requirements). The detailed BOQ without prices shall be included in the technical bid.
2. The rates quoted above shall be all inclusive prices.
3. **Vendor has to provide resource for 24x7 support at site for maintenance and support. Resource should have proper knowledge of DC environment and should able to maintain the non-IT facility of equipment installed as per the tender at 2<sup>nd</sup> floor, Rail Nilayam, Secunderabad .**
4. The rates quoted shall include the cost of operation & maintenance support during the warranty period (12 months) as specified in the special conditions of the contract.
5. The bidder should indicate the taxes, duties and other levies for each item separately.
6. The Long Term Maintenance support charges will not be used for determining the L1 bidder.



## **CHAPTER-III**

### **Technical Specifications**

राज्य  
RAILTEL  
RAILTEL

# 10 Technical Specification

## 10.1 Civil and Interior Works

The scope of civil works shall include but not limited to the following:

- Interior Design
- Pest Control
- Permanent walls and partitions (Fire rated)
- False Ceiling
- Thermal Insulation
- Painting (Fire retardant Paint)
- Metal Doors (Fire rated)
- Glass Doors for office area (non fire rated)
- Any other civil works required at site

The interior has to be aesthetically designed and as per the approved colour scheme of RailTel.

### 10.1.1 Partitions and Walls

- Partitioning walls using 2-hour fire rated 200mm width light weight Aerocon blocks or 12mm thick gypsum partition as per approved drawing in the Data Centre.
- All partition walls shall be full height from true floor to true ceiling with discontinuity beams at 3 meters height.
- All piercings on walls for conduiting / cabling on all the rooms of the Data Centre shall be closed with appropriate fire sealant.

### 10.1.2 Doors

- All metal doors shall be 2-hour fire rated metal doors.
- All doors shall be equipped with DORMA/equivalent make door closers or floor spring and other required hardware.
- All doors shall have accessories to fit devices for access control system.
- All metal doors shall have a fire rated vision glass of size 12"x9".
- Door sizes shall be as per the floor plan attached. All doors shall be 2400mm height with proper lintels.

### 10.1.3 False Ceiling

GI Metal Ceiling Lay in perforated bevelled/Tegular edge global white color tiles of size 595x595 mm and 0.5 mm thick with 8 mm drop; made of GI sheet having galvanizing of 100 gms/sqm (both sides inclusive) and 20%-22% perforation area with 1.5-1.8 mm dia holes and having NRC (Noise Reduction Coefficient) of 0.5, electro statically polyester powder coated of thickness 60 microns (minimum), and backed with a black Glass fiber acoustical fleece.

Server rooms and Electrical room will not have any false ceiling.

### 10.1.4 Vinyl Flooring

- 2mm thick Antistatic vinyl flooring to be provided for the Electrical Room.

- The flooring shall be chemical resistant and slip resistant.

### 10.1.5 Painting

- All the rooms of the Data Centre shall be painted with 2 coats of fire retardant anti dust type painting.
- Gypsum / Plaster of Paris paste of thickness 5 - 8 mm putty over cement plaster shall be provided so as to ensure a level and smooth texture to the exposed walls and columns.
- The existing surfaces are to be cleaned and scratched and markers are kept before the application of putty.
- After the material has dried upon application, it is to be smoothed by means of rubbing it with sandpaper.
- Upon this smoothed surface one coat of primer and two coats of plastic emulsion paint of approved make & shade is to be applied.

### 10.1.6 Thermal Insulation

The bidder shall provide 12mm thick thermal insulation to the true ceiling in Server rooms with proper adhesive.

### 10.1.7 Pest Control

The bidder shall carry out pest control measures for walls, partitions and other civil works executed by them as per the specifications outlined by Bureau of Indian Standards or other bodies. The pest control shall be done for all external walls, ceilings, furniture and civil works using suitable chemical emulsions as per specifications of BIS and industry standard practices. Anti-termite treatment under existing cavity floors shall be done using suitable chemical emulsion.

### 10.1.8 Miscellaneous Works

- Providing & fixing glow signage on both sides of the door shutters marking PUSH / PULL along with other signage marking different work areas and emergency exit signs in the Data Centre.
- Civil works for panels, earthing and other required electrical installation as per local regulatory requirements and site conditions.
- Any other civil works required to complete the works in the Data Centre shall be in the scope of the bidder.

## 10.2 Electrical works

### 10.2.1 Raw Power/HVAC Panels

This specification covers the 'General Requirements' for the design, manufacture, performance, inspection, testing and supply of indoor type 415V Low Voltage Switchboards

Temperature	Maximum 50°C, Minimum 10°C
-------------	----------------------------

Humidity	80% at maximum temperature
Rainfall	Around 1000mm per annum
Altitude	Less than 1000m above MSL

### 10.2.1.1 Electrical Supply Specifications

Incoming system voltage nominal	415 V
Distribution Voltage	415V
Voltage variation limits	-15% to +10% on HT Side
No. of phases	3
Frequency	50 Hz
Frequency variation limits	+3% or -5%
Fault level	Not exceeding 50 kA at 1.1kV & 50kA at 415V
Earthing	TNS with separate Neutral & protective conductor
Neutral earthing	Solidly earthed

### 10.2.1.2 Standards & Design Conditions

All materials, equipment and accessories used in the manufacture shall conform to the latest editions of relevant Indian and International Standards including amendments and addenda, some of which are listed below

IS/IEC 61439-1&2	General Rules and Specification for Power gear and control gear assembly.
IS/IEC 60947 (Part 1 to 5)	Specification for Air Break Circuit breakers & MCCBs & Contactors
IEC 61641	Internal arc containment for low voltage switchgear assembly
IS :1248	Electrical measuring instruments
IS : 2705 (Part 1 to 4)	Current Transformers
IS : 3156 (Part-1 to 4)	Voltage Transformers
IS : 11353	Marking and identification of conductors & apparatus terminals.

IS : 10118 (Part-1 to 4)	Code of Practice for selection, installation & maintenance of switchgear & control gear.
IS : 11353	Guide for uniform system of marking and identification of conductors and apparatus terminals.

### 10.2.1.3 Constructional features

- Standard CPRI approved cubical type, compartmentalized, totally enclosed, floor mounting, free standing, flush front, single bus type suitable for MCCBs/ MCBs. The switchboards shall be of single front design as specified.
- All feeder components to be mounted on an equipment plate which in turn is fixed within the compartment by screws.
- The panel builder shall offer Design Verified assemblies of reputed make such as Schneider/ RailTel /ABB/L&T which have undergone test for internal arc containment.
- Pretreatment process for sheet steel shall be seven tank process. Type of paint finish shall be powder coated with paint shade RAL 7035. The paint thickness shall not be less than 70 microns.
- Sheet still thickness shall be 2.5mm for frames, 2mm for load bearing members, 1.6mm for doors & covers, 1mm for barriers, 2mm for gland plates. The cable gland plate shall be 3mm Aluminum sheet wherever single core cables are specified.
- Degree of protection shall not be less than IP43 or indoor type.
- Base frame shall be 75mm height ISMC. Overall height of the panel shall be not be more than 2000mm including base frame. The maximum operating height of the switchboard shall not be more than 1800 mm and minimum operating height shall not be less than 400mm.
- All the doors and covers shall be fully gasket to prevent any ingress of dust. Gasket used for all doors shall be of double lip type Doors shall have concealed hinges. Door locks shall be of the quick opening, industrial type.
- Cable alley & rear doors shall be hinged on one side & bolted on the other. Cable alley shall be accessible from the rear for switchboard for Single front and front of the switchboard for double front panels. Cable / bus duct entry shall be from the Top. Cable clamping facility should be Provided.
- All the control circuits shall be controlled by MCBs and fuse links shall not be used

### 10.2.1.4 TVSS

All the LT panels shall be provided be with Transient Voltage Surge Suppressor (TVSS) having Response time <0.5ns, Let-through Voltage 600V-800V

### 10.2.1.5 Safety Features

The operating handles shall be interlocked with the door and shall have padlocking facility. However, this interlock shall have defeat facility. All switchboards must comply with Internal Arc Containment as per IEC 61641 for 50kA/0.3s. All switchboards must be suitable for Seismic Zone III / V as per IS 1893 part-1. Padlocking provision shall be provided on all hinged doors and

switch/MCCB/ACB handles in line with LOTO requirements. Live parts shall be shrouded. All wiring to be finger touch proof (IP 2x).

#### **10.2.1.6 Busbars**

The material of the busbar shall be Electrolytic grade Aluminium/Copper as per SLD. The Busbar sizes shall be determined taking into consideration the continuous rating without exceeding the final temperature as permitted by IEC 61439 when carrying rated current; and must be suitable for a fault level of 50kA (1 sec).

Busbars for main horizontal and risers shall be of uniform section throughout. The selection of cross section shall also be as validated in the design verification documentation and same needs to be certified by the OEM. The neutral bus shall be half the size of the phase bus for main distribution boards. Busbar supports shall be SMC/FRP type. It should have Very high Comparative Tracking Index (CTI > 600 as per IS 2824 - Type test certificate to be submitted). Temperature rise over ambient shall be as per permissible limits in IEC 61439-1. The design verification certificates to be provided for ratings above 1600A. For ratings below 1600A assessment as per IEC 60890 can be provided. Bus bar clearance for the main Bus bars shall not be less than 20mm clear for phase bus bars and not less than 19mm clear for neutral bus and main bus. Bus bar bolts shall be conical washers at all busbars. The bus bars shall be sleeved with black colour, heavy duty, heat shrinkable sleeves capable of withstanding 90°C continuously without deterioration and colour coded using identifying colour rings at regular interval. Red, Yellow & Blue colour shall be used for phases & Black for neutral. The earth Busbar shall be identified with Green colour rings at regular intervals.

There shall be minimum 2 sets of auxiliary copper busbars of 5x5 mm cross sections for control wiring supply.

The body earth busbars of the panels shall be aluminium

The short time short circuit rating of busbar shall be 50kA at 415V for 1sec. as specified in the drawing.

### **10.2.2 Electrical Circuit Breakers**

#### **10.2.2.1 MCCB General**

- Moulded-Case Circuit Breakers (MCCB) shall comply with IEC 60947-1, IEC 60947-2 & IEC 60947-3 standards.
- MCCB shall be of category A with a rated service breaking capacity (Ics) equal to the ultimate breaking capacity (Icu) on all the ratings @ 415VAC
- MCCB shall have a rated operational voltage of 690 V AC (50/60 Hz)
- MCCB shall have a rated insulation voltage of 800 V AC (50/60 Hz)
- MCCB shall be suitable for isolation, as defined by IEC 60947 -1 and -2
- MCCB upto 250A shall be thermal magnetic type with adjustable overload and adjustable short circuit release. MCCB above 250A shall be Microprocessor based.
- MCCB should be fully rated up to 50 Deg C

- MCCB Dimension should be independent of the kA rating.
- MCCBs shall be permissible for mounting in all 3 axes (Vertical Wall, Laterally Rotated Wall, Ceiling & Floor mounting) without any adverse effect on electrical performance. It shall have line load reversibility.
- MCCBs shall be insensitive to Vibrations and meet requirements on mechanical & electromechanical vibration strength according to IEC/EN 60068. Also, suitable for Shock resistance without tripping up to 10g (IEC / EN 60068-2-27)

#### **10.2.2.2 Current Limit & Selectivity**

- MCCBs shall be Current Limiting type.
- MCCBs, the current ratings of which are identical with the ratings of their trip units, shall ensure selectivity in rated current interval up to 1:1.6

#### **10.2.2.3 Accessories**

- MCCBs shall have uniform Internal Accessories platform across the range
- MCCBs should have the facility to use both auxiliary release together (Shunt Release & Under-voltage release)
- MCCBs Door Mounted Rotary Handle shall have an option of integrated status indication to indicate three stable mechanism positions (ON, OFF and TRIPPED).
- MCCBs with TMTU Release should have provision for separate indication for Short Circuit signals.
- MCCBs shall be snap fit type to enable safe on-site installation of auxiliaries, voltage releases, signal contacts etc. It shall be color coded for easy identification. All accessories should be mounted in OFF position only to ensure personnel safety.
- MCCBs should have symbols engraved in the lid of the accessories compartment to indicate possible mounting position of internal accessories.
- Shunt Release should be freely mountable on either side of Rotary Operator.

#### **10.2.2.4 Protection functions**

MCCBs entire range shall be available in both the release type

- Thermal-Magnetic Release
- Microprocessor Release

#### **10.2.2.5 Common features**

The MCCB Trip units shall comply with Electromagnetic Compatibility as per the following standards CISPR 11, Class A & B

- IEC / EN 60947-1, Appendix S
- IEC / EN 60947-2, Appendix B, F, J & N
- Protection settings shall apply to all circuit breaker poles
- Thermal-Magnetic Trip Units (up to 250 A)

### **10.2.3 Multi-Function Meters**

#### **10.2.3.1 Applicable Standards**

The meters shall conform in all respects to the following standards IEC 62053-21.

### 10.2.3.2 General Requirements

- The meter shall be suitable for operation in single phase or multi-phase networks, balanced as well as unbalanced load.
- It shall be possible to use the multifunction meter directly for networks up to 480V.
- Meter shall be suitable for pollution degree II & overvoltage category III.
- The current inputs shall be configurable at site for measuring on x/1 A or x/5 A current transformers
- The multifunction meters shall be suitable for operations up to 55 Deg C
- The meters shall be suitable for operation with AC auxiliary power and shall have wide tolerance band of 95V to 240 V ( $\pm 10\%$ )
- The meter shall operate for frequency variation of 45-65 Hz.
- The multifunction meters shall have high degree of protection (IP65 from the front) against ingress of dust & water
- The multifunction meters shall have LCD display.
- The meter shall be tamper-proof (password protected) to avoid mishandling by unauthorized person
- Meter shall have minimum one digital input.

### 10.2.3.3 Measurement Specs

- Meter shall be with accuracy class 1.0
- Meter must have a MODBUS RTU communication protocol over RS 485 interface.
- All basic electrical parameters (Current, Voltage, Power, Energy, Frequency, Power factor) should be available on display as well for communication with BMS software.
- Meter shall measure line current, line to line voltage as well as neutral current and line to neutral voltage.

### 10.2.3.4 Current Transformers

- CTs shall be epoxy molded ring type either bar or wound primary. CT shall be tested as per IS 2705.
- The CT secondary shall be 1A/5A as per the SLD. CTs shall be class-I accuracy for metering and minimum 5P10 for protection. Final selection shall be as per the SLD.

### 10.2.3.5 Indicating lamps-

The indicating lamp shall comply with IS 60947 standard.

The indicating lamp shall be suitable for 230V AC. The minimum consumption of indicating lamp shall be 1W. Indicating lamp shall comply with Class-2 electric shock protection.

### 10.2.3.6 Push buttons

Push buttons shall be snap fit type, finger touch proof. Push button shall comply with class-2 electric shock protection. The degree of protection shall be upto IP 65. Push button shall have facility to add on NO/NC contact block.

### 10.2.3.7 Main & Auxiliary wiring

Internal wiring of power circuits rated upto 63A shall be carried out using 1100V, FRLS grade PVC insulated, flexible copper conductor wires. Minimum size of wiring shall be 6 Sq.mm and maximum shall be 25Sq.mm. For rating above 100A,

busbars of appropriate size shall be used. The bus bar sizes shall be selected as specified elsewhere.

The internal wiring for signalling and protection and instrumentation shall be carried out using

660V grade PVC insulated, multistrand copper conductors. The sizes of wires shall be as follows:

For Controls & Signalling : 1.5 Sq.mm. for internal wiring. For Controls & Signalling: 2.5 Sq.mm for external cabling. For C.Ts : 2.5 Sq.mm for internal wiring

For C.Ts : 4.0 Sq.mm for external cabling.

For C.Ts : Inter panel wiring shall be carried out using PVC troughs.

Each wire shall preferably be terminated at a separate terminal. Termination of upto two outgoing wires at a single terminal will be acceptable. Wires shall not be joined between terminal points. Shorting links shall be provided for all C.T terminals. Wiring shall be neatly bunched.

Each wire shall be identified at both ends by yellow colour PVC ferrules marked with black letters. Supporting facilities shall be provided for clamping the control cables. Inter panel wiring shall be done by the switchgear manufacturer before dispatch with disconnection facility at the shipping section with plug in type multiway connector.

Rubber grommets shall be provided so that metal parts should not come in contact with any power or control wires/cables.

Minimum size of terminals for control wiring shall be 2.5sq.mm or higher to suit the wiring sizes stipulated. Clipon type terminals shall be provided. 20% spare terminals shall be provided on each terminal block. The terminal blocks for C.T connections shall have C.T disconnection and shorting facility.

Stranded conductors shall be terminated with tinned copper lugs at both ends before connections are made.

Wiring shall be finger touch proof at all places. Where the terminals of equipment meters/relay and accessories are not finger touch proof, insulating shrouds shall be provided.

Control wiring requirements will be communicated to the successful bidder. The bidder shall include necessary auxiliary contactors, A/M switches, timers & wiring for the same.

Communication ports to be wired to terminals using appropriate connectors and wires to avoid any loss of data or corruption in transmission.

For power monitoring system all MDMs shall be daisy chained such that upto 30MDMs are connected in a single loop. RS 485 cable shall be used for this purpose and terminated in the incomer or bus coupler panel to facilitate external connection.

## 10.2.4 Earthing

All cubicles shall be connected to a common Hot dip galvanized iron earth busbar of specified size running throughout the length of the switchboard and brought outside at both ends. All doors and movable parts shall be connected to the earth bus with flexible connections.

Provision shall be made to connect the earthing busbar to the plant earthing grid at two ends. All non-current carrying metallic parts of the mounted equipment shall be earthed.

## 10.2.5 LT cables

### 10.2.5.1 LT and Control Cables

This specification covers the design, manufacture, testing, inspection at Manufacturer's works and supply of power and control cables as detailed in Data Sheet conforming to specific requirements mentioned in this specification. The estimated quantities are given in the price schedule. However, the System Integrator shall recheck the quantities and supply according to the requirements.

### 10.2.5.2 Design Feature

The cable shall maintain their insulating properties as required by the operating conditions when subjected to maximum ambient temperature of 50° C and a maximum conductor temperature of 90° C.

The conductor temperature during short circuit shall not exceed 250° C. Cables shall be suitable for short time overload.

The cables shall maintain its required insulating properties when exposed environment and mechanical stresses resulting during installation and operation.

Cables shall be suitable for installation on multi-tier ladder type cable trays running horizontally or vertically in the buildings as well as in the concrete cable trenches, RCC Hume/ GI pipes, and outdoor cable trays with restricted ventilation. No forced ventilation is envisaged for the cables. Cables shall also be suitable for lying underground directly.

### 10.2.5.3 General Construction

- Outer sheath of all XLPE / PVC cables shall be black in colour and the minimum value of oxygen index shall be 29 at 27 ± 2°C. In addition, suitable chemicals shall be added into the PVC compound of the outer sheath to protect the cable against rodent and termite attack.
- Sequential marking of the length of the cable in meters shall be provided on the outer sheath at every one meter. The embossing shall be legible and indelible.
- The overall diameter of the cables shall be strictly as per the values declared in the technical information furnished along with bids subject to a maximum tolerance of ± 2mm
- PVC/Rubber end caps shall be supplied free of cost for each drum with a minimum of eight per thousand-meter length. In addition, ends of the cables shall be properly sealed with caps to avoid ingress of water during transportation and storage.
- Cable bending radius for multi core cables should not exceed 12D, where D is the diameter of cable.
- Voltage grade would be according to required voltage.

- Number of cores for power would be one, two, three, three and half or four as per design. Number of cores for control cable shall be four & above or as specified.
- All the cables shall be rated at 650V for control cables and 1100V for power and auxiliary cables for armoured and unarmoured cables.
- XLPE insulated cables shall be rated for continuous operation at maximum conductor temperature of 90deg C and for a maximum short circuit temperature of 250°C.

#### **10.2.5.4 1.1kV Power & Control Cables**

- All power/control cables for use on medium voltage systems shall be heavy-duty type, 1100V insulated, FRLS XLPE for LT and FRLS PVC for control cables of sizes and quantity as per the Master SLD/Cable Schedule.
- Sheathing of cable shall be of PVC for both XLPE & PVC insulated cable.
- The conductors shall be 'stranded' for both aluminum and copper cables. Conductors of nominal area less than 25 Sq. mm shall be circular only. Conductors of area 25 Sq. mm and above may be circular or shaped. Cables with reduced neutral conductor shall have sizes as per Tables 1 of IS 1554 (Part-I).
- The thickness of insulation and the tolerance on thickness of insulation shall as per table 2 of IS: 1554 Part – 1. Control cables having 6 cores and above shall be identified with prominent and indelible English numerals on the outer surface of the insulation. Color of the numbers shall contrast with the color of insulation with a spacing of maximum 50mm between two consecutive numbers. Color coding for cables up to 5 cores shall be as per Indian standard.
- Armouring for multi-core cables shall be by single round galvanized steel wires where the calculated diameter below armouring does not exceed 13mm and by galvanized steel strips where this dimension is greater than 13 mm. Requirement and methods of tests for armor material and uniformity of galvanization shall be as per IS-3975 and IS-2633. The dimensions of armor shall be as per table 5 of IS: 1554(Part-1).
- Conductors shall be smooth, uniform in quality, free from scale, spills, splits and any other defects. There shall be no joints in individual strands except those made in the base rod or wire before final drawing.

#### **10.2.5.5 XLPE Cables**

- System Voltage: 11kV, 3Phase, 50 Hz unearthed as per the system design requirement.
- Power cables for 1.1 kV up to and including 11 kV systems shall be Aluminum or Copper conductor as shown in the Drawings; XLPE insulated, screened, sheathed, armored and overall PVC sheathed as detailed below.
- The conductor shall be stranded and compacted circular for all cables.
- All cables rated 3.8/6.6kV and above shall be provided with both conductor screening and insulation screening. The conductors shall be provided with non-metallic extruded semi-conducting shielding.
- The core insulation shall be with cross-linked polyethylene insulating compound applied by extrusion. It shall be free from voids and shall withstand all mechanical and thermal stress under steady state and transient operating conditions. It shall confirm the properties given in Table-1 of IS: 7098 (PART-II).
- The insulating shielding shall consist of non-metallic extruded semi-conducting compound in combination with a nonmagnetic metallic screening of copper. The copper screen shall be capable of carrying the single line to ground fault current as per specified duration in datasheet.

- The conductor screen, XLPE insulation and insulation screen shall all be extruded in one operation by “ Triple Extrusion “ process to ensure perfect bonding between the layers. The core identification shall be by colored stripes or by printed numerals.
- The inner sheath shall be applied over the laid up cores by extrusion and shall conform to the requirements of type ST2 compound of IS: 5831. The extruded inner sheath shall be of uniform thickness for multi core cables, the armoring shall be by galvanized steel strips. If armoring is specified for single core cables in the data sheet, the same shall be with H grade hard drawn aluminum round wire of 2.5 Sq. mm diameter. Also in case of single core cables, there shall be extruded inner sheath between insulation metallic screen and armoring.”
- The outer sheath of the cables shall be applied by extrusion over the armoring and shall be of PVC compound conforming to the requirements of type ST2 compound of IS: 5831. The thickness of outer sheet shall be as per amendment No. 1 to table 5 of IS: 7098 part 2. (for both armored and unarmored cables.)
- The dimensions of the insulation, inner sheath and armor materials shall be governed by values given in Table 2,3 and 4 (Method “b”) of IS: 7098 Part-II. Aluminum cables shall be used for HT distribution. The type of insulation for cable will be XLPE & the type of inner sheathing will be PVC wrapped PVC extruded. The type of armour shall be unarmored /armored /tape armored. Outer sheath shall be PVC.
- The fire survival cables shall meet the following additional requirements:
  - ✓ The insulation shall be of EPR or equivalent material with glass mica tape below or above insulation.
  - ✓ The cables shall meet requirement of circuit integrity test for a minimum period of 3 hours at maximum temperature of 950°C.
  - ✓ Vendor shall have the test certificate for circuit integrity test as per IEC: 60331-21.”

#### **10.2.5.6 Cable Accessories**

- The termination and straight through jointing kits for use on the systems shall be suitable for the type of cables offered as per IS:13573
- The accessories shall be supplied in kit form. Each component of the kit shall carry the manufacture’s mark of origin.
- The kit shall include all stress grading, insulating and sealing materials apart from conductor fittings and consumable items. An installation instruction sheet shall also be included in each kit.
- The contents of the accessories kit including all consumables shall be suitable for storage without deterioration at a temperature of 45° with self-life extending to more than 5 years.
- TERMINATING KITS: The terminating kits shall be suitable for termination of the cables to indoor switchgear or to a weather-proof transformer/motor. For outdoor terminations, weather shields/sealing ends and any other accessories required shall also form part of the kit. The terminating kits shall be one of the makes/types mentioned in the data sheet.
- JOINTING KITS: The straight through jointing kits shall be suitable for installation on overhead trays, concrete lined trenches, and ducts and for underground burial with uncontrolled backfill and possibility of flooding by water and chemicals. These shall have protection against any mechanical damage and suitably designed to be protected against rodent and termite attack. The inner sheath similar to that provided for cables shall be provided as part of straight through joint.”

### **10.2.5.7 Tests**

Type tests should have been carried out to prove the general qualities and design of given type of termination /jointing system. The type tests shall include the following tests conforming to IS specification. The type test certificates shall be submitted along with the offer.

- Rated withstand AC voltage test
- Partial discharge test
- Rated withstand surge voltage test
- Continuous AC voltage test with cyclic current load (umber of heating cycles-3)
- Partial discharge test
- Continuous AC voltage test with cyclic current load (Number of heating cycles-60) Thermal short circuit test
- Continuous AC voltage test with cyclic current load (Number of heating cycles-63)
- Rated withstand surge voltage test
- D.C. voltage test
- Test under the influence of moisture
- Dynamic short circuit test

### **10.2.6 Automatic Transfer Switches**

Automatic Transfer Switches (ATS) shall be suitable for 415V 3 Phase 4 wire system and shall withstand a fault current of minimum 50KA for 1 second. Each ATS shall consist of an inherently double throw power transfer switch mechanism and a microprocessor controller to provide automatic operation. All transfer switches and controllers shall be the products of the same manufacturer.

#### **10.2.6.1 Mechanically Held Transfer Switch**

- The transfer switch shall be electrically operated and mechanically held. The electrical operator shall be a momentarily energized, single-solenoid mechanism. Main operators which include over current disconnect devices, linear motors or gears shall not be acceptable. The switch shall be mechanically interlocked to ensure only two possible positions, normal or emergency.
- The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
- All main contacts shall be of silver composition. Switches shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.
- Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars
- Where neutral conductors must be switched as shown in the drawings, the ATS shall be provided with fully rated overlapping neutral transfer contacts. The neutrals of the normal and emergency power sources shall be connected together only during the transfer and retransfer operation and remain connected together until power source contacts close on the source to which the transfer is being made. The overlapping neutral contacts shall not overlap for a period greater than 100 milliseconds. Neutral switching contacts which do not overlap are not acceptable.

- Where neutral conductors are to be solidly connected, a neutral conductor plate with fully rated AL/CU pressure connectors shall be provided.
- Microprocessor Controller
- The controller's sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through a serial communication module.
- A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to  $\pm 1\%$  of nominal voltage. Frequency sensing shall be accurate to  $\pm 0.2\%$ . The panel shall be capable of operating over a temperature range of  $- 10$  to  $+ 50$  °C.
- The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator's manuals.
- All connections shall be wired to a common terminal block to simplify field-wiring connections.
- The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
  - ✓ IEEE472 (ANSI C37.90A) Ring Wave Test.
  - ✓ EN55011 1991 Class A Conducted and Radiated Emission.
  - ✓ EN61000-4-2 Electrostatic Discharge Immunity, Direct Contact & Air Discharge.
  - ✓ EN61000-4-3 Radiated Electromagnetic Field Immunity.
  - ✓ EN61000-4-4 Electrical Fast Transient Immunity.
  - ✓ EN61000-4-5 Surge Immunity.
  - ✓ ENV50141 HF Conducted Disturbances Immunity.

## **10.2.7 UPS System**

### **10.2.7.1 UPS System for Server Racks**

Supply, install, test and commissioning of two numbers of true online, double conversion, high efficiency, unity power factor Uninterruptible Power Systems (UPS) rated as per the IT load with battery backup support for 12 minutes on full load for each UPS with Lithium-Ion Batteries. The UPS system shall be modular. The backup batteries should be supplied with the necessary arrangements to mount outside the cabinet.

### **10.2.7.2 Scope**

- The scope shall include design, supply, installation, testing and commissioning of the complete UPS system and related accessories including:
- All Server racks will get power feed from two independent UPS systems to ensure redundancy. UPS should be configured for the entire system with N+N redundancy
- All systems should be tested in factory as per the manufacturer's recommended procedure for all operating parameters and the test results should be provided during the installation.
- Delivery at site, unloading, handling, installation of complete system including interconnection from the UPS system to batteries and to input / output panels switches. All interconnections shall be done using multi-strand Flexible Copper conductor cables of appropriate sizes.
- Scope includes Li Ion battery bank connections and providing safety barriers for all bus bars and cable connection leads on battery racks.

- Energizing of UPS and Battery bank commissioning.
- UPS control parameters setting and complete testing of system on load.
- Service backup by engineer till system is fully operational and subsequently training is to be provided to the concerned persons
- Any upgrade of the system hardware and associated other software during the warranty period should be supplied at free of charge.
- Acceptance tests will be carried out after installation and the systems will be taken over only after successful completion of the acceptance tests.
- Operation and service manuals of the systems containing technical / Electronic drawings / circuit diagrams complete in all respects should be supplied.

### **10.2.7.3 Characteristics of UPS**

- Energy Efficient - Up to 96% efficiency at 50-75 % load and Up to 95% efficiency at 25% load. Input Power Factor is 1; Input Harmonic current < 3%.
- Powerful Loading Capacity - Output Power Factor Unity (kVA=kW) with leading & lag power factor (no derating).
- Easy to Install – Provision for Top / Bottom cable inlet / outlet
- Easy to Maintain – Front access for easy maintenance
- Input, Output, Bypass & M. Bypass Switch Assembly
- Hot Swappable Static Bypass Module Assembly
- Hot Swappable Power Modules
- Monitoring Interface Ports

### **10.2.7.4 Modes of Operation**

The UPS is an on-line, double-conversion, reverse-transfer UPS that permits operation in these modes:

- Normal mode
- Battery mode
- Automatic restart mode
- Bypass mode
- Maintenance mode (manual bypass)
- Parallel and redundancy mode
- Dormancy mode
- Common battery mode

### **10.2.7.5 Installation**

- The entire system shall be installed as per manufacturer's recommendations & instructions including all interconnections for supply & control circuits.
- All components shall be clearly identified using labels including battery cells individually.
- Services of authorized representative or manufacturer for supervision of installation, connections, testing, & adjustments shall be provided.

### **10.2.7.6 Testing & Commissioning**

- Under supervision of manufacturer's representatives all system functions, operations, protective features shall be checked & pre-set to ensure compliance or specifications.
- Test the system as per recommendations & test listed below using pre-calibrated instruments.
  - ✓ Load simulation.
  - ✓ Simulation of malfunctions to verify protective device operations.

- ✓ Duration of supply on emergency. Low battery voltage alarm & shutdown, transfer & restoration of normal supply.
- ✓ Remote status & alarm tests.

In case of test any shortfalls / faults, the same shall be rectified & test procedure shall be again repeated to establish satisfactory performance.

#### 10.2.7.7 Cleaning

On completion of installation, testing of the system all components, cabinets etc. shall be cleaned & unwanted material, debris shall be removed from site. Scratches dents if any shall be cleaned & touched up to match the original finish.

#### 10.2.7.8 Drawings & Manuals for UPS

- ✓ Following drawings & manuals / information shall be submitted in at least THREE copies at appropriate stages & for handing over the system.
- ✓ Manufacturer's data for product, features, components & performance along with the offer.
- ✓ Operation & maintenance manual with.
- ✓ List of recommended spares & replacement components.
- ✓ Detail operating instructions covering operations in normal & abnormal conditions.
- ✓ Shop drawings showing detail fabrication, assembly of components, internal & interconnecting wiring, dimensions, plans & views, installation details access & clearance etc. for approval.
- ✓ Product certificates for Brought out items.
- ✓ Factory test certificates & Inspection report.
- ✓ Field test reports.

UPS other technical specification	
Parameter	Requirements
General	
UPS type	ON-LINE
Rating (VA/W)	To cater to the IT load
Technology	IGBT with PWM Switching
Crest Factor	3:1
Invert efficiency	>96 %
Overall efficiency	>95 %
INPUT RATINGS	
Nominal Input Voltage	380/400/415 (3-phase and sharing neutral with the bypass input)
Permissible input voltage variation at full load	305 ~ 477; 304 ~ 228 (output derated below 80%)
Nominal input frequency	50 Hz
Permissible input frequencies variation	40 Hz to 70 Hz
Input power factor at full load	> 0.99 at full load

<b>UPS other technical specification</b>	
<b>Parameter</b>	<b>Requirements</b>
Input socket	Anderson connectors
<b>OUT PUT RATINGS</b>	
Nominal output voltage	(380V / 400V / 415V) (3-phase 4-wire, with neutral reference to the bypass neutral)
Output Voltage regulation	< $\pm 1\%$
Output voltage distortion	2% (0 ~ 100% linear load); 4% (0 ~ 100% non-linear load)
Nominal output frequency	50 Hz
Waveform	Pure Sine wave
Power factor	Unity
Over load capability	<105%, continuous. 105% ~ 110%, 60min; 110 ~ 125% of rated load, 10min; 125 ~ 150% of rated load, 1min; >150%, 200ms
Output sockets	Anderson connectors
Transient recovery time	Within 20 milliseconds to +/- 1%
<b>EFFICIENCY</b>	
On Line Mode Efficiency	Up to 96.5%
ECO Mode Efficiency	Up to 99.1%
<b>BYPASS</b>	
Voltage Range	Upper limit: +10%, +15% or +20%, default: +15%; Lower limit: -10%, -15%, -20%, -30% or -40%, default: -20%
Frequency	50/ 60Hz
Frequency Range	$\pm 10\%$ or $\pm 20\%$ , default: $\pm 20\%$
<b>BATTERY PARAMETERS</b>	
Type	Lithium Ion
Make	Samsung / LG
Battery Autonomy	12 minutes
Battery Voltage	As per OEM

UPS other technical specification	
Parameter	Requirements
ENVIRONMENTAL PARAMETERS	
Operating temperature	0 to 40° Centigrade
Storage temperature	-20 to 70° Centigrade
Relative Humidity	95% RH non-condensing
Altitude	≤ 3000 meters
Temperature de-rating	30-40° de-rating
Altitude de-rating	< 3000m; derating according to GB/T3859.2 when higher than 3000m
Acoustic Noise level at 1 meter @ full load	<70dbA
MECHANICAL PARAMETERS	
Height X width X Depth (MM)	OEM to specify
Weight	OEM to specify
Ventilation	Forced - Air cooled
Cable Entry	Top
Colour / Panel finish	Black ZP7021
Protection	IP20
MONITORING SOFTWARE	SNMP, Dry contact card, site monitoring / shutdown for multiple servers

#### 10.2.7.9 UPS System for Cooling Auxiliaries

- The UPS shall be rated to cater to the HVAC loads on the output, with N+N Redundancy
- The required UPS kVA rating will be set the same as the minimum kW rating.
- Load voltage and bypass line voltage shall be 400VAC, three-phase, four-wire plus ground. Input voltage shall be 400VAC, three-phase, four-wire plus ground. The AC input source and bypass input source shall each be a solidly grounded wye service.
- The battery shall support the UPS at the rated kW load for at least 30 minutes at 25°C during start-up.

