Bharat Heavy Electricals Limited

(A Govt. Of India Undertaking)

Power Sector, Eastern Region

BHEL BHAWAN, PLOT NO. DJ-9/1 , SECOTR II , SALT LAKE CITY , KOLKATA ,WEST BENGAL, INDIA

Phone : 033-23216130-31,033-23216130 FAX : 033-23211960

Sub	**TENDER CHANGE NOTICE (TCN-10) DATED: 05/05/2012**
Job	**Rate contract for fixing secondary service provider to setup MPLS Wide Area Network (WAN) across entire BHEL locations**
Ref	**Tender no : PSER:PUR: MSX:218 :145 Dtd: 20/01/2012 along with Tender Change Notices : TCN-01 dtd. 27/01/2012,TCN-02 dtd. 07/02/2012, TCN-03 dtd. 09/02/2012,TCN-04 dtd. 18/02/2012,TCN-05 dtd. 03/03/2012, TCN-06 dtd. 19/03/2012 & TCN-07 dtd. 09/04/2012, TCN-08 dtd. 23/04/2012 & TCN-09 dtd. 30/04/2012**

WITH REFERENCE TO ABOVE, FOLLOWING POINTS/ DOCUMENTS, RELEVANT TO TENDER, MAY PLEASE BE NOTED AND COMPLIED WITH WHILE SUBMITTING OFFER.

I. REVISED TECHNICAL CONDITIONS OF CONTRACT [VOL-IF(Rev.02)], SUPERSEDING EARLIER [VOL-IF(Rev.01)], IS ENCLOSED.

II. REVISED `NO DEVIATION CERTIFICATE' AS PER ENCLOSED ANNEXURE-3. BIDDER SHALL SUBMIT NO DEVIATION CERTIFICATE AS PER ENCLOSED FORMAT ONLY.

ALL OTHER TERMS AND CONDITIONS OF THE SUBJECT TENDER SHALL REMAIN UNCHANGED.

Thanking you,

Yours faithfully,
for BHARAT HYEAVY ELECTRICALS LTD

SR.MANAGER (PURCHASE)

ANNEXURE - 3

FORMAT FOR NO DEVIATION CERTIFICATE
(To be submitted in the bidder's letter head)

BHARAT HEAVY ELECTRICALS LIMITED,
Power Sector - Eastern Region,
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,
Kolkata – 700 091

Sub	No Deviation Certificate.	
Job	Rate contract for fixing secondary service provider to setup MPLS Wide Area Network (WAN) across entire BHEL locations	
Ref	1.0	**Tender no : PSER:PUR: MSX:218 :145 Dtd: 20/01/2012 along with Tender Change Notices : TCN-01 dtd. 27/01/2012,TCN-02 dtd. 07/02/2012, TCN-03 dtd. 09/02/2012,TCN-04 dtd. 18/02/2012,TCN-05 dtd. 03/03/2012, TCN-06 dtd. 19/03/2012 & TCN-07 dtd. 09/04/2012, TCN-08 dtd. 23/04/2012 , TCN-09 dtd. 30/04/2012 & TCN-10 dtd. 05/05/2012**
	2.0	All other pertinent issues till date

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

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

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorised representative of the contractor)

Bharat Heavy Electricals Limited

Power Sector Eastern Region , Kolkata

BHEL Network Requirements for 2nd Service Provider for MPLS WAN

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Definition Of Terms

Throughout the Tender Documents including the Enquiry Letter, the following words shall have the meanings assigned to them herein, unless the subject matter or the context requires otherwise.

1. The **Purchaser** shall mean M/s **Bharat Heavy Electricals Limited** (A Govt. of India Undertaking) incorporated under the Companies Act 1956 acting through its **POWER SECTOR EASTERN REGION, KOLKATA,** DJ 9/1 , SALTLAKECITY, KOLKATA – 700 091 which expression shall include its successors and assigns. It may also be referred to as **BHEL**.

2. The Tenderer shall mean the Firm/Company/Organisation, which quotes against the Tender Enquiry issued by the purchaser. It may also be referred as bidder or vendor.

3. **Acceptance of offer** shall mean issue of letter of intent/award or memorandum or detailed Order/Contract communicating the acceptance of offer, to the successful tenderer.

4. The **Order/Contract** shall mean and include the general conditions, bidding conditions, specific conditions, specifications, schedules, drawings, form of tender, covering letters, schedule of prices and quantities, letter of intent/award of the Purchaser, "Integrity Pact (IP) (as and when applicable) " any special conditions applicable to the particular Order/Contract and subsequent amendments mutually agreed upon. It may also be referred as order or contract/order or purchase order or contract.

5. The **Seller/Contractor** shall mean the firm/company/organization with whom the Order/Contract is made and shall be deemed to include his successors, representatives, heirs, executors, administrators and permitted assigns, as the case may be. It may also be referred as **contractor, seller, service provider or supplier**.

6. The **Sub-contractor** shall mean the person/firm/company/organization to whom any part of the work has been sub-contracted by the Seller/Contractor, with the written consent of the purchaser and shall include sub contractor's heirs, executors, administrators, representatives and assigns.

7. **The Engineer** shall mean officer of the purchaser as may be duly appointed and authorized in writing by the purchaser to act as the engineer on his behalf for the purpose of the Order/Contract.

8. **The Specification** shall mean the specifications contained in the Tender Documents and any subsequent modifications thereof and the drawings, schedules etc. attached thereto, if any.

9. Tests on completion shall mean such tests as are prescribed by the specifications and/or tests mutually agreed upon by the purchaser and the Seller/Contractor, to be performed by the Seller/Contractor after installation of the equipment to establish satisfactory operation as required by the specifications.

10. **Commissioning** shall mean successful completion of trial operations and readiness of the contracted/ordered equipment and materials for production use.

11. **Initial operation** or **Trial operation** or **Reliability run** or **Performance Guarantee Test**shall mean continuous integrated operation of the contracted/ordered equipment, materials and systems under varying conditions to furnish proof of satisfactory operation, for a specified period.

12. **Temporary work** shall mean all temporary works of every kind required in or for the execution, completion or maintenance of the works.

13. **Approved** means approved in writing including subsequent written confirmation of previous verbal approval and approval means approval in writing including as aforesaid.

14. **Inspection Agency (IA)** shall mean any person(s), who may be duly authorized by the purchaser to inspect the stores included in the Order/Contract, at the contractor's/sub-contractor's works.

15. **Month** shall mean calendar month and week shall mean 7 days.

16. **Consignee** shall mean the official(s)/person(s) to whom the stores are required to be delivered in the manner indicated in the Order/Contract.

17. **Plant/Equipment/Stores** shall mean the goods, machinery, components, parts, spares, etc. required to be supplied by the Seller/Contractor as per Order/Contract.

18. **Contract Engineer (CE)**shall mean the official who has signed the Order/Contract on behalf of the Purchaser.

19. **Site Engineer** shall mean officer of the purchaser as may be duly appointed and authorized in writing by the purchaser to act as the Site Engineer on his behalf for the purpose of receipt & verification of in-coming stores and issue of Material Receipt Certificate (MRC)/Stores Receipt Voucher (SRV) .

20. **Site Inspection Agency (Site IA)**shall mean any person(s), who may be duly authorized by the purchaser / owner to inspect the stores/works included in the Order/Contract, at the Project Site.

21. **General**

    The words incorporating singular shall include plural and vice-versa, in the words importing masculine gender shall include feminine and vice-versa and the words importing persons shall include bodies; corporate, limited liability companies, partnership and other legal entities.

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Instructions to Bidders

1. The tenderer shall closely peruse all the clauses, specifications and drawings etc., indicated in the tender documents, before quoting. Should the tenderer have any doubt about the meaning of any portion of the tender specifications or find discrepancies or omissions in the drawings or the tender documents issued are incomplete or shall require clarifications on any of the technical aspect, scope of work etc. he shall contact the official inviting the tender, for clarifications, before the specified date for seeking clarifications.

2. The tenderer shall make independent enquiries as to the conditions and circumstances affecting his tender estimates and to the possibility of executing the supplies/works as described. In assessing the tender, the tenderer shall be deemed to have inspected and examined the site and its surroundings and to have satisfied himself (as far as practicable) as to the form and nature of the site, the quantities and materials necessary for the completion of the work and the means of transport and access to the site, the accommodation he may require, the general labour position at the site and to have quoted his prices taking into consideration, the risks, contingencies and other circumstances which may influence or affect the execution of the Order/Contract.

3. It is the responsibility of the tenderer to keep himself informed of the correct rates of customs and other duties and taxes leviable for the materials/services as prevailing at the time of tendering. If the rates assumed by the tenderer are less than the tariff rates prevailing at the time of tendering, the tenderer will be himself responsible for such under quotations.

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Requirements

1. Introduction:

BHEL is the largest engineering and manufacturing enterprise in India in the energy-related/infrastructure sector, today. BHEL was established more than 50 years ago, ushering in the indigenous Heavy Electrical Equipment industry in India - a dream that has been more than realised with a well-recognised track record of performance. The company has been earning profits continuously since 1971-72 and paying dividends since 1976-77.

BHEL manufactures over 180 products under 30 major product groups and caters to core sectors of the Indian Economy viz., Power Generation & Transmission, Industry, Transportation, Telecommunication, Renewable Energy, etc. The wide network of BHEL's 14 manufacturing divisions, four Power Sector regional centers, over 100 project sites, eight service centers and 18 regional offices, enables the Company to promptly serve its customers and provide them with suitable products, Systems and services -- efficiently and at competitive prices. The high level of quality & reliability of its products is due to the emphasis on design, engineering and manufacturing to international standards by acquiring and adapting some of the best technologies from leading companies in the world, together with technologies developed in its own R&D centers.

BHEL's vision is to become a world-class engineering enterprise, committed to enhancing stakeholder value. The company is striving to give shape to its aspirations and fulfill the expectations of the country to become a global player.

2. Objective:

To setup a highly available and resilient MPLS network that provides high speed connectivity between various BHEL Project sites, Regional HQs, Manufacturing units and Offices. All mission critical business applications like ERP, Project Monitoring, transfer of Engineering drawings, Messaging and Video Conferencing will run on this network.

3. Current Scenario:

BHEL has currently two service providers (M/s Reliance Communications Infrstructure Ltd & M/s BSNL) for MPLS based Wide Area Network (WAN). Currently there are about 150 locations connected on MPLS network. There are some locations where there is link from single service provider and there are other locations where there are links from both the service providers. The locations include Manufacturing Units, Power Sector Regional Headquarters, Other Offices &Project Sites. Applications like ERP, Project Management System, Engineering applications, Video Conferencing, Messaging, Internet access, etc. are running on these networks. Both the networks are working concurrently and seamlessly in a mesh topology. A schematic of the BHEL MPLS WAN is given in **Annexure-VIII(a)**. The contract with M/s Reliance is expiring in 2012. A secondary service provider is to be selected after the expiry of contract with M/s Reliance.

4. Requirement:

The requirement is for MPLS links at various BHEL manufacturing units, regional head quarters, other offices and project sites.

The total network will comprise of about 250 locations (200 sites & 50 permanent locations) with a variation of about 20% on either side.

Most of these locations already have one MPLS link from BSNL. The requirement is for a secondary link for redundancy purpose.

The locations are classified as Class A, Class B & Class C as per criteria given below:

Class of Location	**Description / Criteria**
Class A	Permanent & Major Location
Class B	Permanent but Small Location
Class C	Non-Permanent or Project Site

The project sites are normally at remote locations and are temporary in nature. Typically life of a project site is 3 to 4 years. MPLS connectivity is required at project sites from day one for running online business applications and fast exchange of information.

The tentative list of locations where MPLS connectivity is required is attached as **Annexure-IX**.

The bandwidth requirement at each of these locations as on day one is given in **Annexure-IX**. Bandwidth requirements will increase from time to time, and CPE and last mile provisioned at these locations should have the capability to support the higher bandwidth as per the scalability required at each of the locations, without any hardware replacement.

The orders will be placed in phases. After Phase-I**(Annexure – X)**, orders will be placed as and when requirement is received.

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Special Terms & Conditions (Technical)

1. As BHEL has already taken BSNL as primary service provider for MPLS VPN connectivity and is taking new service provider for redundancy purpose, it is required that the service provider shall not have its backbone on BSNL OFC. Moreover, at no location last mile shall be from BSNL.

2. Last Mile:

Class A Locations	The last mile shall be OFC in a ring.
Class B Locations	The last mile can be OFC, Copper or RF. However, percentage of RF & Copper links cannot be more than 50% of total Class B locations. However offer to be submitted for OFC link.
Class C Locations	The last mile can be OFC, Copper or RF. However, the percentage of RF & Copper links cannot be more than 75% of total Class C locations. However offer to be submitted for OFC link.

3. Bidders to subit price for OFC only.

4. In case last mile is on RF or Copper, the charges payable shall be equal to only 75% of that of an OFC link of equal bandwidth.

5. In due course of time, MPLS connectivity will be required at more sites as BHEL keeps getting new orders regularly. The service provider shall be bound to provide MPLS links at any location within the country. Non-feasibility is not acceptable. In case of new sites, **the delivery period shall be four (4) months** from the date of issue of order. After issue of order by BHEL, service provider shall give acceptance of the order within 15 days from the date of issue of order. If the service provider does not give acceptance within 15 daysof the order date, BHEL shall be free to take an alternate link (Leased Link / MLLN) from any other service provider in the market. The Leased Link / MLLN will be taken from the project site to the respective Power Sector Regional Head Quarter (Noida, Kolkata, Nagpur

or Chennai). If the charges of the Leased Link /MLLN link are higher than the MPLS link of equal bandwidth, the differential charges will be recovered from the service provider's quarterly bills.

6. The MPLS VPN shall be taken as a service. All necessary hardware & software required for commissioning of the link shall be provided by the service provider. BHEL will pay for the services for the time period the services are used as per terms & conditions and SLA conformance. For Class A& Class B (permanent) locations, the commitment period shall be of 5 years. For project sites, thecommitment period shall be of 3 years. However, generally a project site runs for 3 to 4 years. After the expiry of commitment period, BHEL shall be free to surrender the link along with associated hardware without any commercial implication to BHEL. For surrendering a link, a 30 days advance notice will be given.

7. Requirement of MPLS links will be at around 250 locations (200 sites & 50 permanent locations) with a variation of about 20% on either side in 5 years period. However, firm commitment is for Phase-I**(Annexure – X)**links only. If there is any shortfall in the number of projected links in 5 year period, there shall be no commercial implication on BHEL.

8. If a link is redeployed from one site to another site before the expiry of the commitment period, BHEL will pay one-time redeployment charges as per below:

i. Transportation charges for the equipment (CPE) will be paid as per actual on submission of bills and due verification by BHEL representative. Transportation shall be the responsibility of the service provider.

ii. One-time redeployment charges, which includes de-commissioning, dismantling, packing, unpacking & re-commissiong charges, etc, will be paid after completion of successful recommissioning& as certified by IT group.

9. All hardware & software supplied by the service provider under this contract shall be new and licensed to BHEL. Bidders to submit "Newness certificate" to respective consignee/IT department in support of the same during execution of job. All routers & switches shall be of same make.

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Technical Section

1. Network Design Requirements:

The Service Provider shall provide MPLS WAN & Internet services to BHEL at various manufacturing units, regions, offices and project sites. CIT Noida& RC Puram Hyderabad shall act as the two hubs of this network with Noida as Primary & Hyderabad as secondary hub. The network should be a very secure, highly available, scalable and resilient. There should be enough free bandwidth available in the backbone of Service Provider's network so that no choking of the network takes place. The peak backbone utilization of the service provider shall not be more than 60%. The service provider shall share on request, with BHEL the current backbone network bandwidth utilisation. The network will be used to run business applications like:

i. Mission critical ERP application (SAP based)

ii. Video Conferencing

iii. Project Monitoring System, like Primavera

iv. Sites Operations Management System (SOMS)

v. Financial Information System (FIS) & Personnel Information System (PIS)

vi. Messaging, Intranet & Internet access

vii. IP telephony (VoIP)

viii. Legacy applications, etc.

The following are the minimum design requirements of the network:

1.1. The MPLS network shall be a secure network capable of GET VPN (Group Encrypted Transport) or equivalent connecting various BHEL locations.

1.2. The bandwidth provided shall be dedicated uncompressed 1:1 with dedicated last mile and CPE.

1.3. **Last Mile:** OFC as last mile is preferred.

Class A locations:	The last mile shall be on OFC and mandatorily in a ring.
Class B locations:	The last mile shall be on OFC and preferably in a ring

Class C locations:	The last mile shall be on OFC and preferably in a ring.

At Class A locations, except OFC, no other medium will be accepted as last mile. At Class B & Class C locations, if OFC is absolutely not feasible, Copper or RF can be offered as last mile. However, the following will apply in the case of Copper & RF:

i. The bandwidth offered shall be dedicated symmetrical bandwidth.

ii. All statutory requirements & any permission required from any government / local bodies shall be met and arranged by the service provider.

iii. In case of Class B locations, the number of RF & Copper links cannot be more than 50% of the total number of Class B links.

iv. In case of Class C locations, the number of RF & Copper links cannot be more than 75% of the total number of Class C links.

1.4. The network should integrate with the existing MPLS network of BHEL from M/s Bharat Sanchar Nigam Limited (BSNL). The two networks shall integrate, communicate and inter-operate seamlessly with one another. There shall be following scenarios:

i. **Location A:** where there is link from Service Provider One (SP1) only

ii. **Location B:** where there is link from Service Provider Two (SP2)only

iii. **Location C:** where there are links from both the Service Providers (SP1 & SP2)

In all the above three scenarios, any location on network of SP1 shall be able to communicate with any location on the network of SP2 and vice-versa. The configuration required for this seamless inter-operation shall be done by the service provider on the CPE or a layer 3 switch/router in BHEL LAN.

At those locations where there are links from both the service providers, it should be possible to operate the two links in parallel in active – active and /or active – standby mode. In case of a failure, the two links shall automatically fail-over on each other without any manual intervention. With the above configuration the service provider shall ensure that no non-optimal routing or asymmetrical routing takes place. All the necessary configuration required for this arrangement shall be done by the service provider and no extra hardware or software should be required for this. Service Provider shall present a solution diagram to meet this requirement. Moreover, the service provider shall ensure that no law of the land is violated by this configuration.

1.5. For better scalability, flexibility & inter-operability, the service provider shall run BGP (Border Gateway Protocol v4 or above) as preferred routing protocol on the network. The BHEL subnets shall be advertised through BGP.

1.6. The network should offer Quality of Service (QoS) for various applications. It should also be possible to prioritize certain traffic on these links. ERP should get the highest priority and dedicated bandwidth. Similarly VC should get priority over other non-critical traffic and should get dedicated bandwidth while VC is going on. The QoS required by BHEL will be communicated at the time of implementation.

