RFP for Selection of Project Implementing Agency For BharatNet Phase-III Project in Gujarat under GFGNL

(Design, Construction, Supply, Implementation, Testing & Commissioning and Operation & Management Model)

(Tender No. GFGNL/GFG/e -file/263/2025/0006/Phase-III(ABP in Gujarat))

Gujarat Fibre Grid Network Limited (GFGNL)

A Government of Gujarat Company

Block No: 6, 5th Floor, Udyog Bhavan, Sector-11, Gandhinagar 382010

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i) DISCLAIMER

The information contained in this Request for Proposal (RFP) document or subsequently provided to Bidder(s), whether verbally or in documentary or any other form by or on behalf of the Gujarat Fibre Grid Network Limited (GFGNL) or any of their employees or consultants, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

The purpose of this RFP is to provide interested parties with information that may be useful to them in eliciting their financial offers (the "Proposal") pursuant to this RFP. This RFP includes statements, which reflect various assumptions and assessments arrived at by the TENDERER, in relation to the RFP. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require. This RFP may not be appropriate for all persons, and it is not possible for the TENDERER, its employees, or Consultants to consider the investment objectives, financial situation and particular need of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in this RFP, may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own surveys and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources before filling up the Bid. Any deviation in the specification or proposed solutions will be deemed as incapability of the respective Agency and shall not be considered for final evaluation process.

Information provided in this document to the Bidder(s) is on a wide range of matters, some of which depends upon interpretation of law. The information given is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The TENDERER accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

TENDERER- its employees and advisors make no representation or warranty and shall have no liability to any person, including any Applicant or Bidder under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise, including the accuracy, adequacy, correctness, completeness, delay or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way during the Bidding process.

ii) ABBREVIATIONS

Sr. no.	Abbreviations	Description
1.	BCP	Business Continuity Plan
2.	BOM	Bill of Material
3.	DR	Disaster Recovery
4.	EMD	Earnest Money Deposit
5.	EMS	Element Management System
6.	FAT	Final Acceptance Testing
7.	ICT	Information and Communication Technology
8.	IE	Independent Engineer
9.	IP	Internet Protocol
10.	IPS	Intrusion Prevention System
11.	ISO	International Organization for Standardization
12.	IT	Information Technology
13.	KPI	Key Performance Indicator
14.	LAN	Local Area Network
15.	LoA	Letter of Award
16.	LoI	Letter of Intimation
16.	Mbps	Megabits per second
17.	MPLS	Multi-Protocol Label Switching
18.	MSP	Managed Service Provider
19.	NMS	Network Management System
20.	NOC	Network Operations Centre
21.	NSP	Network Service Provider
22.	OEM	Original Equipment Manufacturer
23.	OFC	Optical Fiber Cable
24.	OS	Operating System
25.	PAT	Partial Acceptance Testing
26.	PBG	Performance Bank Guarantee
27.	SDC	State Data Centre
28.	PoP	Point of Presence
29.	RFP	Request for Proposal
30.	R-NOC	Remote – Network Operations Centre
31.	SLA	Service Level Agreement
32.	SPOC	Single Point of Contact
33.	TDS	Tax Deducted at Source
34.	UPS	Uninterruptible Power Supply

Sr. no.	Abbreviations	Description
35.	VC	Video Conferencing
36.	VLAN	Virtual LAN
37.	VoIP	Voice over Internet Protocol
38.	VPN	Virtual Private Network
39.	VSAT	Very Small Aperture Terminal
40.	WAN	Wide Area Network
41.	SIA	State Implementation Agency (GFGNL)

iii) DEFINATIONS

Sr. No.	Abbreviation/ Term	Description
1	Acceptance of Letter of award (LoA)	The date on which the successful bidder(s) accepts the letter of award issued by Purchaser.
2	Bidder	The Party who will be offering the solution(s), service(s) and/or materials as required in the RFP. The word Bidder when used in the pre-award period shall be synonymous with party bidding against this RFP
3	Business Hours	The prime utilization period, which shall be starting from 10:30 hrs. till 18:10 hrs. on all working days or as defined by the Purchaser from time to time, unless the specific context requires otherwise.
4	Amended BharatNet Program	Bharatnet Phase-3
5	Deliverables	The products, infrastructure, and services to be delivered by the successful bidder in the RFP and Contract, and as proposed in the Proposal and all related documentation/designs/policies and guidelines.
6	End-of-Life	End-of-life is the date of End-of-Sale and/or End-of Support (whichever is earlier) given by the OEM/ on its website or through any public announcement. End-of-Life would be indicating that a product is in the end of its useful lifetime and on the specified dates the vendor will no longer be marketing, selling, or sustaining a particular product and may also be limiting or ending support for the product.
7	End-of-Sale	The date indicated by the OEM on its website or through any public announcement, after which the OEM/ stops marketing or selling the product.
8	End-of-Support	Is with reference to a product and is the date indicated by the OEM/distributor on its website or through any public announcement, till which the OEM/distributor will provide service/updates/patches/spare parts/technical support service.
9	FAT	Final Acceptance Testing to test the successful implementation of the scope of work specified in the RFP
10	Fixed Scope	Means the scope of work to be done by the SP as part of the RFP.
11	Go-Live	The date of commencement of work and acknowledged by end customer
12	MSP/Managed Service Partner	Managed Services Provider is the company who optimize your communications infrastructure to minimize downtime and remediate problems on your behalf.

Sr. No.	Abbreviation/ Term	Description
13	Original Equipment Manufacturer (OEM)	Manufacturer of any equipment/system/software/product/services who is providing such goods services to the Purchaser's requirement(s).
14	Parties	The Purchaser and the Service Partner collectively, for the purposes of this Contract and "Party" shall be interpreted accordingly to the context therein.
15	State Data Centre (SDC)	State Data Centre (SDC means a Data Center located at Gandhinagar that would house the Information and Communication Technology (ICT) equipment required for carrying out centralized operations of the BharatNet.
16	Project	The activities to be performed by the Service Partner regarding this RFP
17	Purchaser	Purchaser Means GFGNL or any other government agency
18	Requirements	All the documents prepared by the Purchaser about the Project, Scope of Work, SLA, schedules, details, description(s), statements of technical data, performance characteristics and standards (Indian & International) as applicable and specified in the RFP
19	RFP	The Request for Proposal bearing reference no: *GFGNL/GFG/e -file/263/2025/0006/Phase-III(ABP in Gujarat)* and any other documents/formats provided along with this RFP or issued during the selection of successful bidder(s), corrigenda, seeking a set of solution(s), services(s), materials and/or any combination of them.
20	Service Level	The level of Service and other performance criteria which will apply to the Services delivered by the Service Partner.
21	Service Level Agreement	Service Level Agreement (SLA) is an agreement, to be signed between the successful bidder and the Purchaser includes all attachments, appendices, all documents incorporated by reference thereto together with any subsequent modifications, the RFP, the bid offer, the acceptance and all related correspondence, clarifications, presentations for the level of service and other performance criteria which will apply to the services delivered by the Service Partner.
22	Scope of Work/ SoW	To be performed by the Service Partner as provided in RFP and as arising from other clauses of the RFP and includes the requirements and deliverables of the project.
23	Special sites	Special sites are those sites which are to be included for purpose of External Audit. Physical visits for Audit to these sites are necessary.
24	Office Hours	Working hours of the GFGNL (10:30 AM to 6:10 PM) on all Working days

Sr. No.	Abbreviation/ Term	Description
25	Day	Day means both working as well as non-working day, unless specified otherwise
26	POP	Point of Presence is any location from where connectivity can be extended.
27	RKM	Total Fibre(not optical core) Running Kilometers

iv) STRUCTURE OF THE RFP

Tenderer desires to select the Service Provider for RFP for Selection of Project Implementing Agency For BharatNet Phase-III Project in Gujarat under GFGNL (Design, Construction, Supply, Implementation, Testing & Commissioning and Operation & Management Model). In this respect, Tenderer is undertaking a comprehensive Tendering process to select the most-suitable service Provider via competitive Bidding. This RFP is meant to invite proposals from the interested bidders capable of delivering the services described herein. Details of the same are given in following sections:

Section	Description
Section I	KEY INFORMATION & INSTRUCTIONS
Section II	INTRODUCTION
Section III	ELIGIBILITY CRITERIA
Section IV	INSTRUCTIONS TO BIDDERS
Section V	SCOPE OF WORK
Section VI	PROJECT TIMELINES
Section VII	SERVICE LEVEL AGREEMENT (SLA) & PENALTY
Section VIII	FINANCIAL BID
Section IX	ANNEXURES & FORMATS
Section X	SPECIAL TECHNICAL CONDITIONS (TECHNICAL SPECIFICATIONS)

v) FACT SHEET

The following table provides information regarding the important dates of the bid process:

#	Particular	Details
1.	RFP Inviting Authority	Gujarat Fibre Grid Network Limited (GFGNL),
2.	Job Requirement	RFP for Selection of Project Implementing Agency For Bharatnet Phase-III Project in Gujarat under GFGNL
3.	Date of Publication	29/01/2025
4.	Availability of RFP Document	The RFP document can be obtained from website https://bharatnet.gujarat.gov.in/home, https://tender.nprocure.com/
5.	Name and address for communication and seeking clarification regarding the RFP	Chief Finance Officer (CFO) Gujarat Fibre Grid Network Limited (GFGNL), Block No: 6, 5th Floor, Udyog Bhavan, Sector-11, Gandhinagar -382010 email id: jte-ho5@bharatnet.gujarat.gov.in, jte-ho6@bharatnet.gujarat.gov.in , pmc@bharatnet.gujarat.gov.in, pmc2@bharatnet.gujarat.gov.in , pmc3@bharatnet.gujarat.gov.in,
6.	Last date for receiving queries/clarifications	The last date of submission of pre-bid queries shall be 12/02/2025 at 11: 55.pm All the pre-bid queries should be received on or before the prescribed date and time, through only official email id with subject line as: Pre-bid queries < Bidder's name> The queries should be submitted in an .xls Format as per the format prescribed in RFP document.
7.	Time, Date and Venue of Pre-Bid Conference	12/02/2025 at 03:00 pm At Department of Science and Technology, Government of Gujarat/Gujarat Fibre Grid Network Limited (GFGNL) Block No: 7, 5th Floor, New Sachivalaya, Gandhinagar: 382010"
8.	Date of response to Bidder Queries	Within 15 days from the date of pre-bid conference. ***Note:*** *The Purchaser shall not be obligated to respond to any or all the queries. The Purchaser may, at its sole discretion, choose to publish responses to the pre-bid queries and /or any corrigendum on Central Public Procurement portal https://eprocure.gov.in/eprocure/app or may send through email or any other means.*

#	Particular	Details
9.	Last date for submission of Bid/proposal	28/02/2025 at 06:10 pm
10.	Last date for submission of Bid/proposal (Physical copy excluding financial bid only if asked based on nature of RFP)	Within 4 working days from the Date of submission of online bid dates in working hours(till 06:10pm) in event of particular ask of submitting physical copy then logical portion of the bid should be appropriate in the respective sealed cover for maintaining confidentiality.
11.	Bid Processing fee payable	Bidders shall submit, along with their bid, non-refundable bid processing fee of Rs. 15K/- +GST Extra (Fifteen Thousands Rupees -- only)+ GST extra, in the form of a DD on any nationalized bank payable in favor of "Gujarat Fibre Grid Network Limited" Name of the Beneficiary: Gujarat Fibre Grid Network Limited Bank Name: HDFC Bank Ltd. Bank Account Number: 50200061 458239 IFSC code: HDFC0000190 MICR Code: 520011025
12.	Bid Security/ Earnest Money Deposit (EMD) Amount Payable	Rs. 10 Cr (Rupees Ten Crore only) per package **Details of the Bank:** Name of the Beneficiary: Gujarat Fibre Grid Network Limited Bank Name: HDFC Bank Ltd. Bank Account Number: 50200061 458239 IFSC code: HDFC0000190 MICR Code: 520011025 Branch Code : 000190 Branch Name: Sector 16 , Gandhinagar Branch
13.	Submission of Integrity Pact, EMD, RFP Document Fee and Letter of Authorization	At 06:10 pm (Date of submission of online bid + 4 working Days)
14.	Address at which bids are to be submitted	Proposal shall be uploaded online in the format and mode as provided for in the Portal https://tender.nprocure.com/ for this RFP in the system and shall be digitally signed by the authorized signatory of the Bidder.
15.	Opening of Qualification Bids	To be announced later
16.	Opening of Technical Bids	To be announced later
17.	Technical Presentation	To be announced later
18.	Method of Selection (Define)	QCBS (50:50) H1 Based selection
19.	Date for the opening of financial bid for technically qualified bidders	To be announced later

#	Particular	Details
20.	Contract Duration	10 Years (3 Years of Implementation(As per Project timeline section), 10 Years of Operation and Maintenance) from the date of assigning workorder
21.	Performance Bank Guarantee	5 % of CAPEX, 5% of OPEX per package.

Note: The above date, time and venue may be altered by GFGNL at its Sole discretion after giving prior notice to the Bidders, some of the information provided in the above Fact sheet is further elaborated in the subsequent sections of this RFP and the information provided in the sections of this RFP are to be read in conjunction and are to be interpreted harmoniously.

SECTION-1 KEY INFORMATION & INSTRUCTIONS

1.1 INFORMATION REGARDING RFP

a) Proposal in the form of the BID is requested for the item(s) in complete accordance with the documents/attachments as per following guidelines.
b) Bidder shall upload their bids on eProc-Suite (https://gfgnltender.nprocure.com)
c) The Bid Security in the form of EMD in a sealed envelope super scribed with the bid document number to GFGNL office.
d) Bids complete in all respects should be uploaded on or before the BID DUE DATE.
e) Technical Bids will be opened in the presence of Bidders' representatives who choose to attend on the specified date and time.
f) In the event of the date specified for receipt and opening of bid being declared as a holiday for GFGNL office, the due date for submission of bids and opening of bids will be the next working day at the appointed time.
g) Services offered should be strictly as per requirements mentioned in this Bid document.
h) Please spell out any unavoidable deviations, Clause/ Article-wise in your bid under the heading Deviations and Bidder has to clarify with tenderer in pre-bid and in post corrigendum's.
i) The bid submitted should be valid for a period of 180 days from the last date of submission of bids.

1.2 INSTRUCTION TO THE BIDDERS FOR ONLINE BID SUBMISSION

i. Tender documents are available only in electronic format which Bidders can download free of cost from the website https://bharatnet.gujarat.gov.in/ and (https://gfgnltender.nprocure.com)

ii. The bids have been invited through e-tendering route, i.e., the eligibility criteria, technical and financial stages shall be submitted online on the website (https://gfgnltender.nprocure.com)

iii. Bidders who wish to participate in this bid, will have to register on (https://gfgnltender.nprocure.com), such Bidders will have to procure Digital Certificate as per Information Technology Act 2000 using which they can Sign their electronic bids. Bidders can procure the same from (n) code solutions – a division of GNFC Ltd., or any other licensed by Controller of Certifying Authority, Govt. of India. Bidders who already have a valid Digital Certificate need not procure a new Digital Certificate.

iv. Interested and eligible Bidders are required to upload the eligibility related document in eligibility bid section, Technical related document in technical bid section & Commercial Bid in Commercial bid section. The Bids should be accompanied by a bid security (EMD) as specified in this tender document. The Technical & Commercial Bid must be uploaded to https://gfgnltender.nprocure.com & the Bid Security must be delivered to the office of Gujarat Fibre Grid Network Limited on or before the last date and time of submission of the bid.

v. The eligibility section and the Bid Security section will be opened on the specified date & time in presence of the Bidders or their authorized representative who choose to attend. In the event of the date specified for bid receipt and opening being declared as a holiday for the office of Gujarat Fibre Grid Network Limited the due date for submission and opening of bids will be the following working day at the scheduled times.

SECTION-2 INTRODUCTION

2.1 BHARATNET PROJECT BACKGROUND

BharatNet is a project funded by Universal Service Obligation Fund (USOF), Department of Telecommunications (DoT), with an aim to provide high speed broadband connectivity to all inhabited Gram Panchayats (GPs), Villages across India. The network infrastructure under this project shall be a national asset and accessible on a non-discriminatory basis to all eligible service providers to enable them to provide services in rural areas.

Following are a few enablers for BharatNet Program,

a) A World Bank study has estimated that a 10% increase in broadband connectivity leads to 1.38% increase in Gross Domestic Product (GDP). Broadband penetration in India at present is less than 2%.

b) Broadband is a tool for improving the lives of people by providing affordable and equitable access to information and knowledge. For individuals, broadband has direct impact on their day-to-day lifestyle. It can contribute towards increased trade and employment avenues.

c) Information and communication Technologies (ICT) applications such as e-Commerce, e-Banking, e-Governance, e-Education and Tele-medicine require high speed Internet connectivity.