#### 10.2.7.10 Modes of Operation

The UPS shall operate as an on-line reverse transfer system in the following modes:

- **Normal:** The critical AC load shall be continuously powered by the UPS inverter. The rectifier/charger shall derive power from the utility AC source and supply DC power to the DC-DC converter, which in turn shall supply the inverter while simultaneously float charging the battery.
- **ECO Mode:** The critical AC load shall be continuously powered by the bypass with the inverter available to power the load if the bypass source voltage or frequency exceeds adjustable parameters of power quality.

- **Battery:** Upon failure of utility AC power, the critical load shall be powered by the inverter, which, without any switching, shall obtain its power from the battery plant via the DC-DC converter. There shall be no interruption in power to the critical load upon failure or restoration of the utility AC source.
- **Recharge:** Upon restoration of the utility AC source, the rectifier shall supply power to the output inverter and to the DC-DC converter, which shall simultaneously recharge the batteries. This shall be an automatic function and shall cause no interruption to the critical load.
- **Bypass:** If the UPS must be taken out of service, the static transfer switch shall transfer the load to the bypass source. The transfer process shall cause no interruption in power to the critical load. An optional external wrap-around maintenance bypass shall be used to ensure full isolation of the unit for the service of internal components while providing safety from arc flash.
- **Off-Battery:** If the battery only is taken out of service, it shall be disconnected from the DC-DC converter by means of an external disconnect circuit breaker. The UPS shall continue to function and meet all of the specified steady-state performance criteria, except for the power outage backup time capability. If multiple battery strings are used, each string shall be capable of being electrically isolated for safety during maintenance.

Parameters	Specification data
Rating	To be mentioned based on the High Density Server racks cooling units
UPS + Batteries mounting type	Floor-Mounted
Battery autonomy time	10 min@ 0.9 PF on UPS
Battery placement	External
Cable Entry	Rear side of the unit (Top)
Built-in switches (Input, output, bypass, and Maintenance Bypass)	Required
Intelligent Paralleling Feature (Applicable for Parallel UPS system)	Required
Cold start Function	Required
Nominal Voltage	380/400/415VAC, three-phase, four-wire-plus-ground
Tolerance on voltage	305-475VAC at full load; 228-475VAC at 50% derated load conditions without battery discharge
	50% derated load conditions without battery discharge
Nominal frequency (60Hz selectable)	50Hz
Tolerance on frequency	40-70 Hz
Input Power factor @nominal voltage	0.9

Parameters	Specification data
Total harmonic distortion (THDi) @ full load at THDV is <2%	<3%
Supports variable number of battery blocks	Specify
Type of Batteries	Lithium Ion
Charging current	10% AH capacity
Ripple voltage	<1.414% (RMS Value) V float
Ripple current	<5% C10
Nominal voltage	380/400/415VAC, three-phase, four wire-plus-ground.
Nominal frequency (60Hz selectable)	50Hz
Output power factor	Unity
Parameters	Specification data
Nominal Power @40°C (kW/kVA)	
Output Voltage Stability in steady state condition	+/-1% (100% balanced load),
	+/-1% (100% unbalanced load)
Stability in dynamic conditions for 100% load step variations	Complies IEC 62040-3, Class-1 Stds.
Load crest factor without derating	3:01
Output voltage distortion with 100% linear load	<2%
Output voltage distortion with 100% non-linear load as specified by IEC/EN 62040-3	<5%
Output frequency stability in synchronization with Mains	Nominal $\pm$ 10%
Frequency stability	
Synchronized with internal clock	$\pm$ 0.25%
Synchronized with bypass	$\pm$ 0.25%
Frequency slew rate (Hz/s)	Selecting range: 0.1 to 0.6
Permitted overload:	
. For 60 Minutes	105-110%
. For 10 Minutes	110-125%

Parameters	Specification data
. For 60 seconds	125-150%
. For <200msec	>150%
Nominal voltage	380/400/415Vac (three-phase and sharing neutral with bypass input)
Tolerance on voltage	Upper limit: +10%, +15%, or +20%
	default: +20%; Lower limit: -10%, -20%, -30% or -40% default: -40%
Nominal frequency (60 Hz selectable)	50Hz
Frequency range	± 5% or ± 10%
	default: ± 10%
Maximum UPS cabinet dimension- W X D X H in mm	Specify
Noise level measured @ 1 meter and @ 100% load according to ISO 3746	<60dBA
Efficiency	
Double conversion Mode (without Transformer / with transformer eff. will drop by 1.5%)	100%- 95.6%
	75%- 96%
	50%- 95.5%
	25%-94.5 %
Eco mode	Up to 99%
Degree of protection	IP 20
UPS Operating temperature	0 - 40° C without derating
Altitude	<1500m above sea

RAILTEL

## 10.2.8 Lithium Ion Battery

The Battery modules shall be lithium-ion type with LMO (Lithium Manganese Oxide) & NCM (Nickel, Cobalt, Manganese) only. The Complete battery system shall be comprised of multiple such module in series / parallel combination to arrive at the required backup and DC voltage requirement of UPS. Batteries should be compliant to Safety Cell UL1642, Module UL 1973, Transportation UN38.3, Seismic GR63, EMC IEC61000-6-2, 61000-6-4.

The Battery System shall be equipped with Battery Management system to indicate the availability and health of entire battery system. Battery cabinet shall be freestanding housing Battery modules with Battery breaker, Battery management system, Communication protocol for DCIM etc.

The Lithium ion battery solution shall include following components:

- Cell - Highly reliable lithium-ion battery prismatic can cell
- Each module shall contain lithium ion cell connected in Series including Battery Management System.
- Racks containing modules connected in series, switchgear and SMPS assembly to power the Rack BMS. BMS shall be integral part of Battery module as well as rack.

## 10.2.9 Floor Mount PDUs with Isolation Transformers

### 10.2.9.1 Scope

The scope includes supply, installation, testing and commissioning of Floor Mount PDUs pr Precision Power Centre with K-13 or higher rated shielded isolation transformer. All systems shall be designed and manufactured to assure maximum reliability, serviceability and performance. The isolation transformer shall support harmonic rich non-linear loads while maintaining safe temperature restrictions. The multi-shielded isolation transformer shall be wound with Electrolytic copper wire with high conductivity. The shielded isolation transformer shall regulate the secondary voltage to provide the correct output voltage and offer superior common mode and transverse mode noise attenuation.

- Standards: K-rated Isolation Transformer shall be in accordance with IS 2026/Equivalent to International Standards.
- Environment: Humidity: 0 to 95% non-condensing.
- Altitude: the altitude of location:-Ambient Temperature: 25C± 10C-
- Ratings: 225 KVA DYn11, Three Phase-The K-rated Isolation Transformer shall be designed as per the ratings of K-13 or higher. Model number shall indicate identity for: input, phase, output, and frequency, KVA, Series, Shielding, Filtering and Surge Protection. -Input: Nominal input voltage is 415 V. However the transformer shall be designed to with stand an input of 440V AC 3 phase delta with sufficient margin to sustain a constant input of +10% without saturation.-Operating Frequency: 50 Hertz +3 Hertz-Turn-On Characteristics When energized the current inrush shall not exceed four times the full load input current for 1/2 cycle or less.
- Output: The three phase transformer's output shall be configured as a 5 wire wye 415/240 volts AC 3 phase with neutral and ground (other voltages available). -Load Regulation: The output voltage shall be maintained within +2.5%, or less, from no load to full load.
- Overload Rating: 500 % for ten seconds.-1,000 % for one cycle.

- harmonic Distortion:-K-rated Isolation Transformer system shall add no more than 1% total harmonic distortion to the output waveform.-Output voltage shall have no flat topping when non-linear loads are present at the output, upto crest factor of 3.0.
- Efficiency: Not less than 98 %.
- Audible Noise: Less than 55 dB units measured from 1 meter.
- Noise Attenuation: Vendor shall specify the minimum common-mode noise attenuation that he proposes to deliver. Common mode noise shall be < -126 db.-The transformer shall incorporate a dual or triple copper electrostatic shield to minimize inner winding capacitance, transient and noise coupling between primary and secondary windings.
- Operating Temperature: -20°C to +40°C
- Branch Circuit Monitoring: Yes, shall be available for all output breakers of the PDU.

#### **10.2.9.2 Main Transformer**

- The K-rated Isolation Transformer shall be designed as a dry type, convection air cooled, shielded isolation transformer.-The transformer windings shall be all copper conductor construction, with separate primary and secondary, isolated windings. The transformer conforms to IS2026/equivalent to International Standards that specifies a separately derived power source. -All leads, wires and terminals shall be labelled to correspond with circuit wiring diagram. Mean Time Between Failure (MTBF) shall be 200,000 hours or better.
- Insulation: Class H, 200°C system.
- Cooling: The transformer shall be designed for natural convection cooling. The full load operating temperature rise shall be less than 115° C above ambient.
- Cabinet: Cabinet shall be suitable for indoor installation. Transformer cabinet shall be equipped with suitable terminals for hard wiring the input and output

#### **10.2.10 Lighting**

Lighting system includes supply, erection and commissioning of all associated parts and accessories required for construction, operation and maintenance of complete system comprising of lighting fixtures complete with lamps, supports and accessories, exhaust fans, lighting panels, galvanized rigid steel conduits, lighting wires, G.I. earth wire, receptacles, switchboards, switches, junction boxes, pull out boxes complete with accessories, power cables, conduits, and allied accessories for such lighting system.

The electrical installations shall meet the requirement of Indian Electricity Act - 2003.

The following illumination level has to be maintained at 1000mm height from finished floor level for each area:

- Server Room – 500 Lux
- All other Rooms and Corridors of the Data Centre – 300 Lux

##### **10.2.10.1 Lighting Fixture**

- The lighting fixtures shall be designed for use in  $230 \pm 10\%$  V, 50Hz, AC system.
- The emergency lighting fixtures shall be designed for use in  $220 \text{ V} \pm 10\%$  AC System (or other suitable level DC system).
- All equipment and accessories shall be suitable for continuous operation.
- All lighting fixtures complete with lamps/LEDs, tubes and accessories shall be within the scope of the bidder.
- Light fittings shall be so arranged that the required lux values specified are maintained uniformly, with supply of required fixtures and supports.

### **10.2.10.2 LED Lights**

- Luminaries will be selected to suit architectural, functional and aesthetic requirement.
- Energy efficient LED lighting using 600mm x 600mm fixtures shall be used at all locations in the Data Centre.
- Reflector, if used, shall be made out of high purity aluminum scientifically designed for high optical performance.
- The distribution of fittings over the three-phase supply shall be such that any particular area is not completely void of supply in case of failure in any phase.
- All accessories and fittings shall be within the scope of supply of the bidder.

### **10.2.11 Receptacle with plug**

All receptacles shall be of flush mounting type complete with individual plug and switches. The receptacle shall be 5A/15A/230V, 2-Pole, 3-Pin type with 3rd pin grounded and suitable for indoor and outdoor installation.

#### **10.2.11.1 Switch and switchboard**

- All switchboard/boxes shall be fabricated from 14 SWG sheet steel and shall be hot dip galvanized.
- All switchboards shall have adequate space to accommodate all accessories and wires.
- All switches shall have quick make and quick break mechanism. Modular small duty switches shall be piano type with service marking on the switches.

#### **10.2.11.2 Lighting cables**

- All lighting cables shall be 1.1 KV graded PVC insulated with stranded copper conductor. Multicore cables shall have extruded PVC inner sheath and overall extruded PVC outer sheath. Entry of the cables shall be through suitable and appropriate cable sockets and glands.
- Final casing wiring / cable routing shall be done based on fixture location and other site conditions.
- The size and number of cores of all the cables shall be determined as per scheme requirement. The size of cables shall be supported by cable-sizing calculation.
- All cables used in the Data Centre shall be Fire Retardant, Low Smoke, Zero Halogen (LSZH) type
- Cable shall be standard product of reputed manufacturer and shall conform to relevant Indian Standards.

#### **10.2.11.3 Junction box**

- The Junction Box shall be of 14 SWG sheet steel with hot dip galvanized and have screwed cover. The junction boxes shall be square/rectangular type. Each junction box shall have the following marking with indelible ink:
- Circuit numbers on the top.
- Circuit numbers with ferrule (inside).
- Danger sign in case of 415 V junction box.

### **10.2.12 Terminals**

Multi-way terminal block of approved make 1100V grade and of approved type complete with screws, nuts, washers and marking strip shall be furnished for termination of incoming and outgoing wires. Each terminal shall be used for only one termination.

20% spare terminal blocks shall be provided for future use.

### **10.2.13 Grounding**

All lighting panels/distribution boards, junction boxes, switchboard, fixtures, etc. shall be grounded in compliance with the provision of IE Rules.

### **10.2.14 Cable Trays and Raceways**

The cable trays / ladders shall be fabricated according to the design specified by IEC 61537 and should be tested for Safe Working Load (SWL)

Fabrication of Tray / Ladder and accessories at site and welding is not permitted. In unavoidable circumstances, if any cut or holes are made in the trays/Ladder/accessories, zinc spray need to be applied over the surface. The metal edge has to be protected by edge protection sleeves to avoid cable damage. Edge of the supports has to be protected with plastic END caps. Screwed connections and internal fixing Devices should not create any damage to the cable when correctly fixed. Sudden or jerky motions shall not be used to tighten reusable screw connections.

Cables shall run in cable tray/ladder mounted horizontally or vertically on cable tray support system which in turn shall be supported from floor, ceiling, overhead structures, trestles, pipe racks, trenches or other building structures using mounting accessories

### **10.2.15 Cable tray**

The cable tray and all accessories shall be fabricated from sheet steel and has to be hot dip galvanized against corrosion confirming to ISO 1461-1999 for installations in both indoor and outdoor applications & should have a Base Perforation Class B according to IEC 61537. The cable trays shall be supplied in standard lengths of 3000mm and the width of the tray shall be as follows.

Width: 150, 200, 300, 450 & 600 mm as per site requirement.

All the cable tray accessories like Bends, TEESs, Cross overs, etc. should be designed in accordance with IEC 61537 and shall be factory fabricated. The accessories shall be from the same material as of the tray and modular type, it should be connected with the trays by using fasteners. Typical details of trays, fittings and accessories, etc.

For Cable trays designed, tested and confirming to IEC 61537, thickness of cable tray should be according to the manufacturer's catalogue. For locally fabricated and non-tested tray, thickness should be 2 mm up to span length of 1.5 meter, 2.5 mm for span length between 2 to 3 meter and 3 to 4 mm for span length between 4 and 10 meter

### **10.2.16 Cable ladder**

The cable Ladder and all accessories shall be fabricated from sheet steel and has to be hot dip galvanized against corrosion confirming to ISO 1461-1999 for installations in both indoor and outdoor applications & should have a Free Base Area classification Y according to IEC61537. The cable ladders shall be supplied in standard lengths of 3000/6000 mm and the width of the tray shall be as follows.

Width: 200 to 1200 mm in multiples of 100 mm

Maximum rung spacing in the ladder shall be 300mm. The rungs should be made of C profiles suitable to fix cables by special metal clamps according to the drawing. The ladder shall be of riveted and foldable type for easy transportation and to avoid damage during transportation and storage. All the ladder accessories like Bends, TEESs, Cross overs, etc. should be designed in accordance with IEC 61537 and shall be factory fabricated. The accessories shall be made from the same material as of the ladder and modular type, it should be connected with the ladder by using fasteners.

For Cable Ladders designed, tested and confirming to IEC 61537, thickness of cable Ladder should be according to the manufacturer's catalogue. For locally fabricated and non-tested Ladder, thickness should be 2.5 mm up to span length of 1.5 to 2-meter, 3 mm for span length between 2.5 to 4 meter and 3 to 4 mm for span length between 5 and 10 meter

#### **10.2.16.1 Cover for cable trays / ladder**

Cover for trays/ladders to protect the cable insulation from falling objects, water droplets, and harmful effects of ultraviolet rays and accumulation of dust. The cover shall be made either from Hot Dip Galvanized sheet steel or superior quality Double Dip Galvanized Sheets. For Outdoor application, Double dip Galvanized material shall be used. The covers should be fitted properly to the Ladder / Tray by using pre-fixed and tested locks which ensure that covers are fitted rigidly to Tray / Ladder. For outdoor application in high wind areas, additional cross over beadings to be used for fixing the cover on tray / ladder of width more than 500 mm.

#### **10.2.16.2 Mounting accessories (supports and brackets)**

The mounting accessories shall be fabricated from steel and has to be hot dip galvanized against corrosion confirming to ISO 1461-1999 for installations in both indoor and outdoor applications and should be of completely modular type. All supports, and Brackets should be factory made, hot dip galvanized after completing welding, cutting, drilling, other machining operations and tested according to IEC 61537 according to the arrangements in the enclosed drawing. The system shall be designed such that it allows easy assembly at site by using Bolts and Nuts. The main support and brackets shall be fixed at site using necessary brackets, clamps, fittings, bolts, nuts and other hard ware etc. to form various arrangements required to support the cable trays. Welding of the components at the site shall not be allowed.

#### **10.2.17 GI Raceways & Junction Boxes**

The raceways shall be made out of 1.6mm GI sheet with cover on top. The cable raceways shall be complete with all necessary coupler plates, elbows, tees, bends, reducers, stiffeners and other accessories and hardware (i.e. bolts, nuts, screws, washers, etc.) It shall be used to lay in floor screeding/ceiling. If the screeding is done before laying raceways, necessary chipping work with floor cutting machines, shall be done by the electrical System Integrator. After laying floor shall be finished with necessary cement works. The body of all raceways shall be earthed using minimum 4Sq.mm copper flexible wires.

#### **10.2.18 Data Centre Earthing**

Proper grounding of Data Centre equipment, often called network grounding or the Data Centre grounding infrastructure, is defined by TIA/EIA-942 Telecommunications Infrastructure Standard for Data Centres, and goes beyond the requirements of the National Electrical Code (NEC) to protect equipment and improve system reliability. The bidder shall follow both TIA and NEC;

however whenever NEC does not cover any aspect or there is difference between the two, TIA/EIA-942 would prevail.

IEEE Std. 1100-2005 (IEEE recommended Practice of Powering Grounding) shall also be acceptable. Earthing schematic shall be submitted along with electrical SLD with details of conductors.

#### **10.2.18.1 Design criteria**

The two goals of the grounding system are (1) to equalize electrical potentials and (2) to create a low resistance path to ground to ensure equipment safety and personnel safety. It should facilitate proper operation of protection system during earth fault in the system. Five basic principles shall be used when designing a grounding system to accomplish these goals:

As the grounding system is no more reliable than its weakest link, only high-quality components shall be used and trained professionals must make all connections.

The grounding system shall be visually verifiable so as to be able to visually inspect degradation of any component of the grounding system, from the equipment to the rack, to the common bonding network (CBN), to the earth. The system shall be accessible during moves, adds, and changes, ensuring long-term system reliability and scalability.

The grounding system shall be adequately sized to prevent premature equipment failure that contributes to increased operating costs.

The grounding system shall make each rack to bond directly to the CBN, thereby directing current away from sensitive electronics.

All metallic components in the Data Centre e.g., equipment, racks, cabinets, ladder racks, enclosures, and cable trays shall be bonded to the grounding system to ensure all conductive materials at the same electrical potential to minimize current flow.

#### **10.2.18.2 Installation Criteria**

The bidder shall, however, be liable for proper quantification for the work.

The design shall ensure that the ground resistance shall be within the limit. The composite of all ground electrodes connected together must have an impedance of less than 1 ohms to ground. If this impedance exceeds 1 ohm, then additional driven ground rods or a chemically assisted grounding electrode must be added to reduce this value to below 1 ohm.

Safe earthing electrode of 80mm diameter 3-meter length pipe-in-pipe technology with electrode backfill compound shall be used. The number of earth pits shown mentioned in the earthing drawing are minimum quantity required. Based on the soil resistivity additional electrodes shall be used.

Copper flats of appropriate sizing shall be used for connecting to the earth pits and also for interconnection of the earth pits.

Standby Generator or UPS system are considered to be separately derived systems (by the definition in NEC Article 100.1) and, therefore, must be separately grounded in accordance with NEC Article 250-30.

Methods for attaining low impedance to ground for data processing grounding electrode may include:

- An array of grounding electrodes spaced at least 12 ft apart
- A buried ground loop with multiple ground rods
- Chemically enhanced grounding electrodes
- Ufer grounds or other types of grounding systems.

Once the grounding electrode has been established (location, low impedance, minimum length, configuration, etc.), all electrical distribution components associated with the Data Centre should be connected to a central ground bus. This ground bus is an insulated, isolated ground bus and is intended for a signal reference ground—not an equipment, safety ground. It will be connected to the isolated ground bus in the UPS, the PDUs, the branch circuit panels, and the isolated ground conductors going to the individual server racks. This bus will be completely isolated within the Data Centre room from the green-insulated or bare, safety-grounding conductor that is connected to the conduit, boxes, panel board cabinets, server rack frames, UPS enclosures, generator frames, and the like. It is critical to the Data Centre grounding system's integrity that there are no connections between these two systems within the Data Centre and, in fact, no connections anywhere—with the exception of a single bonding jumper specifically located to minimize the interactions between the electrical distribution system and the Data Centre ground system.

Thus by providing two separate low-impedance grounding electrodes (one for the main electrical service and one for the sensitive electronic system), and connecting them with the smallest bonding conductor permitted by the NEC (i.e., the conductor with the highest impedance), a reliable, low-noise, low-impedance, virtually isolated, signal reference ground for electronic systems.

Apart from the two types of grounding system mentioned above one more type of earthing, named Signal reference earthing, needs to be implemented with braided copper wire tied with false floor pedestal. It will eventually create a mesh system the level of which will be in between power and data cable trays.

Because most racks and cabinets are made of painted components that are bolted together, there remains uncertainty about electrical continuity from one rack component to the next. In the Data Centre, rack and cabinet continuity is important for safety; electrostatic discharge (ESD) protection; and the proper grounding of switches, servers, and power strips. Continuity may not exist if the installer fails to scrape paint between sections of rack or use specially designed paint-piercing hardware.

To avoid loosening of grounding connectors over time, permanent copper compression lugs shall be used instead of setscrews to fasten conductor.

Failing to create an electrical bond between the structural components of racks and cabinets can trap currents within sections of them, resulting in potential safety hazards, failure of ESD protection, and ungrounded equipment. So components, such as hardware and jumper cables are to be tested for their ability to create electrical bonds and carry current.

### **10.3 HVAC System**

DX Based in-row type cooling units to be provided for the Data Centre Expansion with required capacities based on IT load.

HVAC system shall be designed for concurrent maintainability of the equipment.

In-row Units shall be used for the Server Rooms with N+1 redundancy.

For Electrical Room Dx based comfort air conditioner units shall be used with N+1 redundancy.

### 10.3.1 In Row Cooling Units

The AC Units should have high sensible heat ratios, to match high sensible loads of Computer/Server Rooms. A Microprocessor controlled, DX AC system shall be suitable to take thermal and adjust its operation accordingly to achieve highest levels of performance and efficiency.

The DX based precision in-row cooling unit shall be designed as per following conditions

- Cold Aisle temperature : 22± 1°C at 45%-55%RH
- Ambient air design temperature : 45.5 °C as per ASHRAE-2021
- Sensible Cooling Capacity : 25kW, 35kW & 45kW or better to suit to the IT load
- Air Flow Direction : Horizontal-in front of the racks
- Air inlet Temp & RH : Set point ± 1°C (DB) & Set point ± 5% (Return Air)
- Units should be able to maintain 21± 1°C inside the cold aisle containment and 50± 5% of relative humidity.
- Proposed IRCs shall have heaters and humidifiers to control relative humidity.
- Units should be able to provide 1 SHR at part load
- Units should be able to work for fixed air supply logic instead of return air control logic. Units should be also connected to cold aisle remote sensors for taking the temperature feedback from the top of the racks at multiple places. This would help to regulate the fan for required airflow in the cold aisles.
- The Units shall be designed for 70DBA at 1.5 meter from the unit outlet quiet operation with all moving parts mounted on anti-vibration mounting and carefully balanced to ensure minimum vibration.
- If required, the unit shall be tested at site for performance rating before acceptance. Performance test shall be a heat load test using heater supplied by the Precision unit supplier.
- Its mandatory to submit software selection output of the proposed unit. The specific power consumption and other performance details shall be as mentioned in BoQ.

#### 10.3.1.1 Design Requirements

The environmental control system shall be a factory assembled unit. It shall be floor mounted, optimized for maximum cooling capacity in a minimum footprint. It shall be specifically designed for service from the front and rear of the unit. The system shall be designed for draw-through air arrangement to insure even air distribution to the entire face area of the coil. It shall have adjustable air supply diffusers; the unit shall be capable to be mounted between the racks or at the end of row. The unit shall modulate cooling capacity and airflow based on requirements.

These units are to be supplied with dual powered for 400 Volt, 3 phase, 50 Hz power supply. Each High density rack cooling unit shall have additional external ATS which combines both source-1 and source-2 raw powers.

#### 10.3.1.2 Quality Assurance

The specified system shall be factory end of line tested (functionality test) before shipment and designed to meet Industry best standards. The system shall be designed and manufactured according to world-class quality standards. The manufacturer shall be ISO 9001 certified.

### **10.3.1.3 Fan section**

Units shall be with Direct Driven EC Fans, High efficiency, external rotor electronically commutated (EC) motor with integrated electronics, True soft start characteristics (inrush current lower than operating current), Backward curve, corrosion resistant aluminium fan wheel, Maintenance free design and construction. The fan section shall be designed for higher air flow. The fan shall be protected over temperature of motor, electronics, locked rotor protection, short circuit of motor output. Fans are IP54, Protection class F.

### **10.3.1.4 Cabinet and Frame**

The unit shall be powder painted steel panels with min 10mm insulation. It shall have suitable enclosure for high voltage components. The frame shall be painted with a powder coat finish to protect against corrosion. The unit is to be totally front and rear accessible including any component removal. Unit shall be provided with castors and levelling feet for an easy unit placement into the row of racks.

### **10.3.1.5 Air Filtration**

Room air to be filtered with filters rated MERV8 following ASHRAE 52.2 (45% by ASHRAE 52.1) or G4 following EN779, located within the cabinet, and accessible from the rear of the unit. Frame of the filter shall be made of galvanized steel.

Clogged filter alarm shall be a standard feature.

### **10.3.1.6 Microprocessor Controller**

The controller is microprocessor based. It consists of the Main Board and a distributed intelligence of devices able to collect thermodynamically data (sensors) and activation of refrigerant circuit components (compressors, valves, etc.)

Unit utilises multiple temperature sensors placed at the rack inlet, to ensure management and control of temperature by rack. Each cold aisle should be connected up to 3-10 sensors.

The controller allows setting and monitoring of the following space parameters:

- Air inlet Temperature
- Air supply Temperature (remote sensors at rack inlet)
- Return Temperature set-point
- Supply Temperature set-point
- Return Temperature band
- Supply Temperature band
- Humidity (inlet)
- Humidity set-point
- Humidity band
- Rack Min, Max and Average temperature

The example of available warnings / alarms:

- High supply temperature
- Low supply temperature
- High return humidity
- Low return humidity
- Loss of airflow

- Compressor Low Pressure
- Compressor High Pressure
- High CW Temperature
- Loss of CW flow
- Electrical heater high temperature (When applicable)
- Clogged filter
- Customer input (No 4 inputs)
- LP transducer fail
- Call service (customer input)
- High temperature (customer input)
- Unit hours exceeded
- Compressor hours exceed
- Humidifier hours exceed
- Supply sensor failure
- Network failure
- Humidifier problem
- high temperature
- Smoke detected
- Fire alarm & Rack sensor failure

Following features to be incorporated in the controller:

- Status Report of the latest 200 event messages of the unit.
- Input for remote on-off and volt-free contacts for simple remote monitoring of low and high priority alarms: high/low temperature, high/low refrigerant pressure, fan/control failure, compressor/control failure and others are available
- LAN management: functions provided as standard include stand-by (in case of failure of the unit in operation, the second one starts automatically), and automatic rotation.
- Automatic restart after a power failure.

#### **10.3.1.7 Monitoring**

Suitable provision to be made for SNMP/Modbus connectivity.

The unit shall also include input for remote on-off and volt-free contacts for simple remote monitoring of low and high priority alarms: high/low temperature, high/low refrigerant pressure, fan/control failure, compressor/control failure and others are available.

#### **10.3.1.8 Electric Re-Heating**

The heating resistors shall be of rigid design for extended operational life and are normally utilised to maintain room dry-bulb conditions during a system call for dehumidification. The heating system also to incorporate Miniature Circuit Breaker which protect the heaters from short circuits, should the harness be damaged accidentally. Electrical re-heat can be disabled by remote contact (Optional - humidifier and reheat lockout).

#### **10.3.1.9 Humidifier**

The unit to be fitted with a canister type steam humidifier suitable for use with water of varying degrees of hardness, provided that the water is not treated or demineralised (Conductivity range 125-500 $\mu$ S/cm). The humidifier is complete with a water inlet valve, water outlet valve and a maximum water level sensor, disposable cylinder, steam distributor and electronic controls.

Humidifier control shall be of the ON-OFF type, can be also disabled by remote contact (Optional - humidifier and reheat lockout).

## **10.4 Safety and Security Systems**

### **10.4.1 Fire Alarm System**

Fire Alarm system with addressable devices shall be provided for the Data Centre in the 2<sup>nd</sup> Floor adhering to NFPA standards. Cross zoning shall be done for activation of the Fire Suppression System. The successful bidder shall integrate the 2<sup>nd</sup> floor Data Centre Fire Alarm Panel with 3<sup>rd</sup> floor Data Centre Fire Alarm Panel.

The Fire Alarm System supplier shall furnish and install a fully integrated Fire Detection & Alarm System for the Data Centre wherein all the sensors, modules, devices are to be installed in all areas and voids to cover the Data Centre.

This section of the specification includes the furnishing, installation, and connection of a microprocessor controlled, analog addressable, intelligent fire alarm equipment required to form a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, auxiliary control devices, annunciators, power supplies, and wiring.

- The Panel shall be interface with 3<sup>rd</sup> floor FACP.
- Each designated zone shall transmit separate and different alarm, supervisory and trouble signals to the Central Monitoring Station.
- The system shall also support independent gas release circuits for activation of Fire Suppression system. The system shall include hardware, modules to facilitate cross zoning of specific sensors, abort release functions, time delay and inputs for pressure switch and 24V output for solenoid operation.
- The panel shall be capable to further extend fire and fault output to the BMS for critical alarm monitoring, and it shall be possible to connect an interface card for open Protocol based (Commonly BACnet, Modbus or equivalent) output to enable a software level integration with the BMS System.
- 15% spare capacity has to be factored in the loop for future expansion.

#### **10.4.1.1 General**

- The control panel, to be intelligent device addressable, analog detecting, low voltage and modular, with digital communication techniques, in full compliance with all applicable codes and standards. The features and capacities described in this specification are required as a minimum for this project and shall be furnished by the successful System Integrator.
- The system shall be in full compliance with National and Local Codes.
- The system shall include all required hardware, interconnecting wiring and software to accomplish the requirements of this specification and the contract drawings, whether or not specifically itemized herein.
- All equipment furnished shall be new and the latest state of the art products of a single manufacturer, engaged in the manufacturing and sale of intelligent fire detection devices.
- The system as specified shall be supplied, installed, tested and approved by the local Authority Having Jurisdiction, and turned over to the owner in an operational condition.

#### **10.4.1.2 Standards & Codes**

The publications listed below form a part of this publication to the extent referenced. The publications are referenced in the text by the basic designation only. The latest version of each

listed publication shall be used as a guide unless the Authority Having Jurisdiction has adopted an earlier version.

- UL/FM/EN approved. Manufacturer's Representative

Provide the services of a factory trained and certified representative or technician, experienced in the installation and operation, maintenance and service of the type of system provided. The technician shall supervise installation, software documentation, adjustment, preliminary testing, final testing and certification of the system. The technician shall provide the required instruction to the owner's personnel in the system operation, maintenance and programming.

#### **10.4.1.3 System Requirements**

The system shall be a complete, electrically supervised fire detection and notification system, microprocessor-based operating system having the following; capabilities, features and capacities:

- Communication between network nodes, each supporting an interactive, self-standing, intelligent local control panel, with system wide displays.
- The local system shall provide status indicators and control switches for all of the following functions:
  - ✓ Audible and visual notification alarm circuit zone control.
  - ✓ Status indicators for sprinkling system water-flow and valve supervisory devices.
  - ✓ Any additional status or control functions as indicated on the drawings, including but not limited to; emergency generator functions, fire pump functions, door unlocking and security with bypass capabilities.
  - ✓ Each intelligent addressable device or conventional zone on the system shall be displayed at fire alarm control panel by a unique alphanumeric label identifying its location.

#### **10.4.1.4 System Operation**

Activation of any system fire, security, supervisory, trouble, or status initiating device shall cause the following actions and indication to display in the panel.

#### **10.4.1.5 Fire Alarm Condition**

- Sound an audible alarm and display a custom screen/message defining the building in alarm and the specific alarm point initiating the alarm in a graphic display. The display shall provide standard NFPA graphical symbols indicating hazardous materials and personnel situations critical to situation management. ICONs must conform to NFPA standard 170 formats. The system shall supply a simple building floor plan and icons representing alarm devices in off normal or alarm condition.
- Log to the system history archives all activity pertaining to the alarm condition.
- Print to system printer (where required) alarm condition information.
- Sound the ANSI 117-1 signal with synchronized audibles and synchronized strobes throughout the facility.
- Audible signals shall be silenced from the fire alarm control panel by an alarm silence switch. Visual signals shall be programmable to flash until system reset or alarm silencing, as required.

#### **10.4.1.6 Supervisory Condition**

- Display the origin of the supervisory condition report at the local fire alarm control panel LCD display.
- Activate supervisory audible and dedicated visual signal.

- Audible signals shall be silenced from the control panel by the supervisory acknowledge switch.
- Record within system history the initiating device and time of occurrence of the event.
- Print to the system printer (where required) the supervisory condition.

#### **10.4.1.7 Trouble Condition**

- Display at the local fire alarm control panel LCD display, the origin of the trouble condition report.
- Activate trouble audible and visual signals at the control panel and as indicated on the drawings.
- Audible signals shall be silenced from the fire alarm control panel by a trouble acknowledge switch.
- Record within system history, the occurrence of the event, the time of occurrence and the device initiating the event.
- Print to the system printer (where required) the trouble condition.