1.7. **Change Requests:** The service provider shall put in place a proper change request management. During the currency of the contract BHEL shall be free to demand any change request regarding minor or major configuration change in the CPE or the backend routers / equipment of the service provider relevant to the BHEL network. The changes could be like advertisement of new networks/subnets, adding of new routes, reverse routes, change of IP address, change of QoS, etc. All change requests raised shall be assigned a token number and shall be categorized in two classes, Major & Minor. Any change request which requires changes / re-configuration at one or two locations shall be considered as Minor and any change request which requires changes / re-configuration at more than 2 locations shall be considered as Major. All minor change requests shall be implemented within 3 days and all major change requests shall be implemented within 7 days of the request. If any change request is not implemented within 7 days, a penalty equal to 0.5% of quarterly link charges per week shall be imposed for the delay beyond 7 days.

1.8. **Configuration Management:** The service provider shall take regular backup of configuration of all the CPE devices. Proper configuration management should be implemented. Any configuration change shall be undertaken after advance intimation to and consultation with BHEL and after analyzing the impact of the change.

1.9. **IPv6 Compliance:** The network should be fully IPv6 compliant. It should be possible to run both IPv4 & IPv6 concurrently on the network. Internet IP Addresses for both IPV4 & IPV6 are to be provided.

1.10. All devices like routers, switches, modems, UPS, etc, supplied as part of this contract should be from leading OEMs and should be brand new. No refurbished hardware should be used. Any software supplied as part of this contract should be licensed one & Bidder to give Undertaking regarding the same.

2. Scope of Work:

The scope of work includes but is not limited to the following:

2.1. Provisioning of uncompressed (1:1) MPLS & Internet bandwidth. The bandwidth requirement at various locations is given in **Annexure-IX**. The bandwidth must be exclusively dedicated for BHEL.

2.2. Supply, Installation and configuration of WAN end equipments (CPE) like switches, routers, modems, UPS, etc. at all the locations.

2.3. Integration with existing BHEL MPLS network. Changes to be done for the same in devices like Routers, Switches etc. shall be in the scope of the Service Provider.

2.4. Provisioning of MPLS & Internet links at the two Hub locations as per requirement with the necessary hardware and software.

2.5. The Service Provider shall also provide the following at each internet gateway location (i.e., Hyderabad &Noida). A complete list of deliverables at Noida and Hyderabad is enclosed as **Annexure-XI.**

i. Firewalls in failover mode are required for Internet Links. The firewalls should be equipped with IPS functionality as well. The installation, configuration, maintenance and migration of existing Firewall setup to the new firewall setup shall be done by the Service Provider.

ii. Two proxy servers and two reverse proxy servers, both appliance based and in failover mode. The proxy servers should be equipped with URL filtering functionality. The installation, configuration, maintenance and migration of existing proxy setup to the new proxy setup (and reverse proxy as well) shall be done by the service provider.

iii. One DNS Server at Hyderabad for name resolution of BHEL intranet servers. This will act as secondary DNS server. The primary DNS server is installed at Noida and is not in the scope of this tender.The supply, installation, configuration and maintenance of the DNS server at Hyderabad shall be in the scope of the service provider. This server shall be configured in such a way that it remains in sync with the primary DNS server already existing at Noida.

iv. Two appliance based Server Load Balancers(SLB) in failover mode. The installation, configuration, maintenance and migration of existing SLB setup to the new SLB setup shall be done by the service provider.

v. Supply, installation, configuration & maintenance of VPN appliance in failover mode at Noida.

vi. Switches required to connect various devices at Noida& Hyderabad. An illustrative schematic of network setup at Noida Hyderabad are attached as **Annexure–VIII(b) and Annexure–VIII(c) respectively**. It should be noted that these diagrams are solely illustrative. The actual design may vary depending on the solution proposed by the Service Provider. The switches offered should be managed switches and of the same make as of the routers.

2.6. Provisioning of Last Mile from BHEL location to the Service Provider's nearest POP. The Last Mile should not be on BSNL network. The last mile shall be on fiber. BHEL will provide

Ethernet Port on its switches for termination / connection of CPE equipment at those locations where service provider is not providing the switch.

2.7. Termination, Configuration & Commissioning of the linksshall be done by the service provider.

2.8. All links should be scalable to higher bandwidth as per the scalability required. The scalability required in bandwidth at various locations is also given in **Annexure–IX.** The bidder shall make provision, in the last mile and end equipment (Switch, Router, Modem, etc), for the scalability so that when BHEL asks for higher bandwidth, the same can be made available within 15days without replacing the end equipment and last mile.

2.9. At **Class A** locations, given in **Annexure–IX**, the Service provider shall provide last mile in the form of a ring. The two arms of the ring shall enter BHEL campus in two separate ducts, which shall be in separate trenches and in opposite directions. The ring should provide automatic failover of the last mile, so that if there is cut in one arm of the fiber, the link shall continue to work through the other arm without any disruption. At all Class A locations, Service Provider shall demonstrate this feature to the BHEL representative.

2.10. Provisioning of Internet Leased Line at Noida& Hyderabad Hubs. The architecture of the Internet Leased Line shall be as per **Annexure–VIII(a).There are some devices shown in the diagram but not figuring in the BoM. Such devices (like Link Load Balancer, etc) are already existing/installed at the site and are not part of this tender. For completeness of the diagram, they have been shown here.**

2.11. The Service Provider shall maintain all the links, CPE (switch, routers, modems, etc) during the entire contract period as per the SLA. Service provider shall regularly monitor bandwidth utilisation of the links & resource utilisation (CPU, memory, etc) of the end devices supplied by the service provider. The resource utilisation of the end devices like routers, switches, etc should normally be under **50%**. If however, the resource utilisation of any end device is consistently exceeding **65%** over a period of 15 days, the service provider shall upgrade or replace that device within **30 days** without any cost implication to BHEL.

2.12. BHEL will provide only space & power supply for end equipments like router, modem, etc, at all locations. If the said equipment is installed inside computer centers at such locations, BHEL will provide UPS power supply to the said equipment at Class A and Class B locations specified in **Annexure–IX.**For class C locations, Service Provider shall install its own UPS of appropriate capacity at such locations where BHEL will supply raw power only.

2.13. Adherence to Service Level Agreement.

3. Functional Requirements:

The proposed network should have following features:

3.1. Policy based QoS:

"Quality Of Service (QoS)" means the standard of service which determines different prioritization of VPN traffic on the Bidders backbone and hence determines packet delivery guarantee, latency guaratee and jitter guarantee.

The proposed network should provide policy based quality of service (QoS). It should also provide different class of services for each type of traffic. Critical applications like ERP & Video Conferencing should get priority over other less critical application. Priority of applications and bandwidth to be dedicated for each application would be communicated at the time of implementation.

3.2. Network Security:

The Network should have safeguards and security against unauthorised access. All CPE devices should be password protected and proper access log should be maintained.

3.3. The Service Provider shall provide read-only access and full "show command" privilege level on all CPE devices to the designated BHEL engineers, whereas the "write access" shall remain with the Service Provider. However, if BHEL requires "write access" to any of the CPE, the Service Provider shall provide the same on specific request from a designated BHEL official for a specific time period. After the initial installation and configuration, all "Change Requests" shall be implemented after formal approval from designated BHEL Official.

3.4. Network Management & Support:

The Service Provider shall do proactive monitoring and fault management of the network on an End-to-End basis remotely from its own Network Operations Centre (NOC) and provide the following link wise report at the end of each quarter and as and when required or asked by BHEL:

i. Link downtime / Uptime report.

ii. Bandwidth utilisation report of all the links.

iii. Average latency report of all the links.

iv. Packet Loss reports per link

v. Network availability reports as per SLA parameters.

3.5. The Service Provider shall allocate to BHEL one User-id & Password for web access to monitor in real time all network statistics and reports as mentioned above.

3.6. The service provider shall maintain and provide on-site support for the entire contract period on any hardware/software(s) provided for the delivery of the services under this contract.

3.7. The service provider shall have back-to-back agreement with the OEM of the hardware/software for warranty and support for the complete contract period so that services are delivered smoothly. Service Provider should be able to produce the back-toback agreement with the OEM's, whenever BHEL officials asked for the same.

3.8. The Service Provider shall assign a Programme Manager for effective functioning of the links. He shall conduct a bi-monthly review meeting over VC with Regional Head Quarter regarding performance of the project site links. Project Manager should also keep a track of Supply, Installation, and acceptance, etc. of the links and should send a weekly report on the same to concerned BHEL officials until the commissioning of the links.

3.9. On-Site Engineer at Noida Hub:

The Service Provider shall post 1 (one) qualified (CCNA Certified), trained and OEM certified engineer with proven experience of at least 2 years for monitoring of the BHEL MPLS Network at Noida Hub. The engineer shall be available at the Noida Office normally from 9.00 AM to 5.30 PM. However he may be required to stay for extended Hours & Holidays also, if required by BHEL. The scope of responsibility of the engineers shall include but is not limited to the following:

i. Link status

ii. Bandwidth utilisation of the links

iii. Call logging with the NOC and follow up

iv. Co-ordination with NOC, field engineers, BHEL regions & sites for resolution of complaints.

v. Troubleshooting, diagnostics, fault checking, spares replacement, etc.

vi. Daily, weekly and monthly reports of network like availability of links, bandwidth utilisation, packet loss, etc.

BHEL reserves the right to ask for a change of maintenance personnel citing reasons. The service provider shall arrange a replacement within 03 (Three) working days having the same or higher competence level.

4. Service Level Agreement (SLA):

The proposed MPLS network will be used extensively for data exchange between various BHEL Units, Regions and Project sites. The service provider shall provide support on 24x7x365 basis for all the CPE and links. The service provider shall ensure that the following SLA parameters are met:

4.1. Network Availability and Performance:

Service provider shall monitor the state of all the links and network equipment on a 24x7 basis to ensure that the entire BHEL WAN is up and running. The minimum performance acceptable to BHEL is given in the following table.

S. No.	Service Level Parameter	Minimum BHEL Requirement per Month
1	Uptime for Internet Links	99.9%
2	Uptime of Class A and Class B Location	99.5 %
3	Uptime of Class C Locations	99.0 %
4	Maximum Packet Loss per link	1%
5	Maximum Latency (Round Trip Time) between each location and Primary Hub (In the same cloud)	80 ms
6	Maximum Jitter (For Voice & VC only)	25 ms
7	Proactive Notification through email or SMS in case of service outage	Within15 Minutes

The “Uptime” includes both link uptime as well as the end equipments (CPE) uptime.

The downtime/outage is the period of unavailable time which begins when one of the following situations arises:

4.1.1. The link is down at the physical layer itself:

The downtime will start from the moment event is recorded by the NOC or after BHEL logs a complaint at vendor's Helpdesk, whichever is earlier. Complaints can be closed after getting concurrence from the respective locations.

4.1.2. The CPE (Including switch, router, modem, MUX/DLC etc) hardware level failure:

The Service provider's NOC should automatically get the alert. The downtime will start from the moment alert was recorded by the NOC or after BHEL logs a complaint at vendor's Helpdesk, whichever is earlier. Time will be recorded from that point onwards till the point complaint is resolved. This duration will be treated as outage.

4.1.3. Degradation in service due to high latency or packet loss:

If latency of a particular link is more than or equal to 80ms continuously for more than two hours, then the link will be considered as down. The link will be considered up only when the link gives a latency of less than 80 ms continuously for more than 60 minutes. Latency will be measured by ping response from the site CPE to the Data Centre (Primary HUB) CPE.

However, if the higher latency is due to congestion (over-utilisation, i.e., more than 75% utilization of last mile), then the link will not be considered down and no penalties will be levied. The Service Provider shall substantiate the over-utilisation of the last mile with relevant reports.

If the packet loss of a link is more than or equal to 1% continuously for more than an hour, the link will be considered down for the amount of time for which packet loss is more than 1%. The link will be considered up only when the link gives a packet drop of less than 1% continuously for more than 60 minutes.

4.2. Computation of Availability:

Availability of service shall be assessed by the following formula:

$$Uptime = 100 \times (1 - \frac{total\ outage\ in\ minutes}{maximum\ available\ time\ in\ minutes})$$

Maximum Available Time = No. of days in month * 24 * 60 – (Scheduled Maintenance Time + BHEL introduced Outage + Downtime Due to Force Majeure)

Note: *Scheduled Maintenance Time should not be more than one hour per month per link and BHEL should be informed at least 48 hours in advance and subsequent approval / acceptance should be taken from BHEL.*

5. Penalty for SLA Non-Conformance:

Network Availability (SLA Compliance) will be calculated on monthly basis at the end of each quarter and penalties for non-compliance will be deducted from the quarterly rental charges. The penalty will be calculated per link basis as per the following formula:

Penalty = F x (R x D)

Where F = Multiplication Factor as per table given below.

R = Rental Charges Per Minute

(i.e. Quarterly Rental Charges / Total number of minutes in the Quarter)

D = Downtime in Minutes.

For MPLS:

Multiplication Factor Table (For Class A and Class B Location)

S.No.	Uptime %	Multiplication Factor (F)
1	>= 99.50	0.00

2	99.00 – 99.49	1.00
3	98.00 – 98.99	3.00
4	97.00 – 97.99	5.00
5	96.00 – 96.99	7.00
6	< 96.00	10.00

Multiplication Factor Table (For Class CLocations)

S.No.	Uptime %	Multiplication Factor (F)
1	>= 99.00	0.00
2	98.00 – 98.99	1.00
3	97.00 – 97.99	3.00
4	96.00 – 96.99	5.00
5	95.00 – 95.99	7.00
6	< 95.00	10.00

For Internet:

Multiplication Factor Table (For Internet Links)

S.No.	Uptime %	Multiplication Factor (F)

1	>= 99.90	0.00
2	99.00 – 99.49	1.00
3	98.00 – 98.99	3.00
4	97.00 – 97.99	5.00
6	< 97.00	10.00

Note: Service Provider shall ensure that, under no circumstances, service shall be down for:

i. more than **3 hours** at a stretch in a single day (24 hours) at Class A **and B** Locations.

ii. more than **6 hours** at a stretch in a single day (24 hours) at Class C Locations

For each such instance where downtime is more than the above limits at a stretch, the downtime minutes will be doubled while calculating the total uptime for the period.

If the availability of **25%** of the network (links),is below **95%** continuously over a period of 3 months, BHEL reserves the right to terminate the contract in fullwithout any cost implication to BHEL.

6. Availability of Spares:

The Service Provider shall maintain sufficient spares for SLA compliance. If any spares are required to be stored at BHEL premises for proper SLA compliance, the service provider shall do so as and when required.

7. Training:

7.1. The service provider shall organize a minimum 5 day training course on Routing protocols from an authorized top level training partner of the CPE OEM for 10 to 12 BHEL officials. The traveling & stay charges will be borne by BHEL.

7.2. The Service Provider shall also organize a half-day operational level traing at four (4) Power Sector Regional HQs (Noida, Kolkata, Nagpur, Channai) for site personnel.

8. Bill of Material:

Location-wise Bill of Material (BoM) is attached as **Annexure-XI.** Service providers may note that this is the minimum requirement. Any hardware or software not mentioned in the BoM, but required for the completeness of the solution or proper delivery of the services, shall be provided by the service provider at no additional cost to BHEL.

9. Technical Specifications:

BHEL has the requirement of Internet Leased Lines at the two Hub locations - Noida and Hyderabad. The Noida Hub location hosts critical applications and websites like www.bhel.com, careers.bhel.in, emap.bhel.in, etc., which are published on the internet. Being the Hub locations, users from other MPLS locations will access internet from these two locations. Hence, in these Hub locations, the Service Provider shall provide all necessary hardwares as given in **Annexure XI**.

For all locations service by the vendor means complete solution which includes both bandwidth as well as hardwares necessary to establish connectivity. For the completeness of the solution or proper delivery of the services, any other hardware , if required other than those mentioned in **Annexure XI** shall be provided by the service provider at no additional cost to BHEL.

All hardware & software provided by the service provider under this contract shall be brand new and from leading OEMs only. Softwares should be licensed in the name of BHEL. Minimum technical requirements & specifications of required items is given in **Annexure-XII.** The service provider shall note that these are minimum specifications only and if higher specifications / configuration, higher models or upgrades are required for proper delivery of services and SLA conformance, the same shall be provided as and when required during the currency of the contract at no additional cost to BHEL.

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Other Terms & Conditions

1. Ethical Standard:

Bidders are expected to observe the highest standard of ethics during the procurement and execution of this Contract. In pursuit of this policy, the Purchaser will reject a proposal for award if it finds out that the Bidder being considered for award has engaged in corrupt or fraudulent practices in competing for the Contract. For the purposes of this provision, the terms set forth below are defined as follows:

1.d. ***"Corrupt practice"*** means the offering, giving, receiving, or soliciting of anything of value to influence the action in the procurement process or in Contract execution; and

1.e. ***"Fraudulent practice"*** means a misrepresentation of facts in order to influence a procurement process including collusive practices designed to establish bid prices at artificial, non-competitive levels to deprive the Purchaser of the benefits of competition; By signing the Bid Forwarding Letter, the Bidder represents that for the software it supplies, it is the owner of the Intellectual Property Rights in the software. Willful misrepresentation of these facts shall be considered a fraudulent practice without prejudice to other remedies that the Purchaser may take.

2. Non-Disclosure Agreement:

The Service Provider shall sign a Non Disclosure Agreement (NDA) with BHEL. By signing the NDA, the bidder agrees not to disclose any confidential information, business or proprietary, as covered by the agreement. The proforma for the Non Disclosure Agreement is attached as **Annexure-II.** Disclosure of receipt of any part of the afore mentioned information to parties not directly involved in providing the services requested could result in the disqualification of the Service Provider, pre-mature termination of the contract and/or legal action against the Service Provider for breach of trust.

No news release, public announcement, or any other reference to this RFP or any program there under shall be made without written consent from BHEL. Reproduction of this RFP, without prior written consent of BHEL, by photographic, electronic, or other means is prohibited.

3. Cost of Bidding:

The Bidder shall bear all costs associated with the preparation and submission of its bid and the Purchaser will in no case be responsible or liable for those costs.

4. Price Bid (Part – II):

i. Vendor has to give details of applicable Duties and Taxes clearly. In case of any change in applicable duties till the time of delivery, new lease rates shall be calculated in line with the changes. The changes in the Tax rates will be applicable as per actuals, subject to documentary evidence.

ii. Though offer of higher warranty/configuration/rating, than what is required as per tender specifications, may be accepted, no extra weightage or preference will be given for the same.

iii. Prices of optional items, if any, shall not be considered for Price evaluation and comparison, unless stated otherwise.

5. Taxes:

BHEL will pay direct applicable taxes only. The Service Provider shall clearly specify the current applicable direct taxes and their current rates. Any taxes currently applicable but not specified in the offer by the Service Provider will not be paid by BHEL.

6. Change in Taxes:

In case there is any change in applicable direct taxes during the validity period of the contract, the same shall be to BHEL's account.

7. Insurance:

The equipment supplied by the service provider under the contract shall be fully insured by the Service Provider against any loss, theft, damage, etc, during transportation, storage, delivery, installation and operation for the entire period of the contract.