2.1.1 BHARATNET PHASE I – PROJECT BACKGROUND

a) BharatNet, led by Bharat Broadband Network Limited (BBNL), is a broadband network that provides broadband connectivity across the country to 2.5 lakh GramPanchayats (GPs), which are the primary nodes for information collection and dissemination, as well as service delivery points for government services.

b) A phased approach was planned to connect GramPanchayats across India. The Telecom Commission approved a 3 – phase implementation of this project.

c) The first phase envisages providing 1,00,000 GramPanchayats with broadband connectivity by laying OFC(Optical Fibre Cable) lines by March 2017 across the country. This was to be covered by BBNL.

d) The implementation was done under Central Public Sector Units (CPSU) led model by M/s BSNL.

e) Under this implementation model, the network infrastructure was deployed by leveraging BSNL's existing Optical Fibre Cable (OFC) from Block to Fibre Point of Interconnect (FPOI) and laying incremental underground OFC from FPOI to GP location.

f) The network architecture was based on linear topology where GPON based electronics infrastructure was deployed across Block and GP location for middle mile network connectivity.

g) Bharatnet Phase – I is a multi-stakeholder project, with a number of organizations including the Department of Telecommunications, the Ministry of Electronics and Information Technology, BBNL, BSNL, RailTel, PGCIL, C-DOT, TCIL and NIC collaborating to ensure that broadband connectivity

reaches every Gram Panchayat, enabling adoption by the public and private institutional users as well as the citizens.

h) The ability to access broadband-enabled services provides opportunities to empower digitally marginalized rural citizens; changing the way they learn, communicate, and manage their livelihoods and access health, financial, and government services.

Gujarat Phase-I

Number Of Districts	11
Number Of Blocks	117
Number Of GPs	6761
Executive Agency	BSNL (M/s RAILTEL)

Table:01 Gujarat Phase-I

2.1.1.1 METHODOLOGY OF EXECUTING BHARATNET PHASE I PROJECT

The following fundamental principles were considered while designing the Network.

1. BSNL's backbone Network was used to carry traffic from block level to BSNL Exchange State SDC (State Data Centre).
2. At the block level, BSNL's exchanges were used to install OLTs (Optical Line Terminals).
3. For GPON (Gigabit Passive Optical Network) - a type of point-to-multipoint network technology that delivers broadband access to the end user via fibre optic cable -from OLT to ONT (i.e from block level to GP), 1 / 2 fibre cores were taken on lease from BSNL & RailTel from BSNL exchange / OLT location to FPOI (Fibre Point of Interconnect) location to reduce the quantum of new fibre roll-out.(From OLT to BSNL POI by using existing BSNL & Railtel Fibres)
4. Only incremental/new fibre was planned from FPOI location to GP location.

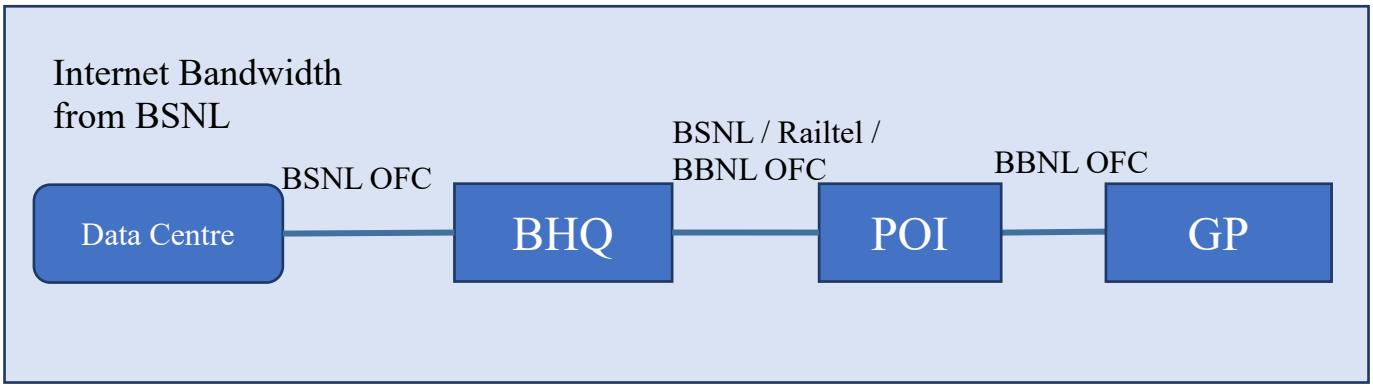


Diagram -01 Phase-I Methodology

To Summarize,
The BharatNet network implemented in Phase- I consists of using BSNL's existing fibre (on lease) from Block to Fibre POI and laying of incremental OFC (24 core) from Fibre POI to GPs. As part of upgradation in the project of Amended Bhartnet Program (ABP), the PIA shall lay additional OFC for connecting Block to GPs in a ring architecture using the existing incremental BharatNet OFC from Fibre POI to GPs. After the PIA upgrades this network in ring architecture from Block to GPs, integrating the incremental OFC from Fibre POI to GPs, the BSNL's existing leased fibre shall no more be part of upgraded ring architecture. As well as laying of incremental OFC (48 Core) for Phase-I blocks interconnectivity to reach up to State Data Center for backhaul connectivity.

2.1.2 BHARATNET PHASE II – PROJECT BACKGROUND

a) The central government had approved a modified strategy to overcome the shortcoming experience during Phase-I project execution and approved the implementation methodology of BharatNet Phase-II to connect remaining GramPanchayats with state of art network designing with enhance bandwidth to achieve the vision of Digital India.

b) The Government of Gujarat has set up an Special Purpose Vehicle (SPV) namely "Gujarat Fibre Grid Network Limited (GFGNL)" to implement Phase-II of BharatNet Project in Gujarat. This SPV has been created to synergize with the efforts of the Government of India under the Digital India initiative.

c) These focused efforts are to actualize a state-to-village fibre grid, to facilitate common Government-owned infrastructure, and to provide internet facilities to residents of Gujarat state.

d) The connectivity is already done by laying end to end (GFGNL owned) OFC from Block to GPs location.

e) The network architecture is based on linear topology at last mile where GPON based electronics infrastructure was deployed across Block and GP location for network mid-haul connectivity.

f) GFGNL has already connected around 8037 locations mainly comprising Gram Panchayat (GP) along with TC/DC/GIDC/Revenue Villages etc. GFGNL also started extending BharatNet connectivity from respective Gram Panchayat (GP) to various offices/Locations of GoG at the village level.

g) GFGNL has implemented BharatNet Phase – II network in Gujarat in two different packages. Package – A has three islands in Rest of Gujarat and Package – B has one island in Saurashtra region. Package – A has 12 districts & Package – B has 10 districts. Further, both the packages are divided into two zones. Package A has two zones i.e., Vadodara zone & Surat zone and Package B has two zones i.e., Ahmedabad zone & Rajkot zone.

h) Bidders are also requested to get the technical information about the network implemented by GFGNL by referring to the RFP (*Request for Proposal for Selection of Project Implementing Agency for BharatNet Phase-II project in the State of Gujarat under Gujarat Fibre Grid Network Limited*). (Reference: *https://bharatnet.gujarat.gov.in/tenders*)

i) GFGNL's Network comprises of the various technology equipment including GPON, DWDM, OTN, Ethernet, RFMS etc.

j) GFGNL has installed telecom grade shelters and already completed the shifting of the OLT and other transport devices from BSNL exchange to approximate 383 shelters.

k) High-level existing network topology is as below,

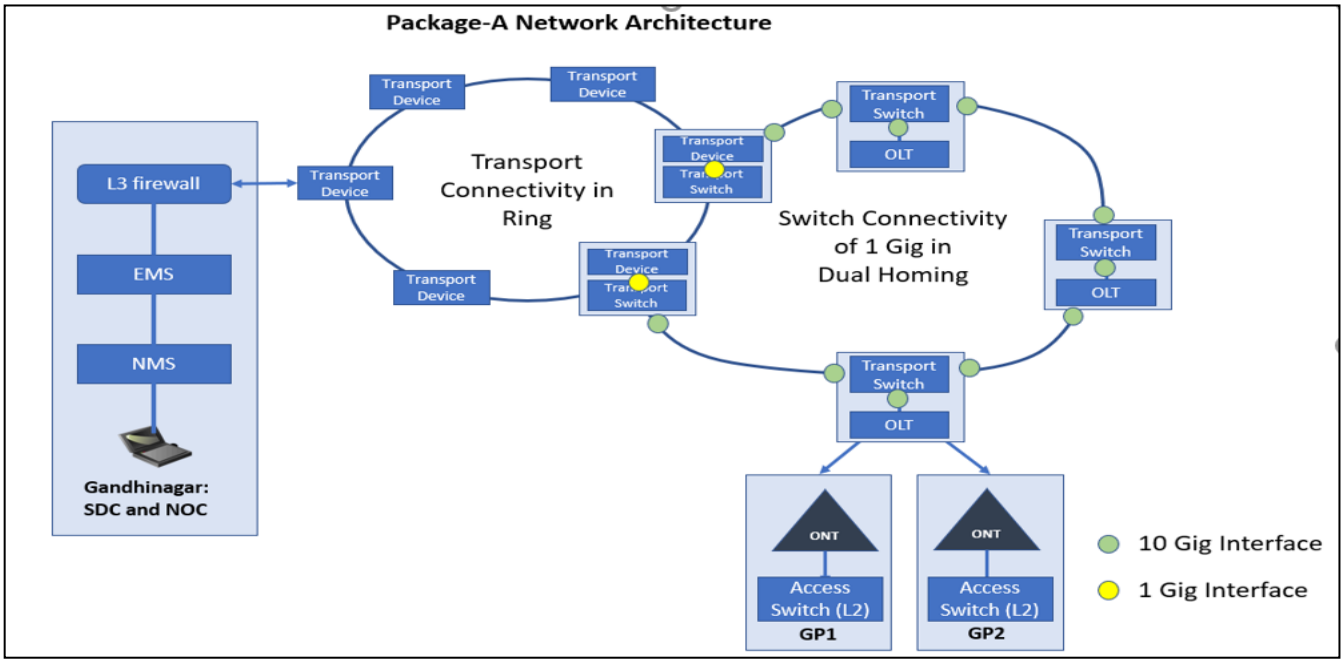


Diagram -02 (Phase-II Package-A Network Architecture)

Note: 20 GP (Gram Panchayat) connected from 1 OLT (Optical Line Terminal) with 2 GP per PON (Passive Optical Network) Port of OLT, However, in OLT approximately 25-27 GPs Connected

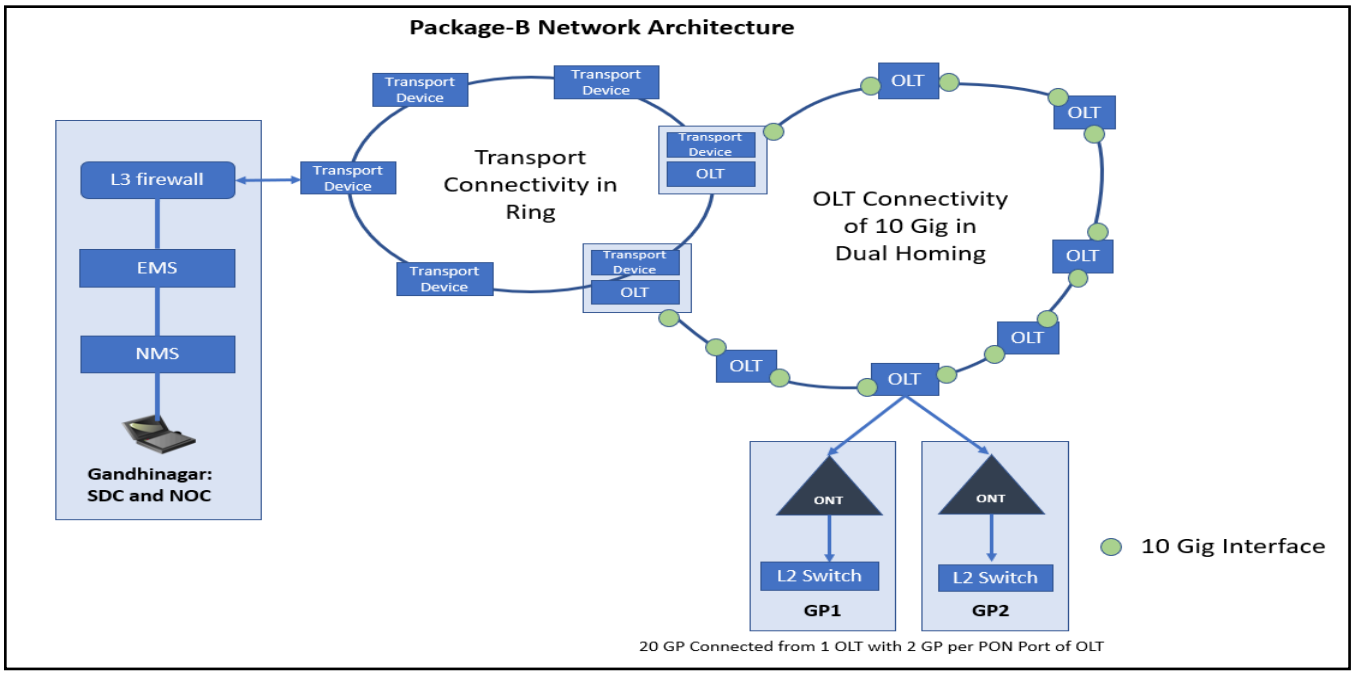


Diagram -03 (Phase-II Package-B Network Architecture)

In a present network, physical connectivity between 2 layers of transport mux and transport switch/OLT is as per below in both packages.

Package - A: Uplink 10G port of each OLT is connected to 10G port of transport switch. Generally, 4 or 5 transport switches are connected in a ring with 10G uplink ports and dual homed on 1G dropping ports of transport mux on both sides.

Package - B: Generally, 8 to 16 OLTs are connected in a ring with 10G uplink ports and dual homed on 10G dropping ports of transport mux on both sides.

2.2 OBJECTIVE OF BHARATNET PHASE III

I. The 'Amended BharatNet Phase-III Program' in Gujarat, commanded by Gujarat Fibre Grid Network Limited (GFGNL), is a transformative initiative aimed at revolutionizing rural connectivity and strengthening digital inclusivity. This comprehensive project encompasses the integration, expansion, and technological upgrade of BharatNet Phase-I and Phase-II networks, laying the foundation for a robust broadband infrastructure. The project endeavors to connect approx. additional ~4,400 more villages over and above the existing rural connectivity, empowering rural communities through enhanced digital services. Leveraging IP-MPLS technology, ring topology, and strategic network design, the upgraded BharatNet Network is poised to bridge the digital divide, drive socio-economic development, and propel Gujarat into a new era of digital empowerment.

II. The 'BharatNet Phase-III Program' in Gujarat is a transformative initiative aimed at bolstering digital infrastructure and digital connectivity throughout the state. The project's comprehensive approach, covering rural areas, is aligned with the national agenda of Digital India, fostering economic development, technological upgradation, and improved operational efficiency.

A) Project Objectives with Strategic Goals

The objectives reflect the project's commitment to providing digital services in equitable manner and contributing to the overall development of the state. The primary objectives of the project are outlined to underscore its strategic goals, which includes:

I. **Comprehensive Integration:** Seamlessly integrate BharatNet Phase-I and Phase-II networks to establish a unified and cohesive digital infrastructure equitable across the state.
II. **Technological Upgrade:** Implement IP-MPLS technology for better accessibility/service-offering and ring topology for better network reliability.
III. **Expanded Connectivity**: Reaching approximately 4400 more villages over and above the existing rural connectivity, to cover full landscape of Gujarat and a step towards everyone's right to take part in digital journey.
IV. **Network scalability:** Future traffic demand to be supported with network scalability as per the device specification mentioned in technical specification section, considered with 1G to 10G at GP level and 10G to 100G at Block Level.
V. **Ensuring better customer service:** Single NOC for the entire network along with 24 x 7 helpdesk support to ensure quality service delivery.
VI. **Ensuring operational efficiency:** High network availability to be maintained up to 98% by additional OFC to be laid with appropriate (24F/48F/96F) Armored cable, UPS deployment with minimum 6 Hrs backup at each GP.
VII. **Socio-Economic Empowerment:** Facilitate digital empowerment by enabling access to education, healthcare, e-governance, and economic opportunities in rural areas. Deployment of mini-OLT at each GP with target of approx. 9 lakhs customer over BharatNet network.
VIII. **Stakeholder Collaboration:** Foster collaboration among GFGNL, the Government of Gujarat, Department of Telecommunication (DoT) and other stakeholders to ensure seamless execution and alignment with national broadband connectivity goals.
IX. **Network Availability**: KPIs (Key performance Indicators) are considered in BharatNet Phase-III (Amended BharatNet Program) for State NOC equipment >=99.9% , for Block level router >=99.5% and for GP level router >=98.5% in view of achieving high network availability.