#### **10.4.1.8 Control Panel**

- The fire alarm control panel shall be microprocessor based using the multiple microprocessors throughout the system providing rapid processing of smoke detector and other initiation device information to control system output functions. Either operating interface unit provides multi-use capability for each end-user to efficiently 'Acknowledge' events; to quickly control the NACs of the FACP, and to permit a manual reset of the respective system. Detailed information about the nature and location of the events can also be displayed, via a backlit LCD screen and navigation push buttons at the top of the FACP.
- The basic system shall have capabilities for 252 intelligent initiation devices in loop. The system shall employ a flexible number of detection input loops to reach maximum system capacity. Systems which, have a fixed number of device addresses per node based on a fixed number of device circuits (loops) shall provide 20% of loop maximum spare capacity on all loops to meet this requirement. The programming software for the 252 / 504-point fire systems is held in flash electrically erasable programmable read-only memory (EEPROM).
- The Device Loop Card shall be capable of maximum 252 intelligent devices distributed between two SLC circuits. Any trouble on one circuit shall not affect the other circuit. This module controls the signalling from the initiation devices reporting alarms and troubles to the control panel. This module shall also provide the signalling to the field devices for controlling the output of specific initiation devices. The circuit shall be capable of being connected with polarity insensitive intelligent initiation devices. The circuits shall have the ability to be wired, Style 4 or Style 6. Any of all of the 252 devices on the loop card shall be capable of activating up to two devices (relay base, audible base or remote lamps). These accessories shall not take away from the 252 addresses available in loop. Systems which, require unique addresses for SLC circuit accessories (remote relays, relay bases, audible bases and remote lamps) shall provide 20% spare capacity for each loop to provide for system expansion. The on board microprocessor provides the loop card with the ability to function even if the main microprocessor fails.
- The Signal Line Circuits shall be tested for opens, shorts, ground faults, device status and multiple device response (2 devices at same address) and communications with all addressable devices installed before connection to the control panel. Systems without this capability shall have a test panel installed for initial testing to eliminate any possible damage short term or long term to the control panel. After initial testing replace the test panel and proceed with complete testing.
- The Network Interface Card shall provide communication between enclosures.

- The Controllable Relay Card shall provide 6 programmable relays. Each relay shall have SPDT contacts rated at 4 amps at 30VDC/120VAC resistive and 3.5 amps, 120VAC inductive. The card shall have as a minimum the following diagnostic LED's; Reset, Power, Card Fail, 24V Fail, Relay 1, Relay2, Relay3, Relay 4, Relay5, Relay6.
- Where required to monitor a large amount of relays, such as monitoring subsystems or normally open contact devices, provide a Supervised Input Module, which will monitor up to 16 inputs. Each input shall be individually programmed for supervised or non-supervised circuits. This module shall be connected to a system network. The module shall contain 2 programmable form "C" relays for control of the monitored subsystem.
- Where required for control of relays or LED's the Output control Module shall provide 16 open collector outputs to operate LED's, incandescent lamps or relays as needed. The module shall contain a local audible output, Lamp Test and local audible silence. All circuits shall be power limited.
- The system card cage shall provide the mounting of all system cards, field wiring, and panel's inter-card wiring. The terminal strips for the cards shall be color-coded to eliminate the possibility of making the wrong connection. The terminal blocks maybe disconnected and reconnected while the system is powered up without causing any difficulties. All power limited field wiring shall connect to the top of the card cage. All non-power limited internal wiring shall be connected to the bottom of the card cage. The card cage shall hold the systems cards and have capability of connecting multiple card cages to meet system demands.
- System response time from alarm to output shall not exceed four (4) seconds.
- To expedite system troubleshooting, the system cards shall have ground fault detection, and diagnostic LED's by card.
- All system cards and modules shall have Flash memory for downloading the latest module firmware.

#### **10.4.1.9 Power Supply**

- All functions are supported by suitable power supplies.

#### **10.4.1.10 System Enclosures**

Provide the enclosure needed to hold all the cards and modules as specified. The enclosures shall be either black or red. The outer doors shall be capable of being a left hand open or a right hand open. The inner door shall have a left hand opening. System enclosure doors shall provide where required ventilation for the modules or cards in the enclosure.

#### **10.4.1.11 Intelligent Initiation Devices**

All initiation devices shall be insensitive to initiating loop polarity. Specifically, the devices shall be insensitive to plus/minus voltage connections on either Style 4 or Style 6 circuits.

The smoke detector shall be an intelligent digital photoelectric detector with a programmable heat detector. Detectors shall be listed for use as open area protective coverage, in duct installation and duct sampling assembly installation and shall be insensitive to air velocity changes. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds. Detectors shall be programmable as application specific, selected in software for a minimum of eleven environmental fire profiles unique to the installed location. These fire profiles shall eliminate the possibility of false indications caused by dust, moisture, RFI/EMI, chemical fumes and air movement while factoring in conditions of ambient temperature rise, obscuration rate changes and hot/cold smoke phenomenon into the alarm decision to give the earliest possible real alarm

condition report. The intelligent smoke detector shall be capable of providing three distinct outputs from the control panel. The system-controlled output functions shall be from an individual or unique input of smoke obscuration, a thermal condition or a combination of obscuration and thermal conditions. The detector shall be designed to eliminate calibration errors associated with field cleaning of the chamber. The detector shall support the use of a relay and LED remote indicator at the same time. Low profile, white case shall not exceed 2.5 inches of extension below the finish ceiling. Detector wiring shall not require any special shielded cable.

Thermal Detectors shall be rated at 135°F fixed temperature and 15° per minute rate of rise. Detectors shall be constructed to compensate for the thermal lag inherent in conventional type detectors due to the thermal mass, and alarm at the set point of 135° Fahrenheit. The choice of alarm reporting as a fixed temperature detector or a combination of fixed and rate of rise shall be made in system software and be changeable at any time without the necessity of hardware replacement. The detectors shall be installed according to the requirements of NFPA 72 for open area coverage.

The smoke detector shall be an intelligent digital photoelectric detector with a programmable heat detector. Detectors shall be listed for use as open area protective coverage, in duct installation and sampling assembly installation and shall be insensitive to air velocity changes. The detector communications shall allow the detector to provide alarm input to the system and alarm output from the system within four (4) seconds. The detector shall be mounted in a duct detector housing listed for that purpose. The duct detector shall support the use of a remote test switch, relay or LED remote indicator. The duct detector shall be supplied with the appropriate sampling tubes to fit the installation. Where duct detectors are exposed to the weather provide a weatherproof enclosure.

Detector bases shall be low profile twist lock type with screw clamp terminals and self-wiping contacts. Bases shall be installed on an industry standard, 4" square or octagonal electrical outlet box.

Where selective localized control of electrical devices is required for system operation, furnish and install detector base with software programmed addressable relay integral to the base. The relay shall switch electrical loads within relay ratings, as indicated on the drawings. Operation of the addressable control circuit shall be independent of the number of detectors and relays on the circuit or the number in an alarm state. Relay bases shall be rated for resistive or inductive load (120VAC or 30VDC) 3 amps.

Where indicated on the drawings, furnish detector base with integral approved audible evacuation alarm signal having an output of 85db. The audible signal shall be individually addressable and software programmed for operation.

Provide single action addressable manual stations where shown on the drawings, to be flush or surface mounted as required. Manual stations shall contain the intelligence for reporting address, identity, alarm and trouble to the fire alarm control panel. The manual station communications shall allow the station to provide alarm input to the system and alarm output from the system within less than four (4) seconds. The manual station shall be equipped with terminal strip and pressure style screw terminals for the connection of field wiring. Surface

mounted stations where indicated on the drawings shall be mounted using a manufacturer's prescribed matching red enamel outlet box.

Addressable Interface Devices shall be provided to monitor contacts for such items as water-flow, tamper, and PIV switches connected to the fire alarm system. These interface devices shall be able to monitor a single or dual contacts. An address will be provided for each device and all physical devices shall require only one address on a signaling line circuit regardless of the number of circuits on an individual module. Where remote supervised relay is required the interface shall be equipped with a SPDT relay rated for 4 amps resistive and 3.5 amps inductive.

#### **10.4.1.12 Notification Appliances**

- The Horn or horn/strobe appliance as indicated on the drawings shall be a synchronized temporal horn with a synchronized strobe light with multiple candela taps to meet the intended application. The appliance shall be red or white as indicated on the drawings. The strobe light taps shall be adjustable for 15/75, 30/75, 75, and 110 candela. The appliance shall be red for wall mounted and white for ceiling mounted. Ceiling mounted appliances shall be rated for that application.
- The electronic chime or chime/strobe as indicated on the drawings shall be a speaker with a tone card and have an adjustable range of 700 to 1300 Hz. The chime or chime/strobe shall be adjustable for either single stroke or continuous operation. The chime/strobe shall be available with adjustable strobe intensities of 15, 30, 75, and 110 candela. The appliance shall be red for wall mounted and white for ceiling mounted. Ceiling mounted appliances shall be rated for that application.
- The strobe only appliance as indicated on the drawings shall be a synchronized strobe light with multiple candela taps to meet the intended application. The strobe light taps shall be adjustable for 15, 30, 75, and 110 candela. The appliance shall be red for wall mounting and white for ceiling mounted. Ceiling mounted appliances shall be rated for that application.
- Where required provide a 10" bell where indicated on drawings to be connected to a non-silence-able circuit for activation of the sprinkler system.
- An alarm extender panel shall be provided where needed. The power supply shall be a minimum of 6 amps. The power supply shall contain four supervised notification circuits maximum of 3 amps each circuit. The power supply shall contain built-in synchronizing modules for strobes and audibles. There shall be a 3 amp filtered auxiliary power limited output. There shall be a minimum of 8 options as to the operations of the inputs and outputs.

#### **10.4.1.13 Installation**

- Perform work in accordance with the requirements of NFPA 70 and NFPA 72.
- Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.
- limited energy cable installation is allowed under Div. 16, all cable runs shall be run at right angles to building walls, supported from structure at intervals not exceeding 3 feet and where installed in environmental air plenums, be rated for such use and tied/supported by components listed for environmental air plenums installation.

#### **10.4.1.14 Boxes, Enclosures and Wiring Devices:**

- Boxes shall be installed plumb and firmly in position.
- Extension rings with blank covers shall be installed on junction boxes where required.
- Junction boxes served by concealed conduit shall be flush mounted.

- Upon initial installation, all wiring outlets, junction, pull and outlet boxes shall have dust covers installed. Dust covers shall not be removed until wiring installation when permanent dust covers or devices are installed.
- "Fire Alarm System" decal or silk-screened label shall be applied to all junction box covers.

#### **10.4.1.15 Conductors**

- Each conductor shall be identified as shown on the drawings at each with wire markers at terminal points. Attach permanent wire markers within 2 inches of the wire termination. Marker legends shall be visible.
- All wiring shall be supplied and installed in compliance with the requirements of the National Electric Code, NFPA 70, Article 760, and that of the manufacturer.
- Wiring for strobe and audible circuits shall be a minimum 14 AWG, signal line circuits shall be minimum 18 AWG.
- All splices shall be made using solderless connectors. All connectors shall be installed in conformance with the manufacturer recommendations.
- Crimp-on type spade lugs shall be used for terminations of stranded conductors to binder screw or stud type terminals. Spade lugs shall have upset legs and insulation sleeves sized for the conductors.
- Permanently label or mark each conductor at both ends with permanent alphanumeric wire markers.
- A consistent color code for fire alarm system conductors throughout the installation.
- The installation contractor shall submit for approval prior to installation of wire, a proposed color code for system conductors to allow rapid identification of circuit types.
- Wiring within sub panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.

#### **10.4.1.16 Devices**

- Relays and other devices to be mounted in auxiliary panels are to be securely fastened to avoid false indications and failures due to shock or vibration.
- Wiring within sub-panels shall be arranged and routed to allow accessibility to equipment for adjustment and maintenance.
- All devices and appliances shall be mounted to or in an approved electrical box.
- Certificate of Compliance
- Complete and submit to the Project Engineer in accordance with NFPA 72, 1999 edition section 1-6.2.

### **10.4.2 Very Early Detection System (VESDA) & Aspiration System**

VESDA or Aspiration System shall be provided for the Server Room & Electrical Rooms. The entire installation shall be installed to comply one or more of the following codes and standards:

- NFPA Standards, US
- British Standards, BS 5839 part :1 and BS 6266
- (UK) - FIA Code of Practice for Design, Installation, Commissioning & Maintenance of Aspirating Smoke Detector (ASD) Systems – Issue 3 February 2012.

All the equipment shall be designed, tested, approved, and listed by anyone:

- LPCB (Loss Prevention Certification Board), UK
- UL (Underwriters Laboratories Inc.), US
- EN 54-20 (European standards)

#### 10.4.2.1 Design Requirements

- The System shall consist of a highly sensitive LASER/LED-based smoke detector, aspirator, and filter.
- It shall have a display featuring LCD & LEDs and Reset/Isolate button. The system shall be configured by a programmer that is either integral to the system, portable or PC based.
- The system shall allow programming of:
  - ✓ Multiple Smoke Threshold Alarm Levels.
  - ✓ Time Delays.
  - ✓ Faults including airflow of each pipe, detector, power, filter block and network as well as an indication of the urgency of the fault.
  - ✓ At least 5 Configurable relay outputs for remote indication of alarm and fault Conditions.
- It shall consist of an air sampling pipe network to transport air to the detection system, supported by calculations from a computer-based design modelling tool. Maximum transport time shall not exceed 90 seconds and designed within the certification requirements of relevant approvals.

#### 10.4.2.2 Performance Requirements

- Shall provide very early smoke detection though four smoke threshold alarm levels per pipe provide multiple output levels. These levels shall be programmable and shall be able to set sensitivities ranging from 0.02 % obscuration / meter.
- Shall report any fault on the unit by using configurable fault output relays or via the graphics Software.
- Shall notify for filter contamination / blockage in holes.
- Shall incorporate a flow sensor in each pipe and provide staged airflow faults.
- Shall have a clean air supply to maintain Laser chamber clean all the time. or have a failsafe technology to verify true fire/smoke alarm conditions.

#### 10.4.2.3 Materials And Equipment

- A particle counting method shall be employed for the purposes of
  - ✓ Preventing large particles from affecting the true smoke reading.
  - ✓ Monitoring contamination of the filter (dust & dirt etc.) to notify automatically when maintenance is required.
  - ✓ Should have dual / special detection technology to distinguish between false alarm conditions resulting from ordinary dust, moisture / condensation, air currents or ambient thermal conditions.
- The detector shall not use adaptive algorithms to adjust the sensitivity from the set during commissioning. An appropriate algorithm should be incorporated to avoid any false alarms

#### 10.4.2.4 Detector Assembly

- The Detector, Filter, Aspirator and Relay Outputs shall be housed in a mounting box and shall be arranged in such a way that air is drawn continuously from the fire risk area by the Aspirator and a sample passed through the Filter and then to the detector.
- The detector shall be LASER/LED-based and shall have an obscuration sensitivity range of 0.005 – 20% obscuration per meter.
- The detector shall have four independent field programmable smoke alarm thresholds across its sensitivity range
- The Detector shall also incorporate facilities to transmit the following faults
  - ✓ Detector
  - ✓ Airflow per pipe

- ✓ Filter
- ✓ System
- ✓ Zone
- ✓ Network
- ✓ Power faults
- The detector shall have multiple pipe inlets which must contain a flow sensor. Both Minor and Urgent flow faults shall be reported. All channels should be capable of giving pipe wise alarms and should be site expendable up to 4 channels.
- The filter must be a disposable type filter cartridge.
- The aspirator shall be a purpose-designed rotary air pump. It shall be capable of allowing/ supporting for a single pipe run / multiple sampling pipe runs with a transport time of less than 120 seconds.
- The Assembly must contain at least 5 relays for fire alarm and fault conditions. The relays shall be software programmable (latching or non-latching). The relays must be rated at 2 A at 30V DC.
- The Assembly shall have built-in event and smoke logging. It shall store smoke levels, alarm conditions, operator actions and faults. The date and time of each event shall be recorded. Each detector (Zone) shall be capable of storing up to minimum 18,000 events.

#### **10.4.2.5 Displays On The Detector Assembly**

The detector shall have a LED and LCD for the multiple alarm threshold levels indicated and faults such as detector fault, airflow fault and indication for Isolate and Reset.

##### **10.4.2.5.1 Programmers**

- When required, a Programmer module may be located within the detector, a remote mounting box, or in a portable hand-held unit.
- Each Programmer at a minimum shall support the following features:
  - ✓ Programming of any device on the system.
  - ✓ Viewing of the status of any device in the system.
  - ✓ Adjustment of the alarm thresholds of a nominated detector.
  - ✓ Setting of Day/night, weekend and holiday sensitivity threshold settings.
  - ✓ Multi-level password control.
  - ✓ To Program latching or non-latching relay operation.
  - ✓ To Program energizing or de-energizing relays.
  - ✓ To Program high and low flow settings for airflow supervision.
  - ✓ To Program aspirator speed control.
  - ✓ To Program maintenance intervals.
  - ✓ Testing of relays assigned to a specific zone to aid commissioning.

##### **10.4.2.5.2 Network**

- The devices in the smoke detection system shall be capable of communicating with each other via twisted pair RS485 cable and have in built TCP / IP network interface. The network shall be able to support up to 250 devices (detectors, displays units and programmers), of which at least 100 detectors can be supported.
- The network shall be capable of being configured in a fault tolerant loop for both short circuit and open circuit. Any communication faults shall be reported unambiguously and shall be clearly attributable to an individual device or wire link in the fault messages.
- PC based configuration tools shall be available to configure and manage the network of detectors.

- Digital Communication Port shall comply with EIA RS485 Protocol.

#### **10.4.2.5.3 Power Supply**

The power supply should be EN approved unit with 110/230VAC input and 18 to 29VDC output with battery backup of 24 hours.

#### **10.4.2.5.4 Sampling Pipe**

- The sampling pipe shall be smooth bore with an internal diameter between 15-25 mm. normally; pipe with an outside diameter of 25mm and internal diameter of 21mm should be used.
- The pipe material should be suitable for the environment in which it is installed, or should be the material as required by the specifying body.
- All joints in the sampling pipe must be air tight and made by using solvent cement, except at entry to the detector.
- The pipe shall be identified as Aspirating Smoke Detector Pipe along its entire length at regular intervals not exceeding the manufacturer's recommendation or that of local codes and standards.
- All pipes should be supported at not less than 1.5m centres, or that of the local codes or standards.
- The far end of each trunk or branch pipe shall be fitted an end cap and drilled with a hole appropriately sized to achieve the performance as specified and as calculated by the system design.

#### **10.4.2.5.5 Sampling Holes**

- Sampling Holes of 2mm, or otherwise appropriately sized holes, shall not be separated by more than the maximum distance allowable for conventional detectors as specified in the local codes & standards. Intervals may vary according to calculations.
- Each sampling point shall be identified in accordance with Codes or Standards.
- Consideration shall be given to the manufacturer's recommendations and standards in relation to the number of Sampling Points and the distance of the Sampling Points from the ceiling and roof structure and forced ventilation systems.

#### **10.4.2.5.6 Installation**

- The Contractor shall install the system in accordance with the manufacturer's recommendation.
- Where false ceilings are available, the sampling pipe shall be installed above the ceiling, and Capillary Sampling Points shall be installed on the ceiling and connected by means of a capillary tube.
- The minimum internal diameter of the Capillary tube shall be 5mm, the maximum length of the capillary tube shall be 2m unless the manufacturer in consultation with the engineer have specified otherwise.
- The Capillary tube shall terminate at a ceiling Sampling Point specifically approved by the Client. The performance characteristics of the sampling points shall be taken into account during the system design.
- Air Sampling Piping network shall be laid as per the approved pipe layout. Pipe work calculations shall be submitted with the proposed pipe layout design for approval.

### 10.4.3 Fire Suppression Systems

The bidder shall supply, install, test and put in operation NOVEC 1230 or FK-5-1-12 based fire suppression system for the following rooms:

- i. Server Rooms
- ii. Electrical Room

The fire suppression system shall include and not be limited to gas release control panel, PESCO/CCOE approved seamless cylinders, discharge valve (with solenoid or pneumatic actuator) as the case may be, discharge pipe, non-return valve and all other accessories required to provide a complete operation system meeting applicable requirements of NFPA 2001 or ISO standards and installed in compliance with all applicable requirements of the local codes and standards.

The system design should be based on the specifications contained herein, NFPA 2001 & in accordance with the requirements specified in the design manual of the agent. The bidder shall confirm compliance to the above along with their bid.

The system shall be properly filled and supplied by an approved OEM (Original Equipment Manufacturer)

Generally the key components of the system shall be FM/UL listed. The NOVEC 1230 gas shall:

- i. Comply with NFPA 2001 or ISO 14520 standard have the approval from US EPA (Environmental Protection Agency) for use as a total flooding fire extinguishant for the protection of occupied space:
- ii. Be given Underwriters' Laboratories Inc. (ULI, USA) component listing for the NOVEC 1230 or FK-5-1-12 gaseous agent.
- iii. Must have zero ozone depletion potential (ODP);
- iv. Have a short life span in the atmosphere, with atmospheric lifetime of less than 5 days
- v. Be efficient, effective and does not require excessive space and high pressure for storage; Commercially available

\*Key components are valves and its accessories, actuators, flexible discharge and connection hoses, check valves, pressure switch, and nozzles

#### 10.4.3.1 Design Condition

The hazard space volumes shall be protected from a common central or individual supply, the cylinder bank or individual cylinder system, with corresponding pipes and nozzle system. The individual zone/ system shall be dimensioned to give a complete discharge of the agent in less than 10 seconds into the affected zone. The software calculation shall be approved FM / UL. The discharge time shall not exceed 10 seconds. After end of discharge (10s) a homogeneous NOVEC 1230 concentration shall be built-up in the room.

The design concentration shall follow ISO 14520 or at minimum NFPA 2001 for under floor, room and ceiling space. Unless otherwise approved, room temperature for air-conditioned space shall be taken around 20°C. For non-air-conditioned space, the temperature shall be taken around ambient temperature. The system shall be designed with minimum design concentration of 4.5 % as per NFPA and applicable to Class-A & C fire.

All voids within each hazard shall be discharged simultaneously. Each hazard shall have an independent system, unless otherwise specifically stated.

The system engineering company should carry out the piping Isometric design and validate the same with a hydraulic flow calculation generated by using the agent's design software. Appropriate fill density to be arrived at based on the same.

The system shall be so designed that a fire condition in any one protected area shall actuate automatically the total flooding of clean agent in that area independently. The entire system shall incorporate inter-alia detection, audible and visual alarms, actuation and extinguishing.

#### **10.4.3.2 Clean Agent Supply System**

The extinguishing agent shall be NOVEC 1230 with physical properties conforming to NFPA Standard 2001/ new release of NFPA edition/amendment.

Each zone to be protected by the Total Flooding System shall be capable of being flooded independently of the other.

#### **10.4.3.3 Re-Filling and Maintenance**

In case of any leakage or accidental discharge of the agent, it should be possible to re-fill the cylinders in India itself. The contractor should indicate the source of re-filling and the time that will be taken for re-filling and replacement.

#### **10.4.3.4 Storage of Extinguishing Agent**

- The agent shall be stored in liquid form at ambient temperature in high-pressure seamless cylinder containers designed for the purpose. The cylinder shall be high pressure, seamless, flat type and concave bottom.
- As per the regulations of the Chief Controller of Explosive (CCE) Nagpur, any system which has a working pressure above 19 bar will require the use of seamless cylinders that have been duly approved by the CCE, Nagpur.
- Each cylinder shall have its own built-in pressure safety relief valves and shall also be equipped with pressure gauge to indicate the pressure of its content.
- The cylinders shall be super-pressurized with dry Nitrogen to 25 Bar. The cylinder shall be capable of withstanding any temperature between -30° C and 70° C.
- All cylinders shall be distinctly and permanently marked with the quantity of agent contained, the empty cylinder weight, the pressurization pressure and the zones they are protecting.
- All cylinders shall be adequately mounted and supported in a manner to facilitate individual servicing or content weighing.
- Cylinders installed shall be of the same size where possible and the manifold shall be provided with non-return or check valves to prevent back flow when any cylinder is being removed for maintenance.

#### **10.4.3.5 Piping and Fittings**

All piping shall be Schedule 40 seamless pipes complying with grade B and all fitting shall be of ASTM A-105.

#### **10.4.3.6 Discharge Nozzles**

Discharge nozzles shall be manufactured in corrosion resistant material and shall be positioned in a manner to affect a uniform concentration at the shortest time after discharge. Each nozzle shall be able to cover a height of 5m effectively.

#### **10.4.3.7 Detection**

The detection part shall consist of the installation of an adequate number of smoke detectors strategically positioned for the early detection of smoke, and/or products of combustion. All detectors shall be ULI, FMRC and/or LPC approved. The detection of smoke by such detectors shall immediately set off an audible alarm at the control unit and visual indication of the zone where smoke has been detected.

The detectors in each zone protected by Total Flooding System shall be wired on a DUAL RISK CIRCUIT basis. The actuation of one detector in a zone shall not be sufficient to cause the discharge of the agent. The agent shall only be actuated to discharge on activation of another adjacent detector in that zone.

The signal from the second activated detector within the particular zone protected by the Total Flooding System shall after a time delay activate the agent release device of the Total Flooding System. The time-delay circuit shall have a delay period adjustable from zero second to 180 seconds.

#### **10.4.3.8 Documentation**

The bidder shall submit copies of the datasheets of the hardware used in the system. The bidder shall also submit copy of CCE approval letter for the cylinder proposed to be used.

The bidder shall also submit calculations to evidence the qty of agent considered for the system.

The successful vendor must submit, along with the supply invoice, a certificate of authenticity, for the agent from the system engineering company duly checked and verified by distributor.

The system engineering company should provide, as part of the handing over, the As-built drawings and Operation & Maintenance manual.

#### **10.4.3.9 Novec 1230 or FK-5-1-12 gaseous based Fire Suppression system**

- Design & execution need to be complied with NFPA & local safety standards. System Integrator to mention the listing or approval for overall system & equipment's.
- System Integrator to submit all type of certificates for design, equipment's & accessories.
- System Integrator to submit the OEM cylinder ref & gas filling certificates.
- System Integrator to submit the necessary certificates for Cylinders, accessories.
- System Integrator to deploy trained & skilled personnel for the execution of job.
- System Integrator to highlight any system limitations, Pre requirements from client. System Integrator to submit solution write up etc., along with quote.
- System Integrator to submit system schematic with operation philosophy.
- System Integrator to confirm the pressure at nozzle while release of gas.
- Pressure gauges & pressure switches at individual cylinders
- Low Pressure alarm of cylinder bank / cylinders to be integrated in FAS / BMS
- The Manual operation (Release / Abort), alert indications with signage's on the door of protected rooms will be provided & controlled by System Integrator's control panel.

- In FSS Control Panel- Complete with Gas Release Module, Timer 0-120 sec delay config, Gas Release Indication, Abort Switch, Manual Release Switch, Auto-Manual Selector Switch with Stand-by Battery & Battery Charger, additional I/O's for integration & controls of warning sign, hooters etc.
- The Manual release & Abort switches to install in red colour powder coated MS make enclosure, front with glass, hammer, key lock, etc.
- System Integrator to clean the internal piping through pressurized nitrogen gas before final testing of system. Also need to carried out Pipe & Manifold test leak & strengthening test.
- The Fire suppression solution/ system life requires min 10 years. Company to provide support/maintenance for entire system min 10 years post commissioning.
- In warranty & AMC period System Integrator to follow RailTel SLA for response & resolution time.
- Refilling of fire suppression gas shall be cover under contract for Top ups.
- If the gas is released because of manual error by System Integrator the refilling will be done by System Integrator (total cost), any gas release due to fire/incident the refilling will be done at extra cost on PO confirmation. Cylinder refilling include transportation (if needed) & System Integrator to make system operational within max 10 days working
- Before handover the system to Operations, OEM visit is must to verify the execution quality of overall system.
- Training to Operations team preferred from OEM or his representative

The successful System integrator shall perform room integrity pressure test for the rooms where fire suppression system is installed.

#### **10.4.4 Access Control System**

Proposed Door Controllers shall integrate with existing ACS software.

The scope of work for Access Control System is to supply, installation, commission of Card Readers, Biometric devices, IP based door controller, door modules, electromagnetic locks, door position sensors, break glass units and necessary cabling. The successful bidder shall configure the Door Controllers to the existing Access control system.

Server Room shall be provided with fingerprint scanner-based entry and smart card reader for exit. Fingerprint scanner shall be provided.

All the other doors of the Data Centre shall have smart card based reader for entry and exit. Licenses for integration of the door controllers to the existing ACS have to be factored.

##### **10.4.4.1 Intelligent System Controllers**

The system shall be configured with the ACS software connected via an Ethernet link to any configurable number of Intelligent System Controllers.

##### **10.4.4.2 Distributed intelligence**

The system shall employ a distributed architecture so that all access decisions are made locally at the Intelligent System Controller (ISC). All decisions to grant access shall be made by the local ISC.

An Intelligent System Controller (ISC) shall link the ACS software to all other field hardware. It shall provide full distributed processing for access control and alarm monitoring operations. Access levels, hardware configurations and programmed alarm outputs assigned at the

administrative workstation shall be downloaded immediately to the ACS software. All access granted/denied decisions shall be made at the ISC to provide fast responses to card reader transactions.

The IP controller is connected to an Internet/Intranet network which allows for communication with the Access Software system and can be configured through the Components dialog in ACS integrated Configuration Client.

#### **10.4.4.3 Single Door/ Two reader IP controller**

- 2 OSDP/Weigand Readers: Controller for one or 2 doors (depending on configuration)
- 4 Monitored or Unmonitored Inputs: Connect for up to 2 x OSDP/Weigand card readers
- 2 Relay Outputs
- 4 Open-collector Outputs
- 1 general-purpose FLN bus to connect to IPM, OPM and 8IO devices
- Capacity for at least 500,000 users (configurable)
- 4 inputs and 6 outputs, of which 2 are relay outputs

#### **10.4.4.4 Housings & equipment tamper switches**

All access control hardware components shall be housed in a lockable metal cabinet that is fitted with equipment tamper switches and meets the appropriate environmental requirements. There are two types of tamper switches: Opening the lid

#### **10.4.4.5 Removing unit from the wall**

The wall tamper requires that the unit is properly fixed to wall with a screw. If the unit is removed, the plastic plug (which presses on the tamper switch) breaks, and the tamper alarm becomes active.

#### **10.4.4.6 Communications**

The system shall use TCP/IP communications techniques over Ethernet, whilst employing proprietary communications protocols. The encryption between the ACS host and each ISC shall use implementation of the Advanced Encryption Standard (AES) to encrypt all messages and ensure data security.

#### **10.4.4.7 ACS communications**

- The connection between the ACS Server and each MMI workstation shall use standard Ethernet communications.
- The communications protocol to transfer messages to or from the ACS Server to any MMI workstation in the system shall be of a proprietary nature to the manufacturer providing the highest level of security.
- In addition, the communications protocol shall allow an encryption mechanism to be configured, that ensures the transfer of data cannot be interpreted.

#### **10.4.4.8 ACS / ISC communications**

- The connection between the ACS Host and the ISCs shall use standard Ethernet communications. All communications between the ISCs and sub-devices shall be based upon the standard RS485 transmission techniques using a proprietary protocol.
- The communications protocol to transfer messages to or from the ACS Host to any ISC in the system shall be of a proprietary nature to the manufacturer providing the highest level of security.

- In addition, the communications protocol shall incorporate an error checking routine that checks the integrity of the messages that are transferred on this line.

#### **10.4.4.9 ISC communications**

- The connection between an ISC and a series of entry devices using Reader Interface Modules (RIMs), or system extension boards shall use standard RS485 communications techniques. The communications protocol to transfer messages to or from the ISC to any connected device shall be of a proprietary nature to the manufacturer providing the highest level of security possible.
- In addition, the communications protocol shall incorporate an error checking routine that checks the integrity of the messages that are transferred on this line.
- Each ISC shall be capable of communicating with at least 96 of these devices at any one time, using four separate channels to co-ordinate the communications process and share the load across different channels.

#### **10.4.5 IP Based CCTV Surveillance System**

The work under this system shall consist of design, supply, installation, testing, training & handing over of all materials, equipment and appliances and labour necessary to commission the said system. The True IP Based CCTV System shall comprise of fixed dome indoor cameras, varifocal cameras, power supply units, monitoring stations, Surveillance software, storage devices and other associated accessories. It shall also include cabling, necessary for installation of the system as indicated in the specification and Bill of Quantities. storage capacity shall be for 90 days for the video feeds for the cameras in 3<sup>rd</sup> floor and 2<sup>nd</sup> floor. . Any openings/chasing in the wall/ceiling required for the installation shall be made good in appropriate manner.

##### **10.4.5.1 System Design and Architecture**

CCTV system should be designed such as to cover the strategic locations and sensitive areas of High-end cameras with Night sense feature to be installed for this outdoor application. All Fixed domes shall be rugged and shall be weatherproof as per specifications. Also, the systems should utilize only industry standard protocol.

General positioning of the cameras are in the Entrance of DC facility, all access entry doors, HVAC outdoor unit monitoring, corridors, main exits, UPS, Electrical, server rooms & Network Racks Rows can be monitored.

A digital IP-Surveillance system, images from a network camera are digitized once and they stay digital with no unnecessary conversions and no image degradation due to distance travelled over a network. In addition, digital images can be more easily stored and retrieved. By using a data connection and computer networking, IP cameras can provide much better performance with no real limitations for future growth in resolution or other capabilities.

The NVRs should allow for recording of events both continuous and motion triggered as per requirement and recordings should be able to create evidence and support post event analysis.

##### **10.4.5.2 2MP Resolution Indoor Dome Camera**

- All equipment and materials used shall be standard components that are regularly manufactured and used in the manufacturer's system.
- All systems and components shall have been thoroughly tested and proven in actual use.