For any theft of or damage to any of the supplied items, where the vendor is filing a claim with the insurance agency; the vendor shall replace the item on its own within 7 working days of the reporting of the incident, after which SLA and Risk Purchase clauses of the contract will become applicable.

8. Sub-Contracting:

The Service Provider shall not sub-contract the services without written consent from BHEL. Further, BHEL shall not be liable for making any payments to the sub-contractors.

9. Delivery Period:

The delivery period for Phase-I **(Annexure – X)**links shall be 3 months from the date of intimation by BHEL. For future project sites, the delivery period for the commissioning of the links shall be 4 months from the date of placement of order. If, the Service Provider fails to deliver the link within the delivery period, penalty for late delivery will be levied on the Service Provider as per Late Delivery Clause.

10. Zero Date:

The date of LOI / Order / Contract whichever is earlier shall be treated as the Zero Date for contractual purpose.

11. Liquidated Damage:

If the vendor fails to complete the subject job as per aforesaid completion period, BHEL shall have the right to recover as liquidated damages (LD) a sum equivalent to 0.5 % of the contract price excluding taxes, duties for delay per week. The liability for delay shall not in any case exceed 10 % (ten percent) of the contract price excluding taxes, duties. Other terms & conditions shall be as per relevant clause of GCC (Volume-IB).

If the service provider fails to deliver the link in 5 months after intimation by BHEL, BHEL reserves the right to invoke the risk purchase clause in General Terms & Conditions as per provisions of the contract.

12. Project Management:

The Service Provider shall assign a dedicated Project Manager for this project. The project manager should preferably be PMP certified and should have done project management of at least 2 large projects, each consistiung of at least 50 locations. The project manager shall submit a Time Bar Chart indicating starting and completion of dates of each activity, i.e. Supply, Installation, and acceptance, etc. and shall submit weekly project progress report to designated BHEL officials. Weekly project review meetings shall held between the service provider project team and BHEL representatives. After implementation of the project, the service provider shall submit a detailed project report /documentation containing list of locations, IP addresses, other technical details, location-wise item list, a high level network diagram, etc.

13. Commitment Period:

13.a. For Class A& Class B locations the order will be placed for a period of 5 years and commitment shall also be for five (05) years.

13.b. For Class C locations, the order will be placed for a period of three(3) yearsand commitment shall also be for three (03) years. After the expiry of the commitment period, BHEL will have the right to surrender the link with a prior notice of one month period. After the expiry of the notice period, no charges shall be payable whatsoever.

13.c. The contract can be extended after initial 5 years / 3 years period on mutually agreeable terms & conditions.

13.d. If the Service Provider stops giving services without giving prior notice, BHEL reserves the right to encash the Bank Guarantee.

14. Redeployment:

Sometimes, within the commitment period, BHEL may like to redeploy the links from one location to another anywhere within the country. This will more likely happen at project sites. In that case, BHEL will intimate the service provider at least 1 (one) month in advance for de-commissioning of link at one location and re-commissioning of the link at a new location. The link will have to be commissioned at the new location within 4 months from the date of intimation. After the expiry of one

month notice period, no charges will be paid for the link until it is commissioned at the new location. BHEL will pay one-time redeployment charges as per below:

iii. Transportation charges for the equipment (CPE) will be paid as per actual on submission of bills and due verification by BHEL representative. Transportation shall be the responsibility of the service provider.

iv. One-time redeployment charges, which includesde-commissioning, dismantling, packing, unpacking& re-commissiong charges, etc, will be paid as per the contract.

15. Terms of Payment:

BHEL will not make any advance payment. Payment will be made on quarterly basis in arrears based on fulfillment of SLA parameters after adjustment of penalty (if any) due to non compliance of SLA or due to late delivery of link. The charges shall accrue on pro rata basis in the following manner:

i. The Service Provider shall commission links at Hub locations (Noida& Hyderabad), in the first go.

ii. Links at other sites will be accepted only after commissioning of links at the two hub locations at Noida and Hyderabad. The start date for the payment of charges for all the links will be taken as per actual acceptance date, not earlier than the acceptance date for links at Hub locations. There will be only one acceptance form for all the equipment(s) installed at that location. Acceptance date of the last equipment installed will be taken as the accrual date of that link.Details of location wise equipments to be installed at different locations is shown in Bill of Material - **Annexure-XI.**

iii. The payment of charges for any subsequent orders or links will start from the date of acceptance of those individual links.

iv. The payment period (quarter) will be measured from the date of acceptance by BHEL. Calendar quarter will be taken as quarter for payable charges.

v. Payment will be made in Indian Rupees Only.

vi. Payment will be made by the agency which has placed the order.

vii. Payment for the first and last quarter will be made on a pro rata basis for link to link basis

viii. The payment of charges shall start only after the successful completion and acceptance of all first phase activities.

15.a. <u>Payment for quarterly charges (Lumpsum charges towards bandwidth including equipment rental) :--</u>

i. 100% quarterly Payment (lumpsum charges towards rental &Bandwidth) shall be payable after completion of each quarter and as certified by respective Ordering agencies IT group.

ii. Downtime shall be recorded by respective IT group against SLA & the same shall be certified in each quarterly bill.

15.b. Payment for diversion charges :--

i. One-time redeployment charges, which includes de-commissioning, dismantling, packing, unpacking & re-commissiong charges, etc, will be paid after completion of successful recommissioning& as certified by IT group.

ii. Transportation charges for the equipment (CPE) will be paid as per actual on submission of bills and due verification by BHEL representative. Transportation shall be the responsibility of the service provider.

16. Link Charges&Upgradation of Link Bandwidth:

The link charges shall remain firm during the full tenure of the contract.

Any upgradation in bandwidth if required by any location shall be carried out as per the bandwidth rates finalised in the contract .If BHEL desires, vendors may be asked for negotiation after two years in case of downward trend in bandwidth charges. For upgradation of Bandwidth, separate order will be placed by the Ordering Agency as indicated in Clause No. 10 above. In this case,upgradation in bandwidth shall be carried out by the service provider within one month after placing the order for the same. Any delay in upgradation beyond one month will entail penalty equal to 0.5% of the yearly link charges (including the upgraded bandwidth) per week. If the upgradation is not carried out within 3 months of placing the order, a flat 30% deduction will be made from then on from the quarterly link charges.

17. Purchaser's Rights:

The Purchaser reserves the right to make changes within the scope of the contract in following respects at any point of time.

BHEL may at any time, by a written order given to the Service Provider, make changes within the general scope of the contract in any one or more of the following during the contract period:

i. Change of location for provisioning of services.

ii. Change in bandwidth required at any location or across all the locations.

iii. Change in QoS parameters at any location or across all locations.

iv. Addition or surrender of links and end equipment due to opening or closing of locations.

18. Clarification on Bidding Documents:

The Bidder is expected to carefully go through this Tender Document and understand all the requirements thoroughly before submitting their offer. All legitimate queries and clarifications regarding this tender must be submitted in writing and addressed to the official inviting the offers. All these queries will be clarifiedin the **Pre-Bid Meeting.**

19. Mobilization Advance /Interest Bearing Recoverable Advance

No mobilization advance/ interest bearing recoverable advance is admissible under this part of the tender

20. Over Run Charges (ORC) :ORC is not applicable for this tender.

21. Price Variation Compensation (PVC) :PVC is not applicable for this tender.

22. Security Deposit & Performance Bond :

22.1 Security deposit shall be applicable as per relevant clause of GCC (Volume-IB).

23. Contract Price

The bidder shall quote their rates strictly in accordance with prescribed rate/price schedule of Volume-III.

24. Other Terms

24.1. While bidder's scope include deplyment of all resources, like T&P, materials, consumables, manpower including supervision etc for proper completion of the subject job and no sub-contracting for execution of the job is allowed by BHEL, depending on project's requirement and on prior acceptance of BHEL, bidder may associate agencies for deployment of skilled/ unskileld manpower only for site execution. Bidder should arrange all resources, like T&P, materials, consumables, supervision etc directly for the subject job.

24.2. All other term & conditions of this specification, not mentioned above shall be governed by the pertinent provisions of GCC, Volume-IB.

List Of Annexures of TCC

Sl. No.	Annexure	Description
1	Annexure-I	Not Applicable
2	Annexure-II	Proforma for Non Disclosure Agreement
3	Annexure-III	Authorisation by OEMs
4	Annexure-IV	Not Applicable
5	Annexure-V	Checklist of Make and Models for OfferedEquipments
6	Annexure-VI	Not Applicable
7	Annexure-VII	Not Applicable
8	Annexure-VIII(a)	Schematic of BHEL MPLS WAN & Internet
9	Annexure-VIII(b)	Illustrative schematic of network setup at Noida
10	Annexure-VIII(c)	Illustrative schematic of network setup at Hyderabad
11	Annexure-IX	List of locations, Class, Type and Bandwidth
12	Annexure-X	List of WAN Locations in Phase I
13	Annexure-XI	BoM
14	Annexure-XII	Technical Specification

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ANNEXURE - II

THIRD PARTY NON-DISCLOSURE AGREEMENT

I, _____, on behalf of the _____ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL on contract is confidential and that the nature of the business of the BHEL is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL. Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.

- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data,

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL all documents and property of BHEL, including but not necessarily limited to: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, and are reasonable given the nature of the business carried on by the BHEL. I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Dated at _____, this ____ day of _____, 20__.

Name

Company

Signature

Note:- The above format is suggestive in nature. Any other format of NDA duly approved can also be used.

Annexure-III

Authorization by OEM

Date: _____

To,
BHEL
PSER, KOLKATA

Subject: **Letter of Authority**

Tender Ref. No.: **……. dated ……..**

Dear Sir,

We hereby authorise _____ who has all India presence and fulfills the requirements of the tender enquiry ref. no……., dated ……. 2011 to quote / negotiate and service the equipment as required in the above tender enquiry.

This authorization is valid only for the following equipment for which we are the OEM:

1. _____
2. _____
3. _____
4. _____
5. _____

The authorised agency would ensure reliable service during complete lease period of 5 years.

(Authorized Signatory)

For _____

Note: This 'Letter of Authority' should be issued on the letterhead of OEM & enclosed in Part-I.

Annexure-V

Checklist of Make & Models for Offered Equipments

Class A locations (HUB Locations)

Sl. No.	Item Name	Equipment Specification (as per Annexure - XII)	Qty (Noida)	Qty (Hyd.)	Qty. (Total)	Vendor Compliance	Make & Model offered
1	Firewall(and IPS)	FW-IPS	2	2	4		
2	VPN Concentrator (SSL & IPSec)	VPN	2	0	2		
3	VPN Concentrator (SSL & IPSec)	VPN	0	1	1		
4	Core Switches	L3 Switch-Type-I	2	0	2		
5	Uplink L2 Switches	L2 Switch-Type-I (48 Port)	0	2	2		
6	Access Switches	L2 Switch-Type-I (48 Port)	0	2	2		
7	Uplink L3 Switches (Distr)	L3 Switch-Type-II	0	2	2		
8	Forward Proxy and URL Filtering Appliance	Proxy-Type-I	2	0	2		
9	Forward Proxy and URL Filtering Appliance	Proxy-Type-I	0	2	2		
10	Reverse Proxy	Proxy-Type-I	2	0	2		
11	Server Load Balancer	SLB-Type-I	0	2	2		

Class A locations (Other than HUB Locations)

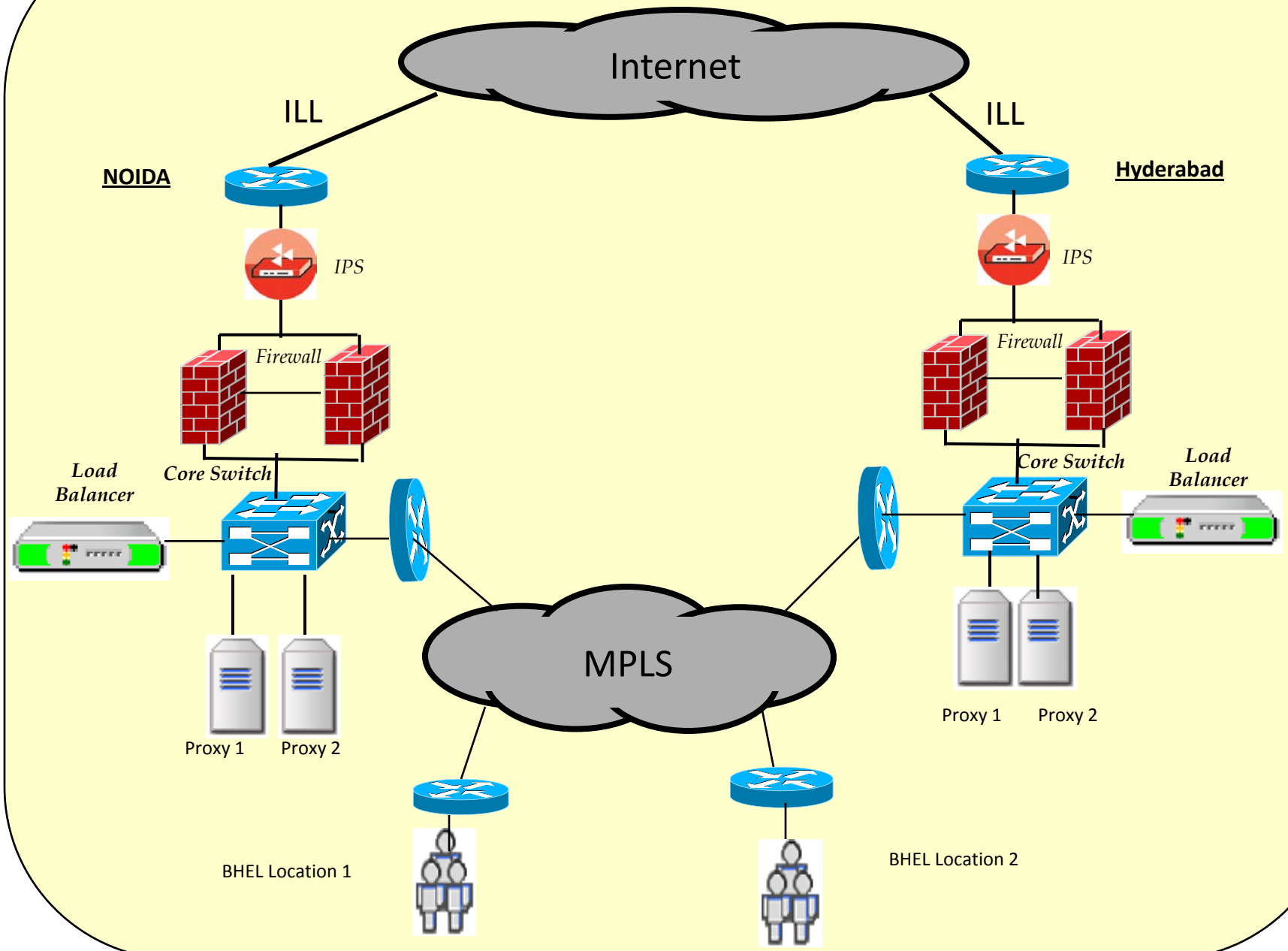
Sl. No.	Item Name	Equipment Specification (as per Annexure - XII)	Quantity/ location	Vendor Compliance	Make & Model offered
1	MPLS Router	Router Type - I	1 No.		

Annexure-V

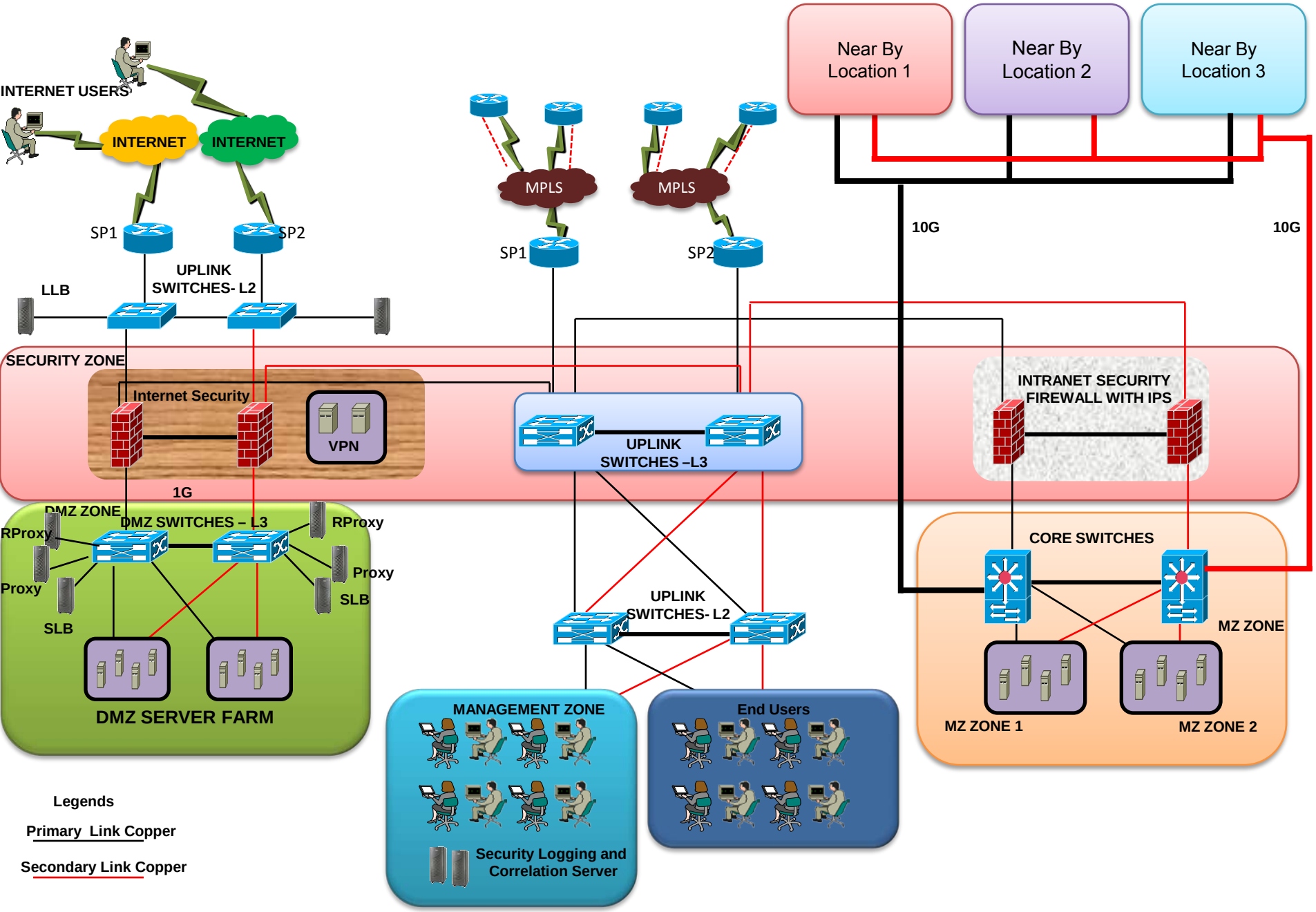
Checklist of Make & Models for Offered Equipments