B) Effective Fiberization:

Fulfilment of compliances of amended BharatNet guidelines using concentrative purpose of 'Effective Fiberization (5-E and 6-F)' across the rural landscape of Gujarat which is to be kept in consideration for organic growth of Network and Business revenue streams by having unique element of **Omni presence in unreachable areas to meet first and foremost purpose of USOF.**

<u>'Effective':5-E dimensions</u>

1. Extend the network footprint for equitable coverage.

2. Expand the network service basket for unlocking revenue streams through dark fiber for Telco & digital enterprise, Internet peering service, wireless broadband, Govt Network (SWAN), Enterprise VPN, Community Wi-Fi to meet long term financial sustenance.
3. Enhance availability by optimum redundancy in the network paths.
4. Economize through scale and lessor expenses on last mile through enroute locations for affordability to onboard lower strata of rural masses and
5. End-to-end seamless flow of bits from state capital upto villages including Internet breakout points for effective Internet/Intranet both with Omni presence proposition.

'Fiberization':6-F dimensions

1. Fibre to Far flung areas
2. Fibre to Family
3. Fibre to Field offices of Government
4. Fibre to Farm
5. Fibre to Financial market and
6. Fibre to Fraternity (Social Inclusion)

The first and foremost objective for attaining business momentum is to target following entities and provide them conducive, cooperative, competitive footprint and cost effective statewide one stop services:

I. Government segment: E-Governance, Rural schools (Govt and private), Agriculture, Animal husbandry, Community health, Anganwadi, Food and civil supplies, public community Wi-Fi at Panchayat
II. Telco segment: Fibre for TSP, Broadband local ISP
III. Power segment: Electricity distribution, utilities, and solar companies
IV. Financial market: Cooperative banks, Private banks, non-banking finance companies and Insurance, Stock exchange intermediaries
V. Agriculture: Fertilizer shops, Seeds and pesticides retail chains, Agriculture mandis, APMC, Commodity traders, IoT
VI. Education: Digital aided learning centers, Private schools, Libraries, Hostels
VII. Business enterprises: Logistics and transport, Retail chain, Hotel chain, Digitization anywhere, Remote factories
VIII. New emerging rural opportunities: Open Network for Data Commerce (ONDC), rural e-Commerce, Rural ATMs, Rural IoT

C) Approach to achieve the objectives.

With the envisage objective of digitization, the approach is bifurcated in below three major categories.

Part – I: Acquisition and upgradation of BharatNet Phase-I network along with integration to Phase-II Network and Operation & Maintenance of existing Phase-I BharatNet

Part – II: To upgrade BharatNet Phase – II Network with IP – MPLS technology and Operation & Maintenance of existing Phase-II BharatNet
Part – III: Connectivity to balance ≈4400 villages of Gujarat

SECTION-3 ELIGIBILITY CRITERIA

3.1 PRE-QUALIFICATION CRITERIA

I. The Bidder may be a single entity or a group of entities (the "Consortium"), coming together to implement the Project. However, any Bidder applying individually or as a member of a Consortium, as the case may be, for a Package, cannot be member of another Bidder applying for the same Package. The term Bidder used herein and, in this RFP, would apply to both a single entity and a Consortium.

II. In the event of disqualification due to conflict of interest, GFGNL shall be entitled to blacklist the Bidder from participation in the tendering process for GoG/DST/GFGNL the work of Ministry of Communications / Department of Telecom / any public sector undertaking engaged in Telecom and any work under other state Sponsored Schemes for a period of one year from the Bid Date and/or forfeit and appropriate the Bid Security or Performance Security, as the case may be, as mutually agreed genuine pre-estimated loss and damage likely to be suffered and incurred by GFGNL and not by way of penalty for, inter alia, the time, cost and effort of GFGNL, including consideration of such Bidder's proposal (the "Damages") without prejudice to any other right or remedy that may be available to GFGNL under the Bidding Documents or otherwise. Without limiting the generality of the above, a Bidder shall be deemed to have a Conflict of Interest affecting the Bidding Process, if:

- A constituent of such Bidder, for the Package, is also a constituent of another Bidder, for the other Package or
- A constituent of the GFGNL Central NOC RFP or
- Such Bidder has the same authorized representative for purposes of this Bid as any other Bidder for the same Package or
- For the same Package, such Bidder, or any Associate thereof has participated as a consultant to GFGNL in the preparation of any documents, design or technical specifications of the Package.

iv. The selected sole bidder or any of the consortium members and its Parent Company / Child company shall not be allowed to bid in the tender for monetization of the network laid under this RFP (leasing of Dark Fibre or Bandwidth sharing). However, selected bidder bidding for one package can bid for the other package during the monetization bid that is planned for the future.

v. In case of Consortium, the number of bidders including Lead Bidder can be maximum two.

vi. The Bidder must attach valid documents in support to their Technical and Financial capabilities/ strength, as mentioned above. Without proper supporting documents, the Bid proposals are liable for rejection.

vii. Following are the common criteria for eligibility for submitting bids against one or more packages in the tender. However, the Bid Security shall be submitted for each package

separately which are independent packages for the purpose of tender evaluation. Accordingly, financial bids are to be submitted separately against each package for which bids are submitted.

#	Description	Minimum Requirement	Documentary Proof
1	Legal Entity	**1.1** The Sole and each of the Consortium members should be an Indian firm. **1.2** The Sole or Lead Bidder (in case of consortium) should be registered under the Companies Act 1956/2013 in India or a Limited Liability Partnership Firm under Limited Liability Partnership Firm Act 2008 at the time of the bidding. **1.3** The Sole or Lead Bidder (in case of consortium) should have a registered number of, GST, Income Tax / Pan number. **1.4** The Sole and each of the consortium members should be in operation in India for a period of at least 5 years as on publication of this tender.	**a)** Copy of certification of incorporation issued by competent authority/ Registration Certificate/ Shop & Establishment certificate **b)** Copy of PAN card **c)** Copy of GST registration
2	Company Turnover	**2.1** The Sole Bidder should have an average annual turnover of at least following values in last three (3) audited financial years (FY 2021-22, FY 2022-23, and FY 2023-24) solely generated from the business of OFC Business/ ITeS / Telecom Networking field only, • Rs 1250 Crores for Package A • Rs 1250 Crores for Package B **<u>In Case Of Consortium:</u>** Lead bidder(in case of consortium) should have average annual turnover as per following in last three audited financial years (FY 2021-22, FY 2022-23, and FY 2023-24) solely generated from the business of OFC deployment/ Telecom Networking / ITeS field only Only one consortium partner is allowed.	The Sole Bidder For Annual Turnover: **a)** Copy of audited Balance Sheet, audited Profit & Loss statements for each of the last 3 financial years **b)** Copy of Certificate from the statutory auditor / Charted Accountant (CA) clearly specifying the annual turnover for each of the last 3 financial years, i.e. FY 2021-22 ,FY 2022-23 and FY 2023-24. **c)** Self Certification to be signed by Company Secretary/ Statutory Auditor on company's letter head mentioning the required shareholding." **2.2** For Positive net worth: **a)** Certificate from the Statutory Auditor on net worth (i.e. FY

<table>
<tr><th>#</th><th>Description</th><th>Minimum Requirement</th><th>Documentary Proof</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Package/s</th><th>Lead Bidder (In Cr)</th><th>Consortium Partner (In Cr)</th></tr>
<tr><td>Package-A</td><td>940</td><td>625</td></tr>
<tr><td>Package-B</td><td>940</td><td>625</td></tr>
<tr><td>Both The Packages</td><td>1880</td><td>1250</td></tr>
</table>

<u>Note:</u>
1. In case the sole bidder or a Lead bidder (in case of Consortium) desires to bid for both of the packages then the bidder must have average annual turnover criteria (sum of 100% of highest and 25% of other package above financial value) i.e., for the last three audited financial years (FY 2021-22, FY 2022-23, and FY 2023-24)
2. One sole or lead bidder can bid for only one package
3. Turnover considered would be a consolidated turnover of the company i.e. A parent Company can use the turnover of its subsidiaries (75% and above holding) but a child company cannot use parent company’s turnover. However, both the company should have same domain experience.
4. The lead bidder of one package is allowed to participate in only one package. However, Participation as a consortium member being a project experience partner in another package with other lead partner is allowed.

2.2 The Sole must have atleast 15% positive net worth against their financial turnover in last three (3) financial years (i.e., FY 2021-22, FY 2022-23, and FY 2023-24)
Note: In case of Consortium, each member of the consortium should have positive Net Worth. All the consortium partners can meet the Net worth criteria cumulatively.
</td><td>2021-22, FY 2022-23 and FY 2023-24)</td></tr>
</table>

#	Description	Minimum Requirement	Documentary Proof
4	Experience	The Sole or lead bidder in case of consortium should have demonstrable experience with following: i) **For Optical Fibre:** The Bidder should have experience of Laying, Installation, Testing and Commissioning of EPC Based Optical Fibre Cable (Underground), Duct and accessories as mentioned below in last 10 Years, as on this bid submission date: One Package: 8,000 Kms Two Package: 15,000 Kms • In case the bidder desires to bid for both packages then the bidder must have experience of 10,300 Kms, in Laying, Installation, Testing and Commissioning of Optical Fibre Cable (Underground), Duct and accessories in last 10 Years as on bid submission date. • The EPC OFC Construction project execution shall consist of both Supply and Construction of OFC Network. **Note:** 1. If bidder bids for both the packages and it is found that his experience is not meeting the work experience requirement of 10,300 Kms, as above, then in that case GFGNL reserve the right to consider his bid for relevant package." **AND** **ii) For Equipment's** : Experience of Telecommunication equipment installation, commissioning and O&M of at least- • 1000 active nodes, if bidding for 1 package, • 2200 active nodes, if bidding for 2 packages, The active nodes to be considered for this criterion can be include atleast, MPLS Routers, RFMS,Layer-3 Switches, Transport equipment(DWDM/PTN(packet and	The Sole or lead bidder in case of Consortium **3.1**Validated Data from Government sources (reports, portal log Etc.) • The details of ISP nodes or points of presence with their locations. Need to submit WO Copy /LOI/LOA/Contract agreement **For completed projects** (WO copy / LOI / LOA contract copy & client completion Certificate), work completion certificate from end client mentioning satisfactory performance & total Km of Fibre with other inventories/Equipment mentioned implemented (satisfactory performance & functionalities implemented may be mentioned separately as a performance certificate from the client) **For ongoing projects** (WO copy / LOI / LOA contract copy), Performance certificate from end client mentioning satisfactory performance & total Km of Fibre with other inventories/Equipment mentioned implemented by the Sole/lead Bidder(in case of consortium)

#	Description	Minimum Requirement	Documentary Proof
		transmission equipments)/OTN/RON/CPANs/OLT of 16 or more ports . **For completed projects** • If WO date is older than 10 Years from bid released date(excluding bid released date), then work completion certificate must not be older than 9 years from bid released date. • If WO date & Work completion date falls within 10 Years years from bid released date(excluding bid released date), it is ok. **For ongoing projects** • WO date must be earlier than one (1) year from bid released date(excluding bid released date). **Note 1:** The Sole bidder or members of the Consortium should meet the Technical Capability requirements either on their own or jointly for the works awarded directly by the TSPs, Category-A ISPs, IP-1, Central Government, State Government, Municipal Corporations for Smart City Projects, BharatNet SPVs, PSUs for their own network and not sub-contracted works. However, for installation and commissioning of active nodes, the experience certificate issued by the OEMs for the works awarded by the TSPs to the OEMs shall also be considered. The above experience conditions can be met either through single project or multiple projects executed during last 10 Years years as on date of submission of bid. It is also clarified that the work experience issued by TSPs to the executing agencies for the USOF/DOT awarded projects shall also be accepted. **Note 2:** The technical experience(on active elements only) for work executed in foreign countries for TSPs or Government shall also be considered. **Note 3 :** Regarding the experience certificate issued to IP-1 Service Provider, the concerned TSP or ISP has to certify that the TSP/ ISP has taken fibres on lease from the said IP-1 out of	

#	Description	Minimum Requirement	Documentary Proof
		the network constructed using 24 or more fibre Under Ground OFC or ADSS/ OPGW/ Aerial OFC, as the case may be, which should be constructed and owned by the concerned IP-1 Service Provider for at least one completed year. TSP/ ISP shall also certify the Route KM of OFC with route wise details for which leasing has been done. The information may be submitted in the format mentioned. **Note:4** For installation and commissioning of active nodes, the experience certificate issued by the OEMs for the works awarded by the TSPs to the OEMs shall also be considered. **Note-5:** If a bidder falls short of the EPC requirement through underground OFC-implementation, upto 40% of the EPC requirement can also be met through EPC work of 24 or more core Aerial Fiber Cables (deployed in BharatNet by BBNL or state SPV)/ ADSS/ OPGW OFC. **Note-6:** If any project has been executed in the consortium, the lead bidder and the consortium partners can use the same project experience for qualification individually, if not participating as the partner of same consortium. If they are participating as the consortium partners, then the experience shall be considered only once. However, other than consortium experience, the experience from any type of joint execution, like "teaming agreement, sub-contracting (including any EPC partnerships), backend partnership" shall not be considered. **Note-7** The above experience conditions can be met either through single project or multiple projects executed during last 10 years as on date of submission of bid.	
5	Mandatory Undertaking	The Sole, and any of the consortium members & OEM should: **5.1** Not have been blacklisted/debarred by Ministry of Communication or GFGNL or	An undertaking signed by CEO/ Country Head/ Authorized Signatory of the company to be provided on

#	Description	Minimum Requirement	Documentary Proof
		debarring order issued by Department of Expenditure (DOE), Ministry of Finance (MOF) covering all central Ministries/ Departments as per provision of OM No.F.1/20/2018-PPD by Department of Expenditure (DoE)/ MoF dated on 2nd Nov 2021/ Central Government / Any State Government / Urban Local Body (ULB) /SmartCity (SPV)/ Supreme Court of India / Any government / PSU in India as on the date of bid submission." **5.2** Not be insolvent, in receivership, bankrupt or being wound up, not have its affairs administered by a court or a judicial officer, not have its business activities suspended and must not be the subject of legal proceedings for any of the foregoing reasons. **5.3** The Sole/lead Bidder(in case of consortium) should have at least one office in Gujarat and preferably support centres/logistics for the entire state. If the Bidder is not having any office in Gujarat, then bidder should submit a letter of undertaking to open the office in Gujarat within 45 days from the date of issue of work order if he is awarded the work **5.4** Not have their directors and officers convicted of any criminal offence related to their professional conduct or the making of false statements or misrepresentations as to their qualifications to enter into a procurement contract within a period of three years preceding the commencement of the procurement process, or not have been otherwise disqualified. **5.5**There must not be any criminal case booked by any Government authority against the sole and any of the consortium members in any court in last 5 years as on bid submission date.	Non – judicial stamp paper of INR 100/- or such equivalent amount and document duly attested by notary public. (or Self-declaration by the Bidder duly signed and stamped by the authorized signatory.)
6	MAF	**6.1** The Sole Bidder or lead Bidder (in case of consortium) should submit valid letter from each of the OEM (one and only one OEM for each component) - confirming the following: OEM shall ensure that all	Documentary evidence such as Authorization letters, MAF (Annexure XXX) from all OEM/Vendors whose products

#	Description	Minimum Requirement	Documentary Proof
		equipment/components/sub- components being supplied by them shall be supported for entire contract period. If the same is de-supported by the OEM for any reason whatsoever, The bidder shall replace it with an equivalent or better substitute that is acceptable to Tenderer without any additional cost to the Tenderer and without impacting the performance of the solution in any manner whatsoever. In case replacement with a product from an OEM other than the OEMs proposed by the bidder prior approval from GFGNL will be required. **Note:** i) If product is changed due to specific functional/technical requirement asked in this tender, then fresh TSEC certificate is required to be obtained and submitted at the time of delivery. ii) If the OEM has TSEC approval for the exactly same product which has been asked in this tender, then no fresh TSEC approval is required. But if product is changed due to specific functional requirement asked in this tender, then TSEC approval is required ii) TSEC/TAC are applicable for Hardware (Active and Passive) only.	are being quoted by the Bidder need to be attached in the bid. Copy of valid Technical Specification Evaluation Certificate (TSEC) / Type Approval Certificate or copy of Application for fresh TSEC/TAC as applicable from each OEM whose products are being quoted by the Bidder. The Bidder or the lead member (in case of Consortium) should submit valid Manufacturer Authorization Form (MAF) from maximum one(1) for all passive components (Like, (all types of OF Cables, Duct, Joint Closures (SJC & BJC), FDMS & FTB) and up to maximum one (1) OEMs for all active components (Routers, RFMS, UPS & Racks). TSEC issued against earlier tender(s) of BSNL/BBNL/MTNL/State Government/Central Government/ BharatNet Projects BSNL QA registered QF-103 or Form B issued by TEC for the quoted products shall also be acceptable for eligibility to submit the Bid only. In order to meet the delivery timelines, the successful bidder can procure and supply the material from one or more quoted OEMs in any combination.
7	Land Border	**7.1** The sole bidder- and OEM of proposed solution from a country which shares a land	Self-certification from sole and OEMs on Non-Judicial stamp

#	Description	Minimum Requirement	Documentary Proof
		border with India will be eligible to bid in this tender only if the bidder is registered with Competent Authority as per OM No. 6/18/2019-PPD dated 23rd July 2020 issued by Department of Expenditure, GoI	of Rs. 300/- in the prescribed format (Annexure – II), separately.
8	Certification	**8.1** The bidder should submit at least one distinct certification from any of the below Certifications (valid at the time of bidding): • CMMI- Process Level 3 or above • ISO 9001:2015 • ISO 27001 for Information Security Management Systems • ISO/IEC 20000	Copies of valid certificates in the name of the bidding entity
10	Bharatnet Project	**10.1** If a bidder has been declared as non-performer in any USOF project(s) such as BharatNet Project and 4G saturation project, on the bid submission date, such bidder shall stand not eligible to submit the bid for this tender.	A Self-declaration for not being declared as non-performer in any USOF project(s), as per the clause. A Self-declaration for not being declared as non-performer in any USOF project(s) shall be submitted by all the members, in case of consortium bidder.