Parameter	Requirement
Image Sensor	1/2.8" Progressive CMOS
Maximum Resolution	1920 x 1080 (2MP)
Lens Type	Fixed-focal
Focal Length	f = 2.8 /4/6mm
Aperture	F1.8
Field of View	113° (Horizontal)
	63° (Vertical)
	136° (Diagonal)
Shutter Time	1/5 sec. to 1/32,000 sec.
WDR Technology	WDR Enhanced
Analytics	Rule based alarms and tracking, Line crossing, Enter / leave field, Follow route, Loitering, Idle / removed object
Day/Night	Yes
Minimum Illumination	0.05 Lux @ F1.8 (Color)
	< 0.001 Lux @ F1.8 (B/W),
On-board Storage	Slot type: MicroSD/SDHC/SDXC card slot
	Seamless Recording
Video	
Compression	H.265/H.264 & MJPEG
Maximum Frame Rate	30 fps @ 1920x1080
	In both compression modes
Maximum Streams	2 simultaneous streams
S/N Ratio	47 dB
Dynamic Range	70 dB
Protocols	IPv4, IPv6, TCP/IP, HTTP, HTTPS, UPnP, RTSP/RTP/RTCP, IGMP, SMTP, FTP, DHCP, NTP, DNS, DDNS, PPPoE, CoS, QoS, SNMP, 802.1X, UDP, ICMP, ARP, SSL, TLS
Interface	10 Base-T/100 Base-TX Ethernet (RJ-45)

	*It is highly recommended to use standard CAT5e & CAT6 cables which are compliant with the 3P/ETL standard.
ONVIF	Supported, specification available at <a href="http://www.onvif.org">www.onvif.org</a>

- Ethernet : RJ-45 (10/100Base-T)
- Video Compression Format : H.265/H.264(MPEG-4 part 10/AVC), MJPEG
- Resolution : 1280x1024 / 1280x720 / 1024x768 / 800x600 / 640x480 / 320x240
- Max. Framerate
  - ✓ H264 : Max 60fps at all resolutions
  - ✓ Motion JPEG : 1280x1024 / 1280x720 / 1024x768: Max. 15 fps  
: 800x600 / 640x480 / 320x240: Max. 30fps
- Video Quality Adjustment
  - ✓ H.264 : Compression level, Target bit rate level control
  - ✓ MJPEG : Quality level control
- Bitrate Control Method
  - ✓ H.264 : CBR or VBR
  - ✓ MJPEG : VBR
- Streaming Capability : Multiple Streaming (Up to 10 Profiles)
- IP : IPv4, IPv6
- Protocol: TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL, DHCP, PPPoE, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour
- Security : HTTPS(SSL) Login Authentication, Digest Login Authentication, IP Address Filtering, User access Log 802.1x Authentication
- Streaming Method : Unicast, Multicast
- Max. User Access : 15 users at Unicast mode
- Memory Slot : SD/SDHC/SDXC motion Images recorded in the SDX/SDHC/SD memory card can be downloaded.
- ONVIF Conformance : Yes, Profile S
- Webpage Language : English, French, German, Spanish, Italian, Chinese, Korean, Russian, Japanese, Swedish, Danish, Portuguese, Turkish, Polish, Czech, Rumanian, Serbian, Dutch, Croatia, Hungary, Greek, Norwegian
- Web Viewer
  - ✓ Supported OS : Windows XP / VISTA / 7 / 8, MAC OS X 10.7
  - ✓ Supported Browser : Microsoft Internet Explorer (Ver. 7~10), Mozilla Firefox (Ver. 9~19), Google Chrome (Ver. 15~25), Apple Safari (Ver. 6.0.2(Mac OS X 10.8, 10.7 Only),\* Mac OS X Only.
  - ✓ Central Management Software : Smart Viewer 4.0

#### 10.4.5.3 Electrical

- Voltage : DC12V, PoE(IEEE802.3af, Class3)
- Consumption :Max. 9.0W (DC 12V)  
Max. 11.0W(PoE, Class3)

#### **10.4.5.4 Environmental Specifications**

- Operating Temperature : 10°C ~ +55°C (14°F ~ 131°F)
- Operating Humidity : Less than 90% RH

#### **10.4.5.5 Certifications**

- CE mark
- FCC mark

#### **10.4.5.6 Support for MJPEG, MPEG-4 SP, MPEG-4 ASP, H.264 and H.265 compression formats**

The software solution shall support H.265, H.264, MPEG-4 (both ASP and SP), and MJPEG compression formats for the video stream from all devices including analog cameras connected to encoders, DVRs, and IP cameras connected to the system.

#### **10.4.5.7 IP device brands and models directly supported via dedicated driver**

A continuously updated list of supported brands and models shall be made available by the software manufacturer.

#### **10.4.5.8 Secure HTTPS camera connectivity (on supported devices)**

The software solution shall support the use of secure Hypertext Transfer Protocol Secure (HTTPS) using Secure Sockets Layer (SSL) to establish a secure connection between supported hardware devices and the software solution.

#### **10.4.5.9 Multi-streaming (one or more live streams plus one recording stream)**

The software solution shall allow live multi-streaming from the cameras in different resolutions, formats, and frame rates.

When running a JPEG stream, it shall be possible to record less JPEG images than the amount of JPEG images retrieved in the stream, for example receive or view live 25 images and only record 5.

#### **10.4.5.10 Built-in video motion detection (VMD)**

The VMD shall be able to detect motion on key frames or at a set interval.

VMD exclusion zones shall ensure that the software solution does not detect motion in selected areas of an image.

The software solution shall make it possible to set automatic adjustable motion detection sensitivity to optimize the motion detection algorithm according to the background noise level in a video stream in changing light conditions.

The VMD shall be able to generate motion metadata.

#### **10.4.5.11 Set video motion detection per camera**

The software solution shall provide the possibility to set video motion detection on a per camera basis.

#### **10.4.5.12 Input, output and events**

The software solution shall support setting up or adding events rules or time profiles in the DVMS which shall be used for triggering actions. The DVMS shall support the following events:

- Hardware-related events (configurable or predefined)
- Device-related events (configurable or predefined)
- External events (Predefined, generic or user-defined)
- Recording server-related events
- Analytic events (video content analysis events from third-party integrations)

The DVMS shall support attaching external units, typically external sensors, to input ports on devices.

The DVMS shall support attaching external units to output ports on devices. This shall allow operators to, for example, turn on/turn off lights.

#### **10.4.5.13 Notifications**

The software solution shall make it possible to set notification profiles which shall allow email notifications to be pre-defined and automatically sent by a rule. The software solution shall support the attachment of still images (JPEG), AVI video clips and system information to the e-mail.

The software solution shall act as an SNMP agent which can generate an SNMP trap as a result of rule activation in addition to other existing rule actions.

#### **10.4.5.14 Hardware for Management & Recording**

- CPU: Intel® Core™ i3 or better.
- RAM: 16 GB or more.
- Network: Ethernet 100 Mbit or better.
- Graphics Adapter: Onboard GFX, AGP or PCI-Express, minimum 1024×768, 16-bit color or better.
- Hard Disk Space: OS -50 GB free or more. Storage- 2TB or more (depends on number of devices and recording settings).
- Operating System:
  - ✓ For Individual Servers:
    - Microsoft Windows 10 Enterprise (64 bit).
    - Microsoft Windows Server 2016 (64 bit): Essentials, Standard and Datacenter.

#### **10.4.5.15 Power cable**

The Power Cable shall be Multicore 2 core 1.5 sq mm PVC insulated and Shielded cables.

#### **10.4.5.16 Unshielded Twisted pair cable**

The unshielded twisted pair cable shall be CAT6 for connection for Camera to Switch/NVR, Server and LAN

Unshielded Twisted Pair, Category 6 Type cable.

- ✓ 24-26 AWG stranded copper conductor.
- ✓ 1 meter and 2 meter Length
- ✓ Matching colored snag-less, boot to maintain bend radius

- ✓ Plug - Clear polycarbonate Housing, Phosphor Bronze with gold plating, 50 micron" gold over nickel Terminals.
- ✓ PBT polyester Load bar.
- ✓ PVC Jacket.
- ✓ Flame Retardant Polyethylene Insulation.
- ✓ Factory standard connector End point connector.



रायल  
RAILTEL

## **10.4.6 Rodent Repellent System**

Rodent Repellent System shall be designed by using Electronic transmitters of high frequency sound waves, which will emit sound at very high decibel levels painful to pests, as described in the specification given hereunder.

The system shall consist of a Master Console, satellites and its cable circuits.

### **10.4.6.1 Master Console**

These will be Electronic transmitters of high frequency sound waves (well above the 20 KHz frequency which is the upper limit of the hearing range of the human ear) emitting sound at high decibel levels (sound pressure) that is audible and painful to pests, but inaudible and harmless to humans. The system will consist of one Master Console and twelve Satellites / Transducers. The Console will be installed in the control room, or as directed and the satellites in the problem areas as required. The powerful sound waves generated by the satellites shall be within the hearing range of many pests and cause them pain and discomfort. Satellites should be quiet and inaudible to humans.

### **10.4.6.2 Satellite**

Each satellite will cover an open floor area of approximately 300 sq. ft for an average height of the ceiling is 10 ft. As regards area of false ceilings or false floorings, it should cover an approximate area of 150 sq. ft. The satellites should

- Be able to mount in any angle to match the decor.
- Possible to install in sensitive areas.
- Should withstand high temperatures in false ceilings, and low temperatures in cold storages and air locks.
- Should not require a power connection.
- Should be able to test on an audible range with the help of a self-testing facility or any other suitable means.

### **10.4.6.3 Nature of sound waves**

The sound waves propagated should be linear sine waves with constantly varying frequencies.

### **10.4.6.4 Operating environment**

Range of  $-4^{\circ}$  C to  $60^{\circ}$  C, 100% humid environment and also under water.

### **10.4.6.5 Circuit**

- Signal generator should have full wave rectification, regulated 12V DC power supply to withstand power fluctuations ranging from 170V AC to 270V AC.
- Amplifier should have a preamplifier stage coupled with signal generator for dual transistor amplification having a push-pull configuration.

### **10.4.6.6 Pressure**

- Uniform pressure output of 80 dB to 110 dB.
- Linear propagation of mixed / variable frequencies detectable at, or about 40 ft distance from the source (Transducer/ Satellite).
- Spatial average intensity – 83mW per  $\text{cm}^2$

#### **10.4.6.7 Power Supply**

- 5A Power Socket (230 V AC) shall be provided for each Master Console.

#### **10.4.6.8 Specifications**

- Operating frequency : Above 20 KHz (Variable)
- Sound Output : 80 dB to 110 dB at 1.00 Mts.
- Power Supply : 230 V AC, 50 Hz
- Mounting : Wall / Table

#### **10.4.7 Water Leak Detection System**

Water Leak Detection System (WLDS) is required to detect and water flooding on the floor of the Data Centre. WLDS should be wire based solution with alarm; the wire needs to be laid in Data Centre surrounding the Inrow- cooling units in Server Room areas having probable source of water leakage.

This section of the specification covers the design, supply, installation, testing, commissioning and thereafter maintaining of the Water Leak Detection System (WLDS).

This complete WLDS shall include water leakage detection panel, zonal modules, conductive sensing cable, monitoring leakage at any zone along the run and all required auxiliary accessories (such as jumper cables, connectors, hold down clips and tag/labels).

##### **10.4.7.1 General**

The Water Leak Detection System (WLDS) shall identify any abnormal presence of water on any point of the sensor cable. It shall be installed to detect any seepage of water into the critical area and alert the BMS Room for such leakage.

##### **10.4.7.2 SITC of Water Leak Cable with end Connections.**

- Flame retardant polymer with greenish colour for high visibility, Non flame propagating and self-extinguishing,
- 2 wired sensing cable
- Sensing Cable should be able to detect Water & slightly corrosive liquids.

##### **10.4.7.3 Specifications of 4-Zone Water Leak Detection Panel**

- LED/LCD Panel for Zonal indication.
- Module to be powered with 230 V AC
- Upon removal of water or slightly corrosive liquid the Module should reset automatically without any human intervention
- Each Zone should be able to detect leak in 50 meters of sensing cable
- 80dB Buzzer to be inbuilt in the panel with silencing button
- Leak sensitivity to be adjustable.

#### **10.4.8 Building Management System (BMS)**

Existing Building Management System shall be upgraded and equipment proposed in 2<sup>nd</sup> floor and 3<sup>rd</sup> floor will connect to upgraded BMS. Necessary hardware modules like the Direct Digital Control (DDC) shall be provisioned for the Data Centre in Second Floor and Third floor.

**BMS Upgradation:** BMS software Upgradation with warranty support and licenses.

### **Sensors for 3rd Floor:**

- Temperature & Humidity Sensors (Rack mounted)
- Temperature, Humidity and Co2 Sensors (Ceiling mounted)

The following infrastructure of the Data Centre in 2<sup>nd</sup> Floor will be monitored by the Building Management System:

- Access Control System (2<sup>nd</sup> floor door controllers will be integrated to the existing Access Control System)
- Fire Alarm System
- Fire Suppression System
- Temperature and Humidity sensors for Server Rooms, Electrical room
- Water Leak Detection System
- CCTV integration for incident monitoring
- VESDA or Aspiration System
- Rodent Repellent System
- UPS System
- Floor-Mount PDUs
- In-Row Cooling Units

System Integrator shall supply and install a fully integrated BMS, wherein all the services of the Data Centre are to be integrated and monitored.

The BMS shall incorporate Direct Digital Control (DDC) for energy management, equipment monitoring and HVAC monitoring, suitable for the Data Centre usage.

The system design shall utilize the latest technology in “open” network architecture, with distributive intelligence and processing, and direct digital control. The BMS system offered should be from the latest offerings and should be freely programmable.

#### **10.4.8.1 General**

System Integrator shall provide new, latest technology, high speed, networkable, interoperable, user friendly, fully operational, Lon works/ BACnet protocol Building Management System

The System shall mainly comprise of Direct Digital Controllers, Middleware, Web Server LAN Routers, and relevant field level instrumentation. The BAS shall provide design the system with DDC Controls distributed at all floors to minimize cabling and to achieve maximum operational system redundancy & high speed communication.

The DDCs offered shall be intelligent type with self storage of data & expanded memory. The BMS shall ensure that all critical / medium alarm generation points of any one service not to be linked to one DDC/PI. This shall avoid failure of entire data of particular services in case of failure of the corresponding DDC/PI.

#### **10.4.8.2 Integration of open standards**

- Integrate via OPC
- Integrate third-party devices via OPC
- The system must be OPC Foundation tested and certified and must be able to integrate and process, but also to provide real-time data as OPC data points. The System processing must include Alarming, Trending, Scheduling, Reporting and allow cross communication with other integrated devices.

The System must be support the OPC specification:

- OPC Data Access
- Energy efficiency and references to applicable standards.
- Energy efficiency class "A" as per EN 15232.
- Standard serves as the basis for energy efficiency functions. The system supplier must prove that the functions are as described by the standard.
- Energy efficiency monitoring and evaluation.
- Management level
- Visualize the quality state in the plant graphics.

A violation of energy efficiency limit values for measured values of primary plants (e.g. centralized air handling, energy generation) must also be displayed in the plant graphic directly on the application components or function. The parameters for monitoring, evaluating and forming the quality state can be set directly in the plant graphic based on read and write access rights.

#### **10.4.8.3 Function of Building Management System**

The various functions that this system shall perform are as follows:

- i. It shall maintain design inside conditions, within the specified limits, throughout the year.
- ii. It shall monitor the start/stop and faults of units.

The Employer requires that all goods and materials to be used in the works are new, unused, of the most recent or current models and incorporate all recent improvements in design and materials.

All the equipment and ancillary materials shall confirm in all respects to highest standard of engineering, design and workmanship.

### **10.5 Passive Networking & Racks**

#### **10.5.1 Server Rack**

42U Server Racks 600 mm (W) x 1200 mm (D). The unit should have a minimum IP 20 rating.

#### **10.5.2 Network Rack**

42U Network Racks 800 mm (W) x 1200 mm (D). The unit should have a minimum IP 20 rating.

##### **10.5.2.1 Rack Frame**

- The Rack frame shall be constructed as a welded steel/bolted frame and promote flexible mounting options and fully adjustable rail positioning. Finished in powder-coat black (RAL 7021)
- The frame shall include depth markings for ease of EIA rail alignment.
- The frame shall support 3000 lbs. (1361kg) static weight load.
- A driver/adaptor shall be provided for levelling feet adjustment
- All cabinet components (doors, side panels, top panels, 19" rails, PDU brackets shall be grounded directly to the frame.
- Grounding points shall be provided on the cabinets frame to externally ground each unit to the building ground.
- Shipping brackets may be used to bolt the rack to the floor either internally or externally

### 10.5.2.2 19" Rack Mounting Rails

- All mounting rails shall be constructed of 14-gauge sheet steel, 19" rails, folded 5 times for maximum rigidity, finished in powder-coat black (RAL 7021)
- Color-contrasting full-height RU position labels on front/rear of each rail.
- 19" Mounting Rails shall be spaced 29.1" (740mm) apart from the factory
- The mounting rails shall support the EIA-310E standard hole-mounting pattern, shall be factory-installed in the Rack frame and be individually and depth-adjustable within the useable space to allow for flexibility of mounting depth. Mounting rails accept cage nuts (M6 type included with all units).
- Integrated cable management features accept tool-less cable management accessories.

### 10.5.2.3 Door Specification

- Doors shall be tool-less lift off removable. Doors come standard with locks keyed to 1333 key code, and (2) hinges per door allowing a maximum 148° door opening. Rack doors shall be available in two primary versions:
- Front Door - Single door, 77% free-area perforation, 16 GA (1.5mm) steel finished in powder-coat black (RAL 7021).
- Rear Door - Split doors, 77% free-area perforation, 18 GA (1.2mm) steel finished in powder-coat black (RAL 7021).

### 10.5.2.4 Side Panels

- The Rack split locking side panels shall be made of 20 GA(0.9mm) sheet metal and finished in powder-coat black (RAL 7021).
- Panels shall be externally removable and come standard with a locking slam latch keyed to 1333.
- Panels shall install internal to the frame

### 10.5.2.5 Top Panel

- The standard top panel shall be toolless removable in the field and include (2) 153mm (6.04") x100mm (3.94") rectangular cut outs located in the front and rear of the top panel for cable entrance or exit.
- Rectangular cut outs shall include field removeable tabs to expand cut out size to accommodate 60A plug sizes.
- The top panel shall be made of 18 GA (1.2mm) sheet metal and finished in powder-coat black (RAL 7021).
- The top panel shall include an integrated hole pattern for easy installation of top panel mount accessories (cable management, ladder/cable tray support brackets)

### 10.5.2.6 PDU/Cable Management Brackets

- The PDU/Cable Management Brackets shall be made of 16 GA (1.6mm) sheet metal and be finished in powder-coat black (RAL 7021).
- All PDU/Cable Management Brackets shall include button-mount keyholes throughout to accommodate tool-less button-mounting of Rack PDUs of various heights.
- All PDU/Cable Management Brackets shall be depth-adjustable within the useable depth
- All PDU/Cable Management Brackets will have integrated cable management features to accept tool-less cable management accessories.
- The frame shall accommodate up to (4) PDU/Cable Management brackets for cable management and Rack-PDU installation.

### 10.5.2.7 Paint Finish

Powder Coat RAL7021(Black) paint finish shall be provided for all the Rack sheet metal components.

### 10.5.2.8 Non-Intelligent PDU

- Each server rack should have 2 PDUs. The PDUs should be connected to the two different UPS sources A and B individually. The 2 IPDUs in each rack should have different chassis color for identification of UPS source. The input rating of the PDU should be 63A, 215V, 32A 400V & 63A 400V.
- Low Density Racks: 63A Single phase PDUs with input cable of minimum 3-meter-long.
- Medium Density Racks: 32A Three phase PDUs with input cable of minimum 3-meter-long.
- High Density Racks: 63A Three phase PDUs with input cable of minimum 3-meter-long.
- Network Racks: 32A Single phase PDUs with input cable of minimum 3-meter-long.
- Each PDU should have min. 24 numbers of hybrid outlets which can be utilized as either C13 or C19 outlets
- The PDU hybrid outlets should meet electrical compliance and should be UL certified.
- The PDU should be high temperature grade, operating temperature up to 60°C.
- The IPDU should have approvals form RoHS, CE marked, EN55032 and 55024, IEC 60950-1.
- All the three phase PDU should have color coded alternate phase outlets for simplified circuit/phase balancing and cable management.

### 10.5.3 Aisle Containment

Aisle containment shall be provided for all the 33 racks in the Server Room.

- All the components used in the aisle containment shall be Fire Retardant.
- Entry and Exit Doors of the aisle should have swinging/sliding door
- Each door should have CRCA frame with fire retardant glass sheet of 4 mm thick or Fire-Retardant Rigid UL V-0 Plastic 3 mm
- The frame of door should have vertical MS Columns of rectangular section with thickness of 1.5mm
- PU Foam Gasket should use across the metal edges of the door to prevent any leakage on cold air
- The doors should have automatic door closers installed to ensured that those are closed.
- Polyamide Cable Brushes should be fitted at the bottom of doors to avoid leakage of cold air when doors are closed.
- Top panels of the aisle should be covered with either fire rated Glass or Polycarbonate panels
- Top Panels are fixed in CRCA frame per "IS 513 Grade D" with thickness of 1.2 mm
- The Glass/ Polycarbonate in the top Panels are of 4 mm thick

### 10.5.4 Network Cabling

#### 10.5.4.1 Network Connectivity Requirement

Connectivity from Existing Central Network Racks (3<sup>rd</sup> floor) to Network Racks (2<sup>nd</sup> floor)

- 2x12 Core OM4 Multimode MPO based cabling from Two Central Network Racks to Each Network Rack in 2<sup>nd</sup> floor

Connectivity from Network Racks to Server Racks

- 2 x 12 Core OM4 Multimode MPO based cabling from Each Network Rack to Each Server rack in pod as per schematic.
- 6 Runs of CAT6A Copper cabling from Each Network Rack to Each Server rack in pod as per schematic.

#### **10.5.4.2 Multimode OM4 Fiber**

- Fiber optical cable and components, copper cable and components, and fiber raceway system must be the single brand for end to end support and same warranty system.
- OM4 multimode fiber must comply with international standard IEC 60793-2-10 Ed. 6, for fiber type A1a.4, and TIA standard TIA-492AAAE.
- The cabling supplier must provide DMD (differential mode delay) test bench certification from Intertek ETL test laboratory.
- Cabling supplier must provide a 25-year end-to-end application assurance guarantee that will support, at a minimum, the following applications over OM4 multimode fiber
  - 100 Gigabit Ethernet, 850 nm SWDM (100G-SWDM4)
  - 40 Gigabit Ethernet, 850 nm 4-lane parallel (40GBASE-SR4)
  - 40 Gigabit Ethernet, FIT extended reach 850 nm 4-lane parallel (40GBASE-eSR4)
  - 40 Gigabit Ethernet, Cisco extended reach 850 nm 4-lane parallel (40GBASE-CSR4)
  - 40 Gigabit Ethernet, Cisco "BiDi" (QSFP-40G-SR-BD)
  - 40 Gigabit Ethernet, 850 nm SWDM (40G-SWDM4)
  - 25 Gigabit Ethernet, 850 nm Serial (25GBASE-SR)
  - 10 Gigabit Ethernet, 850 nm Serial (10GBASE-S)
  - 128 Gigabit Fibre Channel, 850 nm Parallel (12800-M5x-SN)
  - 32 Gigabit Fibre Channel, 850 nm Serial (3200-M5x-SN)
  - 16 Gigabit Fibre Channel, 850 nm Serial (1600-M5x-SN)
  - 8 Gigabit Fibre Channel, 850 nm Serial (800-M5x-SN)
- The applications support covered by the 25-year end-to-end applications assurance shall include detailed application tables showing guaranteed length as a function of the number of connections in the channel, including up to 6 MPO and 6 LC connections.
- The applications support covered by the 25 year end-to-end applications assurance shall include guaranteed channel insertion loss calculations for all the configurations supported, including but not limited to the following:
  - 100GBASESR4 up to 130m with 4 MPO connections – Maximum channel loss @850 shall not exceed 1.24 dB
  - 100G-SWDM4 up to 150m with 4 MPO and 6 LC connections – maximum channel loss @850 nm shall not exceed 1.70 dB
  - 40GBASE-SR4 up to 195m with 4 MPO connections – maximum channel loss @850 nm shall not exceed 1.24 dB
  - 40GBASE-eSR4 to 500m with 4 MPO connections – maximum channel loss @ 850 shall be 1.24 dB
  - 40G-SWDM4 to 460m with 4 MPOs and 6 LC connections – maximum channel loss @ 850 shall be 1.70 dB
  - 32G Fiber Chanel to 120m with 4 MPOs and 6 LC connections – maximum channel loss @850 shall be 1.70 dB

##### **10.5.4.2.1 Preterminated Fiber System Components important features**

- The polarity of MPO module shall be Enhanced Method B. There shall be no need for flipping the cassette to enable the correct polarity onsite.
- MPO adaptors shall be aligned key.

- MPO equipment cords shall be unpinned on both ends. To avoid gender issues and importantly damage to equipment ports
- MPO Trunk cable shall be pinned at either end of the cable.
- MPO trunk cables shall connect with MPO modules or MPO equipment/patching cords.
- MPO trunk cable and MPO module shall be available with 8, 12 and 24 fiber MPO connectors.
- The MPO trunk cables, array and breakout cables, and LC patch cords shall be available in OFNP or LSZH ratings.
- The cabling supplier must provide fiber website tracking and validation for fiber cable and assemblies with a unique number
- The Cassettes also shall have the unique number to verify the parameters online.

#### **10.5.4.2.2 OM4 multimode fiber optical cable specification**

- ISO/IEC 11801-1 3rd Information technology — Generic cabling for customer premises —Part 1:General requirements 2016
- TIA-568.3D Optical Fiber Cabling and Components Standard 2016
- TIA-492AAAE Detail Specification for 50- $\mu$ m Core Diameter/125- $\mu$ m Cladding Diameter Class 1a Graded-Index Multimode Optical Fibers with Laser-Optimized Bandwidth Characteristics Specified for Wavelength Division Multiplexing, dated June 2016
- TIA-455-220-A (FOTP-220), Differential Mode Delay Measurement of Multimode Fiber in the Time Domain, dated January 2003
- IEC 60793-1-49, Edition 2.0, Optical fibers – Part 1-49: Measurement methods and test procedures – Differential mode delay
- IEC 60793-2-10, Edition 5.0, Optical fibers – Part 2-10: Product specifications – Sectional specification for category A1 multimode fibers (fiber model A1a.4, Sections D.5)
- Min OFL(LED)bandwidth@850nm 3500MHz.km
- Min OFL(LED)bandwidth@1300nm 500MHz.km
- Min EMB @850nm : 4700 MHz.Km
- Min EMB @953nm: 2470 MHz. Km
- Max dispersion@840nm: 103 Ps/nm|\*km
- Max dispersion@953nm :61.7 Ps/nm|\*km
- Max @953nm: 2.3 dB/km<sup>2</sup>
- Certification : DMD(differential mode delay) test report from Intertek ETL test laboratory.

#### **10.5.4.2.3 Fiber OM4 MPO trunk cable specification**

- Fiber type :OM4 multiple mode fiber, complaint with TIA492AAAE & IEC 60793-2-10 TYPE A1A.4 type A1a.4
- Jacket color:Lime green
- Connector type: 12 fibers /MPO

#### **10.5.4.2.4 Physical specification**

- Weight:23.0 kg/km
- Outside diameter:4.9mm

#### **10.5.4.2.5 Optical performance**

- All links shall meet or exceed the end to end loss performance specified to support the optic application guarantee
- Fiber Components shall not exceed :
  - ✓ LC/LC .15db max

- ✓ MPO/MPO .20db max
- ✓ MPO/LC module .35db max

#### **10.5.4.2.6 Mechanical performance**

- Cable max tension force, 20N @ 90°, 50N @ 0°
- Min bend radius,load: 7.4cm
- Min bend radius,unload: 4.9cm
- Max pulling force (Fix):200N
- Max pulling force (installtion)::667N

#### **10.5.4.2.7 Flame rating**

- Jacket flammability : available in OFNP and LSZH versions

#### **10.5.4.2.8 Certification**

- RoHS 2011/65/EU compliant

#### **10.5.4.2.9 24F OM4 MPO trunk cable specification**

- Fiber type :OM4 multiple mode fiber, complaint with TIA492AAAE & IEC 60793-2-10 TYPE A1A.4
- Jacket clor:Lime green
- Connector type: 24 fibers /MPO
- Color code:Lime green
- Ultra low loss:0.35dB max
- MPO Polatiry : method B Enhanced
- RoHS 2011/65/EU compliant
- UL certified

#### **10.5.4.2.10 24Fiber OM4 MPO distribution module**

- Fiber type :OM4 multiple mode fiber, complaint with TIA492AAAE & IEC 60793-2-10 TYPE A1A.4
- Connector type: 24 fibers /MPO
- Built-in shutters automatically actuated by connector insertion, allowing for one-handed operation
- Shutters designed to avoid ferrule contact during connector installation
- Shutter door will illuminate when hit with visual fault locator (VFL)
- New latch assist provides easier module removal for faster moves, adds and changes
- Conector type: LC-MPO
- Color code:Lime green
- Ultra low loss:0.35dB max
- MPO Polatiry : Enhanced metho B,unpined
- RoHS 2011/65/EU compliant
- UL certified

#### **10.5.4.2.11 12Fibers OM4 MPO distribution module**

- Fiber type :OM4 multiple mode fiber, complaint with TIA492AAAE & IEC 60793-2-10 TYPE A1A.4
- Connector type: 12 fibers /MPO

- Built-in shutters automatically actuated by connector insertion, allowing for one-handed operation
- Shutters designed to avoid ferrule contact during connector installation
- Shutter door will illuminate when hit with visual fault locator (VFL)
- New latch assist provides easier module removal for faster moves, adds and changes
- Connector type: LC-MPO
- Color code: Lime green
- Ultra low loss: 0.35dB
- MPO Polarity : Enhanced method B, unpinned
- RoHS 2011/65/EU compliant
- UL certified

#### 10.5.4.2.12 Ultra low loss fiber patch cord

- Fiber type : OM4 multiple mode fiber, compliant with TIA492AAAE & IEC 60793-2-10 TYPE A1A.4
- Connector type: LC
- Jacket flammability : OFNP
- Jacket color : lime green
- Material : RoHS compliant
- Insertion loss : 3.1dB/km @850nm
- Return loss :  $\geq 35$ db
- Fiber attenuation : 3.0dB/km@850nm, 1.0dB/km@1300nm
- Outside diameter : 2.0mm
- Uniboot design, reduce cable outside diameter, easy maintenance
- Polarity shall be reversed in the field, without breaking the Zip Cord.

### 10.5.5 Copper Cat6A Cabling specification

#### 10.5.5.1 Channel Performance

- The Category 6A/ Class EA UTP SCS shall comply with the following standards
  - ✓ ISO/IEC 11801:2010
  - ✓ EN 50173 Part 1 through Part 5:2010 and 2011
  - ✓ ANSI/TIA-568-C
  - ✓ IEC 60603-7-4
  - ✓ IEEE 802.3 applications as outlined in section 2
  - ✓ Local/National Codes and Regulations
- The Category 6A/ Class EA UTP system should support the following IEEE Ethernet applications
  - ✓ 802.3e - 10BASE-T
  - ✓ 802.3i - 10BASE-T
  - ✓ 802.3u - 100BASE-TX, 100BASE-T4
  - ✓ 802.3y - 100BASE-T2
  - ✓ 802.3z - 1000BASE-X
  - ✓ 802.3ab - 1000BASE-T
  - ✓ 802.3af - Power Over Ethernet (15.4W)
  - ✓ 802.3at - Power Over Ethernet Enhancements (25.5W)
  - ✓ 802.3az - Energy Efficient Ethernet
- Additionally the Category 6A/ Class EA UTP SCS shall be capable of supporting the following Fiber Channel Applications Standards, per Technical Committee 11 of INCITS:

- ✓ 1GFC-BASE-T
- ✓ 2GFC-BASE-T
- ✓ 4GFC-BASE-T
- The proposed Category 6A UTP SCS, when configured as a worst-case 100 meter channel shall provide performance headroom over limits specified by Cat6A
- NEXT (Near End Cross Talk): Minimum 3 db above the standards; Should support a minimum of 4 connector Channel with a minimum 3 db guaranteed NEXT
  - ✓ Insertion Loss: < 3%
  - ✓ Return Loss: <1.0db
- The SCS must consist of individual components provided by the same manufacturer. "Mix and Match" products are not allowed as there is no guarantee that the overall channel will meet Category 6A Channel requirements if constructed with components from different vendors.
- The Category 6A cable and Category 6A channel components shall be manufactured by a single manufacturer. The manufacturer shall warrant the Category 6A channel cable, components, and applications for a period of 20 years.
- The 20 year warranty shall be a transferable warranty and has component replacement policy in case of manufacturing defect
- The SCS must be tested by an ISP 17025 accredited 3rd Party test facility to EIA/TIA 568C, ISO/IEC 11801 Amendment 1 and for the channel testing must be provided as part of the bid response.
- The Category 6A system should support channels that are shorter than 15 meters for 2, 3, 4 connector channels without any minimum length requirements.

#### **10.5.5.2 Horizontal Cable**

- The Cable should meet ANSI/TIA 568C.2 Category 6A Specifications
- The cable should consist of Eight 23 AWG copper conductors. Copper Clad Aluminum or any other combinations are not allowed
- The Cable should be round in shape
- The weight of the cable box of 1000 Feet should not be less than 34.7 lb ± 5lb
- The nominal Jacket thickness should be 0.05 ± 0.02 inches
- The nominal Outside diameter should be 0.285 ± 0.075 inches
- The cable should support the installation temperature: 0 to 60 0C.It should support Operating temperature of -20 to 60 0C
- The cable shall be available in Low-Smoke, Zero Halogen (LSZH) compatibility and the LSZH version must comply with the following Fire Safety standards:
  - ✓ ISO/IEC 60332-3-22: Vertical Flame Spread
  - ✓ ISO/IEC 60754-2: Acidity
  - ✓ ISO/IEC 61034-2: Smoke Density
- The cable and cordage shall be True UTP components that do not include internal or external shields, screened components or drain wires. However the end connecting cordage can be UTP/FTP. No Special Grounding requirements.
- The horizontal cable shall have a unique print string on the cable jacket. This unique identifier shall also be used for on-line reference to a full set of factory tests that were performed on a sample from the same mater reel.
- The test parameters shall include NEXT, PSNEXT, Return Loss, Attenuation, ELFEXT and PSELFEXT. The on-line reference must be available on the SCS vendor public website, such that it can be accessed at any time.

#### **10.5.5.3 Category 6A 10Gigabit outlets**

- The 8-pin modular (RJ-45) jacks shall comply with IEC 60603-7-4

- The Category 6A outlets shall be backward compatible with Category 6 and 5E cords and cables.
- The Category 6A outlets shall be of a universal design supporting T568 A & B wiring.
- The information outlet shall have a Current Rating of 1.5 A at 20°C
- The information outlet must support 90 degree cable termination.
- 3rd Party Verification test certificates shall be provided to show compliance to ISO/IEC 11801 Amendment 2 testing for Cat 6A components.
- The information outlet will have insertion life of 750 cycles minimum.