Class B locations					
Sl. No.	Item Name	Equipment Specification (as per Annexure - XII)	Quantity/ location	Vendor Compliance	Make & Model offered
1	MPLS Router	Router Type - II	1 No		

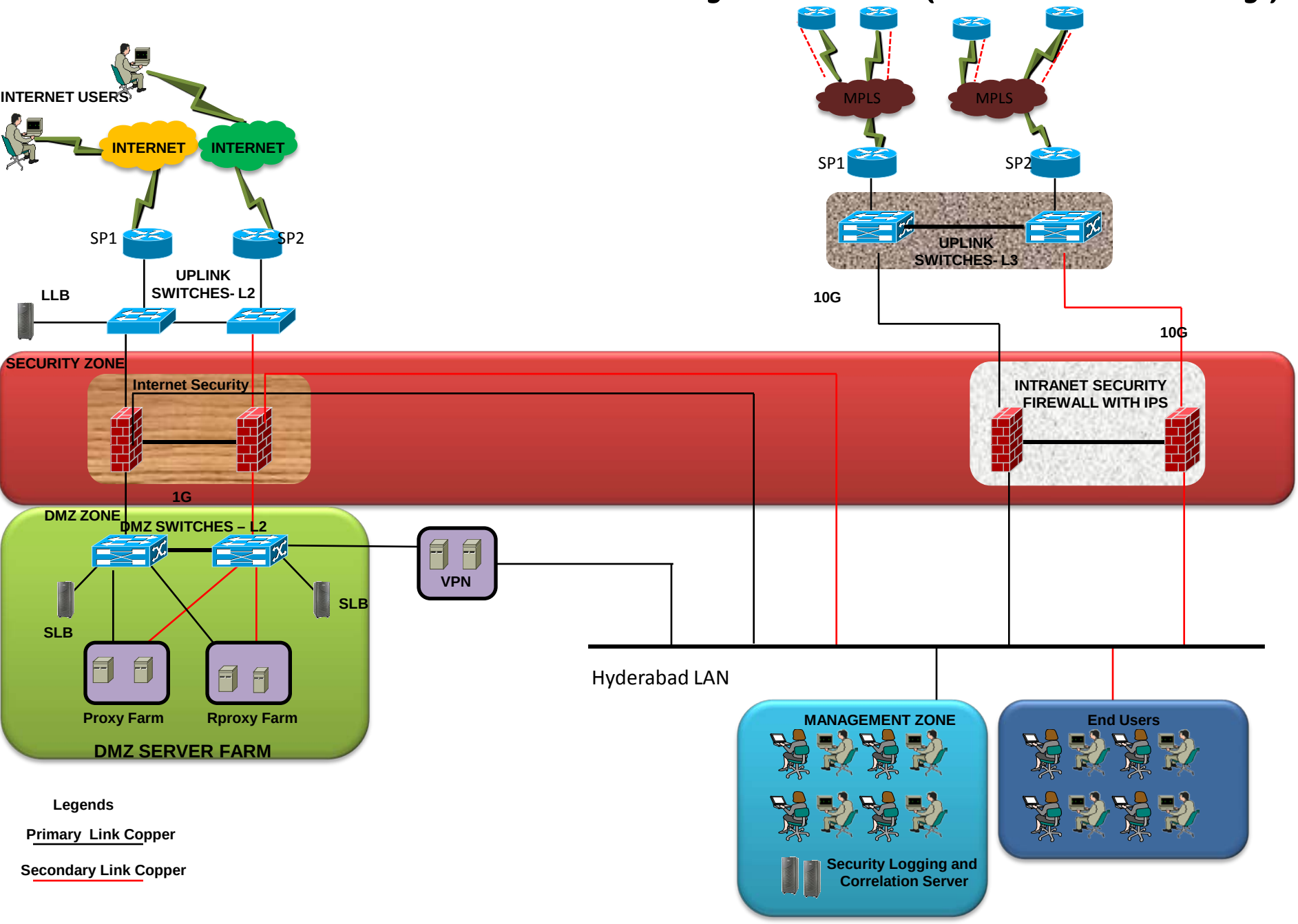
Class C locations					
S. No.	Item Name	Equipment Specification (as per Annexure - XII)	Quantity/ location	Vendor Compliance	Make & Model offered
1	MPLS Router	Router Type - III	1 No		
2	24Port L2 Switch	L2 Switch-Type-I (24 Port)	1 No		
3	2 KVA UPS	UPS	1 No		


Internet
ILL
ILL
NOIDA
Hyderabad
IPS
IPS
Firewall
Firewall
Load Balancer
Core Switch
Core Switch
Load Balancer
MPLS
Proxy 1
Proxy 2
Proxy 1
Proxy 2
BHEL Location 1
BHEL Location 2

BHEL Network Architecture – Noida (Illustrative only)



BHEL Network Architecture – Hyderabad (Illustrative Only)



Annexure-IX

Sr No	Name of the Site	Region	Class Of Location	Proposed B/W Required (Mbps) (Uncompressed 1:1)	B/W Scalability Required (Mbps) (Uncompressed 1:1)	Address	Primary Contact Details	Secondary Contact Details	BOM
1	HEEP and CFFP Haridwar	MU	A	16	64	Heavy Electrical Equipment Plant, Ranipur, Haridwar-249403 (Uttranchal)	Mr. Ajai Pal Singh Ph.No. +911334-281118, 281399 Email: ajaipal@bhelhwr.co.in	Mr Arvind Kumar Gupta Cell No.: +919719004647 Ph.No. : +911334-284082 Email: arvind@bhelhwr.co.in	
2	HEP, Bhopal	MU	A	16	64	Heavy Electricals Plant, Piplani, Bhopal-462022		Mr. Bondad, Cell No.:+919425605007 Vijay Prakash: 9425601910 Ph.No. +91755-2503571 Email: gsbondad@bhelbpl.co.in	
3	Jhansi	MU	A	16	32	Transformer Plant, PO BHEL, Jhansi-284129 (U.P.)	Tarun Suyal Engineer(ICC) Bhel Jhansi Mob:-08004939855 Mr B B Arora Cell No.: +919405590622 Ph.No. :+91510-2412032 Email: bbarora@bheljhs.co.in	Mr. R. Gairola, Ph.No. +919415412024, Email: rgairola@bheljhs.co.in	
4	Goindwal	MU	B	4	16	Industrial Valves Plant 433, Industrial Complex, Goindwal-143423 Distt. Tarn, Taran (Punjab)	Mr. Vishal Devgan Cell No.+919815955597 Email : vishal@ivp.bhel.co.in; vdevgon@gmail.com		
5	Jagdishpur	MU	B	4	16	Jagdishpur Indl.Area, Sultanpur Distt.UP -227817	Mr. Nawazish Ali Saifi Cell No. +919450919157 email:nas@bhelepd.com	Mr Kamlesh Das Ph: 9415046158 Email: kd@bhelepd.com	
6	HPEP, Hyderabad	MU	A	32	64	Heavy Power Equipment Plant, Ramachandrapuram, Hyderabad-502032		Mr K.Ravi Kumar ,Manager/IT Email : ravikk@bhelhyd.co.in Ph: +919490165425	
7	EDN, Bangalore	MU	A	16	64	Electronics Division, BHEL, P.O. Box 2606, Mysore Road, Bangalore-560026	Mr M. S Rawat, Cell No.:+919900541236 Ph.No. +9180-26743160 Email: rawat@bheledn.co.in	Mr.B.S.Baliga Cell No.: +919945530242 Email: baligabs@bheledn.co.in	
8	HPBP, Trichy	MU	A	24	64	High Pressure Boiler Plant & Seamless Steel Tube Plant, Tiruchirappali-620014 (Tamil Nadu)	Mr. D.Varatharajalu / Manager Email: rajalu@bheltry.co.in Ph: 09442502942	Mr.Thyagarajan Sr.Manager, Informatics centre Cell no: +919442507710 Phone: 04312577710 Mail : st@bheltry.co.in	
9	BAP, Ranipet	MU	A	16	32	Boiler Auxiliaries Plant, Indira Gandhi Industrial Complex, Ranipet – 632406, Vellore District (Tamil Nadu)	Mr. Alfred Suman Cell No. +919443867584 Ph.No. +914172-254507 Email: alfred@bhelrpt.co.in	Mr. R.Laxman Ph.No. +914172-241144 Email: rl@bhelrpt.co.in	

Annexure-IX

Sr No	Name of the Site	Region	Class Of Location	Proposed B/W Required (Mbps) (Uncompressed 1:1)	B/W Scalability Required (Mbps) (Uncompressed 1:1)	Address	Primary Contact Details	Secondary Contact Details	BOM
10	Piping Center, Chennai	MU	B	4	16	No. 80 Gopathy Narayanswamy Road, T. Nagar, Chennai-600017	Mr. M. Thangaraj Cell No. : +919940146099 Ph.No. +9144-28158823 Email: raajpillai@bhelmpc.co.in	Mr. C. Annadurai Cell No. : +919444033727 Ph.No. +9144-28158856 Email: cad@bhelmpc.co.in	
11	Corporate Comm. Office, New Delhi	OF	B	4	16	Parliament Street, New Delhi-110001			
12	EPD, ISG, CTI & CBU, SSBG and ROD Bangalore	MU	B	4	16	BHEL Complex, Prof. CNR Rao Circle, Opposite Indian Institute of Science, Malleswaram, Bangalore-560012	Mr. Ankur Khare, Cell No. +919901475215 Ph : +9180-22182230 Email :ankurkhare@bhelepd.com		
13	Corporate R&D , Hyderabad	MU	A	16	32	Corporate Research & Development Division, Vikasnagar, Hyderabad- 500093	Mr. M srinivas, Cell No. +919440090997 Ph.No. +9140-23778995, 23882207 Email: srinivas@bhelrnd.co.in	Mr G Puthraya, Cell No.: +919985306609 Ph.No. +9140-23882207 Email:puthraya@bhelrnd.co.in	
14	CFP, Rudrapur	MU	B	4	16	Component Fabrication Plant Rudrapur-263153	Mr. Manoj Singh Ph.No.+915944-243419		
15	Internet Line - Hyderabad	OF	A	32	64	Heavy Power Equipment Plant, Ramachandrapuram, Hyderabad-502032		Mr K.Ravi Kumar ,Manager/IT Email : ravikk@bhelhyd.co.in Ph: +919490165425	
16	ASSCP Gurgaon	OF	B	2	16	16th Milestone from Gurgaon on Gurgaon Faridabad Road, Gwalpahari Gurgaon-122001	Mr. Satyan Chaddha Dy.Manager Cell No:+919810072001 Ph.No.+911242579216-19		
17	Corporate Office, New Delhi	OF	A	32	64	BHEL House, Siri Fort, New Delhi-110049	Mr N K Singhal Ph.No. : +9111-26493669 Email: nksinghal@bhel.in	Mr. Manish Garg Ph.No. +9111-26493348 Email: manish@bhel.co.in	
18	HERP Varanasi	OF	B	4	16	Tarna, Shivpur, Varanasi-221003	Mr. Sachin Verma Cell No.+919335398665,+919451918681 Ph.No.+91542-6545321,2282240,2283855 Email: sachin@bhel.in		
19	Industry Sector, New Delhi	OF	A	8	32	Integrated Office Complex, Lodhi Road, New Delhi-110003	Mr. Mohit Shah Cell No.: +919873356134 Ph.No. : +9111-41793313 Email: mohitshah@bhelindustry.com	Ms. Alka Wadhwa Cell No.:+919810437377 Ph.No. +9111-41793331 Email: alka@bhelindustry.com	
20	Internet Line - Noida	OF	A	64	128	HRD & ESI Complex, Plot No. 25, Sector 16A, Noida-201301(UP)	Mr Saurabh Kumar Cell No. : +919899313906 Email: saurabh@bhel.in	Mr Ajay Bagati Cell No. : +919818115173 Ph.No : +91120-2510505 Email: ajay@bhel.in	
21	OSBG & EMRP Mumbai	OF	B	4	16	Electrical Machine Repair Plot No. D-1, Cross Road-C, Road No. 16 MIDC, Andheri(East) Mumbai-400093	Mr. Satya Prakash Ph. No.+9122-28358712		

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22	Port Clearance Office, Chennai	OF	B	2	16	1st Floor, Lotus Court, 165, Thambu Chetty Street, Chennai-600001	Mr R Bhaskaran, Sr Engr, Cell No.: +919444932125 Ph.No. +9144-25331640 Email:basker@rodchn.bhel.co.in	Mr. V J Raja Sundar, Sr. Mgr (ROD Chennai), Cell No. : +919840911908 Ph.No. +9144-25356080 Email: raja@rodchn.bhel.co.in	
23	PSNR and HRDI Noida	OF	A	64	128	HRD & ESI Complex, Plot No. 25, Sector 16A, Noida-201301(UP)	Mr Saurabh Kumar Cell No. : +919899313906 Email: saurabh@bhel.in	Mr Ajay Bagati Cell No. : +919818115173 Ph.No : +91120-2510505 Email: ajay@bhel.in	
24	PS-TS, Kribhco Bhawan, Noida	OF	A	8	32	Kribhco Bhawan, 2nd Floor, Sector 1, A 8-10, Noida-201301			
25	ROD & SSBG Bubhneshwar	OF	B	2	8	30/A, 1st Floor, Unit-III, Kharavela Nagar (Behind Ram Mandir) Bhubaneswar-751001	Mr. N N Sarkar Ph. No.+91674-2406911	V.K. Bassi Sr. Manager(Mktg) Ph No.: 011-41793437, 0120-4352245 email: rodbassi@bhelindustry.com	
26	ROD & SSBG Jabalpur	OF	B	2	8	4, Arya Nagar, Narmada Road, Jabalpur-482001	Mr. A K Vajpeyi Ph. No. +91761-2665293	V.K. Bassi Sr. Manager(Mktg) Ph No.: 011-41793437, 0120-4352245 email: rodbassi@bhelindustry.com	
27	ROD Mumbai	OF	B	4	16	14/15th Floor, World Trade Centre-I, Cuffe Parade, Mumbai-400005	Mr Tej Prakash, Cell No.: +919892290783 Ph.No. +9122-22180740 Email:tej@bhelrmb.co.in	V.K. Bassi Sr. Manager(Mktg) Ph No.: 011-41793437, 0120-4352245 email: rodbassi@bhelindustry.com	
28	ROD, Guwahati	OF	B	2	8	4th Floor, Hotel Brahmaputra Ashok, MG Road, Guwahati-781001	Mr. K N Patir Ph. No.+91361-2549438; +91361-2543774	V.K. Bassi Sr. Manager(Mktg) Ph No.: 011-41793437, 0120-4352245 email: rodbassi@bhelindustry.com	
29	ROD, Jaipur	OF	B	2	8	Nehru Place Commercial Complex, 1st Floor NF/0/03/ Tonk Road, Jaipur-302015	Mr. Ravindra Prakash Ph. No. +91141-2743580 email:bheljpr@sify.com	V.K. Bassi Sr. Manager(Mktg) Ph No.: 011-41793437, 0120-4352245 email: rodbassi@bhelindustry.com	
30	ROD, Lucknow	OF	B	2	8	B-2, PICUP Bhawan, 1st Floor, Vibhuti Khand, Gomti Nagar Lucknow-226010	Mr. Ashok Shah Ph. No. +91522-2720782 email:rodbhellko@yahoo.com	V.K. Bassi Sr. Manager(Mktg) Ph No.: 011-41793437, 0120-4352245 email: rodbassi@bhelindustry.com	
31	ROD, Raipur	OF	B	2	8	8, South Avenue, Choubey Colony, Raipur-492001	Mr. R K Vishwakarma Ph. No.+91771-2255170	V.K. Bassi Sr. Manager(Mktg) Ph No.: 011-41793437, 0120-4352245 email: rodbassi@bhelindustry.com	

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Sr No	**Name of the Site**	**Region**	**Class Of Location**	**Proposed B/W Required (Mbps) (Uncompressed 1:1)**	**B/W Scalability Required (Mbps) (Uncompressed 1:1)**	**Address**	**Primary Contact Details**	**Secondary Contact Details**	**BOM**
32	ROD, Ranchi	OF	B	2	8	Ground Floor, Siddhi Ivnayak Apts. (Behind Hotel Yuvraj Place) Kadru Diversion Road, Doranda, Ranchi-2480136	Mr. Ray Pranabes Ph. No. +91651-2480252	V.K. Bassi Sr. Manager(Mktg) Ph No.: 011-41793437, 0120-4352245 email: rodbassi@bhelindustry.com	
33	Township Estate Office Noida	OF	B	2	8	BHEL Estate Office, BHEL Township, Sector-17, Noida-201301			
34	PSER and ROD Kolkata	PSER	A	16	64	BHEL Bhawan, Plot No. DJ-9/1, Sector – II, Salt Lake City, Kolkata-700091	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	Mr. S.Biswas, Head IT Cell No. +919433004104, Ph. No.+9133-23211692, Email: sbiswas@bhelpser.co.in Mr. P. Panja, Sr. Manager Mob: 9433069122 Mail: Pradyut@bhelpser.co.in	
35	Bakreswar TPP	PSER	C	2	8	Bakreswar TPP, P.O. Bakreswar TPP Dist, Birbhum, West Bengal - 731104	Shri Sudipta Das Asstt. Engineer GR. II Mob: 9609501731 Mail: sudipta@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
36	Chandrapura	PSER	C	2	8	BHEL Site Office, Chandrapura T.P.S., (D.V.C.) Dist. Bokaro, Jharkhand	Sh. Manoj Kumar Vishwakarma Accounts Officer/ FIN Mob: (+91)9470591538 Mail: mkv@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
37	Kahalgaon	PSER	C	2	8	BHEL Site Office, Kahalgaon STPP, Extension Project Site, Kahalgaon, Bihar - 813214	Shri Kalyan Rajkumar Cell No. 09748116103 Mail: helpdesk@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
38	Mejia	PSER	C	2	8	BHEL Mejia TPS, P.O. MTPS, Dist. Bankura, West Bengal- 722183	Sh. Ranjan Pal (Engineer/ ELECT) Mail: (+91)9831359056 (+91)9609501453 Mail: r.pal@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	