Notes:1

I. The eligibility criteria mentioned in above table are applicable to both package-A & B.
II. In case of any bidder is quoting the active equipment from multiple OEMs in such case the bidder shall ensure that all quoted equipment should meet the Interoperability requirement for smooth network operations. There shall be no exclusion/ relaxation in SLA/ penalties on this account.
III. All the active and passive items asked in this RFP tender should meet the ask specifications in Technical specifications section of this tender document.
IV. All the tender items e.g. Routers, OFC, Rack Mounted Splitters, RFMS UPS and Batteries, and Charging Control Unit should have valid Type Approval Certificate (TAC) from Telecom Engineering Centre (TEC), New Delhi or Technical Specification Evaluation Certificate (TSEC) from Quality Assurance Circle, BSNL, Bengaluru, against the respective technical specifications of this RFP. In case any of the quoted models does not have TAC/ TSEC then it should be applied for TSEC to Quality Assurance Circle, BSNL, Bengaluru or to TEC, New Delhi for the model against the technical specifications, at least one day before the bid submission date. The registration number allotted for the TSEC purpose by Quality Assurance Circle, BSNL, Bengaluru or for TAC purpose by TEC, New Delhi shall be submitted along with the bid. However, only type approved /TSEC approved products as per above specifications shall be accepted which shall

have to be obtained before issuing Work Order by the Tenderer before supply.

V. The TSEC obtained by the OEMs of bidders for the various tenders floated by BBNL/BSNL in the last two years shall be acceptable for the items which are part of this RFP provided that the technical specifications remain unchanged. In case of OFC, any change in the source of raw material shall be subject to fresh TSEC process of QA.

VI. **For OFC:**

a. Against the requirement of TSEC/ QF-103 of 48F ribbon type armored OFC, bidders may also submit copy of TSEC of 48 or more Fibre Loose Tube type Armored cable and 48 or more Fibre Ribbon type unarmored cable to meet the eligibility for submitting the bid only. However, the PIA/ OEM shall submit the valid TSEC as per the TEC GR/ Standard No.: TEC 85260:2024 with latest amendment, before supply of the OFC.

b. Against the requirement of TSEC/ QF-103 of 24F ADSS Cable, bidders may also submit copy of TSEC/ QF-103 of 24F or more Fiber ADSS Cable to meet the eligibility for submitting the bid only.

c. For the Armored Optical Fibre Cable for underground application (24F loose tube), latest TEC Standard Number- TEC 85170:2024 shall be applicable. However, bidders may submit copy of TSEC against the earlier TEC GR/ Standard No.- TEC 85170:2011 to meet the eligibility for submitting the bid only. Successful bidders shall obtain TSEC against the latest TEC Standard No. before supplies.

VII. **For UPS**: Against the requirement of TSEC/ QF-103 of UPS , bidders may also submit copy of previous TSEC of any UPS or any CCU or both to meet the eligibility for submitting the bid only. However, the PIA/ OEM shall submit the valid TSEC as per the Technical Specifications in this RFP, before supply of the UPS.

VIII. In case of any bidder is quoting the active equipment from multiple OEMs (as per above), in such case the bidder shall ensure that all quoted equipment should meet the Interoperability requirement for smooth network operations. There shall be no exclusion/relaxation in SLA/ penalties on this account.

IX. Exception in relation to OFC OEM eligibility:

a. 24F/48F/96F armored cable:

For OEM eligibility, the OEM has to meet one of the following eligibility:

1. Valid TSEC certificate for 48F/96F armored cable
2. “Applied for TSEC” for 48F/96F armored cable
3. Valid TSEC certificate for 24F armored cable
4. Valid TSEC certificate for ribbon OFC having more than 48F.

b. 48/ 24F ADSS loose tube cable:

For OEM eligibility, the OEM has to meet one of the following eligibility:

1. Valid TSEC certificate for 48F ADSS loose tube cable
2. “Applied for TSEC” for 48F ADSS loose tube cable
3. Valid TSEC certificate for 24F ADSS loose tube cable
4. Valid TSEC certificate for ADSS loose tube cable having more than 24F.

For OFC OEM: The Sole Bidder/lead Bidder should submit valid letter from OEMs of OFC (one and only one OEM for each component) - confirming the following:

1. For OFC items, the support guarantee by OEM shall be for the implementation phase only.
2. OEM shall ensure that all components/sub- components being supplied by them shall be supported for the entire implementation period (Capex period)
3. During O&M phase, PIA will be, subject to adherence to the current specifications for the OFC component in the RFP, allowed to supply OFC components from other OEMs as well.
4. It is expected that OEM for all supplied (active and/or passive) product components will not be allowed to be changed post award of the contract. Post award of work order, for any reason, if OEM fails to supply or doesn't support products for entire implementation period, then permission will be given to replace it with an equivalent or better substitute, which conforms to the specifications as in current RFP - including the requirement for TSEC approval - subject to such product being acceptable to the Tenderer without any additional cost to the Tenderer and without impacting the performance of the solution and time line of the Project in any manner whatsoever subject to levy of a penalty of 2% of the Capex cost of balance supply (Financial Bid Table) for that particular Package. Bidder should ensure to warranty and spare inventories to be aligned with the RFP scope during the entire contract duration including the new / change components.

X. In case the experience of service provider is being submitted in the bid, then the concerned service provider shall submit the Route-wise details, along with certificate(s) obtained from the respective TSP/ISP, regarding Fibres leased by service provider to them, in the below given format:

Route details (Start-End Solutions)	Route length (In RKM)	Cable size (In terms of number of fibres)	No. of fibres leased to TSP/ ISP-A in the route for at least one year	Details of TSP/ISP	Period of lease	Certificate from TSP/ISP-A Placed at Page No. of bid

The Service Provider shall undertake that,

(a) None of the routes mentioned above have any overlapping lengths.

(b) Only one certificate is submitted for claim of experience against one route even, where fibres may have been leased out to more than one TSPs/ISPs, in the same route.

(c) If, at any stage, it comes to the notice of the purchaser or it is found on verification, that any of the routes, mentioned above, has been claimed more than once for experience claimed in a package, the bids of all such packages, where such service provider involved either as sole bidder or as consortium partner, shall be declared nonresponsive.

Note 2: Consortium Criteria:

1. In case of consortium, the Lead Bidder must be specified by the bidder.

2. Only One Consortium is allowed. Consortium shall be not exceed more than two(2) including the lead bidder. And it should be any of the active component's OEM till the entire contract duration and act as a key knowledge partner.
3. Members of the Consortium shall nominate one member as the lead member (the "Lead Member"). The nomination(s) shall be supported by a Power of Attorney, in the format at mentioned in Annexure, signed by all the Members of the Consortium.
4. The lead bidder of one package is allowed to participate in only one package. However, The same lead bidder can participate in another package as a consortium member being a project experience partner. Any lead bidder or member of consortium of a given package, cannot participate as a bidding entity (lead or consortium member) in the same package either as lead or consortium member.
5. The one consortium partner can tie up with only one other bidder for a package. Parent or child of any consortium partner cannot tie up in any other consortium for the same package.
6. In case of a consortium, applicant consortia shall have a valid Memorandum of Understanding (MoU)- joint bidding agreement/ Consortium Agreement among all the members signed by the CEO/ Country Head/Authorized Signatories of the companies dated prior to the submission of the bid.
    a. The MoU/ Consortium Agreement shall clearly state the composition of the consortium who shall be the Lead bidder, the complete description of the partner and roles & responsibilities of the partners.
    b. It also includes the commitment that each of the members, whose experience will be evaluated for the purposes of this RFP, shall discharge the obligations specified by the Bidder.
    c. It includes a statement to the effect that all members of the Consortium shall be liable jointly and severally for all obligations of the consortium in relation to the Project achievement till the end of entire contract duration.
    d. It includes a provision that the Lead Member shall represent all the members of the Consortium and shall always be liable and responsible for discharging the functions and obligations of the Consortium; and that each member of the Consortium shall be bound by any decision, communication, notice, action or inaction of the Lead Member on any matter related to the Contract Agreement and GFGNL shall be entitled to rely upon any such action, decision or communication of the Lead Member.
    e. GFGNL shall have the rights to release payments solely to the Lead Member and shall not in any manner be responsible or liable for the inter se allocation of payments among members of the Consortium.
    f. GFGNL may ask Sole bidder or lead bidder in case of consortium to open the escrow account.
    g. Lead Bidder shall be solely responsible for any failure liable to the Government for the execution of the project in accordance with the terms & conditions of the bid document and a statement of this effect shall be included in the MoU/ Consortium Agreement.
7. The consortium bid submitted without valid MoU / Consortium Agreement shall be treated as non-responsive.

8. The Bid should include a brief description of the roles and responsibilities of individual members, particularly with reference to their obligations.
9. Except as provided under this RFP and the Bidding Documents, there shall not be any amendment to the Joint Bidding Agreement/ MoU without the prior written consent from the GFGNL.
10. By submitting the Bid, the Bidder acknowledges that it will be qualified on the basis of Financial Capacity and Technical Capability of the Consortium Members who shall discharge their obligation as specified in the Bid.
11. By submitting the Bid, the Bidder shall also be deemed to have acknowledged and agreed that in the event of a change in control of a Consortium Member or an Associate whose Technical Capacity and/ or Financial Capacity was taken into consideration for the purposes of short-listing and technically qualified under and in accordance with this RFP, the Bidder shall be deemed to have knowledge of the same and shall be required to inform the competent authority forthwith along with all relevant particulars about the same and the competent authority may, in its sole discretion, disqualify the Bidder or withdraw the work order/LOA/LOI/ from the PIA, as the case may be. In the event such change in control occurs after signing of the Agreement but prior to sign off of the project, it would, notwithstanding anything to the contrary contained in the Agreement, be deemed to be a breach of the Agreement, and the same shall be liable to be terminated without the competent authority being liable in any manner whatsoever to the Bidder. In such an event, not with standing anything to the contrary contained in the Agreement, the competent authority shall be entitled to forfeit and appropriate the Bid Security and Performance Security, as the case may be, as damages, without prejudice to any other right or remedy that may be available to the competent authority under the Bidding Documents and/ or the Agreement or otherwise.
12. The bidder (each member of the consortium) shall have company registration certificate, registration under labour laws & contract act, valid GST registration certificate and Permanent Account Number (PAN) issued by Income Tax department, Memorandum of Association and Article of Association (copy of the same should be provided)
13. Attested copies in respect of company's financial statements for the last three audited financial years (FY 2021-22, 2022-23 and 2023-24) shall be attached along with the bid. Bidder should submit an undertaking that Bidder (or each of the consortium members) should not have been blacklisted/debarred by any Govt. department or any PSU in India as on bid submission date.
14. The award of contract shall be signed with the Lead Bidder only and the Lead Bidder shall be single Point of Contact for this Project. PBG shall be submitted by the Lead Bidder.

Note – 3 :

- The Sole Bidder or Lead Bidder through its consortium partner should comply with Preferential Market Access (PMA) guidelines notified by DoT and all its clarifications/amendments applicable on this RFP.

- However, for the transport equipment's, The bidder shall supply only such network equipment

which, had those equipment been supplied for any defense communication project in India, would have been acceptable to the Indian defense authorities.

Note- 4:

Any Bidder found to have a Conflict of Interest shall be disqualified. In the event of disqualification, GFGNL shall be entitled to blacklist/suspend the Bidder from participation in the tendering process for the work of DST(Department of Science and Technology) / any public sector undertaking engaged in Telecom / OFC business and any work under other Centrally Sponsored Schemes for a period of one year from the Bid Date and/or forfeit and appropriate the Bid Security or Performance Security, as the case may be, as mutually agreed genuine pre-estimated loss and damage likely to be suffered and incurred by GFGNL and not by way of penalty for, inter alia, the time, cost and effort of GFGNL, including consideration of such Bidder's proposal (the "Damages") without prejudice to any other right or remedy that may be available to GFGNL under the Bidding Documents or otherwise. Without limiting the generality of the above, a Bidder shall be deemed to have a Conflict of Interest affecting the Bidding Process, if:

I. A constituent of such Bidder, for the Package, is also a constituent of another Bidder, for the Package; or
II. A constituent of the GFGNL Central NOC RFP or
III. Such Bidder has the same authorized representative for purposes of this Bid as any other Bidder for the same Package; or
IV. For the same Package, such Bidder, or any associate thereof has participated as a consultant to GFGNL in the preparation of any documents, design or technical specifications of the Package.

Note- 5 (Make In India):

i. In accordance to guidelines of GoI issued vide No. P-45021/2/2017-PP(B.E.-II) dated 16th September, 2020, No. P-45021/102/2019-BE-II- (part(I) (E-50310) dated 04.03.2021 and Department of Telecommunications Gazette notification dated 29th August 2018 along with instructions as amended from time to time by Govt. of India, in order to encourage make in India and promote manufacturing and production of goods and services in India, preference will be given to domestically manufactured equipment envisaged to be procured through this tender. A copy of the aforesaid Notifications/Guidelines/ Amendments can be downloaded from Department of Promotion of Industry and Internal Trade website i.e. URL www.dipp.gov.in. Purchase preference for domestic manufacturer, methodology of its implementation, value addition to be achieved by domestic manufacturers, self-certification and compliance and monitoring shall be as per the aforesaid Guidelines/ Notifications. The Guidelines may be treated as an integral part of the tender document.

ii. As per aforementioned guidelines there shall be three categories for manufacturers/ suppliers:
(a) Class-I Local Supplier: A supplier or service provider whose goods, services or works offered for procurement meets minimum 'Local Content' of 50%.
(b) Class-II Local Supplier: A supplier or service provider whose goods, services and works offered for procurement meets minimum 'Local Content' of 20% but less than 50%.
(c) Non-Local Supplier: A supplier or service provider whose goods, services and works offered for procurement has 'Local Content' less than 20%.

iii. The Local Content shall mean the amount of value added in India which shall be the total

iv. value of item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all custom duties) as a proportion of the total value, in percent. DPIIT letter dated 16.09.2020 & 04.03.2021 shall be referred for calculation of Local Content of bid.

v. It is mandatory for the bidder to submit a self-certification as per proforma in Annexure(Part-A) and an undertaking in Annexure (Part-B), along with the bid that the items (Excluding Services (I&C) and AMC value) offered as package in this tender meets the minimum local content and shall give details of the locations at which the local value addition is made. In addition, such bidder is also required to provide a certificate from the statutory auditor or cost auditor of the company giving the percentage of local content in accordance to DPIIT letter dated 16.09.2020 & 04.03.2021. Furnishing of false information on this account shall attract penal provisions as per the Guidelines/Notification. Bidders may note that whereas GFGNL may at its discretion choose to randomly verify any of the documents submitted towards fulfilment of claims of PMI under this clause, it is under no obligation to verify the self-declaration of bidder and/or certificate of Chartered Accountant/Cost Accountant regarding the bidder meeting the criteria to be eligible for class I / class II status in this tender. Mere acceptance of the documents furnished by the bidder as part of the bid by GFGNL in this regard shall not amount to endorsement of their content by GFGNL, and consequences of false declarations if any, discovered at any stage before or after award of work shall completely fall on the bidder.

vi. All instructions/ amendments on the subject of PMI issued by DPIIT or any other department of Government of India, up to the date of bid shall be applicable for this tender, and bidders claiming any benefits under subject provisions must ensure full compliance by furnishing the necessary documents, beyond the list of documents mentioned in this tender.

3.2 TECHNICAL QUALIFICATION CRITERIA

Minimum qualified score from technical qualification to become eligible for next stage of financial bid opening will be 70 marks for bidders. Bidders are requested to provide document for evaluation and marking as defined in Section Eligibility Criteria.