#### **10.5.5.4 Modular RJ45 Patch Cords**

- SCS must support patch cord lengths of 1 meter minimum and equipment cords of 2 meter minimum and the Patch cords shall be available in Stranded construction
- Cords shall be equipped with 8-pin modular plugs on each end.
- All cords shall be round, and consist of copper conductors, tightly twisted into individual pairs.
- Nominal cordage diameter shall not exceed 8.24 mm.
- Plugs shall be designed with an anti-snap latch to facilitate easy removal during move, add and change processes.
- The LSZH version must comply with the following Fire Safety standards:
  - ✓ ISO/IEC 60332-3-22: Vertical Flame Spread
  - ✓ ISO/IEC 60754-2: Acidity
  - ✓ ISO/IEC 61034-2: Smoke Density
- 3rd Party verification of the Fire Safety/ Environmental tests listed above must be provided as part of the bid response.
- The cordage shall be UTP components that do not include internal or external shields, screened components or drain wires.
- The patch cords will have insertion life of 750 cycles minimum.

#### **10.5.5.5 24-Port Unloaded Patch Panel**

- When configured in worst-case 100 meter channels with full cross-connects and consolidation points with the other products proposed in this tender, the panel shall be capable of delivering the minimum guaranteed channel performance
- The panel shall have horizontal cord organizers available as to improve patch cord management
- The patch panel type shall be a 1U straight unloaded patch panel for 19" rack mounting capable of supporting 24 unshielded modular 8-pin connectors compliant with IEC 60603-7-4 while meeting the Channel Performance as specified in Amendment 1 to ISO/IEC 11801:2002
- The panel shall be available in 24-port configurations with universal A/B labeling and 110 connector terminations on rear of panel allowing for quick and easy installation of 22 to 24 AWG cable
- The panel shall be equipped with a removable rear mounted cable management bar and front and rear labels
- The panel shall be UL and cUL Listed
- Operating Temperature Range = -10°C to 60°C
- Storage Temperature Range = -40°C to 70°C
- Humidity = 95% noncondensing
- Nominal Solid Conductor Diameter = 0.025 to 0.020 in (0.64 to 0.51 mm) (22 to 24 AWG)
- Nominal Stranded Conductor Diameter = 0.025 to 0.020 in (0.64 to 0.51 mm) (22 to 24 AWG)
- Insulation Types = All plastic insulates (including PVC, irradiated PVC, Polyethylene, Polypropylene, PTF Polyurethane, Nylon and FEP)
- Insertion Life = 750 minimum insertions of an FCC 8-Position Telecommunications Plug

#### **10.5.5.6 48-Port Unloaded Patch Panel**

- 3rd Party Verification test certificates shall be provided to show compliance to ISO/IEC 11801 Amendment 2 testing for Cat6A components.
- When configured in worst-case 100 meter channels with full cross-connects and consolidation points with the other products proposed in this tender, the panel shall be capable of delivering the minimum guaranteed channel performance
- The panel shall have horizontal cord organizers available as to improve patch cord management
- The patch panel type shall be a 1U angled unloaded patch panel for 19" rack mounting capable of supporting 48 unshielded modular 8-pin connectors compliant with IEC 60603-7-4 while meeting the Channel Performance as specified in Amendment 1 to ISO/IEC 11801:2002
- The panel shall be available in 48-port configurations with universal A/B labeling and 110 connector terminations on rear of panel allowing for quick and easy installation of 22 to 24 AWG cable
- The panel shall be equipped with a removable rear mounted cable management bar and front and rear labels
- The panel shall be UL and cUL Listed
- Operating Temperature Range = -10°C to 60°C
- Storage Temperature Range = -40°C to 70°C
- Humidity = 95% noncondensing
- Nominal Solid Conductor Diameter = 0.025 to 0.020 in (0.64 to 0.51 mm) (22 to 24 AWG)
- Nominal Stranded Conductor Diameter:=0.025 to 0.020 in (0.64 to 0.51 mm) (22 to 24 AWG)
- Insulation Types = All plastic insulates (including PVC, irradiated PVC, Polyethylene, Polypropylene, PTF Polyurethane, Nylon and FEP)
- Insertion Life = 750 minimum insertions of an FCC 8-Position Telecommunications Plug

#### **10.5.6 Fiber Guiding System**

- The Fiber pathway should be UL listed, proof of the same shall be submitted
- The 6 x 4 routing system shall be a system of channel, fittings, and brackets designed to segregate, route, and protect fiberoptic. Channel and fittings shall be assembled using pre-assembled couplers. A selection of spill out options shall be available that can be easily attached.
- The Fiber Pathway System shall maintain a minimum 2 inch bend radius throughout the system.
- Basic components shall include horizontal and vertical straight sections, horizontal and vertical elbows, downspouts, junctions and numerous support hardware and flex-tube kits.
- The fiber raceways system shall be available in 2x2, 2x6, 4x4, 4x6, 4x12 and 4x24 inch dimensions.
- Should be available in Yellow color
- Materials shall be Engineering Thermoplastic.
- "All components shall be UL94V-0 flame resistant and shall not contain any PVC material.
- The Straight Sections and Molded Fittings shall be UL 2024 compliant as well."
- Connection or installation No bolts need to be tightened and no tools are required when installing the Couplers and Brackets take minimum time to make a mechanically secure connection. Shall use hinged fit junctions when connecting two components together

# 11 Installation, Testing and Commissioning

## 11.1 Engineering

Upon award of the contract, the bidder shall complete the engineering design of the Data Centre in line with the design requirements and specifications. The bidder shall submit preliminary design, detailed design and test plan. The submittals shall include but not limited to:

- Preliminary design document
- Detailed design document
- Samples and Datasheets
- GFC drawings
- BOQ as per the design
- Acceptance test plan

Only after approval of the design documents and BOQ, the bidder can initiate their procurement process.

## 11.2 Procurement

After the design approval of every subsystem, the bidder shall go ahead with the procurement and construction as per the approved design, GFC drawings and BOQ.

When the materials are received at site, RailTel will inspect the materials as per the test/inspection plan. Based on the inspection, the bidder shall prepare a Material Inspection Report (MIR), which shall be jointly signed by the authorized signatories of the bidder, and RailTel. The bidder shall keep all the materials in their own safe custody until installation, commissioning and provisional acceptance.

## 11.3 Testing

The bidder shall conduct necessary tests for verification of compliance with the technical specifications. The testing shall be conducted for all critical components such as UPS, Batteries, PDUs, Cables, Panels, HVAC systems, etc. However, the tests shall not be limited to these components. RailTel may require testing of any other components during execution of the projects.

### 11.3.1 Test Categories

- The following tests shall be conducted for acceptance of the equipment and the system before final acceptance of the system.
  - Sample Approvals
  - Pre-Factory Acceptance Testing
  - Factory Acceptance Testing (FAT)
  - Pre-commissioning test (after installation) for total integrated system.
- These tests shall be carried out by the bidder including those supplied by sub-vendors, if any.

- Bidder shall arrange all necessary test instruments, manpower, test-gear, accessories, etc.
- All technical personnel assigned by Bidder shall be fully conversant with the system specifications and requirements. They shall have the specific capability to make the system operative quickly and efficiently and shall not interfere or be interfered by other concurrent testing, construction and commissioning activities in progress. They shall also have the capability to incorporate any minor modifications/suggestions put forward by RAILTEL Engineer.
- Bidder shall arrange power supply and any temporary commissioning facility including communication system required for installation/testing/commissioning.
- Test Plan: The Bidder shall submit to RAILTEL 'Test Plans' well in advance of commencement of actual testing in each of the above mentioned test categories.

The plans shall include:

- System/Equipment functional and performance description (in short) and Tests to be conducted and purpose of test.
- Test procedures (including time schedule for the tests) and identification of test inputs details and desired test results

### **11.3.2 Test Report**

The observations and test results obtained during various tests conducted shall be compiled and documented to produce Test Reports by Bidder. The Test Reports shall be given for each equipment/item and system as a whole. The report shall contain the following information to a minimum:

- Test results
- Comparison of test results and anticipated (as per specifications) test result as given in test plans and reasons for deviations, if any.
- The data furnished shall prove convincingly that
  - The system meets the Guaranteed Performance objectives
  - Mechanical and Electrical limits were not exceeded.
  - Failure profile of the equipment during the tests are well within the specified limits

### **11.3.3 Failure of Components**

Till the system is accepted by the RailTel, a log of each and every failure of components shall be maintained. It shall give the date and time of failure, description of failed component, circuit, module, component designation, effect of failure of component on the system/equipment, cause of failure, date and time of repair, mean time to repair etc. Detailed documentation for the same shall be submitted to Railtel for future reference.

If a malfunction and/or failure of a unit/module/sub-system/equipment repeats during the test, the test shall be terminated and Bidder shall replace the necessary component or module to correct the deficiency. Thereafter, the tests shall commence all over again from the start.

If after the replacement the equipment still fails to meet the specification, Bidder shall replace the equipment with a new one and tests shall begin all over again. RailTel's approval shall be obtained for any allowable logical time required to replace the failed component/unit/module/sub-system.

#### **11.3.4 Readjustments**

No adjustments shall be made to any equipment during the acceptance tests. If satisfactory test results cannot be obtained unless readjustments are made, Bidder shall carry out only that readjustment needed to ready the equipment/system for continuance of tests. A log of all such adjustments shall be kept giving date and time, equipment, module, circuit, adjustments, reasons, test result before and after adjustment, etc. Fresh acceptance tests shall be conducted after the readjustments have been completed.

#### **11.3.5 Sample Approvals**

The bidder shall provide samples of various components such as civil/interior materials (such as tiles), cables, accessories, furniture, etc. prior to their procurement. For components such as UPS, HVAC Systems, Power Distribution Units, etc. where samples cannot be provided, the bidder shall submit OEM datasheets of those components for approval by RailTel. The bidder shall go ahead with the procurement only after RailTel's approval.

#### **11.3.6 Pre Factory Acceptance Testing**

The Bidder on his own, exactly in line with FAT, shall conduct pre-factory acceptance testing and test reports for the same shall be forwarded to RailTel Engineer before start of FAT.

#### **11.3.7 Factory Acceptance Testing (FAT)**

RailTel may require factory acceptance testing to some or all the components to be supplied and installed by the successful Bidder.

Factory Acceptance Test shall be conducted in presence of RailTel/authorized agency for the following equipment's such as Low Voltage Panels, UPS Systems, Isolation Transformers, Precision Cooling Units.

Travel and lodging expenses required for the Factory Acceptance Test is in the scope of bidder.

Factory acceptance tests shall be carried out after review and approval of FAT procedure/documents as per bid requirements and review of Pre-Factory acceptance results & shall be conducted at the manufacturing facilities from where the respective equipment/subsystems are offered. The factory acceptance testing shall be conducted in the presence of the RailTel Engineer. The tests shall be carried out on all equipment/items including those supplied by sub-vendors and factory acceptance certificates shall be issued.

RailTel reserves the right to waive factory acceptance testing to some or all the equipment.

The factory tests shall include but not be limited to:

##### **11.3.7.1 Equipment Testing**

- Mechanical checks to the equipment for dimensions, inner and outer supports, finishing, welds, hinges, terminal boards, connectors, cables, painting, etc.
- Electrical checks including internal wiring, external connections to other equipment, etc.

- Check for assuring compliance with standards mentioned in the specifications.
- Individual check on each/module/sub-assembly in accordance with the modes and diagnostics programs of the Bidder.
- Checks on power consumption and heat dissipation characteristics of various `equipment
- Environment testing and other laid down tests in Type Tests plan of the specification of the equipment.
- Functional testing
- Any other test not included in FAT document but relevant to the project as desired by the RAILTEL at the time of Factory Acceptance Testing.

#### **11.3.7.2 System Integration Testing**

Functional and performance test should be conducted for each complete system/component that requires integration with other components/subsystems of the Data Centre. The interfacing subsystems/components can be simulated reflecting the production scenario.

All functions of the BMS shall be demonstrated in totality with integration with all the test systems concerned.

#### **11.3.8 Installation**

After successful completion of Factory Acceptance Testing, dispatch clearance has to be obtained from RAILTEL subsequent to which equipment shall be sent to site for installation. Equipment without factory acceptance certificates and dispatch clearance shall not be acceptable at site.

Prior to installation, all equipment shall be checked for completeness as per the specifications of equipment required. Installation shall be carried out in accordance with the installation manuals and approved installation drawings in the best workmanship.

Bidder shall bring all installation tools, accessories, special tools, test gears, spare parts etc. at his own cost as required for the successful completion of the job.

If during installation and commissioning any repairs are undertaken, the maintenance spares supplied with equipment shall not be used for the repair. Bidder shall arrange his own spare parts for such activities till such time the system has been finally accepted by the RailTel. A detailed report & log of all such repairs shall be made available by the Bidder to RailTel and shall include cause of faults and repair details, within 2 weeks of fault occurrence.

A detailed time schedule for these activities shall be submitted by Bidder to RailTel to enable their representatives to be associated with the job.

Bidder shall supply all installation materials required for proper installation of the equipment. These shall include all accessories, protection/safety accessories and any other components to complete the installation as per the technical specifications and local/international standards/best practices.

The installation of equipment shall be done as to present neat and clean appearance in accordance with approved installation document drawings.

### **11.3.9 Pre-Commissioning**

On completion of installation of equipment, the correctness and completeness of the installation as per Manufacturer's manual and approved installation documents shall be checked by the Bidder on his own.

A list of Pre-Commissioning tests (same as approved by the RAILTEL for site acceptance testing) and activities shall be prepared by Bidder and the test shall be carried out by the Bidder on his own. After the tests have been conducted to the Bidder's own satisfaction, the Bidder shall provide the test results for review by RAILTEL and then offer the system for Site Acceptance Testing.

During pre-commissioning, if any fault occurs to any equipment or system, Bidder shall identify the same and provide report/history of all faults to the RAILTEL.

During installation and pre-commissioning of the systems, Bidder shall have enough number of commissioning spares so that the installation is not held up because of non-availability of commissioning spares. Bidder shall ensure that the spares meant for operation and maintenance are not used during installation and commissioning.

#### **11.3.10 Integrated Site Acceptance Testing (ISAT)**

On completion of Supply, Installation, Testing and Commissioning of the Data Centre, site acceptance testing shall be conducted as per approved site acceptance test procedures and its constituents by the Bidder under the presence of RAILTEL.

The tests shall include, but not be limited the following:

- Checks for proper installation as per the approved installation drawings for each equipment/item and system as a whole.
- Guaranteed performance specifications of individual equipment/item.
- Self-diagnostics test on individual equipment
- Compliance to standards/best practices
- Integration testing between various subsystems
- Load Testing of the UPS Systems, PACs to the rated capacity of the Data Centre

For the Load Testing of the PACs and the UPS systems, Bidder shall arrange the heat load banks for the specified maximum IT load. Heat load banks shall have to be arranged by the Bidder during Uptime Institute's testing of the Data Centre Constructed Facility.

#### **11.3.11 Spares**

##### **11.3.11.1 Mandatory Spares**

The bidder shall maintain sufficient mandatory spares for meeting the Service Level Requirement specified in the tender. The Bidder shall provide a list of mandatory spares as a part of their technical bid.

Spares shall be provided from the same manufacturing facilities/location from where the respective equipment, subsystems are offered.

Bidder shall provide the address, contact person, telephone number and email id of the manufacturer of the spare parts. The Bidder shall warrant that spare parts for the system would be available for minimum of 10 years (MAF shall have this statement) from the date of supply.

#### **11.3.11.2 Commissioning Spares**

The commissioning spares shall be arranged by the Bidder to cater to the requirement during installation, commissioning, site acceptance testing, trial run and warranty period. These spares shall be readily available with the Bidder. These commissioning spares are different from mandatory spares and Bidder shall not use mandatory spares as commissioning spares.

#### **11.3.12 Protection**

System Integrator shall protect all work and material from damage by his/her work or workers and shall be liable for all damage thus caused.

System Integrator shall be responsible for his/her work and equipment until finally inspected, tested, and accepted. System Integrator shall protect his/her work against theft or damage, and shall carefully store material and equipment received on-site that is not immediately installed. System Integrator shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

#### **11.3.13 Quality Assurance**

- System Integrator shall submit the details of Quality Assurance program followed by him beginning with raw materials, active, passive and fabricated components, units, sub-assemblies, assemblies, wiring, interconnections, structures, etc. to finished product. System Integrator shall obtain and forward the Quality Assurance Program for equipment supplied by Sub-vendor, if any.
- RAILTEL reserves the right to inspect and test each equipment at all stages of production and commissioning of the system. The inspection and testing shall include but not be limited to raw materials, components, sub-assemblies, prototypes, production units, guaranteed performance specifications, etc.
- All work, materials and equipment shall comply with the rules and regulations of applicable local, and national codes.
- System Integrator shall continually monitor the field installation for code compliance and quality of workmanship. All visible piping and/or wiring runs shall be installed parallel to building lines and properly supported.
- For Factory inspection and testing, System Integrator shall arrange all that is required e.g., quality assurance personnel, space, test gear, etc. for successful carrying out of the job in the presence of RAILTEL, at System Integrator's cost, at the Manufacturer's works.
- RAILTEL shall have free entry and access to any and all parts of the Manufacturer's facilities associated with manufacturing and testing of the system at any given time.
- It shall be explicitly understood that under no circumstances shall any approval of RAILTEL relieve the System Integrator of his responsibility for material, design, quality assurance and the guaranteed performance of the system and its constituents.

- System Integrator shall invite RAILTEL, at least 10 days in advance, of the date at which system shall be ready for Inspection and Testing. All relevant documents and manuals, approved engineering drawings, etc. shall be available with RAILTEL well in advance of the start of Inspection and Testing.
- RAILTEL's Engineer or his representative shall, after completion of inspection and testing to their satisfaction, issue factory acceptance certificates and dispatch clearance to release the equipment for shipment. No equipment shall be shipped under any circumstances unless a factory acceptance certificate and dispatch clearance has been issued for it, unless agreed otherwise by RAILTEL.

#### **11.3.14 Maintenance**

The contractor shall maintain systems in a first class and safe manner during guarantee period. Such maintenance shall be for the entire systems except when failure occurs due to work performed by others. Responsibility entails periodic inspection by the supervisor / technician and unlimited call back service including nights, weekends and holidays. Apart from the above, this maintenance shall include one visit by Engineer per month with visit timings adjusted so as not to coincide with the busiest usage period. Call back service shall be responded and restored as per the SLA parameters provide at the Annexure in the document. There shall be no compensation for call back service regardless of the time of day, holidays etc. The contractor shall anticipate demand on supplies and parts and keep an inventory of a reasonable number of spare parts, at his own cost, on site in a self-provided lockable metal cabinet or at the nearest Service Centre in NCR, so that the remediation / restoration can be provided as per the SLA.

If the SI fails to meet the above, Performance Bank Guarantee will be forfeited.

- Carry out preventive and periodic maintenance required as per the recommendations of the OEM, the cost of consumables required for periodic maintenance such as oil, filters, lubricants, batteries, refrigerants, etc. during the warranty period will be to the account of the Bidder.
- Provide periodic maintenance/audits required by the appropriate regulatory authority such as local electricity boards, fire safety authorities, CCOE, etc.
- To maintain adequate spares onsite for ensuring the SLA. The Bidder has to provide a list of spares to be maintained during the support period as a part of the technical bid.
- All the equipment supplied for the Data Centre shall be with three years warranty.
- Scheduled on-site service support and call-based on-site service support to be provided during the warranty period for all the equipment/systems of the Data Centre by the OEMs/System Integrators of various systems. Bidder has to provide the following details:
- Details of OEMs/System Integrators of various systems
  - Warranty documents
  - Confirmation letters from OEMs/System Integrators for:
    - providing the service support for the warranty period
    - their commitment to the response time
  - escalation matrix

- providing patches, upgrades and updates to the supplied software and ensure they are applied after due diligence and approval by the RAILTEL Engineer in-charge.
- Decision of RAILTEL Engineer-in-charge is final and binding.

### **11.3.15 Operation & Maintenance**

The following Operation and Maintenance (O&M) services of the Data Centre shall be considered while bidding:

- Contractor has to provide Operation and Maintenance of the Data Centre for all the equipment and systems supplied and installed by the Contractor for a period of 3 years from the date of issue of Acceptance Certificate. Contractor has to provide the following manpower for providing O&M services 24x7 for this period:
  - ✓ One qualified, trained and experienced maintenance engineer on-site for critical subsystems (power & cooling)
  - ✓ one BMS Engineer on site.

Additionally, One Maintenance Manager in general shift shall be responsible for the overall O&M operations. He has to attend the monthly review meetings and be at site beyond the general shift timings during major maintenance activities of the Data Centre.

The following O&M services are considered:

- Onsite engineers shall continuously monitor the functioning of various subsystems supplied and installed by the contractor and any failures shall be identified within 2 minutes of the occurring of the problem and corrective action shall be initiated immediately.
- To ensure the following service level requirements: 99% as per RailTel Data Centre Category B / Tier II requirements.
- Any failure of critical components (power distribution equipment, cooling system for Data Centre) shall be restored within 30 minutes from the time of failure.
- Any failure of non-critical components shall be restored within 4 hours from the time of failure.
- Provide daily, weekly and monthly service performance reports in the format approved by RailTel engineer in-charge.
- Maintain backup of Access Control logs, CCTV recordings, BMS data, etc. as per the requirements of RailTel. The contractor shall submit the backup policy as per the industry best practices that would be approved by RailTel Engineer in-charge.
- Manage the configuration of all the supplied hardware and software.
- Implement and manage a proper change management process for carrying out changes to configuration, equipment, replacement, etc.
- Train RailTel manpower and associate them for the operation and maintenance of the Data Centre during this period.
- Carry out preventive and periodic maintenance required as per the recommendations of the OEM, the cost of consumables required for periodic maintenance such as oil, filters, lubricants, batteries, refrigerants, etc. during the O&M period will be to the account of the Contractor.
- Provide periodic maintenance/audits required by the appropriate regulatory authority such as local electricity boards, fire safety authorities, CCOE, etc.
- To maintain adequate spares onsite for ensuring the SLA. The Contractor has to provide a list of spares to be maintained during the support period as a part of the technical bid.
- All the equipment supplied for the Data Centre shall be with three years warranty.

- Scheduled on-site service support and call-based on-site service support to be provided during the warranty period for all the equipment/systems of the Data Centre by the OEMs/System Integrators of various systems. Contractor has to provide the following details:
  - ✓ Details of OEMs/System Integrators of various systems
  - ✓ Warranty documents
  - ✓ Confirmation letters from OEMs/System Integrators for:
    - ✓ providing the service support for the warranty period
    - ✓ their commitment to the response time
    - ✓ escalation matrix
    - ✓ providing patches, upgrades and updates to the supplied software and ensure they are applied after due diligence and approval by the RailTel Engineer in-charge.
- Decision of RailTel Engineer-in-charge is final and binding.

### **11.3.16 Submittals**

The bidder shall submit the documents including but not limited to the following as part of the technical bid:

- Detailed DC layout with cross section view
- Detailed electrical SLD for the entire Data Centre
- Detailed Earthing Scheme as per IEEE 1100 and TIA 942 compliance.
- Detailed layouts of the Panels
  - Cable Tray Layouts
  - HVAC layout.
  - Lighting and Switch socket layout.
  - Fire Detection & Suppression layout and gas calculation sheet duly signed by OEM.
  - Drawing indicating locations of sensors and configuration diagrams for Access Control System, Rodent Repellant System and Water Leak Detection Systems.
- Datasheet/Technical Brochures of all the Equipment proposed in Data Centre
- Detailed BOQ for all components and subsystems. Each subsystem BOQ shall contain detailed break-up of the components and quantities without prices.
- OEM/Manufacturer Authorization letter in Original duly signed by authorized signatory of OEM for UPS, PAC, PDU, Racks, Networking Infrastructure, Safety and Security Systems and BMS.
- IO summary, KPIs and MIS for the BMS
- List of documents for demonstrating compliance to Eligibility Criteria.
- Support Methodology
- Escalation Matrix
- How the bidder shall meet the SLA
- The bidder shall provide a comprehensive list of periodic maintenance tasks for all subsystems/equipment
- List of onsite spares

These submittals form part of technical evaluation process.

Any bid not compliant to this requirement is liable to be rejected.

## 12 Approved Makes List

S. No.	Components/Equipment	Makes Preferred
1.	Fire Rated Doors	Shakti Hormann / MPP/Ahlahda or Equivalent
2.	False Ceiling	Armstrong/Saint gobain or Equivalent
3.	False Floor	Unatile / Uniflair / Kingspan or Equivalent
4.	Furniture	Godrej / Featherlite /Sri Ram Furniture/Monarch or Equivalent
5.	Electrical Panels	CPRI Approved or Equivalent
6.	ACBs / MCCBs	L&T. Schneider, ABB or equivalent
7.	MCBs	RL&T. Schneider, ABB or equivalent
8.	UPS system	Vertiv / Schneider / Eaton or Equivalent
9.	Lithium Ion Batteries	Samsung / LG or Equivalent
10.	LT Cables	Polycab / RPG / KEI or Equivalent
11.	Light Fixtures	Wipro / Philips or Equivalent
12.	Electrical Switches and Sockets	Neptune / Legrand or Equivalent
13.	Earthing Electrode and Electrode Backfill	Ashlok / JMV LPS / Earthplus Systems or Equivalent
14.	Inrow Cooling	Vertiv / Schneider / Rittal or Equivalent
15.	Hot/Cold Aisle Containment	Rittal / Vertiv / Schneider/WQ or Equivalent
16.	IBMS	Siemens/Honeywell or equivalent
17.	CCTV	Bosch / Axis / Honeywell/CP PLUS or Equivalent
18.	Access Control System	Siemens/Honeywell or equivalent
19.	Early Detection System	Siemens/Honeywell or equivalent
20.	Rodent Repellent System	Maser / RScat/C Systems or Equivalent
21.	Water Leak Detection System	Sontay / Star Electronics / RScat/ C Systems or Equivalent
22.	Fire Suppression	Siemens/Honeywell/Cryptzo or Equivalent
23.	Addressable Fire Alarm System	Siemens/Honeywell or equivalent
24.	Racks	Rittal / Schneider / Vertiv or Equivalent

S. No.	Components/Equipment	Makes Preferred
25.	PDU	Vertiv/ Schneider/ n-vent/ Netrack or Equivalent
26.	Structured cabling	R&M / Commscope Systimax / 3C3/ Belden or Equivalent
27.	Copper cabling trays / wire baskets	Legrand or Equivalent
28.	Fiber Management System	R&M / Commscope Systimax / 3C3 or Equivalent

**Annexure-I: Interior Layout drawing**

**Annexure-II: Electrical SLD**





**CHAPTER - V**

**INSTRUCTIONS TO TENDERERS**

**AND**

**CONDITIONS OF TENDERING**

**रेलवे**  
**RAILTEL**

## INSTRUCTIONS TO TENDERERS AND CONDITIONS OF TENDERING

### INDEX

PARA	SUBJECT
1.	GENERAL INSTRUCTIONS
2.	INTERPRETATIONS
3.	LOCAL CONDITIONS
4.	COMPLIANCE TO TENDER CONDITIONS, SPECIFICATIONS & DRAWINGS
5.	EARNEST MONEY/ BID GUARANTEE
6.	SUBMISSION OF OFFERS
7.	CONSTITUTION OF FIRM AND POWER OF ATTORNEY
8.	UNIT PRICES
9.	NOT USED
10.	RATES DURING NEGOTIATION
11.	NOT USED
12.	PERIOD OF COMPLETION AND TIME PROGRESS GRAPH
13.	OPENING OF TENDER
14.	NON-TRANSFERABILITY AND NON-REFUNDABILITY
15.	ERRORS, OMISSIONS & DISCREPANCIES
16.	WRONG INFORMATION BY TENDERER
17.	CONSORTIUM BIDS
18.	QUALIFYING CRITERIA
19.	NOT USED
20.	SYSTEM PERFORMANCE GUARANTEE
21.	EVALUATION OF OFFER
22.	AGREEMENT
23.	FOREIGN EXCHANGE AND HIGH SEA SALE
24.	TENDERER'S ADDRESS
25.	PREFERENCE TO PUBLIC SECTOR UNDERTAKING

# **INSTRUCTIONS TO TENDERERS AND CONDITIONS OF TENDERING**

## **1. GENERAL INSTRUCTIONS**

- 1.1 Tender is invited on behalf of M/s RailTel Corporation of India Limited, , 6th Floor, 6A, Gumidelli Towers, Begumpet, Hyderabad – 500016 for the work as defined in preamble para 1.
- 1.2 The Preamble, Instructions to Tenderers and Conditions of Tendering, Special Conditions of Contract, Technical Specifications & Supplement, Schedule of Requirements, all Annexures & Forms and Corrigendum & Addendum etc, if any, shall, hereafter, be collectively referred to as the "**Tender Papers**".

## **2. INTERPRETATIONS**

The following terms wherever occurring in the tender papers and wherever used throughout the execution of the work, shall, unless excluded by or repugnant to the context, have the meaning attributed thereto as follows:

"**CONTRACT**" Means the Contract resulting from the acceptance by the Purchaser of this Tender whether in whole or in part.

"**CONTRACTOR**" Means the successful Tenderer, i.e., the Tenderer whose Tender has been accepted either in whole or in part.

"**CONTRACTOR'S REPRESENTATIVE**" Shall mean a person in supervisory capacity who shall be so declared by the Contractor and who shall be authorized under a duly executed power of attorney to receive materials issued by the Purchaser to the Contractor for the works. He shall be responsible for proper execution of works at each or all places and shall take orders from Purchaser's Engineers and carry out the same.

" **ENGINEER / ENGINEER-IN-CHARGE** " Shall mean an executive of RailTel incharge of works and shall include the superior executives of RailTel. He is responsible for ensuring that all field works covered by the contract are carried out in accordance with approved designs, drawings & specifications and conditions of contract as agreed to.

" **ENGINEER'S REPRESENTATIVE** " Shall mean the supervisor of RailTel in direct charge of the works.

"**EQUIPMENT**" Means all or any equipment considered necessary by the Purchaser's Engineers for satisfactory operation, as a whole, of the installations.

"**MONTH**" Means any consecutive period of thirty days.

"**MATERIALS**" Means all equipments, components, fittings and other materials including raw materials required to complete the work..

"**PURCHASER**" Means Executive Director, RailTel Corporation of India Limited, 2<sup>nd</sup> Floor, B-Block, Rail Nilayam, Secunderabad-500071 .

**"PURCHASER'S ENGINEER"** Means the General Manager of RailTel or successor who will decide all matters relating to design, manufacture, installation and commissioning of the plant and equipment at site.

**"SUB-CONTRACTOR"** Means an individual or a firm of Contractor or a Company registered under Indian Company Act or an approved supplier of materials to whom the Contractor sublets portions of the contract.

**"CONSIGNEE"** Means the person specified in the Acceptance of Tender to whom Stores are to be delivered at the destination.

**"INSPECTING OFFICER"** Means the person ,or organisation specified in the contract for the purpose of inspection of stores of work under the contract and includes his/their authorised representative.

**"RailTel"** Means RailTel Corporation of India Limited, 2<sup>nd</sup> Floor, B-Block, Rail Nilayam, Secunderabad-500071

**"SITE"** Means the areas to be taken up by the permanent works, together with any other area or areas as shall be determined by the Purchaser's Engineer, which may be placed at the disposal of the Contractor for the purpose of the contract and also such area or areas used for store yards, works yards or workshop in proximity of the works as the Purchaser's Engineer may have authorized as an extension of the site, irrespective of the terms and conditions under which they are occupied by the Contractor.

**"BLOCK SECTION"** Means the distance along the railway track between two consecutive Railway stations.

**"TENDERER"** Means and includes any firm of engineers or Contractors or any company or body, corporate or otherwise, who submit the Tender which has been invited.

**"WORK OR WORKS"** Means all or any of the items of the work for which the Tenderer /Contractor has Tendered/contracted according to the specifications, drawings and Annexure hereto annexed or to be implied there from, or incidental thereto or to be hereafter specified or required in such explanatory instructions and drawings, being in conformity with the original specifications, drawings, Annexure and schedules and also such instructions and drawings additional to the aforementioned as may from time to time be issued by the Purchaser's Engineer during the progress of the contracted work.

**"WRITING"** Includes all matters written, typewritten or printed either in whole or in part.

### **3. LOCAL CONDITIONS**

3.1 It will be imperative on each tenderer to fully acquaint himself with all the local conditions and factors which would have any effect on the performance of the contract and cost of the stores. The purchaser shall not entertain any request for clarifications from the tenderer regarding such local conditions. No request for the change of price, or time schedule of delivery of stores shall be entertained after the offer is accepted by the purchaser on account of any local condition or factor.

3.2 The intending tenderer is advised to study the tender papers carefully. Any submission of a bid by the tenderer shall be deemed to have been done after a careful study and

examination of these documents with full understanding of the implication thereof. These conditions and specifications shall be deemed to have been accepted unless otherwise, specifically commented upon by the Tenderer in his quotation. Failure to adhere to anyone or all these instructions may render his offer liable to be ignored without any reference.

- 3.3 Should a tenderer find discrepancies in, or omission from, the drawings or any of the Tender papers or he has any doubt to their meaning, he should at once notify the RailTel who may send a written clarification to all tenderers.

**4. COMPLIANCE TO TENDER CONDITIONS, SPECIFICATIONS & DRAWINGS**

- 4.1 The tenderer shall indicate paragraph by paragraph for each section of the tender document that either his tender complies in every respect with the requirements of each clause and sub clause or if not, precisely how they differ from the requirements of the tender. In latter case, the Tenderer shall enclose a separate statement as per proforma given, indicating only the deviations for any clause or sub clause of Special Conditions of Contract, Instructions to Tenderers and Conditions of Tendering, Technical Specifications, Preamble etc. which he proposes with justifications for deviations proposed. The purchaser reserves the right to accept or reject these deviations and his decision thereon shall be final (see Form 5).
- 4.2 The equipment offered shall be in accordance with the drawings and specifications. Details of variation from the drawings and specifications, if any, should be clearly indicated separately for each annexure with justification for deviations proposed. The Purchaser reserves the right to accept or reject these deviations and his decision thereon shall be final.
- 4.3 Firms should give details of similar works carried out giving details of the name of the project, date of award, length of the section, value of the contract, the original execution period and the actual execution time taken.
- 4.4 The tenderer should serially number all the pages of the credential bid ( part I).
- 4.5 The tenderer should provide information about the compliance of various clauses / sub clauses / paragraphs ( when tenderer plans to give separate compliance of each paragraph or sub clause) of section I,II and III of the tender document as per following table.

Serial no.	Clause no. with chapter and volume no.	First few words of clause / sub clause / paragraph	Compliance status (compliant/ partially compliant/non-compliant)	Reference of clause /page no. of supporting document ( this page no. shall correspond to the serial numbering of the credential bid)	Remarks if any
------------	--	--	--	--	----------------

The table given above , complete in all respects, must be placed with offer letter in the Credential bid ( Part I) of the document. For partially compliant and non-compliant items, suppliers shall state if functionality will be fully supported in future release of equipment.

## 5. EARNEST MONEY/ BID GUARANTEE

The tenderer shall furnish an amount given in of "Preamble para 10" as earnest money in favour of RailTel Corporation of India Limited.

## 6. SUBMISSION OF OFFERS

6.1 The offer in the prescribed forms should be submitted before the time and date fixed for the receipt of the offers.

6.2 In case the date of opening happens to be a holiday, the tender will be received and opened at the same time on the next working day.