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Sr No	Name of the Site	Region	Class Of Location	Proposed B/W Required (Mbps) (Uncompressed 1:1)	B/W Scalability Required (Mbps) (Uncompressed 1:1)	Address	Primary Contact Details	Secondary Contact Details	BOM
39	Santaldihi	PSER	C	2	8	BHEL Site Office, Santaldih TPS , P.O. Santaldih T.P. Dist. Purulia, West Bengal - 723146	Sh. Jay Prakash (Engineer Trainee/ ERN) Mob: (+91)9800896627 Mail: j.prakash@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
40	BHEL Bokaro	PSER	C	2	8	BHEL Site Office, Bokaro-A Thermal Power Plant P.O.- Bokaro Thermal Dist. Bokaro, Jharkhand- 829107	Sh. Sunil Kumar Kurli (Sr. Manager/ ERN) Mob: (+91)9470591703 Mail: skkurli@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
41	Lakwa ASEB	PSER	C	2	8	BHEL Site Office, Lakwa TPS, assam Power Generation Corp Ltd. PO Suffry Dist. Sibsagar, assam-785689	Sh. Vanlal Pana (Dy. Manager/ CMG) Mob: (+91)9954485072 Mail: vanlalpana@bhelpser.co.in Sh.A.Sengupta (CM) Mob: 09435516052"	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
42	Korba West	PSER	C	2	8	BHEL Site Office 1X500 MW Project, CSEB, Korba(West)Project PO: Jamnipali, Korba Chhatisgarh-495450			
43	Adhunik	PSER	C	2	8	BHEL Site Office, 2X270 MW BTG Package, Phase-I, Vill. Padampur, P.O Kandra, Distt. Sareikela-Kharsawan, Jamsedpur, Jharkhand-832105	Sh. Mridul Kumar Taisum (SENIOR ENGINEER) (+91)9771472276 Mail: mridul@bhelpser.co.in C.S. SINGH (FIN) 09771472271 Mail: cssingh@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
44	BRPL	PSER	C	2	8	BONGAI-RPL BHEL Site Office (PSF Plant Area) In Front of Project Office of BRPL P.O. - DHALIGAON BONGAIGAON , DIST. - CHIRANG ASSAM, PIN - 783385	Sh. Monuranjan Sonowal (Engineer)" Mob: (+91)9435725854 Email: sonowal@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
45	Kameng	PSER	C	2	8	SITE : KIMIN, BALUK PONG, Arunachal Pradesh. Nearest Airport: TEJPUR	Sh. Nishant Sharma (Jr. Executive Engg/ ERN) Ph: 03782-273687 / 03782-234466 Mob: 09435746141 Mail: nishant.sharma@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	

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46	DVC, Durgapur	PSER	C	2	8	BHEL SITE OFFICE, 2X500 MW DSTPS PROJECT, P.O.: ANDAL, PIN: 713321, DIST: BURDWAN	Sh. Radha Charan Sahu SR. ADDL. ENGINEER GR.II (+91)9647502744 Mail: rcsahu@bhelpser.co.in Sh. Ujjwal Deb, Asst. Engineer 09748742078 Mail: udeb@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
47	Sagardihi	PSER	C	2	8	BHEL SITE OFFICE, 120 MW TISCO POWER HOUSE #6, TISCO, JAMSHEDPUR, JHARKHAND - 831001	Sh. Rajib Nath Mob : 9434033957 /9433350957 Mail: rajibnath@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
48	Barh	PSER	C	2	8	NTPC Barh, STPP (3*660 MW Super Thermal Power Project) PO Barh Dist. Patna Bihar-803213	Sh. Aditya Mohan (Accounts Officer/ Finance) Mob: (+91)9431005871 Mail: aditya@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
49	Abhijit	PSER	C	2	8	BHEL Site office,4x270 MW BTG Package 4x270 MW Matrishri usha jayaswal mega power plant.Vill-Bana chakla, block-chandwa, distt: jharkhand-829203	Sh. Rajeev Kumar (FTA) Mob: 09693123727 rajeev.kumar@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
50	DPL Durgapur	PSER	C	2	8	BHEL Site Office, Durgapur, Durgapur Projects Ltd., (1x250 MW Thermal Set.), Durgapur, West Bengal - 713201	Sh. Radha Charan Sahu SR. ADDL. ENGINEER GR.II (+91)9647502744 Mail: rcsahu@bhelpser.co.in Sh. Ujjwal Deb, Asst. Engineer 09748742078 Mail: udeb@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
51	Koderma (2 sets)	PSER	C	2	8	BHEL Site Office, 2x500 MW Koderma TPP, Bnajhedih, P.O. Jhumri Telaiya, Dist. Koderma, Jharkhand - 825409.	Sh Navin Gari, Engr., Email: navin.gari@bhelpser.co.in Ph. (+91)9234465721	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
52	SAS, Patna	OF	B	2	8	BHEL-SAS, 'B' Block, 3rd Floor, Maurya Lok Complex, Dakbunglow Road, Patna - 800001	Sh. Brajesh Kumar Singh (Engineer/ SAS) (+91)9934447726	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	

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53	DVC, Maithon (2 sets)	PSER	C	2	8	BHEL Site Office, 2x525 MW Maithon RBTPP, Village Dambhoin, Block Nirsa, Dist. Dhanbad - 828205 (Jharkhand)	Sh Dhrubojyoti Duttamajumder, ST(ERN) Email: dhrubo@bhelpser.co.in Ph. (+91)9204788531	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
54	IISCO, Burnpur	PSER	C	2	8	BHEL Site Office Flat No.A4, Block-B,Abhishek Apartment Gopalpur, Asansol, Dist.Burdwan West Bengal-713304	Sh. S K Sadhukhan (Sr. Accounts Officer/ FIN) Ph. (+91)9609501470 Mail: sksadhukhan@bhelpser.co.in Sh.Sushanta Majumdar (ASSTT. ENGINEER GR.II) Ph. (+91)9609501466 Mail: smajumdar@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
55	OTPC, Pallantana (1&2)	PSER	C	2	8	BHEL Site Office, P.O. Palatana, Dist. - South Tripura, Tripura - 799116	Sh Amit Kumar, Engr.(ERN) Email: kumar.amit@bhelpser.co.in Ph. (+91)9856028024	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
56	NTPC, Bongaigaon (3 sets)	PSER	C	2	8	BHEL Site Office 3x250 MW NTPC-Bongaigaon TPP, P. O. Salakati, Dist. Kokrajhar(BTAD), Assam - 783369	Sh Sinjan Madhab Kashyap, JE(ERN) Email: sinjan@bhelpser.co.in Ph. (+91)9435512142	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
57	Marwa	PSER	C	2	8	BHEL Site Office, CSEB, 2x500 MW Marwa TPP, Tendubhata P.O. Basantpur Via Champa, Distt. Janjgir near Champa, Chhatishgarh-495671.	Sh Sikander Kr Mahato, ST(ERN) Email: sikander@bhelpser.co.in Ph. (+91)9229243024	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
58	BPCL, Lapetkata,Assam	PSER	C	2	8	BHEL Site Office, 1X53 MW Captive Power Plant, M/s. Brahmaputra Cracker & Polymer Limited Lepetkata, Natun Gaon, A.T. Road, P.O. Mahanghat, Dibrugarh-786008 (Assam)	Sh. Subrat Banerji 09957179168 Mail: sb@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	

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Sr No	Name of the Site	Region	Class Of Location	Proposed B/W Required (Mbps) (Uncompressed 1:1)	B/W Scalability Required (Mbps) (Uncompressed 1:1)	Address	Primary Contact Details	Secondary Contact Details	BOM
59	IPCL, Haldia	PSER	C	2	8	BHEL Site Office , IPC(H)L 3X150 MW (BTG) Project Site, Kasberia, P.O. : Sibaram Nagar, Dist : Purba Medinipur, Haldia, West Bengal : 721635	Sh. P. Panja (Sr. Mgr.),IT & MSX,Kolkata (+91)9433069122	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
60	OIL, Duliajan	PSER	C	2	8	BHEL Site Office, OIL India Limited P.O. Duliajan, Dist. : Dibrugarh, Assam - 786602	Sh. Nirmal Kumar Chowdhury ADDL.GENERAL MANAGER Mob: 919433046073 Mail: nkc@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
61	KBUNL, Muzaffarpur (1&2)	PSER	C	2	8	BHEL Site Office, BSEB Administrative Building, Muzaffarpur TPS, Kanti, Bihar Pin-843130	Sh. Bijan Kumar Ghosh (+91)9431024269 Mail: bkg@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
62	Teesta HEP stage-IV (4 sets)	PSER	C	2	8	BHEL Site Office, (NHPC, TLDP-4), P.O. Kalijhora, Dist Darjeeling, (W.B.)	Sh. Chinmoy Gayen Senior Manager Mob: 9800228120 Mail: cgayen@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
63	Namrup CCPP	PSER	C	2	8	BHEL Site Office Namrup Replacement Power Project P.O. Namrup TPS, Dist: Dibrugarh, Assam - 786622	Sh. Pankaj Kumar (Asstt. Engineer/ ERN) (+91)9800869257 Mail: pankaj.kumar@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
64	Hinduja Power - Vizag (2x525 MW) BTG	PSER	C	2	8	HINDUJA NATION POWER CORPORATION LTD. 1040 MW VIZAG PROJECT, PALAVALASA VILLAGE, T.DEVADA POST, PEDAGANTAYADA MANDAL, STEEL PLANT (SUB OFFICE) VISHAKHAPATNAM - 530031	Sh. S.D. Choudhury (+91)9470591706 Mail: sdc@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
65	Neepco, Monarchak	PSER	C	2	8	BHEL Site Office, Monarchak, Dist: South Tripura. Tripura-799116	Saroj Kumar Das Addl.General Manager Mob: 9856051135 Mail: saroj_das@bhelpser.co.in	Shri Dipankar Dey Cell No. 980832013 Mail: helpdesk@bhelpser.co.in Shri Anjali Kumari Cell No. 09831066934	
66	GVK Goindwal	PSNR	C	2	8	BHEL Site Office, GVK TPS, Goindwal Sahib, Tarn Taran, Punjab	Mahendra Manral Ph: +919999684349		

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Sr No	Name of the Site	Region	Class Of Location	Proposed B/W Required (Mbps) (Uncompressed 1:1)	B/W Scalability Required (Mbps) (Uncompressed 1:1)	Address	Primary Contact Details	Secondary Contact Details	BOM
67	Service Center Chandigarh	OF	B	2	8	S.C.O 129-130, 2nd Floor, Sector-17C, Chandigarh-160017	Mahendra Manral Ph: +919999684349		
68	Uprvunl, Parichha	PSNR	C	2	8	BHEL Site Office, Parichha Extension Power Station, Parichha, Jhansi-284305, Uttar Pradesh	Mahendra Manral Ph: +919999684349		
69	Koldam	PSNR	C	2	8	BHEL Site Office c/o Koldam Hydro Power Project P.O. Barmna-174013 Distt. Bilaspur (HP)	Mahendra Manral Ph: +919999684349		
70	Kotteshwar	PSNR	C	2	8	BHEL Site Office, C/o General Manager, THDC, Koteshwar HEP, Koteshwarpuram, Tehri Garhwal (Uttaranchal)-249001	Mahendra Manral Ph: +919999684349		
71	Birsingsar	PSNR	C	2	8	BHEL Site Office, C/o Neyveli Lignite Corporation, PO Birsinghsur, Distt. Bikaner, Rajsthan	Mahendra Manral Ph: +919999684349		
72	Chhabra TPS	PSNR	C	2	8	Chabbra TPS, PO Chabbra Near Guns, Near Kota (130 Kms), Rajsthan	Mahendra Manral Ph: +919999684349		
73	Parbati	PSNR	C	2	8	BHEL Site office, C/O. Chief Engineer (Electrical), NHPC, Parbati HEP, V.P.O. Sainj, Dist. Kullu (HP)-175132	Mahendra Manral Ph: +919999684349		
74	Dadri	PSNR	C	2	8	BHEL Site Office. NTPC Dadri Thermal Power Station, Dadri-U.P	Mahendra Manral Ph: +919999684349		
75	Farakka	PSNR	C	2	8	Farakka STPP, NTPC, Distt Murshidabad Near Railway Station Maldah, West Bengal	Mahendra Manral Ph: +919999684349		
76	Harduaganj	PSNR	C	2	8	BHEL Site Office, UPRvUNL, Harduaganj (UP), aligarh, kasimpur	Mahendra Manral Ph: +919999684349		
77	Obra	PSNR	C	2	8	BSO, UPRVUNL, Obra (UP)	Mahendra Manral Ph: +919999684349		
78	Srinagar ,Uttarakhand	PSNR	C	2	8	BHEL Site office, Kandari palace, Bhaktayana, Near SSB Camp, Srinagar Distt.Pauri Garwal, Uttarakhand 246174	Mr.Daljit Singh Ph.: 01346-250783 Cell: 9872642711, Mr.K N Gupta,Cell No. 9675181077 Email: ds@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	

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Sr No	**Name of the Site**	**Region**	**Class Of Location**	**Proposed B/W Required (Mbps) (Uncompressed 1:1)**	**B/W Scalability Required (Mbps) (Uncompressed 1:1)**	**Address**	**Primary Contact Details**	**Secondary Contact Details**	**BOM**
79	UHL,Himachal Pradesh (1,2&3)	PSNR	C	2	8	BHEL Site office, UHL Stage-III HEP, Village Chullah,Joginder Nagar, P.o. Tullah, Distt. Mandi, H.P. 176120	Mr.S P Singh, Ph.: 01894-232567 Cell No. 1908270815 Email: ds@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
80	Parbati-3	PSNR	C	2	8	BHEL Site Office, PC-102, NHPC Colony, Parbati HEP, V & PO Sainj, Distt. Kullu, Himachal Pradesh - 175134.	Mr.Ajay Nagpal Ph.: 9418033125 Email: akn@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
81	Rampur (1,2,3,4,5&6)	PSNR	C	2	8	BHEL Site office, Rampur HEP, Hotel North Park, Village Nirsu , PO dutt Nagar, Tehsil, Rampur Bushher, Distt. Shimla (H P) 172001	Mr. L N Bairwa Ph.: 01782-208268 Cell: 9418072420 Mr. Jagat Pal Singh Cell-9816503122 Email: lnb@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
82	Ramgarh	PSNR	C	2	8	BHEL Site Office,60 MW Combined Cycle Gas Based Thermal Power Plant Stage-III, RGTPP (RVUNL) Ramgarh 345022, Distt. Jaisalmer (Rajasthan)	Sh A K Zafrani Construction Manager Mobile: 9672988171 E-mail akz@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
83	Tapovan Vishnugarh	PSNR	C	2	8	BHEL Site office , Room no. 108, Ajai Palace, Ajai Nagar,Pipalkoti Distt. Chamoli, Uttrakhand 246472	Shri A K Chaturvedi Mobile- 09997999089 E-mail: akchaturvedi@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	

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84	Nimoo Bajgo,Leh, J&K(3 sets)	PSNR	C	2	8	BHEL Site office, NHPC, Nimboo Bazgo HEP, Alchi Village, Leh, Ladakh, 194101	Mr.Thubstan Rinchen Ph.: 01982-227255 Cell: 9419177603 Email: rinchen@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
85	Chutak-Kargil, J&K (4 sets)	PSNR	C	2	8	BHEL Site office, NHPC Chutak HEP, Minji village, Kargil, Ladhak,(J&K) 194103	Mr. Sayed Riyazuddin Ph: 01985-234098, 2867354 Cell: 9871113989 Mr. Jeetendra Karki, Email: saiyed@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
86	Bawana	PSNR	C	2	8	BHEL Site office, Pragati-III-(Combined Cycle Power Project) PPCL , Sector-5, Bawana Industrial Area, Next To Delhi Transco Ltd., New Delhi 110089	Mr.K K Zalpuri Ph.: 9872640711 Email: kkz@bhelpsnr.co.in Mr.Roni Mallick,9650590895 Ph.: 011-27791291,27791294	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
87	Maruti Udyog,Gurgaon	PSNR	C	2	8	BHEL Site office, Maruti Suzuki India Ltd. Palam Gurgaon Road, Gurgaon 122015	Mr.Anil Kaushal Ph.: 9871291943 Ph: 4348704 Mr.Rajesh Kumar Email: anil@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
88	Bara(3 sets)	PSNR	C	2	8	Bara Site Office, PPGCL (Bara Site), P.O. Lohgara Police Station Shankargarh, Tehsil - Bara Distt- Allahabad(UP)	Udai Singh, Email: udai@bhelpsnr.co.in Mobile (+91)9935527723 Mr. Syed Saadat Ali, E-mail-ssa@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	

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89	Barh	PSNR	C	2	8	BHEL Site office,Near CHP Crusher House,NTPC Barh STPP ST-I Barh,Distt.Patna (Bihar) 813213	Mr.Amitava Das, Email: amdas@bhelpsnr.co.in Mobile (+91) 9431854924 ,Ph:06132-290355	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
90	RSC-Varanasi	OF	B	2	8	BHEL, Power sector(NR), Regional service Center, Tarna, Shivpur, Varanasi 221003(UP)	Mr.B C Jena, Cell No. 9415304594 Mr. M M Alam Ph.: 0542-2283872, 2280369 Cell: 09415203610 Email: mma@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
91	Chhabra(2 sets)	PSNR	C	2	8	BHEL Camp Office, Post Box No. 11, NFL township, Vijaypur, Guna (M.P.) - 473111.	Sh Arun Kumar, Const. Mgr. Mr. Amit Kumar, Cell. 9329540941 Email: arun@bhelpsnr.co.in Ph. (+91)9799042059 rksarkar@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
92	Maruti Manesar	PSNR	C	2	8	BHEL Site office, Maruti Suzuki India Ltd. Plot No.1, Phase 3A, IMT Manesar Gurgaon 122051	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
93	Lalitpur	PSNR	C	2	8	Lalitpur Power Generation Company Limited (LPGCL) , 3X 660 MW Super Critical TPP, Uttar Pradesh	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	

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94	Bamnauli	PSNR	C	2	8	Pragati II Power Project Combined Cycle, Bamnauli, Delhi	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in	Mr. P K LAMBA Sr. Manager (IT) BHEL-PSNR-NOIDA Cell No.+919810720874 Ph.No.+91120-2515424 Email:pklamba@bhelpsnr.co.in Mahendra Manral Ph: +919999684349	
95	PSSR & ROD Chennai	PSSR	A	16	64	BHEL, Power Sector-Southern Region #690, Mount Road (Anna Salai), Nandanam, Chennai-600035	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	Mr. Arul Rose, AGM Cell No. :+919444942051 Ph.No. +9144-24326291, Email: ar@bhelpssr.co.in	
96	Bellary	PSSR	C	2	8	BHEL Site Office, Bellary TPP, Bellary-Hospet Road-NH63, Kudathini - 583115, Karnataka	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
97	Muddanur	PSSR	C	2	8	BHEL Site Office, Rayalseema TPP, Post Box No. 1, V.V Reddy Nagar, Kalamalla Post, Cudappah Dist. 516312 (AP)	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
98	Malwa	PSSR	C	2	8	BHEL Sie Office, 2x600 MW, Shree Singaji Project, Mundi Village, Khandwa Distt. M.P-450012	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
99	Bhoopalpally 1x500MW	PSSR	C	2	8	BHEL Site Office, Kakatya Thermal Power Project Chelpur Warrangal- DT. AP 506168	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
100	Nalco 8 & 9	PSSR	C	2	8	BHEL Site Office, Nalco CPP (units: 9 & 10), Banarpal - 759128 Angul Dist. ORISSA-759128	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
101	Neyveli	PSSR	C	2	8	Neyveli Lignite Power Station 2 (Expansion) BHEI Site Office (2*500 MW) Neyveli-607807 Cuddlore Distt. TN	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
102	Krishnapattnam	PSSR	C	2	8	Damodaram Sanjeevaiah TPS, Krishnapattam, A.P	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
103	KPCL Raichur	PSSR	C	2	8	BHEL Site Office, Raichur TPS (unit 8, 250 MW) Sakthi Nager, Raichur : 584 170 Raichur Dt. Karnataka	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		