<table>
<tr><th>S/N</th><th>Criteria</th><th>Max. Marks</th></tr>
<tr><td rowspan="2">1</td><td><u>Experience Capability:</u></td><td>5</td></tr>
<tr><td>Bidder Should have executed at least one (1) Networking Projects with Supply, Installation, Testing, Commissioning (SITC) or O&M of in last 8 Years with minimum value
For each Project worth ≥ 1000 Cr : 5 Marks
For each set of 2 projects worth ≥ 750 Cr: 3 Marks

<u>In Case Of Consortium:</u>

<table>
<tr><th>Package/s</th><th>Lead Bidder (In Cr)</th><th>Consortium Partner (In Cr)</th></tr>
<tr><td>For Each Project Worth</td><td>800</td><td>750</td></tr>
<tr><td>For each set of 2 Projects Worth</td><td>600</td><td>560</td></tr>
</table>

having components like Routers/Switches/RFMS/OFC/Layer-3 Switches/ Transport equipment (DWDM/PTN/OTN/RON/ /CPANs/OLT of 16 or more ports in last eight(8) years as on date of bid publish.</td></tr>
<tr><td>2</td><td>The available bid capacity of the following entities as commitment (Undertaking) for Gujarat to execute project on time a) Bidder b) Fiber OEM c) Duct OEM d) UPS OEM</td><td>5</td></tr>
<tr><td rowspan="2">3</td><td><u>Offered Product Portfolio</u> (will be as part of contract):</td><td>15</td></tr>
<tr><td>• Passive Component (Supplied quantity in last 3 years, Manufacturing capacity, Delivery commitment in Gujarat, Service support)
• Active Component (Past supplies of offered family and visibility software (EMS) single UI, Repair & return commitment)
• Power Backup (Supplied quantity in last 3 years)
Note: This marking will be based on Percentile. This will be part of the contract and deliverables and same shall be diligently applied in WO/Agreement</td></tr>
<tr><td>3</td><td><u>Space utilization (“U” in Size) at Site by proposed solution</u>
Least Size among Bid participants = 5 marks, Least Size to < 150% of Least size = 3 marks , More than 150% of Least size = 2 marks

Power Consumption (“KWH” in Unit per Hour) at Site by proposed solution
Least Units among Bid participants = 5 marks, Least Size to < 120% of Least size = 3 marks, More than 120% of Least size = 2 marks</td><td>10</td></tr>
<tr><td>4</td><td>For Phase-I:
Fiberization Strategy for improving overall health of the link & redundant link :
• Clarity on broad principles mentioned in the RFP, HLD with traffic engineering, ,% GP above the base criteria for dual homing,
• Integration with Phase-2 ,
• Special planning for optimization of fiber planning desert area like Kutchh,</td><td>7.5</td></tr>
</table>

S/N	Criteria	Max. Marks
	• % Scope of rework declared by PIA (10 % to 20%)(lower % will be having high mark)	
5	**For Phase-2:** • Fiberization Strategy for improving overall health of link & redundant link: Clarity on broad principles mentioned in the RFP, • % GP above the base criteria for dual homing, • HLD with traffic engineering • % Scope of rework declared by PIA (5% to 10%) (lower % will be having high mark)	7.5
6	**HoTo Commitment :** Any slippages in taking over process is non-negotiable. Additional offering as contractual commitment on Early completion of HoTo will be rewared with additional 1 marks per month per phase basis or part thereof.	5
7	**Minimum Up-time including power protection:** Minimum of 98.5 % at GP is having 7 marks, Each increase in 0.5%, 1 marks will be awarded up to maximum of 10 marks **Mean time to restore (MTTR) :** 4 hrs : 2 marks, <= 4 hrs : additional 1 marks for each reduction in MTTR in slot of 15 min up to max 5 marks	15
8	**Early Roll-out commitment:** • Bidder can showcase their expertise and give revise milestone for early rollout of the project. Marking will be given based on percentile of highest commitment from the bidder.	10
9	**Technical Presentation (Bidder & OEM) :** • Rural centric approach and strategy to keep network uptime high with additional efforts as a contractual commitment, • Preparedness for early completion of milestones(as a summary of “Early Roll-out commitment”) as a contractual commitment • Strategy for converting the existing Linear-Network-Topology to IP-MPLS based Ring-Topology with link fail-over enabled on each node, • Monetization of BharatNet assets and related models, strategic inputs and attractive non-binding offers without any additional cost to the GFGNL • Additional Offering over and above the ask of RFP without additional charges - 4S (Service Portfolio, Service Provisioning, Service Performance Monitoring, Service audit and security Compliance) - Network Utilization incentive including TELCO support.	20
	Total Marks	100

Note:1

I. The enhanced and better engineering design, higher quality specifications, and power budget proposed here for obtaining higher score shall be part of the contract and deliverables and same shall be diligently applied while making the payments.

II. Final evaluation will happen on QCBS (50:50), standard QCBS methodology shall be adopted.

Process for Bidder's Final Scoring based on QCBS:

The financial scores (Fs) of the other Financial Proposals will be computed as per the formula for determining the financial scores given below: $Fs = 100 \times F_{low} / F_b$,

Where, Fs = Normalized financial score for the bidder under consideration
Fb = Commercial quote for the bidder under consideration ,
Flow = Commercial quote of the lowest evaluated financial bid criteria

50% weightage will be given to "Technical Qualification derived from Technical Qualification Criteria" and 50% weightage will be given to "Financial Bid".

In order to have a comprehensive assessment of the Bid price and the Quality of each bid:

Bidder Final Score (BFS) = $[((T_b/T_{high})\times100\times 0.5) + ((F_{low}/F_b)\times100\times0.5)]$

T_b = The total marks obtained by the bidder against "Technical Qualification" criteria
T_{high} = The highest mark scored against "Technical Qualification" criteria among all responsive bids
F_b = Evaluated Bid Price of the bidder
F_{low} = The lowest of the evaluated bid prices among the responsive bids

where, Note:

I. The Evaluated **Bidder Final Score (BFS**) shall be considered up to two decimal places.
II. Contract shall be awarded to the bidder with the highest Evaluated **Bid Final Score (BFS)**.
III. In the event of two or more bids having the same highest Evaluated Bid Score. the bid scoring the highest marks against "Technical Qualification" criteria will be recommended for award of contract. Even if there is a tie, 'draw of lots' will be resorted to arrive at the recommended bidder.

SECTION-4 INSTRUCTIONS TO BIDDERS

4.1 GENERAL INSTRUCTION TO BIDDERS

All information supplied by Bidders may be treated as contractually binding on the Bidders on successful award of the assignment by the TENDERER on the basis of this RFP. No commitment of any kind, contractual or otherwise shall exist unless and until a formal written contract has been executed by or on behalf of the TENDERER. Any notification of preferred bidder status by the TENDERER shall not give rise to any enforceable rights by the Bidder. The TENDERER may cancel this public procurement at any time prior to a formal written contract being executed by or on behalf of the TENDERER.

This RFP supersedes and replaces any previous public documentation, communications, and Bidders should place no reliance on such communications. The TENDERER may terminate the RFP process at any time and without assigning any reason. The TENDERER makes no commitments, express or implied, that this process will result in a business transaction with anyone.

4.2 COST OF BIDDING

i. The Bidder shall bear all costs associated with the preparation and submission of the Bid. The TENDERER will in no case be responsible for those costs, regardless of the conduct or outcome of the bidding process.

ii. Cost of tender document (Tender fee, if applicable) is non-refundable and cannot be exempted in any condition.

ii. In case of non-receipt of EMD within stipulated timeline, the bid will be rejected by GFGNL/Dept. of Science & Technology as non-responsive.

v. MSE (Micro & Small Enterprise) bidders are exempted from payment of Tender Fee provided they submit current and valid Udyam Registration Certificate (URC) issued from the Ministry of MSME, NSIC (National Small Industries Corporation) and CSPO. Udyam Registration Certificate (URC), NSIC (National Small Industries Corporation) and CSPO submitted by MSE bidder in their online bid for claiming exemption from Tender Fee, must be current & valid on the date of opening of Technical bid part. Micro and Small Enterprises (MSEs) registered under Udyam Registration are eligible to avail the benefits under the policy. In case of bid by a Consortium, all the members of the Consortium should be MSE to avail the exemption from payment of Tender Fee alongwith NSIC (National Small Industries Corporation) and CSPO. Kindly note that Medium Scale Units are not eligible for exemptions from tender Fee.

4.3 BIDDING DOCUMENT

Bidder can download the bid document and further amendment if any freely available on https://bharatnet.gujarat.gov.in/tenders and https://gfgnltender.nprocure.com/ and upload the same on https://gfgnltender.nprocure.com/ on or before due date of the tender. Bidder is expected to examine all instructions, forms, terms, and specifications in the bidding documents. Failure to furnish all information required by the bidding documents or submits a Bid not substantially responsive to the bidding documents in every respect may result in the rejection of the Bid. Under no circumstances physical bid will be accepted.

4.4 CLARIFICATION ON BIDDING DOCUMENT

1. Bidders can seek written clarifications on or before pre-Bid on e-mail on or before the date of pre-bid meeting,Gujarat Fibre Grid Network Limited., Block No: 6, 5th Floor, Udyog Bhavan, Sector-11, Gandhinagar 382010. through email at jte-ho5@bharatnet.gujarat.gov.in, jte-ho6@bharatnet.gujarat.gov.in and pmc@bharatnet.gujarat.gov.in, pmc3@bharatnet.gujarat.gov.in .
2. The queries should be submitted in the following format (in Excel file,*.xls / any open office format) only for clarification:

Sr. No.	Section No.	Clause No.	Reference/Subject	Clarification Sought

3. The responses to the pre-bid clarifications shall be notified on the website by means of Corrigendum to the RFP. No further clarification what so ever will be entertained after the pre- bid meeting date. Bidders are responsible for duly checking the website regularly for any clarifications.

   Note: Inputs/suggestions/queries submitted by bidders as part of the pre-bid meeting or otherwise shall be given due consideration by the Tender committee. However, State is neither mandated to accept any submission made by the bidder nor the bidder shall be given any written response to their submissions. If an input is considered valid by the committee the same shall be accepted and incorporated as part of the corrigendum.

Amendment of Bidding Documents

i) At any time prior to the deadline for submission of bids, the TENDERER, for any reason, whether at its own initiative or in response to the clarifications requested by prospective bidders may modify the bidding documents by amendment & put on our websites.

ii) All prospective bidders are requested to browse TENDERER'S website & any amendments/ corrigendum/ modification will be notified on the website and such modification will be part of RFP and binding on them.

ii) To allow prospective bidders a reasonable time to take the amendment into account in preparing their bids, the TENDERER, at its discretion, may extend the deadline for the submission of bids.

4.5 AMENDMENT OF BIDDING DOCUMENTS

At any time prior to the deadline for submission of bids, the TENDERER, for any reason, whether at its own initiative or in response to the clarifications requested by prospective bidders may modify the bidding documents by amendment & put on our websites.

All prospective bidders are requested to browse TENDERER'S website & any amendments/ corrigendum/ modification will be notified on the website and such modification will be part of RFP and binding on them.

To allow prospective bidders a reasonable time to take the amendment into account in preparing their bids, the TENDERER, at its discretion, may extend the deadline for the

submission of bids.

4.6 LANGUAGE OF BID

The Bid prepared by the Bidder, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the TENDERER shall be in English.

4.7 BID SECURITY/ Earnest Money Deposit (EMD)

- Bidders shall submit, along with their Bids, EMD of **Rs. 10 Cr/- (Ten Crores rupees only),** in the form of a Demand Draft OR in the form of an unconditional Bank Guarantee by Bank Guarantee (which should be valid for 6 months from the last date of bid submission) of any Nationalized Bank including the public sector bank or Private Sector Banks or Commercial Banks or Co-Operative Banks and Rural Banks (operating in India having branch at Ahmedabad/ Gandhinagar) as per the G.R. No. EMD/10/2020/42/DMO dated 19.10.2020 issued by Finance Department or further instruction issued by Finance department time to time; in the name of "Gujarat Fibre Grid Network Limited." payable at Gandhinagar (in the specified format and must be submitted along with the covering letter.
- EMD of all unsuccessful bidders would be refunded by GFGNL within 60 Days on selection of successful bidder.
- The EMD of the successful bidder would be returned upon successful submission of Performance Bank Guarantee as per the provided format.
- EMD amount is interest free and will be refundable to the unsuccessful bidders without any accrued interest on it.
- The bid / proposal submitted without EMD, mentioned above, will be summarily rejected.
- The EMD may be forfeited, In case of a Bidder if:
- The bidder withdraws its bid during the period of bid validity.
- The Bidder does not respond to requests for clarification of their Bid.
- The Bidder fails to co-operate in the Bid evaluation process.
- In case of successful bidder, the said bidder fails:
    - Fails to sign the agreement in time.
    - Fails to submit performance bank guarantee.

4.8 LATE BIDS

- Bids received after the due date and the specified time (including the extended period if any) for any reason whatsoever, shall not be entertained and shall be REJECTED.
- The bids submitted by telex/telegram/ fax/e-mail etc. shall not be considered. No correspondence will be entertained on this matter.

4.9 SECTION COMPRISING THE BIDS

- All forms / Tables, duly filled-in with necessary proofs, as required and stated in the bid document & supporting documents for eligibility criteria should be uploaded. The bid uploaded shall have the following documents:
- **BID SECURITY SECTION**

The bid security in the form of EMD to be furnished to GFGNL office as well as to be uploaded online on nProcure portal in the form of demand draft in favour of "Gujarat Fibre Grid Network Limited." payable at Ahmedabad/ Gandhinagar before the last date and time of the bid submission.

- **ELIGIBILITY SECTION**

All relevant documents mentioned in eligibility criteria.

- **PRICE BID SECTION**

Priced bid (in the prescribed format)

Note: Filling up prices anywhere other than the prescribed shall render the bidder disqualified.

- **Annexures & Formats**

- Wherever a specific form is prescribed in the Bid document, the Bidder shall use the form to provide relevant information. If the form does not provide space for any required information, space at the end of the form or additional sheets shall be used to convey the said information. Failing to submit the information in the prescribed format, the bid is liable for rejection.
- For all other cases, the Bidder shall design a form to hold the required information.
- TENDERER shall not be bound by any printed conditions or provisions in the Bidder's Bid Forms.
    i. The prices shall strictly be submitted in the given format. Successful Bidder will have to supply/ provide Services with an Invoice from a place located within State of Gujarat.
    ii. Prices shall be written in both words and figures. In the event of difference, the price in words shall be valid and binding.
    iii. Offered price should be inclusive of all applicable taxes (anywhere in Gujarat state) However, Component included should mentioned count, unit type, price, Taxes should be mentioned separately.

4.10 BID OPENING

- Bids will be opened in the presence of Bidder's representatives, who choose to attend. The Bidder's representatives who are present shall sign a register evidencing their attendance.
- In the event of the specified date of Bid opening being declared a holiday for the GFGNL, the Bids shall be opened at the appointed time and location on the next working day.
- The Bidder's names, bid modifications or withdrawals, discounts and the presence or absence of relevant Bid security and such other details as the TENDERER officer at his/her discretion, may consider appropriate, will be announced at the opening.
- Immediately after the closing time, the TENDERER contact person shall open the Un-Priced Bids and list them for further evaluation.
- Bids that are not opened at bid opening shall not be considered further for evaluation.

4.11 BID VALIDITY

i. Bids shall remain valid for 180 days after the date of Bid opening prescribed by the TENDERER. A Bid valid for a shorter period shall be rejected as non-responsive. In exceptional circumstances, the TENDERER may solicit Bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing. The Bid security shall also be suitably extended. A Bidder's request to modify the Bid will not be permitted.

4.12 CONTACTING THE TENDERER

I. Bidder shall not approach the TENDERER officers outside of office hours and/ or outside the TENDERER office Premises, from the time of the Bid opening to the time the Contract is awarded. Any effort by a bidder to influence the TENDERER officers in the decisions on Bid evaluation, bid comparison or contract award may result in rejection of the Bidder's offer. If the Bidder wishes to bring additional information to the notice of the TENDERER, it should do so in writing.