6.3 The offer shall be either type written or written neatly in indelible ink in English. Each page of the offer must be numbered consecutively. A reference to total number of pages comprising the offer must be made at the top right hand corner of the top page. The supporting documents should be submitted either in original or duly signed by the authorised signatory of the tenderer. The original documents shall be produced for verification when called for.

6.4 All copies of the tender papers shall be signed in ink by the tenderer, on each page including closing page in token of his having studied the tender papers carefully.

### 6.5 RATES IN FIGURES & WORDS :-

(I) All prices and other information like discounts etc. having a bearing on the price shall be written both in figures and in words in the prescribed offer form. In case of difference in words and figures the amount written in words will be taken into consideration.

(ii) In the event of any discrepancy between unit rate and total cost, the value shown in unit rate will be taken for evaluation purpose.

(iii) In case the schedule of requirement quoted by tenderer is incomplete with reference to tender document, the offer is liable to be rejected.

6.6 **ATTESTATION OF ALTERATION:** No scribbling is permissible in the tender documents. Tender containing erasures and alterations in the tender documents are liable to be rejected. Any correction made by the tenderer/ tenderers in his/their entries must be signed (not initialed ) by him/them.

6.7 The tender shall be submitted in two parts, **Part I - Technical Bid** along with soft copy in CD and **Part II - Price Bid**. Both bids shall be sealed in separate envelopes and both envelopes put in one large envelop. All the three envelopes should bear the tender number its description and date of closing/opening.

(i) The tenderer shall submit his tender in three copies in one sealed cover. Each copy of the tender shall be complete in all respects. The copies should be marked "original" & 'Duplicate'.

(ii) The original tender paper purchased from this office/ down loaded from web site shall be submitted with each page duly signed and stamped along with the original offer

**The credential bid shall consist of the following:-**

- Offer letter complete.
- Schedule of Supply and Services (i.e., Schedule of Requirements) with summary of prices blanked out.
- Bill of material with prices with prices blanked out.
- Earnest Money in prescribed form.
- Audited balance sheet duly certified by tenderer.
- Constitution of Firm and Power of Attorney
- Clause wise compliance to tender conditions & statement of deviations
- Tenderer's credentials and willingness of original manufacturer as per Qualifying Criteria
- Similar works executed or under execution.
- User's Certificate
- System performance guarantee
- Complete technical data and particulars of the equipment offered, as specified in the Tender papers together with descriptive literature, leaflets, Drawings, if any, complete with list etc.
- Name of manufacturers, place of manufacture and the certificate for proven design and performance
- Technical proposal of tenderer in conformity with system design or alternative proposal of the tenderer, if any.
- Notarized Affidavit as per Form 13 (cl.no.161)
- Bid security declaration along with Udyam or Startup in case of EMD exemption sought.
- Any other information desired to be submitted by the tenderer.
- The present work load of the datacentre turnkey contracts in hand as per the format
- A checklist should be submitted indicating requirement of eligibility criteria and document submitted against the same

**7. CONSTITUTION OF FIRM AND POWER OF ATTORNEY**

- 7.1 Any individual(s) signing the tender or other documents connected therewith should specify whether he is signing:-
- (a) As sole proprietor of the concern or as attorney of the sole Proprietor.
  - (b) As a partner or partners of the firm.
  - (c) As a Director, Manager or Secretary in the case of Limited Company duly authorized by a resolution passed by the Board of Directors or in pursuance of the authority conferred by Memorandum of Association.
  - d) As a lead member of Consortium or joint venture of firms
- 7.2 In the case of a firm not registered under the Indian Partnership Act, all the partners or the attorney duly authorized by all of them should sign the tender and all other connected documents. The original Power of Attorney or other documents empowering the individual or individuals to sign should be furnished to the Purchaser for verification, if required.
- 7.3 The RailTel will not be bound by Power of Attorney granted by the tenderer or by the changes in the composition of the firm made subsequent to the execution of the contract agreement.

7.4 In case where the Power of Attorney partnership deed has not been executed in English, the true and authenticated copies of the translation of the same by Advocate, authorized translators of Courts and Licensed Petition Writers should be supplied by the Contractor(s) while tendering for the work.

7.5 The duly notarised Power of Attorney, Partnership Deed, Memorandum of Joint Venture as the case may be in original or duly signed.

**8. UNIT PRICES**

The Unit prices should be quoted in Indian Rupees by the tenderer after taking all the relevant factors into consideration and these should be Firm and all inclusive without any variation clauses. The prices shall be quoted in rupees for the units under metric system.

**9. VALIDITY OF OFFER**

The tenderer should keep the offers valid for the period as mentioned in "Preamble".

**10. RATES DURING NEGOTIATION**

The tenderer/s shall not increase his/their quoted rates in case the RailTel Administration negotiates for reduction of rates. Such negotiations shall not amount to cancellation or withdrawal of the original offer and the rates originally quoted will be binding on the tenderer/s.

**11. Deleted**

**12. PERIOD OF COMPLETION AND TIME PROGRESS GRAPH**

The works/work are/is to be completed within a period as mentioned in preamble from the date of issue of Letter of Acceptance of the tender. Tenderer shall submit target dates for various stages of contract execution to ascertain completion period.

**13. OPENING OF TENDER:**

13.1 Tenderer's Credential Bid (Part-I) will be opened at the time & date of opening of the tender given in the preamble in presence of such Tenderers/Authorized Representatives who choose to be present online.

13.2 After scrutinizing Credential Bid, "Price Bid (Part- II)" will be opened on a time and date to be informed separately in presence of those Tenderers who qualify in "Credential Bid (Part-I)" as per qualifying criteria laid down in Clause 18 of this Chapter and meeting with technical specifications and who choose to be present online.

13.3 Price Bid (part-II) envelopes of those Tenderers who are not found to meet tender conditions will not be opened.

**14. NON-TRANSFERABILITY AND NON-REFUNDABILITY**

The tender documents are not transferable. The cost of tender paper is not refundable.

**15. ERRORS, OMISSIONS & DISCREPANCIES**

The Contractor(s) shall not take any advantage of any mis-interpretation of the conditions due to typing or any other error and if in doubt, shall bring it to the notice of the Engineer without delay.

In case of any contradiction only the printed rules, and books should be followed and no claim for the mis-interpretation shall be entertained.

**16. WRONG INFORMATION BY TENDERER**

If the tenderer/s deliberately gives/give wrong information in his/their tender which creates/create circumstances for the acceptance of his/their tender the RailTel reserves the right to reject such tender at any stage.

16.1 "The tenderers shall **submit a notarized affidavit** on a non-judicial stamp paper stating that they are not liable to be disqualified and all their statements/documents submitted along with bid are true and factual. Standard format of the affidavit to be submitted by the bidder is enclosed as Form-13. Non submission of an affidavit by the bidder shall result in summary rejection of his/their bid. And It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self attested by which they/he is qualifying the Qualifying Criteria mentioned in the Tender Document. It will not be obligatory on the part of the RailTel to scrutinize beyond the submitted document of tenderer as far as his qualification for the tender is concerned."

With the submission of the affidavit as mentioned above, the practice of verification of tenderer's documents by the RailTel may be dispensed with.

- a) The RailTel reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the RailTel, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the RailTel shall not relieve the bidder of its obligations or liabilities here under nor will it affect any rights of the RailTel there under.

In case of any wrong information submitted by the tenderer, the contract shall be terminated, Earnest Money Deposit (EMD) and Security Deposit (SD) & Performance Guarantee (PBG) of contract forfeited and agency barred for doing business on entire RailTel for 5 (five) years.

**17. DELETED**

**18. QUALIFYING CRITERIA**

For qualifying in credential bid the contractor shall be required to meet the eligibility requirements as given in para 5 of preamble.

**19. NOT USED.**

**20. SYSTEM PERFORMANCE GUARANTEE**

20.1 The OEM shall give unqualified and unconditional guarantee that when the equipment / material supplied by him is installed and commissioned at site, it shall achieve the desired objective and that in the event of performance of the system when installed not complying with the end objective or with the specifications, he shall provide further inputs to enable the RailTel to realize the end objectives with full compliance of the specifications contained in these documents. No additional payment will be made to the contractor for supply of any additional goods and service required in this regard.

20.2 This certificate in the proforma given in Form No. 7, shall accompany the final offer. Absence of this certificate which will form part of the agreement shall disqualify the tenderer automatically.

**21. EVALUATION OF OFFER**

The authority for the acceptance of the tender rests with the Purchaser. The tenders received will be evaluated by the Purchaser to ascertain the best acceptable tender in the interest of the Purchaser.

However, the purchaser shall not be bound to accept the lowest or any tender or to assign any reason for non-acceptance or rejection of a tender. The purchaser reserves the right to accept any tender in respect of the whole or any portion of the work specified in the tender paper or to sub-divide the work among different Tenderers or to reduce the work or to accept any tender for less than the tendered quantities without assigning any reason whatsoever.

**22. AGREEMENT**

The successful tenderer/s shall be required to execute an agreement with the representative of RailTel for carrying out the work according to the tender documents as indicated in para 2 of Special Conditions of Contract (Section II Chapter II).

**23. DELETED**

**24. TENDERER'S ADDRESS**

Tenderer shall state in the tender his postal address fully and clearly. Any communication sent to the tenderers by post at his said address shall be deemed to have reached the tenderer duly & timely, notwithstanding the fact that the communication could not reach the tenderer at all or in time for whatever reason. Important documents shall be sent by Registered Post.

**25. PREFERENCE TO PUBLIC SECTOR UNDERTAKING**

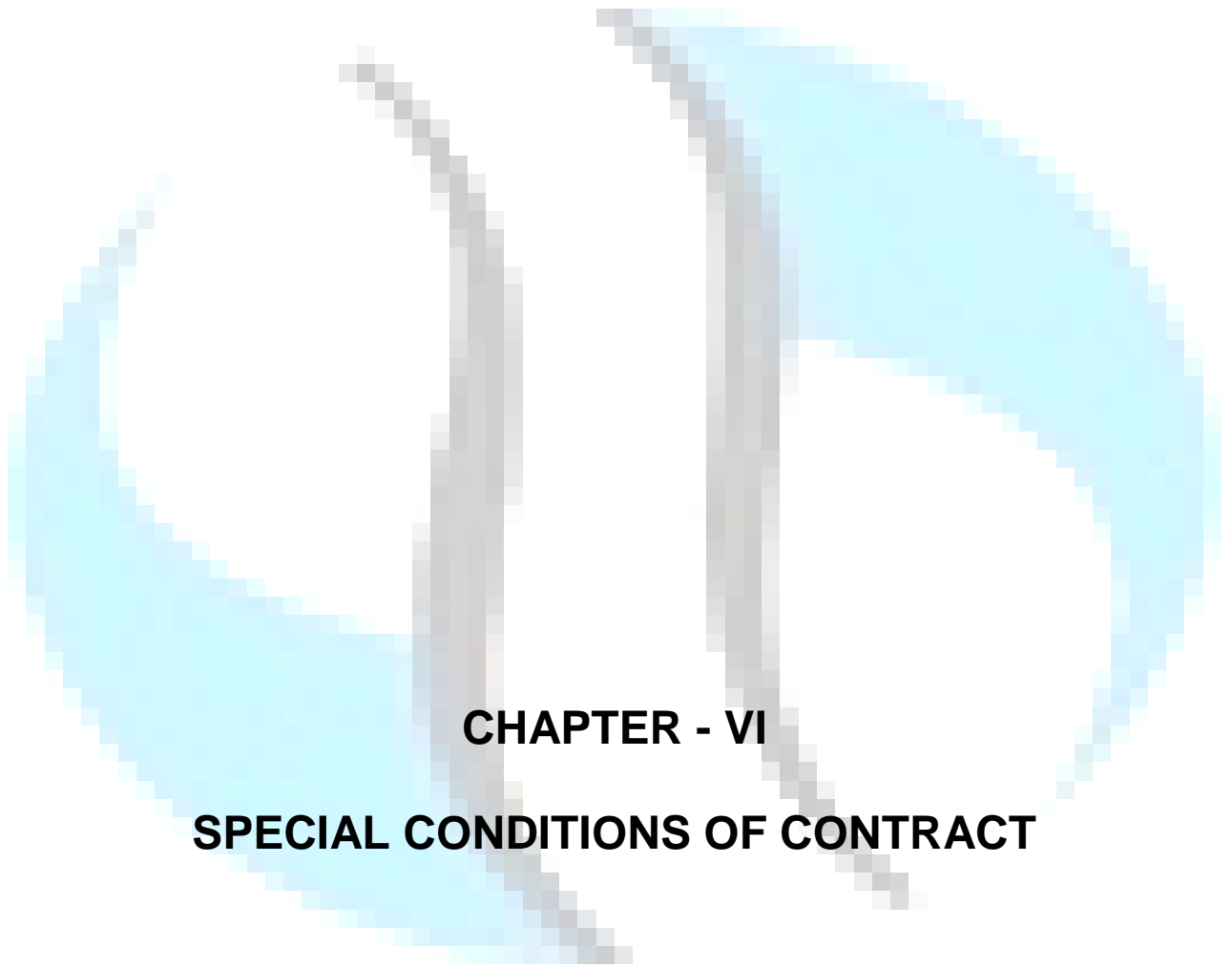
Due preference as per the extant rules if applicable will be given to Public Sector Undertakings.

**26. National Interest**

While evaluating the tender, regards would be paid to National Defence and security considerations.

The directives issued from time to time by the Department of Telecommunications (DoT), Ministry of Communications and IT or any other Ministry of Govt. of India on security considerations shall be applicable to the present tender. Accordingly, as per the extent amendment of the National Long Distance (NLD) Service License Agreement for Security related concerns for expansion of Telecom Services in various zones of the country issued vide Department of Telecommunication, Ministry of Communication and IT, Govt. of India's letter no. 10-54/2010-CS-III (NLD) dated: 31.05.2011, the successful bidder's OEM shall comply with the provisions stated in the above mentioned directive of DoT and shall have to enter into an agreement with RailTel as per the template agreement between Telecom Service Provider and the vendor of equipment, product and services (available on DoT website). The tenderer must submit a declaration along with their techno commercial bid (Part-I)

\*\*\*\*\*



**CHAPTER - VI**

**SPECIAL CONDITIONS OF CONTRACT**

रेलवे  
RAILTEL

# **SPECIAL CONDITIONS OF CONTRACT**

## **I N D E X**

<b>PARA</b>	<b>SUBJECT</b>
1.	TENDER DOCUMENTS
2.	AGREEMENT
3.	CONTRACT PERFORMANCE GUARANTEE (SECURITY DEPOSIT)
4.	CONTRACTOR'S OFFICE & STORES DEPOT
5.	USE OF RAILWAY LAND
6.	PROGRAMME OF WORK.
7.	COMPETENT SUPERVISORS
8.	NOT USED
9.	NOT USED
10.	TEST & MEASURING INSTRUMENTS AND SPECIAL TOOLS ETC
11.	STORES TO BE SUPPLIED BY CONTRACTOR
12.	SUPPLY OF TECHNICAL LITERATURES, DOCUMENTATION, DRAWINGS, INSTRUCTION BOOK & COMPLETION PLANS ETC
13.	SPARES
14.	LONG TERM AVAILABILITY OF SPARES AND SYSTEM SUPPORT
15.	QUALITY ASSURANCE
16.	NOT USED
17.	INSPECTION OF MATERIALS
18.	INSPECTION OF WORKS
19.	VARIATION IN QUANTITIES
20.	FALL CLAUSE
21.	SUBLETTING AND ASSIGNMENT
22.	EXECUTION OF WORK
23.	NOT USED
24.	MAINTENANCE OF WORKS
25.	CLEARANCE OF SITE
26.	PROVISIONAL ACCEPTANCE
27.	PLACING IN SERVICE & MAINTENANCE SUPERVISION
28.	FINAL ACCEPTANCE

29. WARRANTY
30. TRAINING
31. INFRINGEMENT OF PATENTS
32. LICENSE AS PER GOVT. OF INDIA CONTRACT LABOUR ACT
33. DEFAULTS AND DELAYS
34. LOSS SUSTAINED DUE TO DEFAULTS AND DELAYS
35. PENALTY FOR DELAY IN COMPLETION
36. ADHERENCE OF TIME SCHEDULE EXTENSION OF TIME
37. CONTRACTOR'S LIABILITIES FOR COSTS AND DAMAGES
38. UNIT PRICES
39. MEASUREMENT OF WORKS
40. TERMS OF PAYMENTS
41. FINAL PAYMENTS
42. FINAL SETTLEMENT
43. CERTIFICATE FOR MODVAT BENEFITS ON BILLS
44. DEDUCTIONS FROM ON ACCOUNT PAYMENT BILLS
45. TAXES
46. MOBILISATION ADVANCE
47. INSURANCE
48. FORCE MAJEURE CLAUSE
49. SETTLEMENT OF DISPUTE AND ARBITRATION
50. TERMINATION OF CONTRACT

भारतीय  
RAILTEL

## SPECIAL CONDITIONS OF CONTRACT

### 1. TENDER DOCUMENTS

1.1 The goods and services required, bidding procedure and contract terms are prescribed in the tender documents. The set of tender documents issued for the purpose of bidding includes following together with Corrigendum and Addendum, if any.

Section-I:       I)       Preamble.  
                      II)       System Requirement & SOR  
                      III)       Technical Specifications

Section-II:       I)       Instructions to tenderers and conditions of tendering.  
                      II)       Special conditions of contract  
                      III)       Form of Tender  
                      IV)       Inspection, Test, Installation & Commissioning.

1.2 If the Tender submitted by a Tenderer is accepted and the contract awarded to the Tenderer the various works coming under the purview of the contract shall be governed by tender documents mentioned above.

1.3 Any special conditions stated by the Tenderer in the covering letter submitted along with the tender shall be deemed to be a part of the Contract to such extent only as have been explicitly accepted by the RailTel.

### 2. AGREEMENT

The successful Tenderer shall within 15 days after having been called upon by notice to do so be bound to execute an agreement based on accepted rates and conditions, in such form as the RailTel may prescribe, and lodge the same with the RailTel together with the conditions of contract, specifications and Schedule of prices referred to therein duly completed. The form for agreement is included in Section II, Chapter III (Form No.3).

#### 3.1 Security Deposit (SD):

On Receipt of the Letter of Acceptance/PO of Tender from the RailTel, the successful **Tenderer shall deposit an amount equal to 5% of contract value as Security deposit** for due fulfilment of the contract within a period of 15 days.

The Earnest Money already paid by the successful Tenderer may at the discretion of the successful Tenderer be adjusted towards payment of this Security deposit and the additional amount shall be paid in any one of the following forms:

- (a) Demand Draft from any scheduled banks.
- (b) Irrevocable Bank Guarantee issued by any scheduled bank acceptable to purchaser (Proforma of PBG available at Chapter –IV Annexure-1).

The Security Deposit will bear no interest.

**The Instruments for security deposit should be valid for three months beyond the defects liability/warranty period and AMC of 4 year.** On successful completion of AMC period and on certification of concerned RailTel engineer, the security deposit will be refunded or Bank guarantee released to the contractor after adjustment of any dues payable by the contractor.

**3.2 CONTRACT PERFORMANCE GUARANTEE (PBG):**

3.2.1 On receipt of the Letter of Acceptance of Tender from the RailTel, the successful Tenderer should give a Performance Guarantee in the form of irrevocable bank guarantee from any Nationalized Bank or Scheduled Bank in the Form given in Tender document amounting to **5% of the contract value.**

3.2.2 The Performance Guarantee should be furnished by the successful contractor after letter of acceptance has been issued, but before signing of the agreement. The agreement should normally be signed within 30 (fifteen) days after issue of LOA/PO and Performance Guarantee should also be submitted within this time limit. The Instruments for Performance Guarantee should be valid for three months beyond the completion period.

Performance Guarantee upto ₹5 Lakhs will be accepted only through Bank transfer only. As per RBI guidelines BG above ₹50,000/- should be signed by two bank officials. PBG should be from scheduled commercial bank (either private or PSU) but not from any cooperative Bank or NBFC and BG issuing bank must be SFMS enabled. Under SFMS system, a separate advice of the BG (via SFMS IFN 760COV) to be sent to the advising bank (RailTel) through SFMS by the issuing Bank (Applicant). Similar process to be followed for bank guarantee amendment also and separate advice (via SFMS IFN 767COV) is sent to the advising bank (RailTel). RailTel Bank (i.e A/c No, IFSC Code, Branch address etc.,) details will be provided to the vendor for SFMS purpose. Vendor should ensure BG expiry date and BG claim date should be 63 months. Also, if RailTel insist for extension of PBG, vendor must ensure extension of PBG must be carried out at least prior to 90 days of the PBG expiry date.

Performance Guarantee shall be released after satisfactory completion of the work. Wherever the contracts are rescinded, the security deposit shall be forfeited and the Performance Guarantee shall be en-cashed.

The balance work shall be got done independently without risk and cost of the original contractor.

The original contractor shall be debarred from participating in the tender for executing the balance work. If the failed contractor is a Joint Venture (JV) or a partnership firm, then every member/partner of such a firm would be debarred from participating in the tender for the balance work either in his/her individual capacity or as a partner of any other JV/partnership firm.

#### **4. CONTRACTOR'S OFFICE & STORES DEPOT**

The Contractor shall within Fifteen days of issue of letter of acceptance of tender establish an office and store depot at a convenient place for receiving and storing equipments and materials and progressing field work expeditiously in consultation with the approval of the purchaser's Engineer. He shall intimate the purchaser's Engineer address thereof to which all correspondence should be sent. Any communication sent to the contractor by post at his said address shall be deemed to have reached the contractor duly and in time. Important documents shall be sent by Registered post.

#### **5. USE OF RAILWAY LAND**

Use of Railway land required by the Contractor for construction of temporary offices, quarter(s), hutments etc. for the staff and for storing materials etc. will be permitted to him/them subject to approval by Railways, if available at the charges prescribed by the Railways. The land will be restored to Railways by the Contractor(s) in the same condition as when taken over or in vacant condition as desired by the Engineer after completion of the work or at any earlier day as specified by the Engineer. Failure to do so will make the Contractor(s) liable to pay the cost incurred by the Railway for getting possession of land.

#### **6. PROGRAMME OF WORK**

6.1 The Contractor shall have necessary resources to execute the work so that the entire work is completed within a period as mentioned in the preamble from the date of issue of Letter of Acceptance of the tender. He shall also have necessary resources to take up the work simultaneously at more than one independent places in order to expedite the completion of work.

6.2 Within a period of 15 days beginning from the date of issue of Letter of Acceptance of Tender the Contractor shall submit the detailed time Schedule for the execution of work based on the conditions in consultation with the RailTel to the authority mentioned in the Preamble and approved by the later in writing before commencement of the work.

6.3 The Contractor shall be held responsible for the execution of the work according to the Program given above in full compliance of the various clauses of the Technical specifications, instructions/ drawings etc. Failure to comply with any of these will be dealt with as per provision laid down in Conditions of Tendering.

6.4 Approach roads, where ever available can be used for carting materials. While RailTel may facilitate the contractor for getting approval from the Railways, if required, for carting the material to the site, the responsibility for ensuring that the material reaches the site in time, lies entirely with the contractor. The contractor has to bear the necessary expenses for carting the material to the site.

6.5 The contractor will program his work in such a manner so as not to interfere in the working telecom circuits and movement of trains.

#### **7. COMPETENT SUPERVISORS**

7.1 The Contractor shall place and keep competent representatives / Supervisors / Engineers as his representative on the works who will be authorized to receive and acknowledge materials issued by the RailTel and take all orders issued by the RailTel. The said representatives shall be present at site during working hours and any written orders or instructions which the purchaser's Engineer may give to the said representatives of the contractor shall be deemed to have been duly given or communicated to the contractor.

**8 & 9. Not used**

**10. TEST & MEASURING INSTRUMENTS AND SPECIAL TOOLS ETC.**

10.1 Special tools & instruments required for installation and commissioning of the work as detailed in preamble shall be arranged by contractor at his own cost.

10.2 All tests and measuring instruments and other arrangements required for carrying out all the acceptance tests etc shall be provided by the contractor at his own cost.

**11. STORES TO BE SUPPLIED BY CONTRACTOR**

11.1 All materials required for the execution of the contract shall be arranged and supplied by the Contractor as detailed in the scope (Preamble) so as to realize the end objective. The supply of equipments and materials shall also include required installation and other materials and documents etc which may not be specifically mentioned herein but which are usually necessary for completing the work in all respects.

**12. SUPPLY OF TECHNICAL LITERATURES, DOCUMENTATION, DRAWINGS, INSTRUCTION BOOK & COMPLETION PLANS ETC.**

12.1 The supply of equipment and materials shall include supply of two sets of printed documents from original equipment manufacturers with each equipment as given in technical supplement.

12.2 Except where printed documents are supplied with each equipment by original equipment manufacturer, all other documentation and information as mentioned in the technical specifications shall be prepared using CAD or any other software package duly approved by Engineer. In addition to what is specified in the technical specifications, two complete hard sets of documents shall also be supplied for ready use duly bounded in good plastic folders.

**13. SPARES**

13.1 The tenderer shall indicate recommended quantities of spares other than those mentioned in SOR of supplies under spare item for each type of equipment for efficient maintenance of the equipment and the systems for a period of 5 years to ensure that the quality & reliability is achieved. The details, unit price and the total cost of recommended spares, shall be included in the tender only as an option. However, the cost of such recommended spares shall not be considered for tender evaluation.

13.2 The tenderer shall attach Unit Rate Analysis of each item of the Schedule Of Requirements ( cost of each sub-assembly, card etc. ) in his Price Bid. The quoted Unit Rate of spares should correspond to the referred Rate Analysis.

## **14 LONG TERM AVAILABILITY OF SPARES AND SYSTEM SUPPORT**

- 14.1 The tenderer shall undertake to supply on payment all maintenance spares and tools required for the equipment at least for five years after the expiry of warranty. He shall also undertake to supply additional equipment required for replacement or expansion of the network, that may become necessary due to additional traffic requirements.
- 14.2 The manufacturer shall guarantee that spare parts for the system shall be available for a minimum of five years after expiry of the warranty period. The manufacturer shall also undertake to inform RailTel at least six months in advance before any equipment or components are discontinued or phased out from the manufacturing plans.

## **15. QUALITY ASSURANCE**

In the event of RailTel waving off the inspection, the quality assurance department of the manufacturer shall carry out all the tests as per the specification and issue a certificate indicating clearly the test results and the adherence to the technical specifications. This is without prejudice to the purchaser's right to accept or reject the supplies if not found in conformity to its requirement.

Manufacturer shall furnish MTBF values wherever applicable.

## **16. Not used**

## **17. INSPECTION OF MATERIALS**

- 17.1 All equipment's materials fittings and components will be subject to inspection by the purchaser or his representative at the manufacturer's factory/tenderer works before dispatch and no materials shall be dispatched until these are inspected and/or approved. The materials may also be inspected by the purchaser or his representative again at the contractor's depot.
- 17.2 All materials shall be procured from the manufacturers of repute/their authorized dealers. Such materials are to be accepted by the Engineer. The Contractor may be required to produce test certificate from the manufacturer wherever called for by the Engineer.
- 17.3 The cost of equipment and materials, all tests and/or analysis performed for inspection shall be borne by the Contractor.
- 17.4 The inspection charges, if any, payable to the purchaser's representative for carrying out the inspection shall be borne by the purchaser.
- 17.5 RailTel reserves the right to waive the factory inspection for some or all components/equipment.

## **18. INSPECTION OF WORKS**

The Engineer or his representative may inspect and test the various portions of the work at all stages and shall have full power to reject all or any portion of the work that he may consider to be defective or inferior in quality of materials, workmanship or design in comparison to what is called for in the specification. In the event of rejection

of any work already executed and not in accordance with specification as in this tender and/or as determined by the Engineer or which the Contractor has been apprised, the Contractor shall carry out alterations/ replacements to such works to the satisfaction of the Engineer for which no additional expenses will be borne by the RailTel.

## **19. VARIATION IN QUANTITIES**

- (i) The quantities indicated in Schedule of Requirements are approximate and purport to convey the tenderer an idea of the magnitude of the work. The quantities may vary within + / -25% of grand total of schedule of requirements (contract value) as included in the Letter of Acceptance to tender as per site requirement. The Purchaser reserves the right to increase or decrease by up to 25 % of the of the quantity of goods and services specified in the Schedule of Requirement without any change in unit price of the ordered quantity or other terms and conditions.
- (ii) The tenderer/contractor will be bound to execute the additional quantities on the following terms and conditions.
  - (a) Quantity may also vary beyond 25% as per the following –
  - (iii) • Rates for Quantity variation (i) beyond 25% up to 40% with 2% rebate, (ii) above 40% to 50% with 4% rebate and (iii) beyond 50%, rates will be negotiated by RailTel with Contractor.

**20. Fall Clause :** Fall clause is not applicable for this tender.

## **21. SUBLETTING AND ASSIGNMENT**

- 21.1 The contractor may sublet a part of the work under this contract with prior approval of RailTel.
- 21.2 The contractor shall arrange for effective supervision of sub contractor's work and remain solely responsible for materials supplied and for works carried out on his behalf by the sub contractor.

## **22. EXECUTION OF WORK**

All the works shall be executed in strict conformity to the provisions of the contract document and with such explanatory detailed drawings, specifications and instructions as may be approved from time to time based on detailed design and engineering carried out by contractor in line with requirements as per contract document. The contractor shall be responsible for ensuring that the work throughout are executed in the most substantial, proper and workmanlike manner with the quality of material and workmanship in strict accordance with the specifications and as per sound industrial practices and to the entire satisfaction of the RailTel.

## **23. Deleted**

## **24. MAINTENANCE OF WORKS**

The contractor shall at all times during the progress and continuance of the works and also for the period of maintenance specified in the tender form and after the date of passing of the certificate of completion by the RailTel's representative or any other earlier date subsequent to the completion of the works that may be fixed by RailTel's representative be responsible for and effectively maintain and uphold in

good, substantial, sound and perfect condition all and every part of the works and shall make good from time to time and at all times, as often as the RailTel's representative shall require, any damage or defect that may, during the above period, arise in or be discovered or be in any way connected with the works provided that such damage or defect is not directly caused by errors in the contract documents, act of providence or insurrection or civil riot and the contractor shall be liable for and shall pay and make good to the RailTel or other persons legally entitled thereto whenever required by the RailTel's representative so to do, all losses, damages, costs and expenses they or any of them may incur or be put or be liable to, by reason or in consequence of the operations of the contractor or his failure in any respect.

**25. CLEARANCE OF SITE**

At the end of the work the Contractor shall as a part of his Contractual obligation leave the area completely neat and clean.

**26. PROVISIONAL ACCEPTANCE**

26.1 Immediately after the completion of the work the contractor shall certify and advise the purchaser in writing that the installation is (i) complete (ii) ready for satisfactory commercial service and (iii) ready to be handed over. The datacenter shall be operational for minimum 30 days and monitored from BMS/DCIM.

26.2 The test or tests specified in Technical supplement (Chapter IV Section II ) will be conducted jointly by purchaser and contractor as soon as possible after receipt of advice of completion by purchaser from the contractor. The test schedule shall be finalized by mutual discussion between the contractor and M/S RailTel Corporation of India Limited,. Any component, modules, sub assemblies or equipment failing during the commissioning test shall be replaced/repaired free of cost by tenderer.

26.3 Purchaser's Engineer shall issue a Provisional Acceptance certificate for successful commissioning of the datacenter covering all materials and services included in the Schedule of works after the final acceptance test as per the approved test procedure have been completed and the performance has been found to meet the specifications. The Provisional Acceptance Certificate shall not be held up due to minor deficiencies, which shall be attended by Contractor during maintenance period. The Provisional Acceptance Certificate shall be signed by both the parties. The period of maintenance of works shall commence from the date of issue of last Provisional Acceptance Certificate.

**27. PLACING IN SERVICE & MAINTENANCE SUPERVISION**

27.1 After the work has been completed & placed in service and Provisional Acceptance certificate issued by Purchaser's Engineer, the contractor shall be responsible for proper maintenance supervision of the work for a period of twelve months from the date of commissioning.

For this purpose the bidder shall prepare a maintenance plan and make available the services of qualified maintenance engineers for critical subsystems (power, cooling) stationed at the location on 24x7x365 approved by Purchaser's Engineer to provide comprehensive onsite support. Contractor shall submit monthly maintenance report jointly with RailTel Engineer.

In addition one BMS trained engineer shall be provided for 24x7x365 at the location.

27.2 During this period of maintenance supervision if any lacuna is noticed in the functioning, as a result of any deficiency in work, the contractor will rectify the same at no cost to RailTel. During such rectification if any faulty equipment/modules need replacement or repair, they shall be provided by the contractor from the set of equipment or modules that the contractor should bring to the site of installation in addition to all the materials to be supplied against this contract. Use of spare modules covered under the Schedule of material of this tender shall not be permitted to be used during installation, commissioning and period of maintenance supervision.

## **28. FINAL ACCEPTANCE**

28.1 The final acceptance of the works completed shall take effect from the date of expiry of the period of maintenance supervision as defined in para 27 or the expiry of the last of the respective period of maintenance supervision of various sub-sections for which Provisional Acceptance Certificates are issued or brought into commercial operation, provided in any case that the contractor has complied fully with his obligations in respect of each item under the contract.

28.2 Notwithstanding the issue of Final Acceptance Certificate the contractor and the purchaser ( subject to Sub Clause as above ) shall remain liable for fulfillment of any obligation incurred under the provision of the contract prior to the issue of Final Acceptance Certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between the parties hereto.

## **29. WARRANTY SUPPORT & LONG TERM MAINTENANCE SUPPORT**

### **A. Warranty Support**

29.1 All equipment and system supplied by the Contractor shall be guaranteed against the defects for a period of twelve months/ as per OEM not less than year from the date of issue of Provisional Acceptance Certificate. The contractor shall be responsible to provide comprehensive warranty support for all the items supplied by him against this tender for further 2 years (where OEM warranty not covered). At the time of PAC contractor must submit item wise warranty covering by OEM/Contractor.

29.2 Material for repair shall be handed over /taken over to contractor's engineer at the Datacentre location.

To enforce fulfilment of support objectives, for this purpose he shall prepare a maintenance plan and make available the services of qualified maintenance engineers for critical subsystems (power, cooling) stationed at the location on 24x7x365 approved by Purchaser's Engineer. Contractor shall submit monthly maintenance report jointly with RailTel Engineer. In addition, one BMS trained engineer shall be provided for 24x7x365 at the location. The cost of these manpower shall be included in the offer.

The Contract's Engineer shall be responsible to identify the fault and advise corrective measures by coordinating with their/OEM support team and ensure that defective equipment is serviced or replenished.

During this period, the contractor shall remain responsible to arrange replacement within 30 days and for setting right at his own cost any equipment installed by him which is of defective manufacture or design or becomes unworkable due to any cause whatsoever. The decision of the RailTel's representative in this regard to direct the

contractor to attend to any damage or defect in work shall be final and binding on the Contractor.