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104	Simadhari	PSSR	C	2	8	BHEL Site office-stage-II, Simhadri STPP, Parvada, Vizag Dt: 531020 AP	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
105	Kothgudam	PSSR	C	2	8	BHEL site office-stage VI, Kothagudem TPS, Paloncha, Khammam Dt: 507115 AP	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
106	Sipat	PSSR	C	2	8	BHEL Site office, SSTPP, Post-Ujwal Nagar/Sipat,Bilaspur, Chattisgarh-495555	Ms. E Bhamini, Dy Mgr Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in		
107	SAS-Secundrabad	OF	B	2	8	BHEL SAS, Ektara Building, 39 Sarojini Devi Road, Secundrabad - 500003	Mr. V Sathyanarayana, SDGM Mobile No: 09490752823 Ph. No: 040 - 27700827 Email: vsa@bhelpssr.co.in N Jayasankar Ph: 09441300814	Ms. E Bhamini, Mgr/IT Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	
108	RINL Vizag	PSSR	C	2	8	BHEL Site Offcie, RINL-Vizag Steel Plant, Vizagapatnam, AP 530 031	TK PATNAIK, AGM Mobile : 9490798525 TEL - 0891 2010612 Email: tkp@bhelpssr.co.in	Ms. E Bhamini, Mgr/IT Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	
109	NTPC:TNEB NTECL-Vallur (3x500 MW)	PSSR	C	2	8	BHEL Site Office, NTECL Thermal Power Project, Vallur Ponneri Tk Chennai TN 600 120	Mr. Sreenath, Engineer Mobile : 09445040923 Ph.No: 044-27966396 Email : sreenath@bhelpssr.co.in	Ms. E Bhamini, Mgr/IT Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	
110	TNEB-North Chennai II EPC (2 sets)	PSSR	C	2	8	BHEL Site Office, North Chennai Thermal Power Project, Stg.II Athipattu Pudu nagar, Chennai TN 600 120	Mr. S Gopalakrihnan Jr.Executive Mobile : 09894623742 Ph.No: 044-27950145 Email : sgkrish@bhelpssr.co.in	Ms. E Bhamini, Mgr/IT Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	
111	NTCL-Tuticorin (2x500 MW) EPC	PSSR	C	2	8	BHEL site office, NTECL Thermal Power Project, Tuticorin - 628004, TN.	Sh Thangadurai, Engr. Email: thangadurai@bhelpssr.co.in Ph. 0461-2352043 Mobile (+91)9790636623	Ms. E Bhamini, Mgr/IT Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	
112	Mangalore MRPL (2x68 MW Ind.) EPC	PSSR	C	2	8	BHEL Site office, Mangalore Refinery, Katipalla - 575 030, Karnataka.	Mr. Ajmal Hussain, Sr. Engineer Mobile no: 09977474707 Ph.no: 0824 - 2273356 Email : ajmal@bhelpssr.co.in	Ms. E Bhamini, Mgr/IT Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	
113	IOCL Paradip Refinery - Orissa EPC	PSSR	C	2	8	BHEL Site Office, Paradip refinery, IOCL, Jhimani post Jagatsinghput Dt. 754 141 Orissa - 754 142	Mr. B D Bhuyan, Manager Mobile no: 09437120370 Email : bdb@bhelpssr.co.in	Ms. E Bhamini, Mgr/IT Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	

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114	Surana Power - Raichur (2x210 BTG)	PSSR	C	2	8	BHEL Site Office, Surana Thermal Power Project, Vadalur village, Raichur Dt. Karnataka		Ms. E Bhamini, Mgr/IT Ph.No. : +914428286755 Email: bhamini@bhelpssr.co.in	
115	Edlapur - KN (1x800 MW) EPC	PSSR	C	2	8	BHEL Site Office, Edlapur Thermal Power Project, Raichur Dt. Karnataka	Mr. K. Srinivasan ksrini@bhelpssr.co.in Mobile: 09845527892	Ms. E Bhamini bhamini@bhelpssr.co.in Mobile: 09444942035	
116	PSWR, Nagpur	PSWR	A	16	64	Shree Mohini Complex, 345 Kingsway, Nagpur - 440001	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	
117	PSTS, ROD and SSBG Vadodara	PSWR	B	4	16	568/1, Parpia Compound, 5th Floor, R. C. Dutt Road, Alkapuri, Vadodra-390007	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
118	Amravati	PSWR	C	2	8	M/s IndiaBulls Power Limited (5X270 MW), Amravati Thermal Power Project, BHEL Site Office, Plot No. D2, Additional MIDC Area, Nandgaonpeth, District-Amravati, Maharashtra-444901	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
119	New Parli	PSWR	C	2	8	BHEL Site Office, C/O. Dr. Dhakne's Building, Nathnagar, Parli Vaijnath-431515, Dist. Beed, Maharashtra	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
120	Paras	PSWR	C	2	8	BHEL Site Office, MSEB, Paras TPS, Vidhyut Nagar, Paras, Tal-balapur, Dist. Akola	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
121	JPL Raigarh	PSWR	C	2	8	Jindal Power Ltd. OP Jindal STPP, Tamnar-496107	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
122	Vindhyachal	PSWR	C	2	8	BHEL Site Office, NTPC, VSTPP, Dist. Sidhi (MP)-486885	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
123	Korba NTPC 500 MW	PSWR	C	2	8	BHEL Site Office Behind NTPC Administrative Office Jamni Pali Korba, Distt. Korba Bilaspur-495682	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
124	SAIL Bhilai	PSWR	C	2	8	BHEl Site Offcice, Bhilai 2* 250 MW NSPL Expansion Project Near Village Purnea, Bhillai, Distt: Durg, Chatisgarh-490021	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
125	Sikka	PSWR	C	2	8	Chief Engineer (G) GSECL, SIKKA, TPS, Distt. Sikka, Jamnagar	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		

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Sr No	Name of the Site	Region	Class Of Location	Proposed B/W Required (Mbps) (Uncompressed 1:1)	B/W Scalability Required (Mbps) (Uncompressed 1:1)	Address	Primary Contact Details	Secondary Contact Details	BOM
126	Hindalco Mahan	PSWR	C	2	8	Hindalco Mahan 6X150MW Power Station Mahan Near Bargwan Tahsil : Singrauli Dist : Sidhi (MP)	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
127	IDEAL BELA	PSWR	C	2	8	BHEL Site office, 1x270MW Power Station, Vill : Bela, Distt: Nagpur (Maharashtra)	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
128	Hazira	PSWR	C	2	8	Gujrat State Energy Generation Ltd. Near Hazira, village: MORA PO BHATHA, SURAT, Hazira Road, Distt Surat-394510, Gujrat	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
129	Ukai	PSWR	C	2	8	BHEL Site Office 2x220 MW UKAI TPPS UNIT 1X2 RXM WORK UKAI. DAM 394680 Distt- Surat	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
130	Pipavav	PSWR	C	2	8	GSPC PIPAVAV POWER COMPANY LIMITED ; VILLAGE:KOVAYA, NEAR PIPAVAV, TAL: RAJULA, DISTT: AMRELI , GUJRAT	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
131	BINA POWER	PSWR	C	2	8	BINA POWER SUPPLY COMPANY LIMITED(2X250 MW), VILLAGE - JODH & SIRCHOPI, TEHSIL - BINA, DISTT - SAGAR, MADHYA PRADESH - 470001	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
132	Satpura	PSWR	C	2	8	SATPURA THERMAL POWER STATION, SARNI 18 K.M. FROM GHORA DONGRI RAILWAY - STATION DIST –BETUL, MP	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
133	Shrimaheshwar	PSWR	C	2	8	SHREE MAHESHWAR HYDRO POWER CORPORATION LTD DIST KHARGONE MP	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
134	Bhusaval	PSWR	C	2	8	BHEL Site Office Deepnagar, C/o - MSPGCL Bhusawal Expansion Project,Bhusawal Dist Jalgaon - 425307(Maharashtra)	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
135	SLLP Mangrol - IB Nasik	PSWR	C	2	8	: M/s IndiaBulls Realtech Limited (5X270 MW), BHEL,Site Office, Plot No-A1, Additional MIDC Sinnar SEZ, District-Nasik,	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
136	Nabinagar	PSWR	C	2	8	Nabinagar TPP (4X250 MW), Place-Nabinagar , 50 KMs,from Aurangabad near National Highway-2, District-Aurangabad, Nearest Railway Station: Dehri-On-Sone	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		

Annexure-IX									
Sr No	Name of the Site	Region	Class Of Location	Proposed B/W Required (Mbps) (Uncompressed 1:1)	B/W Scalability Required (Mbps) (Uncompressed 1:1)	Address	Primary Contact Details	Secondary Contact Details	BOM
137	Vasant Kunj, Delhi	PSWR	B	4	16	30 Kms), State-Bihar	Mr Deepak Prajapati, Ph. +91712-3048656 Email:deepakp@bhelpswr.co.in		
138	Videocon, Pipavav(2 sets)	PSWR	C	2	8	M/S VIDEOCON PIPAVAV ENERGY PRIVATE LIMITED (2X800 MW) VILLAGE: NEAR BHERAI, BHACHADAR & UCHHAJA, 8 KMS FROM BHAVNAGAR-JAMNAGAR NATIONAL HIGHWAY (NH-8E), NEAREST RAILWAY STATION-RAJULA CITY (APPROX 10 KMS FROM SITE), DIST.-AMRELI, GUJARAT	SHRI SHUSHIL KUMAR Ph. 07123048708	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	
139	Bhavnagar(1&2)	PSWR	C	2	8	M/S BHAVNAGAR ENERGY COMPANY LIMITED (2X250 MW) , VILLAGE: NEAR PADVA, TALUKA:GHOGHA, 1 KM FROM STATE HIGHWAY SH-25/1, NEAREST RAILWAY STATION-BHAVNAGAR (25 KMS APPROX FROM SITE), DISTRICT-BHAVNAGAR, GUJARAT	SHRI J.R.JOSHI Ph. 07123048630 SHRI SUNIL SAHU Ph. 07123048705	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	
140	Jhabua Power	PSWR	C	2	8	BHEL SITE OFFICE, JHABUA POWER LTD, 2X600 MW, THERMAL POWER PROJECT, SEONI, MADHYA PRADESH	SHRI K.L.NITANAVARE 09479276909	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	
141	Vindhyachal(2 sets)	PSWR	C	2	8	BHEL SITE OFFICE, VINDHYACHAL STPP, STAGE-IV, P.O.-VINDHYANAGAR, DIST.-SIDHI, MADHYA PRADESH	SHRI V.K.AGARWAL Ph. 07805247406	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	
142	Khaperkheda	PSWR	C	2	8	BHEL Site Office, Khaperkheda TPS (Expansion), P.O. No. 1, 1x500 MW Unit, Khaperkheda, TQ: Saoner Distt., Nagpur.	Sh A K Mukhopadhyay, Const. Mgr. Email: mukho@bhelpswr.co.in Ph. (+91)9822733683 Ankit Goyal, Engineer-Planning, Ph.:08888847478	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	
143	NTPC Mauda (2 sets)	PSWR	C	2	8	BHEL Site Office, 2x500 MW STPS, P.O. Mauda, Distt. Nagpur - 441104.	Sh N Ganeshan, Const. Mgr. Email: ngn@bhelpswr.co.in Ph. (+91)9503445511 Pawan, Ph.: 07115292060	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	
144	Rihand(2 sets)	PSWR	C	2	8	BHEL Site Office, 2x500 MW STPS, Stage - III, Village - Bijpur, Distt. Sonebhadra (UP).	Sh N K De, Const. Mgr. Email: nkde@bhelpswr.co.in Ph. (+91)9415248098	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	

Annexure-IX									
Sr No	**Name of the Site**	**Region**	**Class Of Location**	**Proposed B/W Required (Mbps) (Uncompressed 1:1)**	**B/W Scalability Required (Mbps) (Uncompressed 1:1)**	**Address**	**Primary Contact Details**	**Secondary Contact Details**	**BOM**
145	Chandrapur (2 sets)	PSWR	C	2	8	BHEL Site Office, 2x500 MW STPS, Village : Neri Chak - Kondi & Durgapur, Tadoba Road, Maharashtra.	Sh N K Gupta Email: nkgupta@bhelpswr.co.in Ph. (+91)9881152278	Mr. S L Sidar, Ph. +91712-3048666 Email: slsidar@bhelpswr.co.in	
146	BHPV, Vizag	OF	B	2	8	BHARAT HEAVY PLATE & VESSELS LTD.(A SUBSIDIARY OF BHEL) VISAKHAPATNAM - 530012, A.P.			

Annexure - X

Critical Locations for MPLS WAN in Phase I

Sl. No	Name of the Site	Class Of Location	Bandwidth (Mbps)
1	HEEP and CFFP Haridwar	A	16
2	HEP, Bhopal	A	16
3	Jhansi	A	16
4	HPEP, Hyderabad	A	32
5	EDN, Bangalore	A	16
6	HPBP, Trichy	A	24
7	BAP, Ranipet	A	16
8	Corporate Office, New Delhi	A	32
9	Industry Sector, New Delhi	A	8
10	PSNR and HRDI Noida	A	64
11	PSER and ROD Kolkata	A	16
12	PSSR & ROD Chennai	A	16
13	PSWR, Nagpur	A	16
14	Internet Link - Noida	A	64
15	Internet Link - Hyderabad	A	32

Annexure - XA

Other Permanent Locations for MPLS WAN (other than those mentioned in Phase I - Annexure X)

Sl. No	Name of the Site	Class Of Location	Bandwidth (Mbps)
1	IVP, Goindwal	B	4
2	IP & CSU Jagdishpur	B	4
3	Piping Center, Chennai	B	4
4	Corporate Communicatiuon, New Delhi	B	4
5	EPD, ISG, CTI & CBU, SSBG and ROD Bangalore	B	4
6	Corporate R&D , Hyderabad	A	16
7	CFP, Rudrapur	B	4
8	ASSCP Gurgaon	B	2
9	HERP Varanasi	B	4
10	OSBG & EMRP Mumbai	B	4
11	Port Clearance Office, Chennai	B	2
12	PS-TS, Kribhco Bhawan, Noida	A	8
13	ROD & SSBG Bubhneshwar	B	2

Annexure - XA			
Other Permanent Locations for MPLS WAN (other than those mentioned in Phase I - Annexure X)			
14	ROD & SSBG Jabalpur	B	2
15	ROD Mumbai	B	4
16	ROD, Guwahati	B	2
17	ROD, Jaipur	B	2
18	ROD, Lucknow	B	2
19	ROD, Raipur	B	2
20	ROD, Ranchi	B	2
21	Township Estate Office, Noida	B	2
22	PSTS, ROD and SSBG Vadodara	B	4
23	PMG, Vasant Kunj, New Delhi	B	4
24	RSC / SAS Patna	B	2
25	SAS Secundrabad	B	2
26	Service Center Chandigarh	B	2
27	BHPV, Vizag	B	2

Annexure - XA			
Other Permanent Locations for MPLS WAN (other than those mentioned in Phase I - Annexure X)			
28	RSC, Varanasi	B	2

Annexure-XI

Bill of Material

Class A locations (HUB Locations)

S. No.	Item Name	Equipment Specification (as per Annexure - XII)	Qty (Noida)	Qty (Hyd.)	Qty. (Total)
1	Uplink L2 Switches	L2 Switch-Type-II (48 Port)	0	2	2
2	Access Switches	L2 Switch-Type-II (48 Port)	0	2	2
3	Uplink L3 Switches (Distr)	L3 Switch-Type-II	0	2	2
4	Core Switches	L3 Switch-Type-I	2	0	2
5	Forward Proxy and URL Filtering Appliance	Proxy-Type-I	2	2	4
6	Reverse Proxy	Proxy-Type-I	2	0	2
7	Server Load Balancer	SLB-Type-I	0	2	2
8	DNS Server	DNS Server	0	1	1
9	Firewall (with IPS)	FW-IPS	2	2	4
10	VPN Concentrator (SSL & IPSec)	VPN Device	2	0	2
11	Internet Router	Router-Type-I (HUB)	1	1	2
12	MPLS Router	Router Type - I (HUB)	1	1	2

Class A locations (Other than HUB Locations)

S. No.	Item Name	Equipment Specification (as per Annexure - XII)	Quantity/ location
1	MPLS Router	Router Type - I	1 No.

Class B locations

S. No.	Item Name	Equipment Specification (as per Annexure - XII)	Quantity/ location
1	MPLS Router	Router Type - II	1 No

Class C locations

S. No.	Item Name	Equipment Specification (as per Annexure - XII)	Quantity/ location
1	MPLS Router	Router Type - III	1 No
2	24Port L2 Switch	L2 Switch-Type-I (24 Port)	1 No
3	2 KVA UPS	UPS	1 No

Annexure-XI		
Sl. No.	**Item Name**	**Equipment Specification**
1	Uplink L2 Switches	L2 Switch-Type-I (48 Port)
2	Access Switches	L2 Switch-Type-I (48 Port)
3	24Port L2 Switch	L2 Switch-Type-I (24 Port)
4	Uplink L3 Switches (Distr)	L3 Switch-Type-II
5	Core Switches	L3 Switch-Type-I
6	Forward Proxy and URL Filtering Appliance	Proxy-Type-I
7	Reverse Proxy	Proxy-Type-I
8	Server Load Balancer	SLB-Type-I
9	DNS Server	DNS Server
10	Firewall (with IPS)	FW-IPS
11	VPN Concentrator (SSL & IPSec)	VPN Device
12	Internet Router	Router-Type-I (HUB)
13	MPLS Router	Router Type - I
14	MPLS Router	Router Type - II
15	MPLS Router	Router Type - III
16	2 KVA UPS	UPS

Annexure-XII

L2 Switch-Type-I (24 Port)			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	Ports	The offered switch should have following ports:	
		24 Nos. of 10/100/1000Mbps Ethernet ports	
3	Switching Performance		
3(a)	Switching bandwidth	Should have minimum 48 Gbps of packet switching capacity.	
3(b)	Packet Switching Throughput	Should have minimum 35 Mpps layer 2 throughput for 64 byte packets.	
4	Standards & Protocol Support	The switch should support following standards & ptotocols: 1) 802.1Q VLAN 2) 802.1p Priority 3) 802.1D Spanning Tree Protocol 4)802.1w (Rapid Spanning Tree Protocol) 5) 802.1s (Multiple Spanning Tree protocol) 6) 802.3x Flow Control 7) 802.1x Authentication 8) VLAN Trunking Protocol or GARP or equivalent 9) Dynamic Trunking Protocol (DTP) or equivalent 10) RADIUS 11) Link Aggregation Control Protocol (LACP) 12) DHCP Server & DHCP Relay 13) Network Time Protocol (NTP) 14) SSH 15)SNMP v1, SNMP v2c & SNMP v3 16) Telnet & TFTP 17) IGMP v1/v2/v3 18) Link Layer Discovery Protocol (LLDP) based on IEEE 802.1ab	
5	Port Mirroring	Should support port mirroring feature for monitoring network traffic of a particular port/VLAN/group of ports/entire switch.	
6	Security Features Required	Should have following security features / protocol support: 1) MAC Address Limiting 2) Dynamic ARP inspection (DAI) 3) Proxy ARP 4) DHCP snooping 5) IP source guard 6) Port based ACL support 7) 802.1X authentication	
7	IPv6 Compliance	The offered switch should be IPv6 compliant.	
8	Voice VLAN	Should Support Voice VLAN for separating and prioritising VoIP traffic.	
9	No. of VLANs	Should support min. 250 Active VLANs	
10	MAC Addresses	Should support min. 8000 MAC Addresses	
11	Multicast	Should support H/W or S/W based IPv4 Multicasting	
12	Software	The offered switch should have the latest operating system supporting all the above features, standards & protocols.	
13	Manageability	Switch should be manageable through NMS on per port/switch basis with common interface for all manageable devices on the network. Should Support syslog, SNMP, RMON/ RMON-II, SSH, telnet, web management, etc.	
14	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