4.13 REJECTION OF BIDS

The TENDERER reserves the right to reject any Bid, and to annul the bidding process and reject all bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder(s) or any obligation to inform the affected Bidder(s) of the grounds for such decision.

a. While all the conditions specified in the Bid documents are critical and are to be complied, special attention of bidder is invited to the following clauses of the bid documents. Non-compliance of any one of which shall result in rejection of the bid. The bids will be rejected at opening stage if Bid security is not submitted as per RFP Clause.
b. If the eligibility condition is not met and/ or documents prescribed to establish the eligibility are not enclosed during the prescribed period, the bids will be rejected without further evaluation.
c. GFGNL on behalf of USOF, DoT reserves the right to disqualify the bidder for a suitable period who had on previous occasion(s) failed to execute/complete the works in time. Further, the bidders whose works do not perform satisfactory in the field in accordance with the specifications may also be disqualified for a suitable period as decided by GFGNL.
d. If clause-by-clause compliance and Nil deviation statements as prescribed are not given, the bid will be rejected at the stage of primary evaluation.
e. General Commercial conditions, Special Instructions to Bidders, Commercial Conditions of Contract & Special Technical Conditions of Contract and Technical Specifications or any other Compliance if given using ambiguous words like "Noted", "Understood", "Noted & Understood" shall not be accepted as complied. Mere "Complied" will also be not sufficient, reference to the enclosed documents showing compliances must be given.
f. Prices are not filled in as prescribed in price schedule.
g. Before outright rejection of the Bid by Bid-opening team for non-compliance of any of the provisions mentioned in clause, the bidder should be given opportunity to explain their

position if required, however if the person representing the company is not satisfied with the decision of the Bid opening team, he/ they can submit the representation to the Bid opening team immediately but in no case after closing of the tender process with full justification quoting specifically the violation of tender condition if any.

h. Bid opening team will not return the bids submitted by the bidders on the date of tender opening even if it is liable for rejection and will preserve the bids in sealed cover as submitted by taking the signatures of representatives of the participating bidder/ companies present on the occasion.
i. The in-charge of Bid opening team will mention the number of bids with the name of the company found unsuitable for further processing on the date of tender opening and number of representations received in Bid opening Minutes and if Bid opening team is satisfied with the argument of the bidder/ company mentioned in their representation and feel that there is prima- facie fact for consideration, the in-charge of the bid opening team will submit the case for review to competent authority as early as possible preferably on next working day and decision to this effect should be communicated to the bidder company within a week positively. Bids found liable for rejection and kept preserved on the date of tender opening will be returned to the bidders after issue of P.O. against the instant tender.
j. Besides other terms & conditions highlighted in the RFP, bids may be rejected under following circumstances:

General Rejection Criteria

a. Bids submitted without or improper Tender fee and EMD.
b. Bids received through Telegraphic / Fax / E-Mail / Hard copies except, wherever required.
c. Bids which do not conform to unconditional validity of the bids as prescribed in the RFP.
d. If the information provided by the Bidder is found to be incorrect / misleading at any stage / time during the bid evaluation process or during Contract period after selection of the Bidder.
e. Any effort on the part of a Bidder to influence the Tenderer's bid evaluation, bid comparison or contract award decisions.
f. Bids received by the Tenderer after the last date & time for receipt of bids prescribed by the Tenderer in RFP.
g. Bids without Power of Attorney (Lead Bidder has to provide letter of Authorization /Power of Attorney (with board resolution) to sign this bid on his/her company letter head.) and any other document consisting of adequate proof of the ability of the authorized signatory to bind the Bidder.

Technical Rejection Criteria

a. Technical Bid containing financial details.
b. Revelation of Prices in any form or by any reason before opening of the Financial Bids.
c. Failure to furnish all information mentioned in the RFP or submission of a bid not substantially responsive to the RFP in every respect.
d. Bidders not quoting for the complete scope of work as indicated in the RFP, addendum (if any) and any subsequent information given to the Bidder.
e. Bidders not complying with the material, specifications and General Conditions of the Contract as stated in the RFP.
f. The Bidder not conforming to unconditional acceptance of all the terms and conditions set out in the RFP (and subsequent clarification/corrigendum, if any) document.
g. If the bid does not conform to the timelines indicated in the RFP.

Financial Rejection Criteria

a. Incomplete Financial Bid
b. Financial Bids that do not conform to the RFPs' financial bid format.
c. If there is an arithmetic discrepancy in the financial bid calculations, the Tenderer shall rectify the same. If the Bidder does not accept the correction of the errors, it may be rejected.

4.14 BID EVALUATION PROCESS

I. The TENDERER will form a committee which will evaluate the proposals submitted by the bidders for a detailed scrutiny. During evaluation of proposals, the TENDERER, may, at its discretion, ask the bidders for clarification of their Proposals.
II. The bidders are expected to provide all the required supporting documents & compliances as mentioned in this RFP.
III. During the evaluation, committee may seek the clarification in writing from the bidder, if required. If bidder fails to submit the required clarifications in due time, the evaluation will be done based on the information submitted in the bid.
IV. The financial bid of the qualified bidders will be opened and H1, i.e., the winner through QCBS(50:50) highest mark obtained bidder shall be preferred to award the contract.
V. Tenderer may negotiate the prices with H1 Bidder, under each item/head offered by Bidder before awarding the contract without change in OEM. Bidder has to ensure not to increase the lineitem rates- during the rate negotiations.
VI. QCBS evaluation process is defined above in this RFP

4.15 AWARD OF CONTRACT

I. The H1 (Highest mark obtained) bidder will be called to accept the award of contract. In case, the H1 bidder does not accept the award of contract or found to be involved in corrupt and/or fraudulent practices, then the H2 bidder will be called to awarded the contract. Further, if the H2 bidder also declines, the tenderer may award the contract to the H3 bidder and so on till H_n of that package.
II. Failure to agreement with n^{th} bidder, GFGNL has rights to award the same process by inviting the other packages successful bidder in sequence mentioned above.

4.16 NOTIFICATION OF AWARD & SIGNING OF CONTRACT

i. Prior to expiration of the period of Bid validity, the TENDERER will notify the successful Bidders and issue LoI.
ii. Within two weeks of receipt of the Contract form, the successful bidder shall sign and stamp the contract and return it to the TENDERER along with performance guarantee. The performance Bank Guarantee shall be equal to 10% of the contract value valid for duration of 180 days beyond the expiry of contract.

4.17 FORCE MAJEURE

• Force Majeure shall mean any event or circumstances or combination of events or

circumstances that materially and adversely affects, prevents or delays any Party in performance of its obligation in accordance with the terms of the Agreement, but only if and to the extent that such events and circumstances are not within the affected party's reasonable control, directly or indirectly, and effects of which could have prevented through Good Industry Practice or, in the case if construction activities through reasonable skill and care, including through the expenditure of reasonable sums of money. Any events or circumstances meeting the description of the Force Majeure which have same effect upon the performance of any contractor shall constitute Force Majeure with respect to the bidder. The Parties shall ensure compliance of the terms of the Agreement unless affected by the Force Majeure Events. The bidder shall not be liable for forfeiture of its implementation / Performance guarantee, levy of Penalties, or termination for default if and to the extent that it's delay in performance or other failure to perform its obligations under the Agreement is the result of Force Majeure.

4.18 FORCE MAJEURE EVENTS

- The Force Majeure circumstances and events shall include the following events to the extent that such events or their consequences (it being understood that if a causing event is within the reasonable control of the affected party, the direct consequences shall also be deemed to be within such party's reasonable control) satisfy the definition as stated above. Without limitation to the generality of the foregoing, Force Majeure Event shall include following events and circumstances and their effects to the extent that they, or their effects, satisfy the above requirements:
- **Natural events** ("Natural Events") to the extent they satisfy the foregoing requirements including:
- Any material effect on the natural elements, including lightning, fire, earthquake, cyclone, flood, storm, tornado, or typhoon;
- Explosion or chemical contamination (other than resulting from an act of war);
- Epidemic such as plague;
- Any event or circumstance of a nature analogous to any of the foregoing.
- Other Events ("Political Events") to the extent that they satisfy the foregoing requirements including:
- Political Events which occur inside or Outside the State of Gujarat or involve directly the State Government and the Central Government ("Direct Political Event"), including:
- Act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, revolution, riot, insurrection, civil commotion, act of terrorism or sabotage;
- Strikes, work to rules, go-slows which are either widespread, nation- wide, or state-wide or are of political nature;
- Any event or circumstance of a nature analogous to any of the foregoing.
- **Force majeure** exclusions:
- Force Majeure shall not include the following event(s) and/or circumstances, except to the extent that they are consequences of an event of Force Majeure:
- Unavailability, late delivery
- Delay in the performance of any contractor, sub-contractors or their agents;

- **Procedure for calling force** majeure:
  The Affected Party shall notify to the other Party in writing of the occurrence of the Force Majeure as soon as reasonably practicable, and in any event within 05 (five) days after the Affected Party came to know or ought reasonably to have known, of its occurrence and that the Force Majeure would be likely to have a material impact on the performance of its obligations under the Agreement.

4.19 CONTRACT OBLIGATIONS

- Once a contract is confirmed and signed, the terms and conditions contained therein shall take precedence over the Bidder's bid and all previous correspondence.

4.20 AMENDMENT TO THE AGREEMENT

Amendments to the Agreement may be made by mutual agreement by both the Parties. No variation in or modification in the terms of the Agreement shall be made except by written amendment Signed by both the parties. All alterations and changes in the Agreement will consider prevailing rules, regulations and laws applicable in the state of Gujarat.

4.21 REPRESENTATIONS AND WARRANTIES

i. Representations and Warranties by the Selected Agency:

1. It is a company duly organized and validly existing under the laws of India and has all requisite legal power and authority and corporate authorizations to execute the Agreement and carry out the terms, conditions and provisions hereof. It has in full force and effect all requisite clearances, approvals and permits necessary to enter into the Agreement and perform its obligations hereof.
2. The Agreement and the transactions and obligations hereof do not contravene its constitutional documents or any law, regulation or government directive and will not contravene any provisions of, or constitute a default under, any other Agreement or instrument to which it is a party or by which it or its property may be bound or any of its obligations or undertakings by which it or any of its assets are bound or cause a limitation on its powers or cause it to exceed its authorized powers.
3. Bidder nor any of its affiliates have immunity from the jurisdiction of a court of from legal process (whether through service of notice, attachment prior to judgement), attachment in aid of execution or otherwise). The successful bidder confirms that all representation and warrantied of the bidder set forth in the Agreement are true, complete in all respects.
4. No information given by the Successful Bidder in relation to the agreement, project documents or any document comprising security contains any material wrong statement of fact or omits to state as fact which would be materially averse to the enforcement of the rights and remedies of TENDERER or which would be necessary to make any statement, representation or warranty contained herein or therein true and correct.
5. A comprehensive on-site warranty and Operations & Maintenance on all goods supplied under this contract shall be provided by the respective Original Equipment Manufacturer (OEM) through PIA till the end of the Contract.

6. Technical Support shall be provided by the respective OEM for till the end of the contract period.
7. The PIA shall warrant that the goods supplied under the Contract are new, non-refurbished, unused and recently manufactured; shall not be nearing End of Sale / End of Support; and shall be supported by the PIA and respective OEM along with service and spares support to ensure its efficient and effective operation for the entire duration of the contract.
8. The PIA warrants that the goods supplied under this contract shall be of the reasonably acceptable grade and quality and consisted with the established and generally accepted standards for materials of this type. The goods shall be in full conformity with the specifications and shall operate properly and safely. All recent design improvements in goods, unless provided otherwise in the Contract, shall also be made available.
9. The PIA further warrants that the Goods supplied under this Contract shall be free from all encumbrances and defects/faults arising from design, material, manufacture or workmanship (except insofar as the design or material is required by the Tenderer's Specifications)
10. The Tenderer shall promptly notify the PIA in writing of any claims arising under this warranty.
11. Upon receipt of such notice, the PIA shall, with all reasonable speed, repair or replace the defective Goods or parts thereof, without prejudice to any other rights which the Tenderer may have against the PIA under the Contract.
12. If the PIA , having been notified, fails to remedy the defect(s) within a reasonable period, the Tenderer may proceed to take such remedial action as may be necessary, at the PIA s' risk &expense and without prejudice to any other rights which the Tenderer may have against the PIA under the Contract.

ii. Representations and Warranties by the TENDERER

1. It has full legal right, power and authority to execute the said project and to enter into and perform its obligations under the Agreement and there are no proceedings pending.
2. The Agreement has been duly authorized, executed and delivered by the TENDERER and constitutes valid, legal and binding obligation of TENDERER.
3. The execution and delivery of the Agreement with the selected agency does not violate any statutory judgment, order, decree, regulation, right, obligation or rule of any court, government authority or arbitrator of competent jurisdiction applicable in relation to the TENDERER, its assets or its administration.
4. All the equipment shall be under warranty for 3 years and will be extended for next 7 years for the contract duration without any additional cost to tenderer w.e.f. the date of commissioning. Date of commissioning for block & GP routers and associated hardware will be taken as the date on which 90% of the GPs of a block , including block router is visible in state NoC NMS, The warranty shall start from 1st day on next calender quarter (i.e., 1st jan / 1st apr / 1st jul / 1st oct) from date of commissioning . for rest of such equipment commissioned after the achievement of mile stone as above, the warranty shall start from 1st day on next calender quarter (i.e., 1st jan / 1st apr / 1st jul / 1st oct) from date of commissioning of all remaining routers and associated hardware of the block .

5. For other eqipments like RFTMS,RFMS , UBR,FSO, etc. the warranty shall start from 1st day on next calender quarter (i.e., 1st jan / 1st apr / 1st jul / 1st oct) from date of commissioning (date on which the equipment is commissioned after successful acceptance testing, this date will be date on which the SNOC is declared as commissioned).
6. The PIA/ supplier shall warrant that the stores to be supplied/works to be executed shall be new and free from all defects and faults in materials used, workmanship and manufacture and shall be of the highest grade and consistent with the established and generally accepted standards for materials/works of the type ordered and shall perform in full conformity with the specifications and drawings. The PIA/supplier shall be responsible for any defect that may develop under the conditions provided by the contract and under proper use, arising from faulty material, design or workmanship such as corrosion of the equipment, inadequate quantity of material to meet equipment requirements, inadequate contact protection, deficiencies in circuit design, unapproved less depth, inadequate protections, and/or otherwise and shall remedy such defects at its own cost when called upon to do so by the Purchaser who shall state in writing in what respect the stores are faulty. This warranty shall survive inspection or payment for/ and acceptance of goods/works but shall expire (except in respect of complaints notified prior to such date) after the period specified, after the stores have been taken over under clause above.
7. If it becomes necessary for the PIA/ Supplier to replace or renew any defective portion(s) of the equipment/works under this clause, the provisions of the clause shall apply to the portion(s) of the equipment/works so replaced or renewed or until the end of the above mentioned period as specified. If any defect is not remedied by the supplier within a reasonable time, the Purchaser may proceed to get the defects remedied from other supplier/contractor/PIA etc., at the supplier's risk and expenses, but without prejudice to any other rights which the purchaser may have against the PIA/supplier in respect of such defects.
8. Replacement under warranty clause shall be made by the PIA/ free of all charges at site including freight, insurance and other incidental charges.

4.22 COURT JURISDICTION

I. Any dispute arising out on account of terms & conditions of the tender/ bid document/ evaluation of bids/ issue of APO/AWO shall be subject to the jurisdiction of the competent court at the place from where the NIT/ tender has been issued i.e. New Delhi. The courts at New Delhi will have exclusive jurisdiction under this NIT and the contract that may be entered into pursuant to this NIT.

II. This Contract/ PO/WO is subject to jurisdiction of Court at New Delhi.

4.23 AUDIT AND SECURITY SERVICES

a. The PIA shall be required to provide comprehensive support to GFGNL during the Third Party Audit, Sample base audit and Security Audit etc. The PIA shall be responsible in getting the required readiness built in the network during audit for security solutions.

b. GFGNL reserves the right to inspect, monitor and assess the progress and performance of the project or sample base either itself or through another designated Contractor as it may

deem fit, throughout the course of the Contract. GFGNL may demand and upon such a demand being made, GFGNL shall be provided any document, data material or any other information which it may require, to enable it to assess the progress of the project.

c. GFGNL shall also have the right to conduct, either itself or through another Contractor as it may deem fit, an audit to monitor the performance of the Contractor of its obligations/ functions in accordance with the standards committed to or required by GFGNL and the Contractor undertakes to cooperate with and provide to GFGNL or any other Contractor appointed by USOF (DoT)/ GFGNL, all documents and other details as may be required by them for this purpose.

4.24 TERM AND EXTENSION OF CONTRACT

a. GFGNL shall reserve the sole right to grant any extension to the term of each work order above against the request of PIA and shall notify in writing to the PIA within 15 days of the request, whether it shall grant the PIA an extension of the term. The decision to grant or refuse the extension shall be at GFGNL's discretion. Accordingly, the Bank Guarantee of the same amount shall be extended up to extended period of the Contract, if required.

b. Where GFGNL is of the view that no further extension of the term be granted to the PIA, GFGNL shall notify the PIA of its decision at least 3 (three) months prior to the expiry of the Term. Upon receipt of such notice, the PIA shall continue to perform all its obligations hereunder, until such reasonable time beyond the Term of the Contract within which, GFGNL shall either appoint an alternative Contractor or create its own infrastructure to operate such Services as are provided under this Contract. GFGNL shall make payment for work executed for the extended period post contract expiry.

4.25 THIRD PARTY DAMAGE

I. If the PIA damages other Private Service provider's cables /sewage line/ Government or public properties, such as electricity cable or roads etc., the damage charges/penalty will be paid by the PIA only as per the claim of such third party. GFGNL/USOF, DoT will not be liable to pay any penalty, or any damage charges made by the PIA as per the indemnity clause below:

II. PIA shall either pay to third parties all expenditure incurred for restoring services which are damaged by it while carrying out the work or the same amount will be deducted from his bills. Such expenditure shall be intimated to the PIA either by Engineer in- charge or concerned third parties in writing. The amount deducted by GFGNL from his bill shall be paid to concerned third parties by the designated authority of GFGNL.