During this period, the contractor shall provide updates, upgrades, patches and bugfixes available from the OEM from time to time for all the software supplied and installed by the bidder as a part of the contract without any additional cost. The contractor shall keep RailTel updated of the availability of such updates and install them after getting approval from RailTel.

- 29.3 During this period, the contractor shall be responsible to the extent expressed in this clause for any defects that may develop under the conditions provided for by the contract and under proper use, arising from faulty materials, design or workmanship in the plant, or from faulty execution of the plant by the contractor but not otherwise and shall remedy such defects at his own cost when called upon to do so by the Purchaser Engineer who shall state in writing in what respect the portion is faulty.
- 29.4 If it becomes necessary for the contractor to replace or renew any defective portions of the system under this clause, the provisions of this clause shall apply to the portions of the plant to be replaced or renewed until the expiration of three months from the date of such replacement or renewal or until the end of the support period whichever may be later. If any defect is not remedied within reasonable time, the purchaser may proceed to do the work at contractor's risk and expense, but without prejudice to any other rights which the purchaser may have against the contractor in respect of such defects.
- 29.5 Until the Final Acceptance Certificate shall have been issued, the contractor shall have the right of entry, at his own risk and expense, by himself or his duly authorised representatives, whose names shall have previously been communicated in writing to the purchaser at all reasonable working hours upon all necessary parts of the works for the purpose of inspecting the working and the records of the system and taking notes there from and, if he desires at his own risk and expense, making any tests subject to the approval of the purchaser which shall not be unreasonably withheld.
- 29.6 In subject of this warranty, the contractor shall make his security deposit, as required under Clause 3 of Special Conditions of Contract, valid to cover the period of warranty also.
- 29.7 During the free warranty maintenance period contractor should stabilize the working of the system. Purchaser has the right to extend the period of supervision of the maintenance free of cost till the system stabilizes and works satisfactorily for a reasonable period of time. If during the time any equipment etc. is to be added or deficiencies are to be rectified to make the system work trouble free the same also will have to be done by the contractor at no cost to RailTel as to make good all the deficiencies.

**B. Long Term Maintenance Support**

- 29.8 Tenderer shall provide maintenance support from OEM after successful completion of the warranty obligations for a minimum period of 2 years. During this period the terms & conditions similar to as mentioned in para 29.2, 29.3 and 29.4 above shall be applicable.

Separate agreement for long term maintenance support after warranty period shall be entered with the contractor by RailTel. A fresh Bank Guarantee for a value of 10% of annual cost of long term maintenance support, shall be required to be submitted by the contractor, on year to year basis, for due fulfillment of long term maintenance support obligation.

Note : The acceptance of the above clause is mandatory and any deviation / non acceptance will lead to rejection of the bid summarily.

### **C. Service Level Agreement**

The contractor shall ensure that the datacentre infrastructure built by them shall have an uptime of 99.982%. During the support period contract shall submit a monthly uptime report of the infrastructure. For every additional minute of downtime beyond SLA, a penalty at the rate of Rs.10000/- per minute.

Any failure of critical components (power distribution equipment's, cooling for system for Datacentre, network room and UPS room) shall be restored within 30 minutes from the time of failure. For Any delays beyond 30 minutes, a penalty of Rs.1000/- per minute.

Any failure of non-critical components shall be restored within 4 hours from the time of failure. For Any delays beyond 4 hours, a penalty of Rs.1000/- per hour.

The total value of the penalty shall be limited to a maximum of 10% of the contract value.

### **30. TRAINING**

30.1 The tenderer shall undertake to train RailTel engineers and other staff nominated by the RailTel in different aspects of equipment designs, functioning, field installation, testing, commissioning, operation, maintenance and repair, covering both hardware and software. The training should be comprehensive for transfer of complete know-how so as to impart full knowledge and competence to independently and successfully execute the installation, operation, user related software changes, maintenance and repair of all equipment. The training courses should, apart from formal class room training, include hands on practical experience at the manufacturer's premises and visits to working installation.

30.2 In the event of any equipment/sub-system being manufactured in India in technical collaboration with foreign firm by the tenderer or any of its sub-contractor, the training as per schedule shall be provided at the collaborator's premises/training centre abroad

30.3 The contractor shall at every stage of installation, testing and commissioning provide all facilities for adequate training of RailTel personnel who may be deputed to work on the project.

30.4 Deleted.

30.5 Set of Documents related to training to each of the trainees shall be provided.

30.6 All expenses for travel to and from the place of training, boarding and lodging of the trainees shall be borne by the RailTel.

**31. INFRINGEMENT OF PATENTS:**

- (a) The Contractor is forbidden to use any patents or registered drawings, processes or patterns in fulfilling his contract without prior consent in writing of the owner of such patents, drawings, patterns or trade marks except where these are specified by the Purchaser himself. Royalties where payable for the use of such patented processes, registered drawings or patterns shall be borne exclusively by the Contractor. The Contractor shall advise the Purchaser of any proprietary rights that may exist on such processes, drawings or patterns which he may use of his own accord.
- (b) In the case of patents taken out by the Contractor of the drawings or patterns registered by him or of those patents, drawings or patterns for which he holds a license, the signing of the contract automatically gives the Purchaser the right to repair by himself the purchased articles covered by the patent or by any person or body chosen by him and to obtain from any sources he desires the component parts required by him for carrying out the repair work. In the event of infringement of any patent rights due to above action of the Purchaser he shall be entitled to claim damages from the Contractor on the grounds of any loss of any nature which he may suffer e.g. in the case of attachment because of counterfeiting.

**32. LICENSE AS PER GOVT. OF INDIA CONTRACT LABOUR ACT**

The Contractors are required to produce license as enjoined in the Government of India Contract Labour (Regulation and Abolition) Act (1978) with latest amendments, if any. They shall not be allowed to undertake or execute any work through contract Labour except under and in accordance with a license issued under the said Act in that behalf by the authorized licensing Officer.

**33. DEFAULTS AND DELAYS**

The Contractor shall execute the work with due diligence and expedition, keeping to the approved time schedule. Should he refuse or neglect to comply with any reasonable orders given to him in writing by the Purchaser's Engineers in connection with the work or contravene the provision of the Contract or the progress of work lags persistently behind the time schedule due to his neglect, the Purchaser shall be at liberty to give seven days notice in writing to the Contractor requiring him to make good the neglect or contravention complained of and should the Contractor fail to comply with the requisitions made in the notice within seven days from the receipt thereof, it shall be lawful for the purchaser to take the work wholly or in part out of the Contractor's hands without any further reference and get the work or any part thereof, as the case may be, completed by other agencies without prejudice to any other right or remedy of the Purchaser Whenever the contractor is unable to complete the work and contract is rescinded The security deposit & PBG shall be forfeited and the balance work shall be got done independently without risk & cost of the failed Contractor. The failed contractor shall be debarred from participating in the Tender for executing the balance work. If the failed contractor is a JV or partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work either in his/her individual capacity or as a partner of any other JV/partnership firm.

#### **34. LOSS SUSTAINED DUE TO DEFAULTS AND DELAYS**

In the event of any loss to the purchaser on account of execution and/or completion of the work or any part thereof by agencies other than the contractor, in terms of para 33 the contractor shall be liable to reimburse the loss to purchaser without prejudice to the other rights and remedies of the purchaser and the reimbursement in full or in part, as the case may be, shall be met at the option of the purchaser from out of all or any of the following sources viz :

- (a) i. Any amount due and payable to the contractor by the purchaser on any account whatsoever;
  - ii. The Contractor's security deposit in the hands of the purchaser as far as available, and;
  - iii. Any other assets whatsoever of the contractor;
- (b) In the event of re-imburement from out of sources (i) and/or (ii) above mentioned, the purchaser shall have the right of appropriation suo moto.

#### **35. PENALTY FOR DELAY IN COMPLETION**

35.1 If the contractor fails to execute and complete the work within the time specified in the Agreement or within the period of extension granted under para 36, the contractor shall accept reduction in the total amount payable to him by the purchaser at the rate of 0.5% per week or part thereof ( rounded off to the nearest whole number ) of the incomplete/uncommission value of the contract for the actual delay occasioned beyond the appointed time by which the work shall have been completed under the contract.

35.2 The total value of penalty on account of above shall be limited to maximum of 10% (Ten percent) of the total contract value.

35.3 Such reduction shall be accepted by the purchaser in full satisfaction of the contractor's liability arising from delay only. This penalty for delay in completion will be applicable separately for each stage of completion of work when two or more stage of completion are specified in the contract. The purchaser's engineer shall at his sole discretion specify a time limit within which the unfinished portion of the work shall be completed after serving on the contractor a notice of Purchaser's intention to recover the said penalty in Form 11. In the event of failure of the contractor, the purchaser shall be at liberty to take action in accordance with provisions in Para 33 and 34.

**NOTE:** For purpose of this para the value of work shall be calculated on the basis of unit prices included in schedule of requirements.

#### **36. ADHERENCE OF TIME SCHEDULE**

36.1 Timely completion of the work is the essence of the contract. While delay in execution will attract penalty, early completion will be rewarded.

36.2 If any delay as aforesaid in clause 35 shall have arisen from any cause which the Purchaser may agree as being a reasonable ground for extension of time the purchaser's engineer or his representative may allow such additional time as he may in his absolute discretion consider to be reasonably justified by the circumstances of the case. Such extensions shall be considered , on request from contractor, .

## **37. CONTRACTOR'S LIABILITIES FOR COSTS AND DAMAGES**

### **37.1 WITHHOLDING AND LIEN IN RESPECT OF SUMS CLAIMED**

- a) Whenever any claim or claims for payment of a sum of money arises out of or under the contract against the contractor, the Purchaser shall be entitled to withhold and also have lien to retain such sum or sums in whole or in part from the security, if any, deposited by the contractor and for the purpose aforesaid the purchaser shall be entitled to withhold the said cash security deposit or the security, if any, furnished as the case may be and also have lien over the sum pending finalisation or adjudication of any such claim.
- b) In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the Contractor, the Purchaser shall be entitled to withhold and have lien to retain to the extent of such claim amount or amounts referred to supra, from any sum or sums found payable or which at any time thereafter may become payable to the Contractor under the same contract or any other department of the Central Government pending finalization or adjudication of any such claims.
- c) It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to by the purchaser till the claim arising out of or under the contract is determined by the Arbitrator (if the contract is governed by the Arbitration clause) or by the competent court, as the case may be, and that the contractor will have no claim for interest of damages whatsoever on any account in respect of such withholding or retention under the lien referred to supra and duly notified as such to the Contractor.
- d) For the purpose of this clause, where contractor is a partnership firm or a limited company, the purchaser shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company, as the case may be, whether in his individual company or otherwise.

37.2 The Maximum Liability of contractor to any Loss/Damages to RailTel including Liquidity Damages and Performance Bond shall be limited to 100% of Value of contract.

## **38. UNIT PRICES**

38.1 The prices quoted by the Tenderer shall include the prices of materials including all incidental charges for transport, loading/unloading and handling of materials, charging for arranging dispatch by rail/road direct from manufacturer's factory. The prices would also include charges towards completing all necessary formalities such as submission of forwarding notes, arranging placement of Wagon, Siding/shunt charges, banker's charges for Bank guarantee, Indemnity Bonds inclusive of cost of Stamp etc. as applicable and also the charges, if any, levied by the RailTel.

38.2 The prices shall include all taxes, duties, Royalty and levies (including Octroi / Entry Tax, Custom Duty with/without High Sea Sale etc.) applicable on this contract. Therefore, the bidder should quote their prices taking into account the rate of central sales tax/ local sales tax/ VAT or any other tax leviable on contract..

Form-C will be issued by RailTel for items in Schedule of Supplies, if applicable.

- 38.3 The prices quoted by the tenderer shall include cost of commissioning and testing and all costs of Administration of Contract, Insurance Premium, Banker's charges for guarantees, custom handling, cost of storage in custom and other locations during execution of work, loading-unloading and handling of materials and road transport which the contractor may use for carriage of materials to his depot/ site of work and any other charges incurred towards delivery of the material at site. The prices shall include the cost of works and adjustments necessary to be done by the contractor during or after tests carried out by the purchaser.
- 38.4 The price to be quoted by the tenderers should take into account the credit availed on inputs under the CENVAT scheme. The tenderers should give a declaration that any set off in respect of duties on inputs as admissible under law is being totally and unconditionally passed on to the purchaser in the price quoted by him (see para 43). The bidder in this regard shall submit the details of breakup of Excise Duty, Counter Vailing Duty, Service Tax and Surcharge & Cess on these, so that RailTel can avail the CENVAT credit benefit. The firm will furnish documentary evidence of such duties/taxes paid, to enable the purchaser to avail CENVAT credit.
- 38.5 The prices quoted in the contract shall be inclusive of all taxes i.e. custom duty, excise duty, octroi, local levies, sales tax levied by any statutory authority, VAT or any other tax. The tenderer will indicate the details of taxes included in the unit price. Offer received without specific details/ breakup of various taxes included in the unit prices are liable to summarily rejected.
- 38.6 The purchaser shall make statutory deductions if required to do so. The deducted amount shall be remitted to the concerned authority and the purchaser shall in no way be responsible for any disputes between such authorities and the contractor in this regard.
- 38.7 All taxes, duties and levies ( Including octroi etc. ) arising out of the transaction between the contractor and his sub contractor/supplier for this work will be included in the rates quoted by the contractor in the relevant Schedule.
- 38.8 Arrangement for all permits/licenses required for delivery of materials at site including Road Permits etc. will be the responsibility of contractor and the contractor will have to make his own arrangements. RailTel shall facilitate by way of authorization /request letters whenever needed. Import license of RailTel can be used for materials procured under high sea sale.

### **39. MEASUREMENT OF WORKS**

- 39.1 Payments for the works shall be made in accordance with approved designs & drawings and measured in relevant units except where provided or otherwise. The measurements will be made generally in accordance with standard engineering practices.
- 39.2 MEANING AND INTERPRETATION BY RAILTEL TO BE FINAL- All measurement, method of measurement, meaning an intent of specifications and interpretation of Special Conditions of Contract, given and made by the Purchaser or by the Purchaser's Engineer shall be final and binding.

#### 40. TERMS OF PAYMENT

40.1 All bills shall be submitted to the authority concerned in RailTel, Secunderabad.

40.2 Subject to any deductions or recovery which the RailTel may be entitled to make under contract, the Contractor will be entitled to be paid from time to time by way of 'on account payment' for supply of goods and 'progress payment' for works as in the opinion of the Engineer he has executed in terms of Contract.

#### 40.3 ON ACCOUNT PAYMENT FOR SUPPLY OF EQUIPMENT & MATERIAL

"On account payment" for supply of equipments, materials indicated in the schedule of requirements subject to recoveries of liquidated damages, if any, shall be once in a calendar month as given below.

60% (Sixty percent) of the value of equipments/ material supplied of each consignment shall be paid on production of the following documents :

- a) On receipt of materials at site.
- b) Original Inspection certificate issued by Inspecting Officer.
- c) Manufacturer's inspection certificate that the materials are in accordance with the specifications of the contract.
- d) Delivery Challan / Invoice in duplicate duly accepted by RailTel Authorised Engineer.
- e) A certificate that the materials supplied are as per the contract and the amount claimed in the invoice is correct as per terms of the contract.
- f) Project Insurance policy for material .
- g) All on account payments shall be covered by a standing indemnity bond in the approved form ( see form No.6 ).

40.3.1 20% (Twenty five percent) value of goods supplied shall be paid after the successful completion of installation of these equipments and completion of all measurements and testing to the satisfaction of Engineer.

40.3.2 15% (Fifteen percent) value of the goods supplied shall be paid after the successful completion of installation & commissioning of whole system, receipt of Site certification and issue of "Provisional Acceptance Certificate by Purchaser's Engineer.

40.3.3 **Final payment** of 5% of the contract value shall be made after satisfactory operation and maintenance of the work under the supervision of the contractor for a period of one year after commissioning and issue of Final Acceptance Certificate.

40.3.4 On the basis of Final Acceptance Certificate from the Purchaser's Engineer for all the works at all the locations covered in this contract and reconciliation of materials issued, the final bill for the balance payment for each item of work shall be submitted by the Contractor along with a clear 'No Claim Certificate'. The Final Acceptance Certificate shall be issued by the Purchaser's Engineer only when he has accepted the work wholly after conducting the acceptance tests as per the details given in the technical specification and supplement.

#### 40.4 PROGRESS PAYMENT (**SERVICES -AMC**)

Payment will be done on Quarterly basis, after completion of quarter and adjustment of penalties against non- compliance of SLA's, accompanied with the following documents:

- 1) Tax Invoice
- 2) Quarterly CAMC Certificate jointly signed by RailTel and Firm for Claimed period.
- 3) Warranty Certificate of one year from OEM/Supplier (as applicable in case if any equipment /module etc replaced).
- 4) Attendance Sheet duly verified
- 5) PM & Services report for invoiced quarter
- 6) ESIC & PF Details employees towards this AMC.
- 7) Minimum wage Certificate
- 8) Labour laws compliance certificate

'Progress payment' shall be made separately for each item/sub-item of work given in the Schedule of Services, once in a calendar month.

**41 VITIATION CLAUSE:** Quantities shown in the schedule are approximate and can vary depending on site conditions. If any vitiation arises on account of variation of quantities, the contractor shall not be paid more than the lowest rate obtained after working out with the final operated quantities.

#### 42 **FINAL SETTLEMENT**

On expiry of the warranty period and issue of the certificate of final acceptance of the entire installations, the security deposit ( Para 3) will be refunded or Bank Guarantee released to the Contractor after adjustment of any dues payable by the contractor.

#### 43. **CERTIFICATE FOR CENVAT BENEFITS ON BILLS**

- a) The Contractor should submit the following certificate along with the bills:  
(see para 38.4) "We certify that no additional duty set offs on the Goods supplied by us have accrued under the VAT/ CENVAT Scheme in force on the date of supply after we submitted our quotations and submitted the present bill".
- b) In the event of VAT/ CENVAT credit being extended by the Government of India to more items that already covered, the firm should advise the purchaser about the additional benefits accrued through a letter containing the following certificate, or any variation thereof, as may be considered necessary by RailTel administration:- "We hereby declare that we can avail additional duty set offs as per latest VAT/ CENVAT scheme in force now and we hereby give a reduction of (-----) per unit and agree to revise the prices indicated in the order. The current E.D. of (-----) is payable on this reduced price. Therefore, we request you to amend the order accordingly."

#### 44. DEDUCTION FROM ON ACCOUNT PAYMENT BILLS

- (i) All costs, damages or expenses, which RailTel may have been paid or incurred which under the provisions of contract are Contractor's obligations will be deducted by RailTel from progress payment Bills/Invoice of Contractor, as and when it is understood that such an expense has been incurred or paid for.
- (ii) All such claims of RailTel shall, however, be duly supported by appropriate and certified vouchers, receipts or explanations as are available to enable the Contractor to identify such claims.

#### 45. TAXES

- 45.1 The Contractor and all personnel employed by him shall pay such taxes like Income Tax etc as are payable under statutory laws of India and the Purchaser **WILL NOT ACCEPT** any liability for the same.
- 45.2 Deduction of Income Tax at source as per provisions of Finance Act and Income Tax in force shall be made from the Contractor/Sub-Contractor and the amount so deducted may be credited to the Central Government.
- 45.3 Wherever the law makes it statutory for the Purchaser to deduct any amount towards Sales Tax on Works Contract, the same will be deducted and remitted to the concerned authority.

#### 46. MOBILISATION ADVANCE

- (a) If required by the Contractor, mobilisation advance limited to 10% of contract value {if contract value exceeds Rs.1.00 (one) crore} shall be payable on submission of irrevocable Bank Guarantee from a Nationalized Bank in India or the State Bank of India in a form acceptance to the RailTel ( Form No.8 ). Bank Guarantee should clearly cover Principle plus interest 14%.

Interest: The mobilisation advance shall carry an interest at the rate of 14% (fourteen percent) per annum for the period commencing from date of payment of mobilisation advance. The advance plus interest is fully adjusted and recovery of the mobilisation advance along with its interest shall be made from 'On account' and progress bills including design payment and advance payments for the work on prorata basis. The interest will be charged on balance outstanding on the first day of each month.

The recovery of the advance shall be commenced from the first on account bill itself.

- (b) In case principal and interest could not be deducted progressively from progress/on account bills during the course of the year, the interest on mobilisation advance as accrued in the end of an year will be recovered within the first 30 days of the next year from the first progress/on account bills or any other bills which may be made by the RailTel to the Contractor. If, for the reason whatever, no progress/on account bill or any other amount is paid

to the Contractor, he will still pay to the RailTel the accrued interest in full within the said 30 days of the next year. Otherwise, the unpaid interest will be added onto the Principal and interest for the next year will be charged on the balance comprising Principal as well as unpaid interest.

- (c) In case of extension of the date of completion due to any reason whatsoever, the interest on the mobilisation advance outstanding would continue to accrue as specified earlier and the contractor/firm would make the payment against the advance in the same manner as specified in Para (b) above.
- (d) No advance/extra payment other than stated above shall be payable against the works.
- (e) The Tenderers shall specifically indicate in their offer whether mobilisation advance is required by them. In case no specific demand has been made in the offer, grant of mobilisation advance shall not be considered subsequently.
- (f) No mobilization advance would be considered for Contract with a value less than Rs. 1.00 crore.

#### **47. INSURANCE OF MEN, OFFICE/STORES ETC**

47.1 The Contractor shall take out and keep in force a policy or policies of insurance against all liabilities of the Contractor or the Purchaser at common law or under any statute in respect of accidents to persons who shall be employed by the contractor in or about the site for the purpose of carrying out the works on the site. The Contractor shall also take out and keep in force a policy or policies of Insurance against all recognized risks to their offices and depots. Such insurance shall in all respects be to the approval of the Purchaser and if he so requires in his name.

#### **47.2 INSURANCE OF MATERIALS & INSTALLATIONS**

The Contractor shall take out and keep in force a Policy or policies of Insurance for all materials including RailTel supply materials/ equipment's irrespective of whether used up in the portion of work already done or kept for the use in the balance portion of the work until such works are provisionally handed over to the RailTel. For this purpose, the works are deemed to have been provisionally handed over when provisional acceptance certificate is issued or the section is put into commercial use for the locations as per para 26.

47.3 The Contractor shall not be liable for losses/damages to the materials either used up in the portion of work done or his material kept for use at site, in consequence of Mutiny, or other similar causes over which the Contractor has no control and which cannot be insured. Such losses or damages shall be the liability of the Purchaser and if required by the Purchaser, be made good by the contractor at the cost of the Purchaser.

47.4 The Contractor should, however, insure the stores brought to site, against risks in consequence of war and invasion, as required under the Emergency Risk (Goods ) Insurance Act in force from time to time.

47.5 It may be noted that the beneficiary of the insurance policy should be RailTel or the policies should be pledged in favour of RailTel. The contractor shall keep the policy/policies current till the installations are provisionally handed over to the purchaser. It may also be noted that in the event of contractor's failure to keep the policy current and alive, renewal of policy will be done by purchaser for which the cost of the premium plus 20% of premium shall be recovered from the contractor.

47.6 For the purpose of enabling the contractor to take the insurance cover in connection with this contract, the purchaser's Engineer will advise the approximate price of all the RailTel supply materials to the Contractor.

#### **48. FORCE MAJEURE CLAUSE**

If at any time, during the continuance of this Contract, the performance, in whole or part, by either party, of any obligation under this contract shall be prevented or delayed by reason of any war, hostility, act of the public enemy, Civil Commotion, Sabotage, Fires, Floods, Earth quakes, explosions, strikes, epidemics, quarantine restrictions, lockouts, any statute, statutory rules/ regulations, order of requisitions issued by any Government Department or Competent Authority, acts of God ( here-in-after referred to as event) then provided notice of the happening of any such event is give by either party to the other within twenty one days from the date of occurrence thereof, neither party shall, by reason of such event, be entitled to terminate this Contract nor shall either party have any claim for damage against the other in respect of such non- performance or delay in performance, and the obligations under the Contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, PROVIDED FURTHER that if the performance in whole or part of any obligation under this Contract is prevented or delayed by reason of any such event beyond a period as mutually agreed to by the RailTel and the Contractor after any event or 60 days in the absence of such an agreement whichever is more, either party may at its option terminate the Contract provided also that if the contract is so terminated under this clause the RailTel may at the time of such termination take over from the Contractor at prices as provided for in the contract, all works executed or works under execution.

#### **49. SETTLEMENT OF DISPUTE AND ARBITRATION**

49.1 Any dispute or difference whatsoever arising between the parties out of or relating to the construction, meaning , scope, operation or effect of this contract or the validity or the breach thereof shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996 as amended and the award made in pursuance thereof shall be binding on the parties. The venue of such arbitration or proceedings thereof shall be Secunderabad.

49.2 All arbitration proceedings shall be conducted in English. Recourse against any Arbitral award so rendered may be entered into court having jurisdiction or application may be made to such court for the order of enforcement as the case may be.

49.3 The Arbitral Tribunal shall consist of the sole Arbitrator appointed by mutual agreement of the parties.

49.4 Each of the parties agree that notwithstanding that the matter may be referred to Arbitrator as provided herein, the parties shall nevertheless pending the resolution of the

controversy or disagreement continue to fulfill their obligation under this Agreement so far as they are reasonably able to do so.

**50. TERMINATION OF CONTRACT OWING TO DEFAULT OF CONTRACTOR :**

50.1 If the Contractor should :

- (i) become bankrupt or insolvent or
- (ii) make an arrangement with or assignment in favour of his creditors, or agree to carry out the contract under a committee of inspection of his creditors, or
- (iii) being a Company or Corporation, go into liquidation ( other than voluntary liquidation for the purpose of amalgamation or reconstruction ) , or
- (iv) have an execution levied on his goods or property on the works, or
- (v) assign the contract or any part thereof otherwise than as provided in clause-21 of SCC, or
- (vi) abandon the contract, or
- (vii) persistently disregard the instructions of the RailTel's Engineer or contravene any provision of the contract, or
- (viii) fail to adhere to the agreed programme of work by a margin of 10% of the Stipulated period, or
- (ix) fail to remove materials from the site or to pull down and replace the work after receiving from the Engineer's notice to the effect that the said materials or works have been condemned or rejected, or
- (x) fail to take steps to employ competent or additional staff and labour as required under clause 7 of SCC, or
- (xi) fail to supply material and/or carry out the works as per contractual specifications, or

promise offer or give any bribe, commission, gift or advantage either himself or through his partner, agent or servant to any officer or employee of RailTel or any person on his or on their behalf in relation to the execution of this or any other contract with the RailTel, then and in any of these said cases, the Engineer on behalf of the RailTel may serve the Contractor with a notice in writing to that effect and if the Contractor does not, within 7 days after the delivery to him of such notice, proceed to make good his default in so far as the same is capable of being made good and carry on the work or comply with such directions as aforesaid to the entire satisfaction of the Engineer, the RailTel shall be entitled after giving 48 hours notice in writing under the hand of the Engineer to rescind the contract as a whole or in part or parts ( as may be specified in such notice ) and adopt either or both the following courses: A final termination notice will be issued by RailTel after expiry of 48 hrs. notice

- (a) to carry out the whole or part of the work from which Contractor has been removed by the employment of the required labour and materials, the cost of which shall include lead, lift, freight, supervision and all incidental charges.
- (b) to measure up the whole or part of the work from which the Contractor has been removed and to get it completed by another contractor, the manner and method in which such work is completed shall be in the entire discretion of the Engineer whose decision shall be final; and in both cases (a) and (b)

mentioned above the RailTel shall be entitled (i) to forfeit the whole or such portion of the security deposit as it may consider fit, and (ii) to recover from the Contractor the cost of carrying out the work in excess of the sum which would have been payable according to the certificate of the Engineer to the Contractor if the works had been carried out by the Contractor under the terms of the Contract, such certificate being final and binding upon the Contractor, provided, however, that such recovery shall be made only when the cost incurred in excess is more than the security deposit proposed to be forfeited and shall be limited to the amount by which the cost incurred in excess exceeds the security deposit proposed to be forfeited. The amount thus to be forfeited or recovered may be deducted from any moneys then due which at any time thereafter may become due to the Contractor by the RailTel under this or any other contract or otherwise.

Provided always that in any case in which any of the powers conferred upon the RailTel by Sub-clause above shall have become exercisable and the same shall not be exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions thereof and such power shall notwithstanding be exercisable in the event of any future case of default by the Contractor for which his liability for past and future shall remain unaffected.

**50.3 RIGHT OF RAILTEL AFTER TERMINATION OF CONTRACT OWING TO DEFAULT OF CONTRACTOR :**

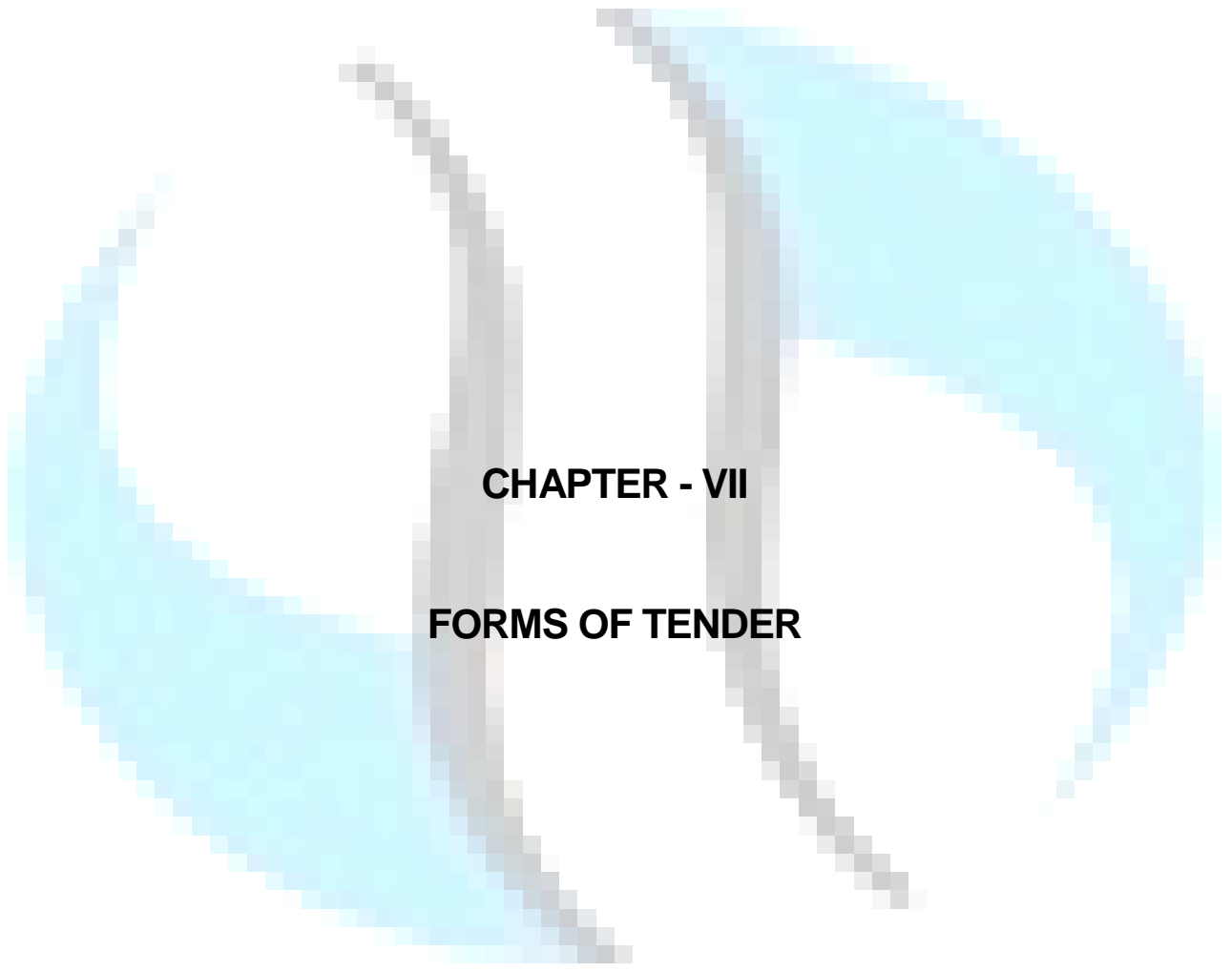
In the event of any or several of the courses, referred in Sub-clause 50.1 above, being adopted :

- (a) The Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any commitments or made any advances on account of or with a view to the execution of the works or the performance of the contract and Contractor shall not be entitled to recover or be paid any sum for any works thereto not actually performed under the contract, unless or until the Engineer shall have certified the performance of such work and the value payable in respect thereof and the Contractor shall only be entitled to be paid the value so certified.
- (b) The Engineer or Engineer's Representative shall be entitled to take possession of any materials, tools, implements, machinery or buildings on the works or on the property on which these are being or ought to have been executed, and to retain the employ the same in the further execution of the works or any part thereof until the completion of the works without the Contractor being entitled to any compensation for the use and employment thereof or for wear and tear or destruction thereof.
- (c) The Engineer shall, as soon as may be practicable after removal of the Contractor fix and determine exparte or by or after reference to the parties or after such investigation or enquiries as he may consider fit to make or institute and shall certify what amount (if any ) has at the time of termination of the contract been reasonably earned by or would reasonably accrue to the Contractor in respect of the work then actually done by him under the contract what was the value of any unused or partially used materials, any constructional plants and any temporary works upon the site.

(d) The RailTel shall not be liable to pay to the Contractor any moneys on account of the contract until the expiration of the period of maintenance and thereafter until the cost of completion and maintenance damages for delay in completion (if any) and all other expenses incurred by the RailTel have been ascertained and the amount thereof certified by the Engineer. The Contractor shall have no claim to any payment of compensation or otherwise howsoever on account of any profit or advantage which he might have derived from execution of the work in full but he did not derive in consequence of termination of the contract. The Contractor shall then be entitled to receive only such sum or sums (if any ) as the Engineer may certify would have been due to him upon due completion by him after deduction of the said amount; but if such amount shall exceed the sum which would have been payable to the Contractor, then the Contractor shall upon demand pay to the RailTel the amount of such excess and it shall be deemed a debt due by the Contractor to the RailTel and shall be recoverable accordingly.