L2 Switch-Type-II (48 Port)			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	Ports	The offered switch should have following ports:	
		48 Nos. of 10/100/1000Mbps Ethernet ports	
		4 Nos. of Uplink Gigabit Ethernet SFP ports with transceivers	
3	Switching Performance		
3(a)	Switching Bandwidth	Should have minimum 100 Gbps of switching bandwidth	
3(b)	Packet Switching Throughput	Should provide miniumum 70 mpps throughput for 64 Byte Packets	
4	Standards & Protocol Support	The switch should support following standards & ptotocols: 1) 802.1Q VLAN 2) 802.1p Priority 3) 802.1D Spanning Tree Protocol 4)802.1w (Rapid Spanning Tree Protocol) 5) 802.1s (Multiple Spanning Tree protocol) 6) 802.3x Flow Control 7) 802.1x Authentication 8) VLAN Trunking Protocol or GARP or equivalent 9) Dynamic Trunking Protocol (DTP) or equivalent 10) RADIUS 11) Link Aggregation Control Protocol (LACP) 12) DHCP Server & DHCP Relay 13) Network Time Protocol (NTP) 14) SSH 15)SNMP v1, SNMP v2c & SNMP v3 16) Telnet & TFTP 17) IGMP v1/v2/v3 18) Link Layer Discovery Protocol (LLDP) based on IEEE 802.1ab	
5	Port Mirroring	Should support port mirroring feature for monitoring network traffic of a particular port/VLAN/group of ports/entire switch.	
6	Security Features Required	Should have following security features / protocol support: 1) MAC Address Limiting 2) Dynamic ARP inspection (DAI) 3) Proxy ARP 4) DHCP snooping 5) IP source guard 6) Port based ACL support 7) 802.1X authentication	
7	IPv6 Compliance	The offered switch should be IPv6 compliant.	
8	Voice VLAN	Should Support Voice VLAN for separating and prioritising VoIP traffic.	
9	No. of VLANs	Should support min. 250 Active VLANs	
10	MAC Addresses	Should support min. 8000 MAC Addresses	
11	Multicast	Should support H/W or S/W based IPv4 Multicasting	
12	Software	The offered switch should have the latest operating system supporting all the above features, standards & protocols.	
13	Manageability	Switch should be manageable through NMS on per port/switch basis with common interface for all manageable devices on the network. Should Support syslog, SNMP, RMON/ RMON-II, SSH, telnet, web management, etc.	
14	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

L3 Switch-Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	Architecture	The Switch should be chassis based modular switch with minimum 6 slots, out of which at least 5 should be payload slots	
		Bandwidth scalability per line-card slot should be minimum 48 Gbps	
		Should support 10G line cards	
3	Switch Redundancy	The Switch should be Configured with single CPU Module and Load-Sharing Hot-Swappable Redundant Power Supplies. All Switch Components should be Hot Swappable (Field Replaceable) without disrupting the Operations for the Switch.	
4	Flash & Memory	The proposed switch should have enough Memory (Flash and RAM) to hold the latest Software Release. It should support all features of switch and parameters like MAC Address Table, IP Routing Tables, VLANs etc.at their peak values as claimed in the Data Sheets of the Switch.	
5	Ports	The offered switch should have following ports:	
		Minimum 96 Nos. of 10/100/1000 Mbps Ethernet ports	
		Minimum 12 Nos. of 10 Gig SFP+ based ports including transceivers using two modules / cards with 6 no. transceivers in each module / card.	
		Minimum 12 Nos. of 1 Gig SFP based ports including transceivers.	
6	Switching Performance		
6(a)	Switching Bandwidth	Should have minimum 500 Gbps switching bandwidth.	
7(b)	Packet Switching Throughput	Should provide minimum 200 Mpps throughput for 64 byte packets.	
8	Storm Control	Should have support for broadcast / multicast storm control to prevent degradation of switch performance from faulty end stations	
9	Standards & Protocol Support	The switch should support following standards & ptotocols: 1) 802.1Q VLAN 2) 802.1p Priority & DSCP 3) 802.1D Spanning Tree Protocol 4)802.1w (Rapid Spanning Tree Protocol) 5) 802.1s (Multiple Spanning Tree protocol) 6) 802.3x Flow Control 7) 802.1x Authentication 8) VLAN Trunking Protocol or GARP or equivalent 9) Dynamic Trunking Protocol (DTP) or equivalent 10) RADIUS 11) Link Aggregation Control Protocol (LACP) 12) DHCP Server & DHCP Relay 13) Network Time Protocol (NTP) 14) SSH 15) SNMP v1, SNMP v2c & SNMP v3 16) Telnet & TFTP 17) IGMP v1/v2/v3 18) Link Layer Discovery Protocol (LLDP) based on IEEE 802.1ab	
10	Port Mirroring	Should support port mirroring feature for monitoring network traffic of a particular port/VLAN/group of ports/entire switch.	
11	IP Routing Support	Should have the capability to run RIPv1, RIPv2, OSPF, OSPF V3, BGP4, Policy Based Routing (PBR), Inter-VLAN routing, VRRP or equivalent, PIM, etc.	
12	IPv6 Support	Should be fully IPv6 Compliant. Should support dual stack (IPv4 & IPv6).	
13	Security & Performance Features Required	Should have following security features / protocol support: 1) MAC Address Limiting 2) Dynamic ARP inspection (DAI) 3) Proxy ARP 4) DHCP snooping 5) IP source guard 6) Port based ACL support 7) 802.1X authentication	
14	Voice VLAN	Should Support Voice VLAN for separating and prioritising VoIP traffic.	
15	No. of VLANs	Should support min. 4000 Active VLANs.	
16	MAC Addresses	Should support min. 50000 MAC Addresses.	

Annexure-XII

L3 Switch-Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
17	No. of Routes	Should support min. 100000 routes.	
18	Multicast	Should support H/W or S/W based IPv4 & IPv6 Multicasting.	
19	Software	The offered switch should have the latest operating system supporting all the above features, standards & protocols.	
20	Redundant Power Supplies	Should come with internal redundant hot-swappable power supplies.	
21	Fans	Should come with hot-swappable redundant fan trays. If redundant fan trays are not supported, One no. spare fan tray should be provided alongwith switch	
22	Manageability	Switch should be manageable through NMS on per port/switch basis with common interface for all manageable devices on the network. Should Support syslog, SNMP, RMON/ RMON-II, SSH, telnet, web management, etc.	
23	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

L3 Switch-Type-II			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	Ports	The offered switch should have following ports:	
		48 Nos. of 10/100/1000Mbps Ethernet ports	
		Should have 2 Nos. of 10 Gigabit Ethernet SFP+ ports for uplinking.	
		Should be capable to support both 10 Gig and 1 Gig uplinks.	
3	Performance		
3(a)	Switching Bandwidth	Should have minimum 136 Gbps of switching bandwidth	
3(b)	Throughput	Should have minimum 100 mpps throughput for 64 byte packets.	
4	Standards & Protocol Support	The switch should support following standards & ptotocols: 1) 802.1Q VLAN 2) 802.1p Priority & DSCP 3) 802.1D Spanning Tree Protocol 4)802.1w (Rapid Spanning Tree Protocol) 5) 802.1s (Multiple Spanning Tree protocol) 6) 802.3x Flow Control 7) 802.1x Authentication 8) VLAN Trunking Protocol or GARP or equivalent 9) Dynamic Trunking Protocol (DTP) or equivalent 10) RADIUS 11) Link Aggregation Control Protocol (LACP) 12) DHCP Server & DHCP Relay 13) Network Time Protocol (NTP) 14) SSH 15)SNMP v1, SNMP v2c & SNMP v3 16) Telnet & TFTP 17) IGMP v1/v2/v3 18) Link Layer Discovery Protocol (LLDP) based om IEEE 802.1ab	
5	Port Mirroring	Should support port mirroring feature for monitoring network traffic of a particular port/VLAN/group of ports/entire switch.	
6	IP Routing Support	Should have the capability to run RIPv1, RIPv2, OSPF, OSPF V3, BGP4, Policy Based Routing (PBR), Inter-VLAN routing, VRRP or equivalent,etc.	
7	IPv6 Support	Should be fully IPv6 Compliant. Should support dual stack (IPv4 & IPv6).	
8	Security Features Required	Should have following security features / protocol support: 1) MAC Address Limiting 2) Dynamic ARP inspection (DAI) 3) Proxy ARP 4) DHCP snooping 5) IP source guard 6) Port based ACL support 7) 802.1X authentication	
9	Voice VLAN	Should Support Voice VLAN for separating and prioritising VoIP traffic.	
10	No. of VLANs	Should support min. 1000 Active VLANs.	
11	MAC Addresses	Should support min. 10000 MAC Addresses.	

Annexure-XII

L3 Switch-Type-II			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
12	No. of Routes	Should support min. 8000 routes.	
13	Multicast	Should support H/W or S/W based IPv4 Multicasting.	
14	Software	The offered switch should have the latest operating system supporting all the above features, standards & protocols.	
15	Power Supply	Should come with internal redundant dual power supply.	
16	Manageability	Switch should be manageable through NMS on per port/switch basis with common interface for all manageable devices on the network. Should Support syslog, SNMP, RMON/ RMON-II, SSH, telnet, web management, etc.	
17	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

Proxy-Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	Proxy Platform and Management	The proposed system shall be an appliance based solution; designed for secure proxy, active content filtering & caching services.	
		Should be IPv6 compliant. Should support full features of IPv6	
		Proposed appliance must support HTTP, HTTPS management GUI console.	
		Proposed appliance must support Telnet, SSH CLI management access.	
		Proposed appliance must support a Graphical based policy editor.	
		Proposed appliance must enforce auto-logouts of GUI, CLI sessions should there be no management activity for a period of time. This period of inactivity must be a configurable parameter.	
		Proposed Appliance must support Forward Proxying capability for a Network of about 10000 Users and maximum Internet B/w Support for upto 128 Mbps.	
		Proposed Appliance should consist a minimum of 12 GB RAM with upgrade option.	
		Proposed Appliance should have a minimum of 2 TB storage capacity.	
		Proposed Appliance must provide minimum of 2 On-Board 10/100/1000 Base-T NIC's with bypass option. Should have an option of uprgading NICs to 4 port.	
		Proposed Appliance should consist of onboard SSL hardware accelerator to decrypt / encrypt and accelerate SSL connections.	
		Proposed Appliance should be able to work in Transparent mode or explicit mode, forward proxy or reverse proxy and should be capable of hiding the client IP to the outside world (internet).	
3	Proxy Services	The Proxy Appliance must support the following proxy protocols: HTTP, FTP,DNS, P2P protocols like BitTorrent, Gnutella, E-donkey, FastTrack (Kazza), SSL Forward Proxy, HTTPS Tunneling, HTTPS Termination, SOCKS v4, SOCKS v5, Telnet, IM (AOL,MSN,Yahoo)	
		The solution should track and block sharing of Internet access from different IP source. Prevention of concurrent login / sharing of internet access by using same credentials (user id & password) from multiple workstations	
		The solution should provide methods to cap bandwidth based on user ID, IP address or Website category.	
4	Authentication Support	The Proxy Appliance must support the following authentication methods: NTLM, Active Directory, LDAP, RADIUS, Local password database, Forms Authentication, Certificate Authentication.	
		Proposed Appliance must have support for multiple authentication realms	
		Local User Database: Creation of user / multiple users / Group / Multiple Groups - based on user-ID & password for authentication	
		Creation of Client/Clients/Clients Group - IP Based	

Annexure-XII

Proxy-Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
5	Networking Support	Should supoort both IPv4 and IPv6 from day one.	
		Proxy Appliance must support Bridging for inline deployment.	
		Proxy Appliance must support transparent redirection of traffic from Layer 3 switches, routers and WCCP Based Redirection via wccp enabled gateway Device.	
		Proxy Appliance must support native fail-over mechanism.	
		Proxy Appliance must support at least 2 default gateways.	
6	DNS Splitting	The solution should support configuration to use Split DNS. It should be able to refer to different DNS for Different Domains.	
7	Content Filtering Services	The appliance should have support for multiple URL database sources, support for multiple URL lists and ability to create blacklists or whitelists and implement the same along with URL database simultaneously.	
		URL Filter should be able to identify and rate malware, phishing and pornography categories.	
		It must support locally defined category lists.	
		It must support user configurable automatic database download capability.	
		It must have the ability to block pop-up ads without the need to use or integrate with external software.	
		It must support specification of policy rules by time of day restrictions.	
		It must support customization of splash pages.	
		It must support ability to filter by: File Extension, HTTP MIME Type.	
		Proxy Appliance must support the ability to perform True File Type detection (eg where a malicious external party may rename a executable as a jpeg file to bypass security filters).	
		Proxy appliance must support filtering by: Destination IP, port, url, category, http request and response headers.	
		It must have the ability to strip-off active content like java applets, activex, visual basic and java scripts as these objects have a high potential for malicious activity.	
		The appliance should be able to allocate bandwidth, user wise/ IP wise/ category wise.	
		Should support scheduling of internet access for specific user / users / group/groups /client /clients on specific Time/Day / Date / Weekly /Monthly etc.	
8	Web Reputation	The solution should have inbuilt Web Reputation service to categorize the URL's on the bases of reputation.	
9	Power Supply	The proxy appliance should have dual power supply. Hot swappable preferred.	
10	Appliance Administration and Management	The appliance should provide remote management for the device and administrative purposes.	
		The appliance should provide multiple administrator roles for configurable administrative functions.	

Annexure-XII

Proxy-Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
		The appliance should allow multiple administrators to access the device at the same time and configure according to their privileges.	
		The appliance should provide Command-Line access for administrative purposes.	
		The appliance should import the system data, configuration data and policy data from the backup medium and restore the functioning of the appliance to the stage at which backup was taken.	
11	Log Management	The appliance should log all the events within the appliance and be configurable to be pushed to external syslog server.	
		The appliance should be able to automatically collect configurable log files and push it into external server through:	
		- HTTP/HTTPS	
		- FTP/SFTP	
12	Reporting	The solution should provide pro -forma and ad hoc reports including histories and trends.	
		The solution should provide automated Real- Time Live reports to assess the performance and volume of traffic being utilized.	
		The solution should be able to generate & export or email reports automatically to assigned users in atleast PDF, Excel / CSV and HTML formats.	
13	High Availability	The appliance should work in High Availability mode along with one or more appliances.	
14	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

SLB Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	Architecture	Should have ASICS Based Switch Architecture	
		Should be IPv6 compliant. Should support full features of IPv6	
		Should have minimum 12 Nos. of 10/100/1000 Mbps Ethernet ports.	
		Should have minimum 4 GB RAM	
		Support for 8M Concurrrent L4 TCP connections	
		Should provide minimum 1Gbps L7 throughput and should have a provision to be upgraded to 4 Gbps L7 throughput without changing the hardware.	
		Should support Dynamic routing protocols like OSPF, RIP1, RIP2	
3	Load Balancing Features	Minimum support for 100 Servers & Maximum for 3000 Servers	
		Should support following load balancing algorithms	
		a) Least amount of Bytes	
		b) Least number of users/session.	
		c) Cyclic.	
		d) Weighted Cyclic	
		e) SNMP Parameters, like Server CPU utilisation etc	
		Should support following content based Load balancing features	
		a) HTTP Header based redirection	
		b) URL-Based Redirection	
		c) Browser Type Based Redirection	
		d) Should Support session persistency Based on IP, DNS, URL Parameters, SSL Session ID-based etc	
4	NAT Support	Should support Client NAT & Server NAT	
5	Other Features	In case of Server / Application failure, device should detect it in not more than 30 seconds	
		In case of Server failure traffic should be diverted to another Sevrer automatically	
6	Application Accelerations	Device should support up to 2000 SSL Transactions per second and should have provision to be upraded to 10000 SSL TPS with license upgrade.	