4.26 UTILITIES

a. Existing utilities and roads

I. Notwithstanding anything to the contrary contained herein, the PIA shall ensure that the Government Instrumentalities owning the existing roads, right of way or utilities, on, under or above the Site (Route) of the New Network and/or the Existing Network are enabled by it to keep such utilities in continuous satisfactory use, if necessary, by providing suitable

temporary or permanent diversions with the authority of the controlling body of that road, right of way or utility, and shall initiate and undertake at its own cost, legal proceedings for acquisition of any right of way necessary for such diversion.

b. Shifting of obstructing utilities

II. During the execution of the underground OFC construction work, if there is a requirement of shifting of any utility including electric lines, water pipes and telephone cables etc, the PIA shall, first, explore an alternative path and execute the construction after getting approval of GFGNL competent authority. In case, no alternative path is feasible, the PIA shall explore the possibility of laying ADSS OFC for that section and shall lay the same after getting approval from GFGNL competent authority. In case where the shifting of utility becomes unavoidable, the PIA shall, subject to Applicable Laws, provisions of Applicable Permits and with the assistance of GFGNL/central, undertake shifting of any utility, including electric lines, water pipes and telephone cables, to an appropriate location or alignment within or outside the Site (Route) of the New Network and/or the Existing Network, if and only if such utility causes or shall cause a Material Adverse Effect on the development, operation or maintenance of the Project. The PIA shall submit, to the GFGNL, the estimate of such shifting cost for approval of the same and shall carry out the shifting work after obtaining approval of cost estimate(s) and issue of Work Order for the same. The cost of such shifting shall be paid to the PIA, as per Work Order, and in the event of any delay in shifting thereof, the PIA shall be excused for failure to perform any of its obligations hereunder if such failure is a direct consequence of delay on the part of the entity owning such electric lines, water pipes or telephone cables, as the case may be. The PIA shall indemnify the Government Instrumentality for any damage to the utilities on account of the Development Works or the Upgradation Works.

4.27 PENALTY FOR CAUSING INCONVENIENCE TO THE PUBLIC

I. The bidder shall not be allowed to dump the empty cable drums/waste materials in Govt/public place, which may cause inconvenience to Govt/ Public. If the bidder does not dispose off the empty cable drums/waste materials within 3 calendar days of becoming empty, GFGNL is at liberty to dispose off the drum in any manner deemed fit and the costs incurred by GFGNL in disposing off such materials shall be borne by the Bidder. USOF, DoT/ GFGNL may also levy a penalty up to Rs One Thousand for each such default.

4.28 RESOLUTION OF DISPUTES

I. If any dispute arises between the Parties hereto during the subsistence or thereafter, in connection with the validity, interpretation, implementation or alleged material breach of any provision of the Agreement or regarding a question, including the questions as to whether the termination of the Contract Agreement by one Party hereto has been legitimate, both Parties hereto shall endeavour to settle such dispute amicably. The attempt to bring about an amicable settlement is considered to have failed as soon as one of the Parties hereto, after reasonable attempts [which attempt shall continue for not less than 30 (thirty) days], give 15 days' notice thereof to the other Party in writing. The said clause shall not be applicable in the case of cyber-crimes and any other type of security breach relating to PHI carried out by either bidder organization itself or its employees.

II. In the case dispute arising between the parties in the contract, which has not been settled amicably, any party can refer the dispute for Arbitration under (Indian) Arbitration and Conciliation Act, 1996. Such disputes shall be referred to Arbitral Tribunal as prescribed by Ministry of Law, Government of India.

III. The place of the arbitration shall be Gandhinagar, Gujarat.

IV. The Arbitration proceeding shall be governed by the Arbitration and Conciliation Act of 1996 as amended.

V. The proceedings of arbitration shall be in English language.

VI. The arbitrator's award shall be substantiated in writing. The arbitration tribunal shall also decide on the costs of the arbitration procedure.

VII. The expenses of the arbitration as determined by the arbitrators shall be shared equally between the two parties. However, the expenses incurred by each party in connection with the preparation, presentation shall be borne by the party itself.

VIII. Arbitration clause shall be only applicable in case of dispute is arising out of contract. The said clause shall not be applicable in the case of cyber-crimes and any other type of confidentiality/security breach relating to PHI carried out by either bidder organization itself or its employees.

IX. Disputes arising under this Request for Proposal (RFP) shall be formally notified in writing (Dispute Notice) by either party ("the Notifying Party") to the other party ("the Receiving Party"). The parties are encouraged to resolve disputes amicably through direct negotiation and information sharing.

X. If the dispute remains unresolved after direct negotiation and communication, the parties shall establish a package wise Dispute Resolution Committee (DRC).

XI. If the dispute remains unresolved after negotiations and the intervention of the DRC, either party may refer the dispute to the Dispute Adjudication Board (DAB) within 15 days from the date of the dispute notice.

XII. The mechanism for resolution of disputes through conciliation under Outside Expert Committee (OEC)

XIII. If any difference or dispute (hereinafter referred as "Dispute") remains unresolved after negotiations and the intervention of the DAB also, the party aggrieved (hereinafter referred as "Claimant") shall refer the Dispute to conciliation under Outside Expert Committee (hereinafter referred as "OEC"). The OEC nominated by USOF/ GFGNL shall be comprised of members who shall be independent of the Arbitration and Conciliation Act, 1996 (hereinafter referred as "Act"). The proceedings shall be governed by Part III of the Act. The detailed procedure has been given in Annexure.

<u>Settlement of commercial disputes between CPSEs inter se and CPSE(s) and Government Department(s)/ Organization(s):</u>

XIV. In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/ Port Trusts inter se and also between CPSEs and Government Departments/Organizations (excluding disputes concerning Railways, Income Tax, Customs & Excise Departments), such disputes or differences shall be taken up by either party for resolution through AMRCD (Administrative Mechanism for Resolution of CPSE's Disputes) as mentioned in DPE OM No. 05/0003/2019-FTS-10937 dated 14-12-2022 and the decision of AMRCD on the said

dispute will be binding on both the Parties.

XV. It is clarified that the parties have agreed that the Arbitration and Conciliation Act, 1996, shall be applicable only for the purpose of Conciliation.

XVI. In case of failure of the conciliation process between the parties and/ or refusal of either of the party to accept the outcome of the conciliation process, the aggrieved party shall be free to seek redressal of its dispute by approaching the Commercial Court.

4.29 BOOKS & RECORDS

The selected agency shall maintain adequate Documents Related to project's materials & equipment's for inspection and audit by the TENDERER during the terms of Contract until expiry of the performance guarantee.

4.30 OWNERSHIP OF EQUIPMENT

i. The Tenderer shall own the services and items supplied by the PIA arising out of or in connection with this Contract only after the date of 100% Go- Live. In case of theft/physical damage (Repair not possible -RNP) to the Network components / equipment, the equipment shall be replaced on PIA's cost till full 100% Go-live and at Tenderer's cost after full 100% Go-live.

ii. The asset(s) so created shall be a National Asset fully owned by the Government of India, and held on its behalf by GFGNL. At end of the contract period, the ownership of complete ring OFC including consisting of associated services which includes active and passive network components supplied during entire contract duration shall be passed on to GFGNL in working conditions according to contract agreement.

4.32 PERFORMANCE GUARANTEE

i. The successful bidder/lead bidder shall furnish the Performance Bank Guarantees as mentioned below, towards faithful performance of the contract obligation and performance of the services during contract period. In case of breach/non-compliance of contract/SLA terms and conditions, Tenderer shall invoke the PBG.

ii. The Bidder whose bids are accepted shall be required to submit two separate performance Bank Guarantees- one for the Project implementation phase and Maintenance Phase as below:

a. 1st Bank Guarantee- Project Implementation Phase: The PIA, within 15 calendar days from the date of receipt of Notification of Award, shall furnish a Bank Guarantee equal to 5% of the CAPEX, valid till 100% go-live of the project/package or 18 months whichever is later. The Performance Bank Guarantee would be released upon submission of PBG for O&M Phase.

b. 2nd Bank Guarantee-O&M Phase: The PIA, within 15 calendar days from the date of 100% Go Live, shall furnish a Bank Guarantee equal to 5% of the OPEX value of the project, valid up to 180 days beyond the expiry of contract.

iii. The performance guarantee will be in the form of bank guarantee for the amount equal of 5% of the value of the Order / LOI towards faithful performance of the contract obligation, and performance of the equipment during Warranty period. In case of termination of contract, the TENDERER shall invoke the PBG.

iv. The Performance Guarantee shall be valid for a period of 180 days beyond Contract period and shall be denominated in Indian Rupees and shall be in the form of an unconditional Bank Guarantee issued by all Public-Sector Banks/private banks having branch in Gandhinagar/Ahmedabad in the format provided by the TENDERER to be submitted Within 21 calendar days from the date of final work order.

v. The Performance Guarantee shall be discharged by the TENDERER and returned to the successful bidder within 30 calendar days from the date of expiry of the Performance Bank Guarantee.

vi. In the event of termination, Tenderer may invoke the Performance Bank Guarantee to enforce the remedies available with the Tenderer as per the contract agreement against the damages from the Agency that may have resulted from such default and pursue such other rights and/or remedies as may be available to the Tenderer under law.

4.33 TERMINATION BY THE TENDERER

The TENDERER, reserves the right to suspend any of the services and/or terminate this agreement in the following circumstances by giving 30 days' notice in writing if: -

I. The bidder becomes the subject of bankruptcy, insolvency, and winding up, receivership proceedings; In case the TENDERER finds illegal use of hardware, software tools, manpower etc. that are dedicated to the project.

II. If SLAs are not maintained properly and not provide services as per SLAs then TENDERER has right to foreclose contract.

III. Upon occurrence of an event of default as set out in Clause above, either party will deliver a default notice in writing to the other party which shall specify the event of default and give the other party an opportunity to correct the default.

IV. Upon expiry of notice period unless the party receiving the default notice remedied the default, the party giving the default notice may terminate the Agreement.

V. During the notice period, both parties shall, save as otherwise provided therein, continue to perform their respective obligations under this Agreement and shall not, whether by act of omission or commission impede or otherwise interfere with party's endeavour to remedy the default which gave rise to the commencement of such notice period.

VI. The termination hereof shall not affect any accrued right or liability of either Party nor affect the operation of the provisions of the Contract that are expressly or by implication intended to come into or continue in force on or after such termination.

VII. In case of termination bidder will be paid for the work/services already delivered till the date of termination after deduction of penalties, if any.

VIII. GFGNL on behalf of USOF, DoT may, without prejudice to any other remedy for breach of contract, by written notice of default, sent to the Contractor, terminate this contract in whole or inpart if the Contractor fails to deliver any or all of the goods & services within the time period(s) specified in the contract, or any extension thereof granted by GFGNL if the Contractor fails to perform any other obligation(s) under the Contract; and if the Contractor, in either of the above circumstances, does not remedy its failure within a period of 15 days (or such longer period as GFGNL may authorize in writing) after receipt of the default notice

from GFGNL.

IX. if the average monthly SLA achievement (for GP uptime in the package) is less than 90% for more than 20% of Blocks (SLA to be calculated as an average of all the GPs in a block) consecutively for 3 months for the network where PIA has started O&M phase of existing network (after hand over by GFGNL) and newly constructed network. This condition shall be applicable after 6 Months from the appointed date(100% Go-live).

X. In the event GFGNL on behalf of USOF, DoT terminates the contract in whole or in part, GFGNL on behalf of USOF, DoT may procure, upon such terms and in such manner as it deems appropriate, works similar to those undelivered and the Contractor shall be liable to GFGNL on behalf of USOF, DoT for any excess cost for such similar works. However, the Contractor shall continue the performance of the contract to the extent not terminated.

XI. Termination for Insolvency: GFGNL on behalf of USOF, DoT may at any time terminate the Contract by giving written notice to the Contractor, without compensation to the Contractor, if the Contractor becomes bankrupt or otherwise insolvent as declared by the competent court provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to USOF, DoT/ GFGNL.

XII. Termination for Convenience: GFGNL on behalf of USOF, DoT, may, by prior written notice sent to the contractor at least 03 months in advance, terminate the Contract, in whole or in part at any time for its convenience. The notice of termination shall specify that termination is for USOF, DoT's/ GFGNL's convenience, the extent to which performance of work under the Contract is terminated, and the date upon which such termination becomes effective.

XIII. GFGNL reserves the right to discontinue the contract any time in future depending upon directions from USOF, DoT

4.34 INDEMNIFICATION

I. Selected agency will defend and/or settle any claims against the TENDERER that allege that Bidder service and/or branded product as supplied under this contract infringes the intellectual property rights of a third party. Selected agency will rely on Customer's prompt notification of the claim and cooperation with our defense. Bidder may modify the product or service so as to be non-infringing and materially equivalent or we may procure a license. If these options are not available, we will refund to Customer the amount paid for the affected product in the first year or the depreciated value thereafter or, for support services, the balance of any pre-paid amount or, for professional services, the amount paid. Bidder is not responsible for claims resulting from any unauthorized use of the products or services. This section shall also apply to deliverables identified as such in the relevant Support Material except that Bidder is not responsible for claims resulting from deliverables content or design provided by Customer.

II. **General indemnity** The PIA shall indemnify, defend, save and hold harmless USOF, DoT/ GFGNL and its officers, servants, agents, Government Instrumentalities and GFGNL owned and/or controlled entities/enterprises, (hereinafter referred as the "Authority Indemnified Persons") against any and all suits, proceedings, actions, demands and claims

from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by the PIA of any of its obligations under this contract or any related agreement or on account of any defect or deficiency in the provision of services by the PIA to USOF, DoT/ GFGNL or to any User, or from any negligence of the PIA under contract or tort or on any other ground whatsoever, except to the extent that any such suits, proceedings, actions, demands and claims have arisen due to any negligent act or omission, or breach or default of this contract on the part of the Authority Indemnified Persons.

III. **Indemnity by the PIA :** Without limiting the generality, the PIA shall fully indemnify, hold harmless and defend the 'Authority Indemnified Persons' from and against any and all loss and/or damages arising out of or with respect to:

a. failure of the PIA to comply with Applicable Laws and Applicable Permits.
b. payment of Taxes required to be made by the PIA in respect of the income or other taxes of the PIA's contractors, suppliers, and representatives.
c. non-payment of amounts due as a result of materials or services furnished to the PIA or any of its contractors which are payable by the PIA or any of its contractors.
d. its omissions or acts of fraud, gross negligence, and willful misconduct.
e. any personal bodily injury or death of any person caused by, arising out of or in connection with its performance of this Contract; or
f. loss of or physical damage to property of GFGNL or any third party caused by, arising out of or in connection with the performance of this contract.
g. Claims towards any default by PIA, in payment of statutory benefits to its employees/sub-contractors engaged to perform the contract.

IV. Without limiting the generality of the provisions of this clause, the PIA shall fully indemnify, hold harmless and defend the 'Authority Indemnified Persons' from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which the 'Authority Indemnified Persons' may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any materials, information, design or process used by the PIA or by the PIA's Contractors in performing the PIA's obligations or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, the PIA shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the revocation or suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Project, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, the PIA shall promptly make every reasonable effort to secure for GFGNL a license, at no cost to USOF, DoT/ GFGNL authorizing continued use of the infringing work. If the PIA is unable to secure such license within a reasonable time, the PIA shall, at its own expense, and without impairing the Specifications and Standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process or modify the same so that it becomes non-infringing.

V. Notice and contest of claims :In the event that Authority Indemnified Person receives a

claim or demand from a third party in respect of which it is entitled to the benefit of an indemnity under this clause it shall notify the PIA within 15 (fifteen) days of receipt of the claim or demand and shall not settle or pay the claim without the prior approval of the Indemnifying Party, which approval shall not be unreasonably withheld or delayed. In the event that the PIA wishes to contest or dispute the claim or demand, it may conduct the proceedings in the name of the GFGNL/Dot/USOF subject to the GFGNL/Dot/USOF being secured against any costs involved, to its reasonable satisfaction.

VI. Defense of claims : The Authority Indemnified Persons shall have the right, but not the obligation, to contest, defend and litigate any claim, action, suit or proceeding by any third party alleged or asserted against such Party in respect of, resulting from, related to or arising out of any matter for which it is entitled to be indemnified hereunder, and reasonable costs and expenses thereof shall be indemnified by the PIA. If the PIA acknowledges in writing its obligation to indemnify the Authority Indemnified Persons in respect of loss to the full extent provided by this clause, the PIA shall be entitled, at its option, to assume and control the defense of such claim, action, suit or proceeding, liabilities, payments and obligations at its expense and through the counsel of its choice; provided it gives prompt notice of its intention to do so to the Authority Indemnified Persons and reimburses the Authority Indemnified Persons for the reasonable cost and expenses incurred by the Authority Indemnified Persons prior to the assumption by the PIA of such defence. The PIA shall not be entitled to settle or compromise any claim, demand, action, suit or proceeding without the prior written consent of the Authority Indemnified Persons , unless the PIA provides such security to the Authority Indemnified Persons as shall be reasonably required by the Authority Indemnified Persons to secure the loss to be indemnified hereunder to the extent so compromised or settled.