\*\*\*\*\*

राज्य  
RAILTEL



**CHAPTER - VII**

**FORMS OF TENDER**

सत्यमेव जयते  
RAILTEL

## FORMS OF TENDER

### INDEX

FORM NO. 1	:	OFFER LETTER
FORM NO. 2	:	USER'S CERTIFICATE (Technical Credential)
FORM NO. 3	:	AGREEMENT
FORM NO. 4	:	GUARANTEE BOND FOR SECURITY DEPOSIT
FORM NO. 5	:	STATEMENT OF DEVIATIONS
FORM NO. 6	:	STANDING INDEMNITY BOND FOR ON ACCOUNTS PAYMENTS AND STORES SUPPLIED BY RAILTEL
FORM NO. 7	:	SYSTEM PERFORMANCE GUARANTEE
FORM NO. 8	:	BANK GUARANTEE FOR MOBILISATION ADVANCE
FORM NO. 9	:	WORKS IN HAND
FORM NO. 10	:	EXTENSION OF PERIOD OF COMPLETION OF WORK ON ACCOUNT OF CONTRACTOR
FORM NO. 11	:	QUALIFICATION EXPERIENCE
FORM NO. 12	:	GUARANTEE BOND AGAINST 'ON ACCOUNT PAYMENTS'
FORM NO. 13	:	Affidavit
FORM NO.14	:	Bid Security Declaration

# OFFER LETTER

To

RailTel Corporation of India Limited,  
6<sup>th</sup> Floor, 6A, Gumidelli Towers,  
Begumpet, Hyderabad -500 016

**Name of the work:** Design, Supply, Installation, Testing, Commissioning with 3-year Comprehensive Maintenance Support for Data Centre Expansion in 2nd & 3rd Floor Integration for RailTel, Rail Nilayam, Secunderabad.

**Tender no.** RailTel/e-Tender/OT/SR/DC/2026-27/01

1. I/We \_\_\_\_\_ have read the various conditions to tender attached here to and hereby agree to ABIDE BY THE SAID CONDITIONS. I/We also agree to keep this tender open for acceptance for a period of 60 days from the date fixed for opening the same and in default thereof, I/We will be liable for forfeiture of my/our Earnest Money. I/We offer to do the work (NAME OF WORK) Corporation of India Limited at the rates quoted in the attached schedules and hereby bind myself/ourselves to complete the work within 180 days from the date of issue of Letter of Acceptance of the tender. I/We also hereby agree to abide by the Various Conditions of Contract and to carry out the work according to the Specifications for materials and works laid down by the RailTel for the present contract.

2. A sum of ₹-----/-(Rupees ----- only) is herewith paid in e-Nivida online portal towards "Earnest Money"/ submitted Udyam / Startup towards exemption. The full value of the earnest money shall be forfeited or action will be initiated as per bid security declaration, without prejudice to any other right or remedies if: -

\*strike off whichever is not applicable

- (i) I/We do not execute the contract document within 15 days after the receipt of notice by the RailTel Corporation that such documents are ready.
- (ii) I/We do not commence work within 21 days from the date of issue of letter of acceptance.

Until a formal agreement is prepared and executed, acceptance of this offer letter shall constitute a binding contract between us subject to modification as may be mutually agreed to between us and indicated in the letter of acceptance of my/our offer.

SIGNATURE OF CONTRACTOR (S)

Date

SIGNATURE OF WITNESS

CONTRACTOR (S) ADDRESS

- 1.
- 2.

**USER'S CERTIFICATE**

1. (a) Name and complete address of the firm :
- (b) Telephone numbers and Corporate email ID:

2. Contract No. & Date :

3. (a) Scope and Work :
- (b) P.O No. and Date:
- (c) Total value of the contract:

4. Completion period as per P.O/Contract :

5. Description and No. of Equipments:

- (a) As mentioned in above P.O and as executed:
  - (i) Server Farm Area \_\_\_\_\_ Square Meter.
  - (ii) Designed IT Load \_\_\_\_\_ kW.
  - (iii) UPS Capacity \_\_\_\_\_ kW
  - (iv) PAC Tonnage \_\_\_\_\_ kW
  - (v) Transformer \_\_\_\_\_ kVA
  - (vi) DG Sets \_\_\_\_\_ kVA
  - (vii) Power Redundancy (N+1 or N+N)
  - (viii) Cooling Redundancy (N+1 or N+N)

(ix) Other scope included:

- Fire alarm and suppression (Yes/No)
- CCTV Surveillance (Yes/No)
- BMS (Yes/No)
- Datacenter Infrastructure Management (Yes/No)
- UTP and Fiber cabling (Yes/No)

6. Period for which the above Datacenter is operational : \_\_\_\_\_ months and \_\_\_\_\_ years.

7. Date of Commencement:

8. Actual date of Successful completion:

9. Total invoiced value:

10. Number of extensions given:

11. Penalty/LD levied:

12. Present working state of the Datacenter:

\_\_\_\_\_  
Signature of the user with Company Seal

Name:

Dated:

Designation:

Phone:

Fax :

**AGREEMENT**

An AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_ two thousand and one, between RailTel Corporation of India Limited, 6<sup>th</sup> Floor, 6A, Gumidelli Towers, Begumpet, Hyderabad - 500016, acting in the premises through Executive Director/SR (hereinafter referred to as 'RailTel ') of one part and M/s \_\_\_\_\_ (hereinafter referred to as 'contractor') of the other part.

Whereas in response to a call for Tender for ( **NAME OF WORK**) as per Tender papers at Annexure'A' hereto the Contractor has submitted a bid as per Annexure 'B' hereto and whereas the said Tender of the Contractor has been accepted for

\_\_\_\_\_ as per copy of Letter of Acceptance of Tender No. \_\_\_\_\_

dated \_\_\_\_\_ complete with enclosures at the accepted rates and agreed deviations from Tender Papers \_\_\_\_\_ as per Annexure-C hereto and at an estimated contract value of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ Only).

Now this agreement witnesses that in consideration of the premises and the payment to be made by the Purchaser to the Contractor provided for herein below the Contractor shall supply all equipment and materials and execute and perform all works for which the said Tender of the Contractor has been accepted strictly according to the various provisions in Annexure 'B' and 'C' hereto and upon such supply, execute and performance to the satisfaction of the purchaser and the purchaser shall pay to the Contractor at the rates accepted as per the said Annexure 'C' and in terms of the provisions therein.

In the witness where of the parties have hereunto set and subscribed their respective hands and/or seals day and year respectively mentioned against their respective signatures.

Signed and delivered at \_\_\_\_\_ by Shri \_\_\_\_\_ for and on behalf of M/s. \_\_\_\_\_

The contractor within named in the presence of :

1. Signatures

Date

Name in Block Capitals

Address

2. Signatures

Date

Name in Block Capitals

Address

Signed and delivered at \_\_\_\_\_ for and on behalf of RailTel  
by Shri \_\_\_\_\_ (Director / Projects or his successor) in the presence of  
:-

1. Signatures

Date

1.1.1.1 **Name in Block Capitals**

2. Signature

Date

Name in Block Capitals

Address: \_\_\_\_\_

Annexure 'A' : Tender Paper No.

Annexure 'B' : Firm's Tender No.

Annexure 'C' : Letter of Acceptance of

(Signature) \_\_\_\_\_

Dated:

Complete with enclosures

**GURANTEE BOND FOR SECURITY DEPOSIT**

( On Stamp Paper of requisite value)

(To be used by approved Scheduled Banks)

1. In consideration of the RailTel Corporation of India Limited, 6th Floor, 6A, Gumidelli Towers, Begumpet, Hyderabad – 500016 (Herein after called RailTel) having agreed to exempt ..... ( Hereinafter called “ the said Contractor(s)”) from the demand, under the terms and conditions of an Agreement No. .... dated ..... made between ..... and ..... for ( hereinafter called “ the said Agreement”) of security deposit for the due fulfillment by the said Contractor (s) of the terms and conditions contained in the said Agreement, or production of a Bank Guarantee for Rs. .... ( Rs. .... only). We, .....( indicate the name of the Bank) hereinafter referred to as “ the Bank”) at the request of ..... Contractor(s) do hereby undertake to pay the RailTel an amount not exceeding Rs. .... Against any loss or damage caused to or suffered or would be caused to or suffered by the RailTel by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.
2. We, ..... Bank do hereby undertake to pay the amounts due and payable under this Guarantee without any demur, merely on demand from the RailTel stating that the amount is claimed is due by way of loss or damage caused to or would be caused to or suffered by the RailTel by reason of breach by the said Contractor(s) of any of terms or conditions contained in the said Agreement or by reason of the Contractor(s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ....
3. We, ..... bank undertake to pay to the RailTel any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) / Supplier(s) in any suit or proceedings pending before any court or Tribunal relating thereto our liability under this present being, absolute and unequivocal. The payment so made by us under this Bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s) / Supplier(s) shall have no claim against us for making such payment.
4. We, ..... Bank further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the RailTel under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till RailTel certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this Guarantee. Unless a demand or claim under the Guarantee is made on us in writing on or before the ..... (1) ..... We shall be discharged from all liability under this Guarantee thereafter.



**STATEMENT OF DEVIATIONS**

PROFORMA FOR STATEMENT OF DEVIATIONS

1. The following are the particulars of deviations from requirement of the Instructions to Tenderers and Conditions of Tendering , Preamble and Special Conditions of Contract.

1.1 Instructions to Tenderers and Conditions of Tendering

<b>Clause</b>	<b>Deviation</b>	<b>Remarks</b> (Including Justification)
---------------	------------------	---

1.2 Preamble Clause	Deviation	Remarks (Including Justification)
---------------------	-----------	--------------------------------------

1.3 Special conditions of Contract. Clause	Deviation	Remarks (Including Justification)
--	-----------	--------------------------------------

2. The following are the particulars of deviations from requirement of the technical specifications.

Annexure	Clause	Deviation	Remarks (Including Justification)
----------	--------	-----------	--------------------------------------

**Notes:**

Where there is no deviation, the statement should be returned duly signed with an endorsement indicated no deviations.

**RAILTEL**  
SIGNATURE AND SEAL OF THE  
MANUFACTURER / TENDERER

*STANDING INDEMNITY BOND*  
(For on Account Payments and Stores supplied by RailTel)  
(On Stamp paper of Requisite Value)

We, M/s \_\_\_\_\_ hereby undertake that we hold at our Stores Depot/s at \_\_\_\_\_ for and on behalf of RailTel Corporation of India Limited in the premises through Director/Projects or his successor hereinafter referred to as "the Purchaser" all materials for which 'On Account' payments have been made to us against the Contract for ----- vide letter of Acceptance of Tender No. \_\_\_\_\_ and the materials handed over to us by the Purchaser for all purpose of execution of the said Contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of said materials against all risk till they are duly delivered as erected equipment to the purchaser or as he may direct otherwise and shall indemnify the Purchaser against any loss, damage or deterioration whatsoever in respect of the said materials while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any engineer authorized by the Director / Projects (whose address will be intimated in due course).

Should any loss, damage or deterioration of materials occur or surplus materials disposed off and refund becomes due, the purchaser shall be entitled to recover from us the full cost as per prices included in the Contract (as applicable) and also compensation for such loss or damage, if any, along with the amount to be refunded without prejudice to any other remedies available to his by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 2026

for and on behalf of M/s \_\_\_\_\_ (Contractor)

Signature of witness

Name and witness in Block letters

Address

**SYSTEM PERFORMANCE GUARANTEE**

**PROFORMA FOR THE SYSTEM PERFORMANCE GUARANTEE**

To

The Director / Projects,

I / We ..... hereby guarantee that the design on the basis of which we have submitted our tender no. .... has been carefully made to conform to the end objectives in the tender documents and to technical specification therein. We further guarantee that in the event of the performance of the system, when installed, not complying with the end objectives or with the specifications contained in the tender documents, we shall provide further inputs to enable the RailTel to realize the end objectives contained in these documents without any additional payment for any additional equipment which may be required in this regard. We further guarantee that all the expenses for providing the additional inputs under the System Guarantee will be borne by us. We further guarantee that these additional inputs will be provided by us to make the system workable within 1 months from the date on which this guarantee is invoked by the Purchaser. The guarantee is valid for a period of one year from the date of commissioning of the system.

(Signature of Firm's Authorized Officer)

Seal

**Signature of witness:**

1. ....

2. ....



**PROFORMA OF BANK GUARANTEE FOR MOBILISATION ADVANCE**

(On Stamp paper of requisite value)

(To be used by approved Scheduled Banks)

1. In consideration of the RailTel Corporation Of India Ltd, , 6th Floor, 6A, Gumidelli Towers, Begumpet, Hyderabad – 500016 ( Hereinafter called “ the RailTel”) having agreed to exempt .....(hereinafter called “ the said Contractor(s)”) from the demand, under the terms and conditions of an Agreement No. .... dated ..... made between ..... and ..... for ( hereinafter called “ the said Agreement”) of Mobilisation Advance for the due fulfilment by the said contractor(s) of the terms and conditions contained in the said Agreement, or production of a Bank Guarantee for Rs. .... ( Rs. .... only). We, .....( indicate the name of the Bank) hereinafter referred to as “ the Bank”) at the request of ..... Contractor(s) do hereby undertake to pay the RailTel an amount not exceeding Rs. .... Against any loss or damage caused to or suffered or would be caused to or suffered by the RailTel by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.
2. We, ..... Bank do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on demand from the RailTel stating that the amount is claimed is due by way of loss or damage caused to or would be caused to or suffered by the RailTel by reason of breach by the said Contractor(s) of any of terms or conditions contained in the said Agreement or by reason of the Contractor(s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ....
3. We, ..... bank undertake to pay to the RailTel any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) / Supplier(s) in any suit or proceedings pending before any court or Tribunal relating thereto our liability under this present being, absolute and unequivocal.  
The payment so made by us under this Bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s) / Supplier(s) shall have no claim against us for making such payment.
4. We, ..... Bank further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the RailTel under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till RailTel certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this Guarantee. Unless a demand or claim under the Guarantee is made on us in writing on or before the ..... (1) ..... We shall be discharged from all liability under this Guarantee thereafter.

- 5 We, ..... ( indicate the name of Bank) Further agree with the RailTel that the RailTel shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the Agreement or to extend time of to postpone for any time or from time to time any of the powers exercisable by the RailTel against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension to the said Contractor(s) or for any forbearance, act or omission on the part of RailTel or any indulgence by the RailTel to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have affect of so relieving us.
6. This Guarantee will not be discharged due to the change in the Constitution of the Bank or the Contractor(s) Supplier(s).
7. We, ..... ( indicate the name of Bank) lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the RailTel in writing.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 2026

for .....  
 ( indicate the name of the Bank)

**Witness**

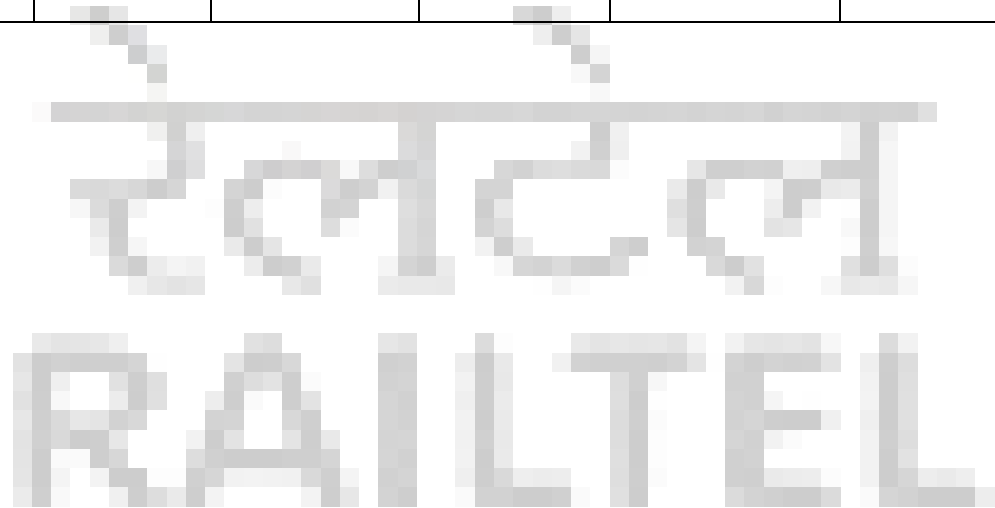
1. Signature  
 Name

2. Signature  
 Name

RAILTEL

**WORKS IN HAND**

S. N	System and Name of Project details	Party's address for whom the work is being done	Total value of contract ( and details)	Schedule period of execution (in months)	%age progress in terms of works done	Likely date of completion	No of Extensions Granted	Payments received till date	Remarks



**EXTENSION OF PERIOD OF COMPLETION OF WORK  
ON CONTRACTOR'S ACCOUNT**

No.

Date:

To,

.....

.....

Sub: (i)

( Name of Work)

(ii) Acceptance Letter No.

(iii) Undertaking / Agreement No.

Ref: .....(Quote specific application of the Contractor for extension to date, if received).

Dear Sir,

The stipulated date for completion of the work mentioned above is .....from the progress made so far and the present rate of progress, it is unlikely that the work will be completed by the above date ( or However, the work was not completed on this date)

Expecting that you may be able to complete the work if some time is given the Director / Projects RailTel Corporation of India Limited, Secunderabad although not bound to do so, hereby extends the time for completion from ..... to .....

Please note that an amount equal to 0.5% of the total value of the contract per week or part thereof (rounded off to the nearest whole number ) subject to a maximum of 10% of the total contract value of the works as a recovery for delay in the completion of the work after the expiry of (1)

..... will be recovered from as mentioned in para 35 chapter II, section II of the special conditions of contract for the extended period notwithstanding the grant of this extension. You may proceed with the work accordingly.

The above extension of the completion date will also be subject to the further condition that no increase in rates on any account will be payable to you.

Please intimate within a week of the receipt of this letter your acceptance of the extension on the conditions stated above.

Please note that in the event of declining to accept the extension on the above said conditions or, in the event of your failure after accepting or acting up to this extension to complete the work by (2) ..... here mention the extended date), further action will be taken in terms of relevant para of special conditions of contract.

Yours faithfully,

for & on behalf of RailTel Corporation of India Limited

**Note:**

1. Give here the stipulated date for completion without any penalty fixed earlier.
2. Here mention the extended date.

Sub: (i) ( Name of Work)

(i) Acceptance Letter No.

RAILTEL

**QUALIFICATION EXPERIENCE**

Details of works executed and under execution during the last 7 years should be furnished in the following format.

S. No.	Name of Project and description of work.	Party's Address of whom the work was done	Total value (in Indian Rupees)	Year of completion and schedule period of execution (in months)	Year of completion and actual period of execution (in months)	Remarks

**Note:** A certificate from the organisation , for which the work was executed, should preferably be executed to indicate that the contract was satisfactorily performed.

Signature and Seal of the  
Manufacturer / contractor

**GUARANTEE BOND AGAINST 'ON ACCOUNT' PAYMENTS**

(On Stamp paper of requisite value)

(To be used by approved Scheduled Banks)

In consideration of the RailTel Corporation of India Limited, 2<sup>nd</sup> Floor, B-Block, Rail Nilayam, Secunderabad – 500 071 ( hereinafter called "the RailTel") having agreed to exempt .....(hereinafter called " the said Contractor(s)") from the demand, under the terms and conditions of an Agreement No. ....dated.....made between ..... and ..... for ( hereinafter called " the said Agreement") of on Account Payment for the due fulfillment by the said contractor(s) of the terms and conditions contained in the said Agreement, or production of a Bank Guarantee for Rs. .... ( Rs. .... only). We, .....( indicate the name of the Bank) hereinafter referred to as " the Bank") at the request of ..... Contractor(s) do hereby undertake to pay the government an amount not exceeding Rs. .... Against any loss or damage caused to or suffered or would be caused to or suffered by the RailTel by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

We, ..... Bank do hereby undertake to pay the amount due and payable under this Guarantee without any demur, merely on demand from the RailTel stating that the amount is claimed is due by way of loss or damage caused to or would be caused to or suffered by the RailTel by reason of breach by the said Contractor(s) of any of terms or conditions contained in the said Agreement or by reason of the Contractor(s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ....

We, ..... Bank undertake to pay to the RailTel any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) / Supplier(s) in any suit or proceedings pending before any court or Tribunal relating thereto our liability under this present being, absolute and unequivocal.

The payment so made by us under this Bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s) / Supplier(s) shall have no claim against us for making such payment.

4. We, ..... Bank further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the

performance of the said Agreement and that it shall continue to be enforceable till all the dues of the RailTel under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till RailTel certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this Guarantee. Unless a demand or claim under the Guarantee is made on us in writing on or before the ..... (1) ..... We shall be discharged from all liability under this Guarantee thereafter.

5. We, .....(indicate the name of Bank)..... further agree with the RailTel that the government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the Agreement or to extend time of to postpone for any time or from time to time any of the powers exercisable by the RailTel against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension to the said Contractor(s) or for any forbearance, act or omission on the part of RailTel or any indulgence by the RailTel to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have affect of so relieving us.
6. This Guarantee will not be discharged due to the change in the Constitution of the Bank or the Contractor(s) Supplier(s).
7. We, ..... ( indicate the name of Bank) lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the RailTel in writing.

**Dated the** ..... **day of** ..... **2026**

for .....

.....  
( indicate the name of the Bank)

**Witness**

1. Signature

Name

2. Signature

Name

RAILTEL

**AFFIDAVIT**

**FORMAT FOR AFFIDAVIT TO BE SUBMITTED BY TENDERER ALONG WITH THE TENDER BID DOCUMENTS**

**(To be executed in presence of public notary on non-judicial stamp paper of the value of Rs. 100/-. The paper has to be in the name of the tenderer)**

I .....(Name and designation) \*\* appointed as the attorney/authorized signatory of the tenderer (including its constituents),

M/s \_\_\_\_\_ (hereinafter called the tenderer) for the purpose of the Tender documents for the work of \_\_\_\_\_ as per the tender No. \_\_\_\_\_ of (RailTel), do hereby solemnly affirm and state on the behalf of the tenderer including its constituents as under:

1. I/we the tenderer (s), am/are signing this document after carefully reading the contents.
2. I/we the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
3. I/we hereby declare that I/we have downloaded the tender documents from RailTel website [www.railtelindia.com/](http://www.railtelindia.com/) online portal <https://www.https://railtel.enivida.com>. I/we have verified the content of the document from the website and there is no addition, no deletion or no alternation to the content of the tender document. In case of any discrepancy noticed at any stage i.e., evaluation of tenders, execution of work or final payment of the contract, the master copy available with the RailTel Administration shall be final and binding upon me/us.
4. I/we declare and certify that I/we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
5. **I/we also understand that my/our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon me/us.**
6. **I/we declare that the information and documents submitted along with the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents, submitted by us.**
7. I/we undersigned that if the certificates regarding eligibility criteria submitted by us are found to be forged/false or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender EMD besides banning of business for five years on entire RailTel. Further, I/we (insert name of the tenderer) \*\* \_\_\_\_\_ and all my/our constituents understand that my/our constituents understand that my/our offer shall be summarily rejected.
8. I/we also understand that if the certificates submitted by us are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of EMD/SD and Performance guarantee besides any other action provided in the contract including banning of business for five years on entire RailTel.

DEPONENT  
SEAL AND SIGNATURE OF THE TENDERER

VERIFICATION

I/we above named tender do hereby solemnly affirm and verify that the contents of my/our above affidavit are true and correct. Nothing has been concealed and no part of it is false.

DEPONENT  
SEAL AND SIGNATURE OF THE TENDERER

Place:

Date:

*\*\*The contents in Italics are only for guidance purpose. Details as appropriate are to be filled in suitably by tenderer. Attestation before Magistrate/Notary Public*

राज्य  
RAILTEL

**FORMAT FOR BID SECURITY DECLARATION**

**(On non-judicial stamp paper of Rs. 100/-)**

Whereas, I/We \_\_\_\_\_(Name of Agency) has submitted bid for\_\_\_\_\_(Name of Work and Tender No.) and whereas Earnest Money Deposit is being exempted in the aforesaid tender to give relief to the bidders as per Govt. of India guidelines as the bidder being \_\_\_\_\_

I/We hereby submit the following “Bid Security Declaration” in lieu of exemption from submitting Earnest Money Deposit :-

- 1) If I/We withdraw or modify my/our bid during the bid validity period (including extended validity of tender) specified in the tender documents;  
Or
- 2) If, after the award of work, I/We fail to accept LOA/LOI, or to sign the contract agreement or fail to submit performance guarantee or fail to commence the work within stipulated time period prescribed in tender documents;  
Or
- 3) If I/We furnish any incorrect or false statement / information/ document;  
Or
- 4) If I/We hide any relevant information or do not disclose any material fact in the tender;  
Or
- 5) If I/We commit any breach of integrity Pact;

I/We may be disqualified and banned for a period of three years and shall not be eligible to bid for future tenders in RailTel for the period of three years from date of issue of such orders.

(Signed by the Authorized Representative of Firm)

Name of Authorized Representative Name of Firm

Date

RAILTEL

## Chapter VIII

### E-tendering Instructions to Bidders

#### General

Submission of Bids only through online process is mandatory for this Tender.

E-Tendering is a new methodology for conducting Public Procurement in a transparent and secured manner. Now, the Government of India has made e-tendering mandatory. Suppliers/ Vendors will be the biggest beneficiaries of this new system of procurement. For conducting electronic tendering, RailTel has decided to use the portal <https://railtel.enivida.com> E-Procurement system (E-NIVIDA).

Benefits to Suppliers are outlined on the Home-page of the portal. Bidders are advised to visit the E-NIVIDA Portal for details related to E-Tender i.e. Registration, FAQ, Helpdesk, Learning Center etc.

#### **1. Tender Bidding Methodology:**

The Bidder has to submit both Technical and Financial bid in Railtel's enivida portal "ONLINE."

#### **E-NIVIDA Helpdesk**

Please visit Helpdesk section on E-NIVIDA Portal.

Phone No.: - 011-49606060 / 9205898228

Mail id: - [eprocurement@RailTelindia.com](mailto:eprocurement@RailTelindia.com)

#### **2. Bid related Information for this Tender (Sealed Bid)**

The entire bid-submission would be online on E-NIVIDA Portal.

Broad outline of submissions are as follows:

1. Submission of Bid Security/ Earnest Money Deposit (EMD)
2. Submission of digitally signed copy of Tender Documents/Addenda
3. Single Packet (Credential/ Techno commercial Bid & Price Bid in one cover)
4. Online response to Terms & Conditions of Tender.
5. (Optional) Online Submission of modification, substitution bids for technical or financial parts, or withdrawal bid.

**NOTE: Bidder must ensure that the bid must be successfully submitted online as per**

## instructions of E-NIVIDA Portal.

### 2.1 GUIDELINES FOR REGISTRATION

- 2.1.1 Bidders are required to enroll on the e-Procurement Portal (<https://railtel.enivida.combidderRegistration/newRegistration>) or click on the link "Bidder Enrolment" available on the home page of e-tender Portal by paying the required Registration fee.
- 2.1.2 As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- 2.1.3 Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication with the bidders.
- 2.1.4 Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Only Class III Certificates with signing + encryption key usage) issued by any Certifying Authority recognized by CCA India (e.g., Sify / TCS / nCode / eMudhra etc.), with their profile.
- 2.1.5 Only valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.
- 2.1.6 Bidder then logs in to the site through the secured log-in by entering their user ID /password and the password of the DSC /e-Token.
- 2.1.7 The scanned copies of all original documents should be uploaded in pdf format on e-tender portal.
- 2.1.8 After completion of registration payment, bidders need to send their acknowledgement copy on our help desk mail id [eprocurement@RailTelindia.com](mailto:eprocurement@RailTelindia.com) for activation of account.

### 2.2 SEARCHING FOR TENDER DOCUMENTS

- 2.2.1 There are various search options built in the e-tender Portal, to facilitate bidders to search active tenders by several parameters.
- 2.2.2 Once the bidders have selected the tenders they are interested in, you can pay the Tender fee and processing fee (NOT REFUNDABLE) by net-banking / Debit / Credit card then you may download the required documents / tender schedules, Bid documents etc. Once you pay both fee tenders will be moved to the respective 'requested' Tab. This would enable the e- tender Portal to

RAILTEL

intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

## **2.3 PREPARATION OF BIDS**

- 2.3.1** Bidder should take into account any corrigendum published on the tender document before submitting their bids.
- 2.3.2** Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid.
- 2.3.3** Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF formats. Bid Original documents may be scanned with Color option.
- 2.3.4** To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g., PAN card copy, GST, Annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use “My Documents” available to them to upload such documents.
- 2.3.5** These documents may be directly submitted from the “My Documents” area while submitting a bid and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process. Already uploaded documents in this section will be displayed. Click “New” to upload new documents.

## **2.4 SUBMISSION OF BIDS**

- 2.4.1** Bidder should log into the website well in advance for the submission of the bid so that it gets uploaded well in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
- 2.4.2** The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document as a token of acceptance of the terms and conditions laid down by RailTel.
- 2.4.3** Bidder has to select the payment option as “e-payment” to pay the tender fee / EMD as applicable and enter details of the instrument.
- 2.4.4** In case of BG bidder should prepare the BG as per the instructions specified in the tender document. The BG in original should be posted/couriered/given in person to the concerned official before the Online Opening of Financial Bid. In case of non-receipt of BG amount in original by the said time, the uploaded bid will be summarily rejected.
- 2.4.5** Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BOQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BOQ file, open it and

complete the white Colored(unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BOQ file is found to be modified by the bidder, the bid will be rejected.

- 2.4.6 The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
- 2.4.7 The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- 2.4.8 Upon the successful and timely submission of bid click "Complete" (i.e. after Clicking "Submit" in the portal), the portal will give a successful Tender submission acknowledgement & a bid summary will be displayed with the unique id and date & time of submission of the bid with all other relevant details.
- 2.4.9 The tender summary has to be printed and kept as an acknowledgement of the submission of the tender. This acknowledgement may be used as an entry pass for any bid opening meetings.

### 3. Online Submissions:

The bidder is required to submit all the relevant documents online only with the following documents.

- a) EMD/UDYAM submission **through E-NIVIDA portal.**
- b) Submission **through E-NIVIDA portal.**
- c) Power of attorney to be submitted online. Original copy is needed to be submitted by the successful bidder before issuance of LOA, if requested by RailTel.
- d) In case bidder happens to be an MSE bidder, the documentary evidence for same shall be submitted on line.

### 4. Submission of Eligibility Criteria related documents

Eligibility criteria related documents as applicable shall also be scanned and submitted ON LINE

NOTE: In case of internet related problem at a bidder's end, especially during 'critical events' such as - a short period before bid-submission deadline, during online public tender opening event, during e-auction, it is the bidder's responsibility to have backup internet connections.

In case there is a problem at the e-procurement/ e-auction service provider's end (in the server, leased line, etc.) due to which all the bidders face a problem during critical events, and this is brought to the notice of RailTel by the bidders in time, then RailTel will promptly re-schedule the affected event(s).

### 5. Instructions for Tender Document TO THE BIDDERS

The RailTel Tenders are published on [www.railtel.in](http://www.railtel.in) and on E-NIVIDA Portal <https://railtel.enivida.com/>. In addition to submitting the e Tender documents online, they should also submit cost of tender document through E-NIVIDA.

NOTE: For online bid submission the bidder will have to necessarily download an official online copy of the tender documents from E-NIVIDA portal, and this should be done well before the deadline for bid-submission.

**6.Submission of Offers and Filling of Tender:**

This e-tender should be duly submitted online using the e-Procurement Portal <https://railtel.enivida.com/>. For detailed instructions please refer to E-NIVIDA Portal.

**7. Attendance of Representatives for Tender Opening:**

Representatives of bidders desirous to attend the tender opening can do so on production of a proper letter of authority from the respective firm, failing which they may not be allowed to attend the tender opening. Authorized representatives of those firms who have submitted the tender documents alone shall be allowed to attend the tender opening.

\* \* \* \* \*



## Chapter IX

### Service Level Agreements and Penalties

#### 12.1 SLAs on Power and Cooling (Data Center Infrastructure)

The bidder shall guarantee 99.982% uptime for Data Centre infrastructure. The Bidder shall be liable for liquidated damages for uptime maintained below 99.982 % in a month.

##### **A. Power Availability:**

- 1) The Vendor should warrant 99.982 % uptime on Power in the Customer Area provided Customer subscribes for dual (both primary and redundant) feed.
- 2) Power problem shall exist when Power is not available to both the primary and redundant outlet simultaneously and would result in a downtime when the particular Power device or equipment is shut down due to the Power problem.

##### **B. Air-conditioning Availability:**

- i. Vendor must warrant 99.982 % uptime on Cooling in the Customer Area.
- ii. The average Cold Ailes temperature will be maintained, between 20° and 22° and  $\pm 2^\circ$  on a daily basis as measured at the nearest PAC unit.
- iii. Average relative humidity will be maintained between 45% and 60% as measured at the nearest PAC unit.
- iv. RailTel shall be eligible for service credits when temperature / humidity recorded shows a deviation from the set limits for a prolonged period of time and this results in a downtime for a particular device or equipment being shut down due to overheating.

##### **C. Service Level Agreements and Penalties**

- 1) The agency shall ensure that the data center infrastructure shall have an uptime of 99.982%. During the support period agency shall submit a monthly uptime report of the infrastructure. **For every**

**additional minute of down time beyond SLA, a penalty at the rate of Rs. 10000/- per minute will be imposed and will be deducted from running invoice.**

- 2) Any failure of critical components like power distribution equipment's, PPC's, PAC's, UPSs' etc shall be restored within 48 hrs from the time of failure. **For any delay beyond 48 hrs, Penalty slab is as follows**

Upto 48 Hr : Nil

48 Hr – 72 Hr : Rs.1000 Per Hr

Above 72 Hr : Rs. 1000 Per Min

Will be imposed and will be deducted from running invoice.

- 3) DG related issues shall be restored within 03 (Three) Days from the time of failure. **For any delay beyond 03 (Three) Days, Penalty slab is as follows**

Upto 03 Days: Nil

03 Days – 06 Days: Rs.5000 Per Day

Above 06 Days: Rs 1000 Per Hr

Will be imposed and will be deducted from running invoice

- 4) For Compressor related issues in PAC, shall be restored within 03 (Three) Days from the time of failure. **For any delay beyond 03 (Three) Days, Penalty slab is as follows**

Upto 03 Days: Nil

03 Days – 06 Days: Rs.5000 Per Day

Above 06 Days: Rs 1000 Per Hr

Will be imposed and will be deducted from running invoice

- 5) Any failure of non-critical components (non-IT service affecting) shall be restored within 72 hours from the time of failure. **For any delay beyond 72 hrs, Penalty slab is as follows**

Upto 72 Hr : Nil

Above 72 Hr : Rs. 1000 Per Day

Will be imposed and will be deducted from running invoice.

- 6) Preventive maintenance should be conducted as per schedule prescribed in tender document. **For any delay beyond 7day, a penalty of Rs 1000/- per day will be imposed and will be deducted from running invoice.**

- 7) Manpower (Shift In-charge DC and BMS) needs to arrange for DC service as per tender condition, **Absence of any shift in-charge will impose penalty of 2000/- per day and will be deducted**

**from running invoice.**

- 8) Manpower (Supervisor) needs to arrange for DC service as per tender condition. **Absence of Supervisor will Impose penalty of Rs 3000/- per day and will be deducted from running invoice**  
**However maximum penalty of 10% of quarterly invoice value as per Tender/PO value will be deducted from running Invoice.**

This SLA document provides for minimum level of services required as per contractual obligations based on performance indicators and measurements thereof. The Agency shall ensure provisioning of all required services while monitoring the performance of the same to effectively comply with the performance levels.

राज्य  
RAILTEL