Annexure-XII

SLB Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
		Device should support Industry standard Compression algorithm. Device should support compression throughput of 100 Mbps and sacalable to 250 Mbps .	
7	Server Management Feature	Should support Gracefull shutdown of Servers	
		Should support Gracefull Activiation of Servers	
		Should able to redirect traffic based on Source IP, Destination IP, TCP Port, etc.	
8	Segmentation	Should be possible to segment the single box into multiple boxes & operate each as independantly. Should support at least 12 segments.	
9	Health Monitoring	Should provide individual health check for each Server & Application	
		Should be able to do health check on protocols like HTTP, SMTP, POP etc	
		Should able to check the health of Server OS, Application & contents as well	
		Should provide AND , OR mechanism between health check	
		Should provide GUI interface to configure any health check	
10	High Availability Support	Should be capable of Active/Active high Availbility	
		Should be capable of Active/Passive stateful failover	
		Appliance should support Stateful Failover of VPN Sessions	
11	Global Server Load Balancing support in same device	Should support DNS based redirection	
		Should support HTTP redirection	
		Should Support GLOBAL SERVER LOAD BALANCING (GSLB)	
		Should support RTSP Redirection	
		Should support VIP advertisement via Dynamic Routing	
12	Device Management & Reporting	Should provide GUI interface for configuration & reporting	
		Should provide HTTP / HTTPS interface management	
		Should provide SSH / Telnet / CLI interface	
		Should suppport SNMP V1, V2c, V3	
		Should provide Detailed LIVE reporting for traffic on each server / Farm	

Annexure-XII

SLB Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
		Should provide detailed historic reporting for each server / farm traffic	
13	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

DNS Server			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	Mounting	Should be rack optimized	
3	Height	Max 2U	
4	Processor	Intel Xeon Quad Core 5630, 2.53GHz or higher	
5	No. of Processors	Two (2)	
6	Chip Set	Intel 5500 family chipset	
7	CPU Cache	Minimum 12MB L3 Cache	
8	RAM	16 GB DDR3 1066 MHz or higher	
9	Extension slots	4 or more PCI-X / PCI-Express slots	
10	HDD	6 x 146 GB or higher SFF hot Pluggable SAS 10K/15K rpm	
11	Internal HDD bays	6 or more hot plug drive bays	
12	DVDROM	8x or higher DVD-CDRW Combo Drive	
13	Raid Controller	2 Nos. of 3G SAS RAID Controller, each with 256 MB battery backed cache	
14	LAN Card	2 Nos. of separate 10/100/1000 Ethernet Cards each with 2 ports (with at least 1 card on board)	
15	Power Supply	Should come with Hot Pluggable & Redundant Power Supply	
16	Fans	Hot pluggable redundant fans	
17	OS	MS Windows 2008 Enterprise Server or latest	
18	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

Firewall-IPS			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	System	The system should be an appliance providing Firewall & Intrusion Prevention functionality preferrably in a single box. In case IPS & Firewall are offered as separate appliances, failover boxes should be offered for both.	
		Should be IPv6 compliant. Should support full features of IPv6	
		Firewall and IPS should work in parallel. A faulty IPS module should not affect the working of Firewall and vice -versa.	
3	Ports	The device should have following integrated ports:	
		Min. 8 Nos. of 10/100/1000 BASE-T Ethernet ports for firewall & minimum 4 nos. of 10/100/1000 Base-T ethernet ports for IPS	
		Should be able to accommodate further interfaces for future expansion	
4	VLAN Interfaces (802.1q)	Should support miunimum 100 802.1q VLAN interfaces	
5	RAM	Should have minimum 4GB of DDR RAM in case of single appliance. In case, firewall & IPS are separate appliances, each should have minimum 2GB DDR RAM.	
6	Flash Memory	Should have minimum 1 GB flash memory in case of single appliance or 512MB per appliance in case of separate appliances.	
7	Routing	Should support RIPv1/v2, OSPF, Static Routes, Multicast, etc.	
8	Throughput	In case firewall & IPS are provided in a single appliance, the combined throughput of the appliance should be 2Gbps or higher. In case of separate appliances, firewall throughput should be 4Gbps or higher & IPS throughput should be 2Gbps or higher	
9	High Availability Support	Should come in a failover cluster. Should be capable of active/active or active/standby failover.	
		Firewall should support Stateful Failover of Firewall and VPN Sessions (if any)	
10	Connections Supported	Should support minimum 9,00,000 concurrent firewall connections.	
11	New Connections Per Second	Should support minimum 45000 connections per second.	
12	Application Inspection & Protection	Should provide application inspection services for applications like HTTP, FTP, SNMP, DNS, SMTP, NFS, LDAP, SIP, etc. Should be able to block popular peer-to-peer applications like Kaaza, bit torrent, Instant Messaging applications like Yahoo messenger, MSN Messenger etc. Should support TCP stream reassembly and analysis, TCP traffic normalization, TCP packet checksum verification.	
13	Transparent Firewall	Should provide layer 2 transperent firewalling functionality	
14	Access Control	Should support time based access list to control the usage of applications and resources based on time parameters.	
15	NAT	Should support Static NAT, Dynamic NAT, PAT, etc.	
16	Encryption Standards	Should provide DES, 3DES, AES (128, 192, 256 bit) encryption. (Any licences if required should be supplied along with device).	

Annexure-XII

Firewall-IPS			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
17	Authentication Standards	Should provide MD-5 & SHA-1 authentication	
18	Intrusion Prevention	Should come with integrated intrusion prevention features based on attack signature database of at least 1500 signatures and support for online automatic signature & variant updation for entire lease period.	
18	Power Supply	Should have integrated redundant power supply	
19	Attack Protection Features	Should be able to inspect and protect against all the major attacks based on protocols like TCP,UDP and ICMP. Should protect the network from known and unknown network and application layer attacks, Reconnaisance attacks, DoS attacks, DDOS attacks, malwares, worms, viruses, Trojan horses, spywares etc. Should also provide protection from ping sweep, port scanning, SQL Injection, Cross Site Scripting and Brute Force attacks.	
20	Action Response	Should be able to respond to attacks in the following ways: 1) Generate an alarm 2) Log the alarm event 3) Record the session to an IP session log 4) Reset TCP connections 5) Deny network access	
21	Intrusion Prevention System Operation Modes	The intrusion prevention system should be able to operate in inline mode and in promiscuous mode for trafic inspection.	
22	Management & Monitoring	Should be configurable usign CLI, GUI interface and central management software. Should support SNMP V1, SNMP V3, SSH, Telnet, HTTP(s), syslog server logging,	
23	Operating System	The offered device should have the latest operating system supporting all the above features, standards & protocols.	
24	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

VPN Device			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	System	The system should be an appliance providing high performance SSL and IPSec VPN functionality.	
		Should be IPv6 compliant. Should support full features of IPv6	
3	Ports	The device should have following integrated ports:	
		Min. 4 Nos. of 10/100/1000 BASE-T Ethernet ports	
		Should be able to accommodate further interfaces for future expansion	
4	VLAN Interfaces (802.1q)	Should support miunimum 100 802.1q VLAN interfaces	
5	RAM	Should have minimum 2GB of DDR RAM	
6	Flash Memory	Should have minimum 512 MB flash memory	
7	Routing	Should support RIPv1/v2, OSPF, Static Routes, Multicast	
8	High Availability Support	Should be capable of Active/Active high Availbility	
		Should be capable of Active/Passive stateful failover	
		Appliance should support Stateful Failover of VPN Sessions	
9	IPSec VPN Services	Should provide Site-to-Site and Remote Access IPSec VPN services. Should come with minimum 500 IPSec VPN licenses.	
10	SSL VPN Services	Should provide Remote Access SSL based VPN services from day one. Should come with minimum 4000 SSL VPN licenses. Users should be able to reset their credentials. The appliance should also support applications based on Sharepoint, Java based technologies.	
11	Connections	Should support minimum 4500 IPSec & SSL VPN connections concurrently.	
12	Throughput	Should provide minimum 1 Gbps throughput.	
13	Access Control	Should support time based access list to control the usage of applications and resources based on time parameters.	
14	Encryption Standards	Should provide DES, 3DES, AES (128, 192, 256 bit) encryption. (Any licences if required should be supplied along with device).	
15	Authentication Standards	Should provide MD-5 & SHA-1 authentication	
16	Power Supply	Should have integrated redundant power supply	
17	Management & Monitoring	Should be configurable usign CLI, GUI interface and central management software. Should support SNMP V1, SNMP V3, SSH, Telnet, HTTP(s), syslog server logging,	
18	Operating System	The offered device should have the latest operating system supporting all the above features, standards & protocols.	
19	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

Router-Type-I (Hub)			
S.No.	**Parameter / Feature**	**Detailed Specifications**	**Vendor Compliance (Yes/No)**
1	Make & Model Offered		
2	Router Architecture	The router architecture should have following features:	
		Should be based on high speed multicore processor	
		Should be a multi-service capable router supporting data, voice and video.	
3	Interface Modules Supported	Ethernet 100/1000 Mbps, V.35 WAN interfaces, Upto 4xE1 G.703 interfaces, 1 E3 interface, Console interface.	
4	Ports Required	The following ports should be available from day one.	
		Atleast 2 Nos. of Layer 3 10/100/1000 Mbps Ethernet or fibre WAN Ports	
		Atleast 4 Nos. of Layer 3 10/100/1000 Mbps Ethernet LAN Ports	
		1 No. Console Port with console cable.	
5	Memory Required	2 GB DRAM or higher	
6	Flash Memory Required	1 GB or higher	
7	Performance Required	Should give a routing performance of at least 2500 Kpps with 64 byte packet size.	
8	Router Functional Requirements	The router should come with the latest Operating System. The following features should be available from day one.	
		Should support Standard Access Lists, Extended Access Lists & Named Access Lists.	
		Should support Route Maps, Class Maps & Policy Maps.	
		Class of Service, Prioritization, Policy based Routing and Low Latency Queuing, etc.	
		Network Address Translation (Static NAT, Dynamic NAT, PAT)	
9	Routing Protocol Support Required	RIP (V1 & V2) , OSPF, BGP4, Policy based Routing, PPP, Multilink PPP	
10	Security Protocols Support Required	Should support IPSec DES, 3DES & AES based encryption. Should also support MD5 & SHA-1 authentication.	
11	Multicasting and QoS	The router should have following multicasting and QoS features:	
		Resource Reservation Protocol (RSVP)	
		Support for QoS	
		Support for WFQ, Committed Access Rate (CAR) , IP Precedence, DSCP	
		Internet Group Management Protocol (IGMPv3)	
		Multicast Routing support such as DVMRP, Protocol Independent Multicast (PIM) or MOSPF	
12	IPv6 Support	Should be IPv6 compliant. Should support dual stack (IPv6 & IPv4).	

Annexure-XII

Router-Type-I (Hub)			
S.No.	**Parameter / Feature**	**Detailed Specifications**	**Vendor Compliance (Yes/No)**
13	Management Features	Should support Telnet, SSH, TFTP and BOOTP protocols.	
		Should support SNMP V1 & SNMP V2c & SNMP v3 for remote management.	
		Should be configurable usign CLI & GUI interface.	
		Should support NTP & RADIUS protocols	
		Should support syslog logs.	
14	Power Supply	Should come with internal Redundant power supplies.	
15	Operating System	Should come with the latest operating system supporting the above features.	
16	Mounting	The offered router should be rack mountable	
17	Accessories	Should come with all necessary power cords, adapters, data cables, connectors, CDs, manuals, brackets accessories, etc, required for installation and commissioning of the equipment.	
18	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

Router-Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifications**	**Vendor Compliance (Yes/No)**
1	Make & Model Offered		
2	Router Architecture	The router architecture should have following features:	
		Should be based on high speed multicore processor	
		Should be a multi-service capable router supporting data, voice and video.	
3	Interface Modules Supported	Fast Ethernet ports 100/1000 Mbps, V.35 WAN interfaces, Upto 4xE1 G.703 interfaces, 1 E3 interface, Console interface.	
4	Ports Required	The following ports should be available from day one.	
		Atleast 2 Nos. of Layer 3 10/100/1000 Mbps Ethernet or fibre WAN Ports	
		Atleast 4 Nos. of Layer 3 10/100/1000 Mbps Ethernet LAN Ports	
		1 No. Console Port with console cable.	
5	Memory Required	1 GB DRAM or higher	
6	Flash Memory Required	512 MB or higher	
7	Performance Required	Should give a routing performance of at least 1250 Kpps with 64 byte packet size.	
8	Router Functional Requirements	The router should come with the latest Operating System. The following features should be available from day one.	
		Should support Standard Access Lists, Extended Access Lists & Named Access Lists.	
		Should support Route Maps, Class Maps & Policy Maps.	
		Class of Service, Prioritization, Policy based Routing and Low Latency Queuing, etc.	
		Network Address Translation (Static NAT, Dynamic NAT, PAT)	
9	Routing Protocol Support Required	RIP (V1 & V2) , OSPF, BGP4, Policy based Routing, PPP, Multilink PPP, IPv6	
10	Security Protocols Support Required	Should support IPSec DES, 3DES & AES based encryption. Should also support MD5 & SHA-1 authentication.	
11	Multicasting and QoS	The router should have following multicasting and QoS features:	
		Resource Reservation Protocol (RSVP)	
		Support for QoS	
		Support for WFQ, Committed Access Rate (CAR) , IP Precedence, DSCP	
		Internet Group Management Protocol (IGMPv3)	
		Multicast Routing support such as DVMRP, Protocol Independent Multicast (PIM) or MOSPF	
12	IPv6 Support	Should be IPv6 compliant. Should support dual stack (IPv6 & IPv4).	
13	Management Features	Should support Telnet, SSH, TFTP and BOOTP protocols.	
		Should support SNMP V1 & SNMP V2c & SNMP v3 for remote management.	

Annexure-XII

Router-Type-I			
S.No.	**Parameter / Feature**	**Detailed Specifications**	**Vendor Compliance (Yes/No)**
		Should be configurable usign CLI & GUI interface.	
		Should support NTP & RADIUS protocols	
		Should support syslog logs.	
14	Power Supply	Should come with internal Redundant power supplies.	
15	Operating System	Should come with the latest operating system supporting the above features.	
16	Mounting	The offered router should be rack mountable	
17	Accessories	Should come with all necessary power cords, adapters, data cables, connectors, CDs, manuals, brackets accessories, etc, required for installation and commissioning of the equipment.	
18	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

Router-Type-II			
S.No.	**Parameter / Feature**	**Detailed Specifications**	**Vendor Compliance (Yes/No)**
1	Make & Model Offered		
2	Router Architecture	The router architecture should have following features	
		Should be IPv6 compliant. Should support full features of IPv6	
		Should be based on high speed multicore processor	
		Should be a multi-service capable router supporting data, voice and video.	
3	Interface Modules Supported	Ethernet ports 10/100Mbps, V.35 WAN interfaces, Upto 4xE1 G.703 interfaces, Console interface.	
4	Ports Required	The following ports should be available from day one.	
		Atleast 2 Nos. of WAN Ports with necessary connecting cables	
		Atleast 2 Nos. of Layer 3 10/100/1000 Mbps Ethernet Ports	
		1 Console Port with console cable	
5	Memory Required	1GB DRAM or higher	
6	Flash Memory Required	256MB or higher	
7	Performance Required	Should give a routing performance of at least 350 Kpps with 64 byte packet size.	
8	Router Functional Requirements	The router should come with the latest Operating System. The following features should be available from day one.	
		Should support Standard Access Lists, Extended Access Lists & Named Access Lists.	
		Should support Route Maps, Class Maps & Policy Maps.	
		Class of Service, Prioritization, Policy based Routing and Low Latency Queuing, etc.	
		Network Address Translation (Static NAT, Dynamic NAT, PAT)	
9	Routing Protocol Support Required	RIP (V1 & V2) , OSPF, BGP4, Policy based Routing, PPP, Multilink PPP, IPv6	
10	Security Protocols Support Required	Should support IPSec DES, 3DES & AES based encryption. Should also support MD5 & SHA-1 authentication.	
11	Multicasting and QoS	The router should have following multicasting and QoS features:	
		Resource Reservation Protocol (RSVP)	
		Support for QoS	
		Support for WFQ, Committed Access Rate , IP Precedence, DSCP	
		Internet Group Management Protocol (IGMPv3)	
		Multicast Routing support such as DVMRP, Protocol Independent Multicast (PIM) or MOSPF	
12	Management Features	Should support Telnet, SSH, TFTP and BOOTP protocols.	
		Should support SNMP V1 & SNMP V2 for remote management.	
		Should be configurable usign CLI & GUI interface.	

Annexure-XII

Router-Type-II			
S.No.	**Parameter / Feature**	**Detailed Specifications**	**Vendor Compliance (Yes/No)**
		Should support NTP & RADIUS protocols	
		Should support syslog logs.	
13	Operating System	Should come with the latest operating system supporting the above features.	
14	Mounting	The offered router should be rack mountable	
15	Accessories	Should come with all necessary power cords, adapters, data cables, connectors, CDs, manuals, brackets accessories, etc, required for installation and commissioning of the equipment.	
16	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

Router-Type-III			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model Offered		
2	Router Architecture	The router architecture should have following features	
		Should be IPv6 compliant. Should support full features of IPv6	
		Should be based on high speed multicore processor	
		Should be a multi-service capable router supporting data, voice and video.	
3	Interface Modules Supported	Ethernet ports 10/100Mbps, V.35 WAN interfaces, Upto 4xE1 G.703 interfaces, Console interface.	
4	Ports Required	The following ports should be available from day one.	
		At least 2 No. of WAN interface Ports(V.35 or Ethernet as per link type to be provided) with the necessary connecting cable	
		2 Nos. of L3 10/100/1000 LAN Ethernet ports	
		1 console port with Console Cable	
5	Memory Required	512MB DRAM or higher	
6	Flash Memory Required	256MB or higher	
7	Performance Required	Should give a routing performance of at least 220 Kpps with 64 byte packet size.	
8	Router Functional Requirements	The router should come with the latest Operating System. The following features should be available from day one.	
		Should support Standard Access Lists, Extended Access Lists & Named Access Lists.	
		Should support Route Maps, Class Maps & Policy Maps.	
		Class of Service, Prioritization, Policy based Routing and Low Latency Queuing, etc.	
		Network Address Translation (Static NAT, Dynamic NAT, PAT)	
9	Routing Protocol Support Required	RIP (V1 & V2) , OSPF, BGP4, Policy based Routing, PPP, Multilink PPP, IPv6	
10	Security Protocols Support Required	Should support IPSec DES, 3DES & AES based encryption. Should also support MD5 & SHA-1 authentication.	
11	Multicasting and QoS	The router should have following multicasting and QoS features:	
		Resource Reservation Protocol (RSVP)	
		Support for QoS	
		Support for WFQ, Committed Access Rate (CAR) , IP Precedence, DSCP	
		Internet Group Management Protocol (IGMPv3)	
		Multicast Routing support such as DVMRP, Protocol Independent Multicast (PIM) or MOSPF	
12	Management Features	Should support Telnet, SSH, TFTP and BOOTP protocols.	
		Should support SNMP V1 & SNMP V2 for remote management.	
		Should be configurable usign CLI & GUI interface.	

Annexure-XII

Router-Type-III			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
		Should support NTP & RADIUS protocols	
		Should support syslog logs.	
13	Operating System	Should come with the latest operating system supporting the above features.	
14	Mounting	The offered router should be rack mountable	
15	Accessories	Should come with all necessary power cords, adapters, data cables, connectors, CDs, manuals, brackets accessories, etc, required for installation and commissioning of the equipment.	
16	Warranty	OEM onsite, labour, parts warranty for the entire contract period	

Annexure-XII

UPS			
S.No.	**Parameter / Feature**	**Detailed Specifcations**	**Vendor Compliance (Yes/No)**
1	Make & Model		
2	Rating	2KVA	
3	Technology	Line Interactive	
4	Nominal Input Voltage	230V single phase	
5	Input Voltage Tolerance	170V to 275V	
6	Input Frequency	50 Hz +/- 3 Hz	
7	Nominal Output Voltage	230 V AC +/- 5%	
8	Output Frequency	50 Hz +/- 1 Hz	
9	Output power factor	0.7 or higher	
10	Automatic Voltage Regulation	Required	
11	EMI/RFI Protection	Required	
12	Overall Efficiency	>90%	
13	Overload capability	110% for 5 minutes;150% for 1 min	
14	LED indicators	Required (on mains, on battery, replace battery, overload, etc)	
15	Cold start	Required	
16	Battery Type	Sealed Maintenance-free	
17	Battery Make	Panasonic / Rocket / CSB	
18	Backup	Min. 30 minutes on full load	
19	Battery Refresh	Bidder shall replace batteries after 2.5 years and whenever the batteries get faulty.	
20	Communication Port	RS232C port & necessary communication cables to be provided	
21	Power Management Software	The UPS has Power Management Software to view & monitor UPS status, backup time, battery status, temperature & shutdown scheduling for Windows XP / Vista & Red Hat Linux systems.	
22	Certifications	IEC-60950-1: 2001 / IS 13252:1992 / UL (Underwriters Laboratories)	
23	Warranty	OEM onsite, labour, parts warranty for the entire contract period	