If the PIA has exercised its rights under Clause above, the Authority Indemnified Persons shall not be entitled to settle or compromise any claim, action, suit or proceeding without the prior written consent of the PIA (which consent shall not be unreasonably withheld or delayed).

If the PIA exercises its rights under Clause above, the Authority Indemnified Persons shall nevertheless have the right to employ its own counsel, and such counsel may participate in such action, but the fees and expenses of such counsel shall be at the expense of the Authority Indemnified Persons, when and as incurred, unless:

(a) The employment of counsel by such party has been authorized in writing by the PIA;

(b) The Authority Indemnified Persons shall have reasonably concluded that there may be a conflict of interest between the PIA and the Authority Indemnified Persons in the conduct of the defense of such action;

(c) The PIA shall not, in fact, have employed independent counsel reasonably satisfactory to the Authority Indemnified Persons, to assume the defence of such action and shall have been so notified by the Authority Indemnified Persons; or

(d) The Authority Indemnified Persons shall have reasonably concluded and specifically notified the PIA either:

i. that there may be specific defences available to it which are different from or additional to those available to the PIA; or

ii. that such claim, action, suit or proceeding involves or could have a material adverse effect upon it beyond the scope of this Contract.

Provided that if Sub-clauses (b), (c) or (d) of this Clause shall be applicable, the counsel for the Authority Indemnified Persons shall have the right to direct the defence of such claim, demand, action, suit or proceeding on behalf of the Authority Indemnified Persons, and the reasonable fees and disbursements of such counsel shall constitute legal or other expenses hereunder.

4.35 NO CONSEQUENTIAL CLAIMS

Notwithstanding anything to the contrary contained in this clause, the indemnities herein provided shall not include any claim or recovery in respect of any cost, expense, loss or damage of an indirect, incidental or consequential nature, including loss of profit, except as expressly provided in this Contract.

4.36 LIMITATION OF LIABILITY

i. Selected agency's cumulative liability for its obligations under the contract shall not exceed the value of the project payable by the TENDERER within the contract term from the day claim is raised.

ii. Notwithstanding anything to the contrary in this Contract, the liability of the PIA towards the authority Indemnified Persons for any damages or compensation of any nature whatsoever under this Contract, shall not exceed Total cost of Project awarded to PIA. For the avoidance of doubt, the limitation hereunder shall not apply to any or all liabilities in respect of third parties. The Parties agree that the PIA's liability will be uncapped in case of any liabilities arising due to:
    a. any amount payable as indemnity to USOF, DoT/ GFGNL due to its acts or omissions or fraud, gross negligence and willful misconduct;
    b. breach of any Applicable Laws or any Applicable Permits;
    c. any claims or loss on account of Intellectual Property rights violation by the PIA;
    d. any personal bodily injury or death of any person caused by, arising out of or in connection with its performance of this Contract; or
    e. any loss of or physical damage to property of GFGNL, or any third party caused by, arising out of or in connection with the performance of this Contract.

4.37 EASEMENTS, PERMITS, LICENSES AND OTHER FACILITIES

I. The PIA shall obtain at its own cost, all easements, permits and licenses, required to execute the contract including but not limited to following:

    a. "Right of Way" easements and permits.

    b. Railway, Highway, Forest and other Authorities crossing permits including bridge.

    c. Canal/stream crossing permits.

d. ROW

PIA shall pay applicable charges against the demand note/ estimate raised by the concerned authorities. PIA shall submit the copies of the proof of payment along with the invoices for reimbursement.

II. No extra charges will be paid to the bidders for pursuance of easements, permits, RoW etc. from the different local authorities.

III. The bidder shall be fully responsible for handling and obtaining all necessary easements, permits and licenses, for moving all construction equipment, tools, supplied materials and men across Railways and Highway, across public or private road as well as premises of any public utility within the right of user and for bearing all costs that may be incurred in respect of the same.

IV. The bidder is to confine his operation to the provided construction "Right of User" unless it has made other arrangement with the particular property owners and /or tenants such other arrangements shall be entirely at the responsibility of the bidder as to cost and arrangement as also breach and claim and shall be entitled with a copy to the Divisional Engineer.

V. The bidder will not be entitled to extra compensation for hardship and increase in cost by the cable trench being routed adjacent to or across other pipeline, Highway, Railways, telephones or poser poles and wires or guy wires, embankment, cliffs, streams or other obstacles which may physically or otherwise in any manner, restrict or limit the use of the construction "Right of User". Some construction and such contingency shall be deemed to have been provided for in the rates.

VI. At locations where the optical fiber cable trench is routed across or along railways or roads the bidder shall without extra cost provide and maintain such detours and road controls as are required by the railways or government or local agencies having jurisdiction.

4.38 PROTECTION OF LIFE AND PROPERTY AND EXISTING FACILITIES

I. The bidder is fully responsible for taking all possible safety precaution during preparation for and actual performance of the works and for keeping the construction site in a reasonable safe condition. The bidder shall protect all life and property from damage or losses resulting from his construction operations and shall minimize the disturbance and inconvenience to the public.

II. If the excavation of trench alters the contours of the ground around road and highway crossing in such locations dangerous to traffic, the bidder shall at his own cost, take all necessary precautions to protect public and shall comply with all GFGNL/DST/GoG regulations as to placing of warning boards (minimum size 3' x 2'), traffic signals, barricades, flags etc., at such location. If the bidder does not put the warning signal as per above directions, then a penalty of Rs 1000/- per day shall be levied on the bidder, till the directions are complied by the bidder. The bidder shall take due precautions to avoid damages to other pipe lines, water mains, sewers, telephones, telegraphs and power conduits, laid wires poles and guy wires, railways, highways, bridges or other underground or above ground structure and/or property crossing or adjacent to the cable trench being excavated.

III. Attention of the bidder is drawn to the rules regarding laying of cables at road crossing, along Railways Bridges, highways safety precautions while working in Public Street as per Engineering Instructions.

IV. The bidder shall be solely responsible for location through approved non-destructive means and ensuring the safety of all existing underground pipeline, electrical cables, and or other structures.

V. The bidder shall be solely liable for all expense for and in respect of repairs and/or damages occasioned by injury of or damage to such underground and above structures or other properties and undertake to indemnify USOF, DoT/ GFGNL from and against all actions, cause of actions, damages, claims and demands what-so-ever, either in law or in equity and all losses and damages and costs (inclusive between attorney and client), charges and expenses in connection therewith and/ or incidental thereto. The bidder shall take all responsibilities and risk in crossing other pipelines and cables and shall be responsible for protecting all such existing pipelines, poles, electric lines, sewers, cables or other facilities from damage by the bidder's operation in connection with the work. The bidder without cost of USOF, DoT/ GFGNL shall promptly repair any damage incurred.

VI. The current market value of any commodities lost as a result of any damage to the aforesaid existing facilities shall be paid by the bidder together with such additional sums necessary to liquidate the personal of property damages, resulting there from.

4.39 LABOUR WELFARE MEASURES AND WORKMAN COMPENSATION

I. Obtaining License before commencement of work. The bidder shall obtain a valid labour license under the Contract Labour (R &A) Act 1970 and the Contract Labour (Regulation and Abolition) Central Rules 1971, before commencement of the work, and continue to have a valid license until the completion of work. The bidder shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act 1986. Any failure to fulfill this requirement shall attract the penal provisions of the contact arising out of the resultant non-execution of work.

II. Bidders Labour Regulations: The bidder shall ensure compliance of all statutory obligations, viz. payment of wages / salary to the workers engaged by him on regular and timely basis (by 7th every month) and any other amounts including any Statutory Dues, charges, taxes and levies payable as per the relevant statues applicable and subsequent amendment thereof and same should be sole liability of Bidder and USOF, DoT/ GFGNL will not be liable in any circumstances whatsoever. The Bidder shall comply with the provisions of Employees State Insurance Act 1948, Workmen's Compensation Act, the Employees Provident Fund (and Family Pension Fund) Act 1952, the Payment of Bonus Act 1963, the Industrial Disputes Act 1947, the Payment of Wages Act, Contract Labour (Regulation & Abolition) Act 1970 with Contract Labour (R&A) 1971 and / or any other rules, regulations and / or statues that may be applicable from time to time or that may be introduced by the Central /State Government or Municipal / Local Self Government authorities, subsequent to the date of this agreement. Default on this account shall be deemed as sufficient ground for termination of the Agreement. In case of accident arising out of and in the course of this agreement. GFGNL as Project Management Agency and USOF, DoT being owner/ Principal Employer will not be responsible for payment of any compensation or under any other law. It will be the sole responsibility of the bidder for payment towards loss or compensation whatsoever.

III. The person engaged by bidder shall be treated as bidder's own employees and they will claim no privileges from USOF, DoT/ GFGNL. The bidder will be directly responsible for

administration of his employee as regards their wages, uniforms, general discipline and courteous behaviour.

IV. **Insurance:** Without limiting any of his other obligations or liabilities, the bidder shall, at his own expense, take and keep comprehensive insurance including third party risk for the plant, machinery, men, materials etc. brought to the site and for all the work during the execution and Operation & Maintenance. The bidder shall also take out workmen's compensations insurance as required by law and undertake to indemnify and keep indemnified GFGNL from and against all manner of claims and demands and losses and damages and cost (including between attorney and client) charges and expenses that may arise in regard the same or that USOF, DoT/ GFGNL may suffer or incur with respect to end / or incidental to the same. The bidder shall have to furnish originals and/or attested copies as required by the department of the policies of insurance taken within 15 (fifteen) days of being called upon to do so together with all premium receipts and other papers related thereto which USOF, DoT/ GFGNL may require.

The Goods (Man,Material,Machinary) supplied under this Contract shall be fully insured by the PIA, against any loss or damage during transit, upto the time it is installed at the Tenderer's designated location. For the Operations and Maintenance phase, the insurance taken should cover comprehensive risks such as fire, earthquake,theft, flood and cyclone (for wind speeds greater than 80 kmph). The PIA shall submit to the Tenderer, certificate of insurance issued by the insurance company, indicating that such insurances have been taken at the end of each payment milestone as a proof. Any slippage in procuring or renewing insurance during entire contract duration will be sole responsibility of the bidder and will not be considered as an exclusion in any condition/s and bidder will not free from their any liability.

V. **Compliance with Laws and Regulation**: During the performance of the works the bidder shall at his own cost and initiative fully comply with all applicable laws of the land and with any and all applicable by-laws, rules, regulations and orders and any other provisions having the force of law made or promulgated or deemed to be made or promulgated by the Government, Governmental agency or municipal board, Government of other regulatory or Authorized body or persons and shall provide all certificates of compliance therewith as may be required by such applicable law, By-laws, Rules, Regulations, orders and/or provisions. The bidder shall assume full responsibility for the payment of all contributions and pay roll taxes, as to its employees, servants or agents engaged in the performance of the work specified in the bidder documents. If the bidder shall require any assignee or sub-bidder to share any portion of the work to be performed hereunder may be assigned, sub-leased or sub-contracted to comply with the provisions of the clause and in this connection the bidder agrees as to undertake to save and hold USOF, DoT/ GFGNL harmless and indemnified from and against any/all penalties, actions, suits, losses and damages, claims and demands and costs (inclusive between attorney and client) charges and expenses whatsoever arising out or occasioned, indirectly or directly, by failure of the bidder or any assignee or sub-bidder to make full and proper compliance with the said by-laws, Rules, Regulations, Laws and Order and provisions as aforesaid.

4.40 THE PIA'S OFFICE

The PIA's office shall be equipped with the following facilities within 7 days from the issue of Work Order:

(i). Land line / Mobile,

(ii). E-mail facility with PC

The PIA should have at-least one office in each Business Area of GFGNL and one nodal person in each district with above facilities. It may have more than one office in a district as per the operational need.

4.41 CONFIDENTIALITY

i. Selected agency understands and agrees that all materials and information marked and identified by the TENDERER as 'Confidential' are valuable assets of the TENDERER and are to be considered as proprietary information and property. Selected agency will treat all confidential materials and information provided by the TENDERER with the highest degree of care necessary to ensure that unauthorized disclosure does not occur. Selected agency will not use or disclose any materials or information provided by tenderer without its prior written permission.

ii. Selected agency shall not be liable for disclosure or use of any materials or information provided by the TENDERER or developed by selected agency which is:

1. Possessed by selected agency prior to receipt from the TENDERER, other than through prior disclosure by the TENDERER, as documented by selected agency's written records;
2. Published or available to the general public otherwise than through a breach of Confidentiality; or
3. Obtained by selected agency from a third party with a valid right to make such disclosure, provided that said third party is not under a confidentiality obligation to the TENDERER; or
4. Developed independently by the selected agency.

ii. If selected agency is required by judicial or administrative process to disclose any information or materials required to be held confidential hereunder, selected agency shall promptly notify the TENDERER and allow reasonable time to oppose such process before making disclosure.

iii. Selected agency understands and agrees that any use or dissemination of information in violation of this Confidentiality Clause will cause the TENDERER irreparable harm, may leave the TENDERER with no adequate remedy at law and the TENDERER is entitled to seek to injunctive relief.

v. The TENDERER does not follow the practice of asking Confidential Information of selected agency, however if any confidential information is required/shared by the selected agency then selected agency must clearly marked it as "Strictly confidential". The TENDERER in turn will not share the same without prior concern of the selected agency.

v. Above mentioned "confidentiality clause" shall be applicable on both the parties i.e. the TENDERER and the successful bidder.

4.42 SERVICE TERMS

i. The entire scope of the work depends on the technical skill and experience in management of the same level or kind of capabilities.

ii. The Bidder must submit regular schedule of manpower availability.

iii. The Bidder will need to coordinate and approach various departments/Sub-departments/

Boards/Corporations during this contract.

iv. The Bidder is responsible to maintain documentation on the progress of the work and will have to update the same on regular basis. Bidder will have to submit the progress reports regularly, as per the guidelines issued by TENDERER from time-to-time.

v. TENDERER shall provide office space to the operational consultants in its own premise during project period. All other expenses related to transportation, consumables, stationary, printing, scanning, telephone, food, snacks, etc. in case required, must be completely borne by the Bidder as part of Contract Agreement.

vi. The bidder shall ensure that security measures, policies and procedures implemented are adequate to protect and maintain the confidentiality of the Confidential Information. Bidder also agrees and acknowledges that it shall adhere to reasonable security practices over all sensitive personal information of the said project as prescribed by various rules under I.T. Act, 2000 (as amended from time to time).

4.43 FRAUDULENT AND CORRUPT PRACTICES

i. Fraudulent practice means a misrepresentation of facts to influence a procurement process or the execution of a Contract and includes collusive practice among Bidders (prior to or after Bid submission) designed to establish Bid prices at artificial non-competitive levels and to deprive the TENDERER of the benefits of free and open competition.

ii. "Corrupt Practice" means the offering, giving, receiving or soliciting of anything of value, pressurizing to influence the action of a public official in the process of Contract execution.

iii. The TENDERER will reject a proposal for award and may forfeit the EMD and/or Performance Bank Guarantee if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for, or in executing, contract(s).

4.44 PATENT RIGHTS, COPY RIGHT & IPR

i. The Service Provider shall indemnify tenderer against all third-party claims of infringement of copyright, patent, trademark or industrial design rights arising from use of the Goods/services. In the event of any claim asserted by a third party, the Bidder shall act expeditiously to extinguish such claim. If the Bidder fails to comply and tenderer is required to pay compensation to a third party resulting from such infringement, the Bidder shall be responsible for the compensation to the Tenderer including all expenses, court costs and lawyer fees.

ii. All the software licenses on the name of Tenderer.

iii. IPR of finished / customized product shall belongs to the tenderer.

iv. The contractor shall indemnify GFGNL against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the Service / goods or any part thereof in Indian Telecom Network.

4.45 APPROVALS/ CLEARANCES

i. Necessary approvals/ clearances concerned authorities, for establishing the proposed project needs to be obtained by the selected agency.

4.46 EXIT MANAGEMENT PROCEDURE

i. This Schedule sets out the provisions, which will apply on expiry or termination of the Contract Period and/ or earlier termination of the PIA and/ or the SLA for any reasons whatsoever. An Exit Management plan shall be furnished by PIA in writing to the Tenderer within 60 days on completion of the contract period or termination of the contract for default of the PIA, which shall deal with at least the following aspects of exit management in relation to the contract as a whole and in relation to the Project Implementation and Service Level monitoring.

ii. A detailed program of the transfer process that could be used in conjunction with a Replacement PIA including details of the means to be used to ensure continuing provision of the services throughout the transfer process or until the cessation of the services and of the management structure to be used during the transfer.

iii. Plans for provision of contingent support to Project and Replacement PIA for a reasonable period after transfer.

iv. Exit Management plan in case of normal termination of Contract period.

v. Exit Management plan in case of any eventuality due to which Project is terminated before the contract period.

vi. Exit Management plan in case of termination of the PIA.

vii. In the case of termination of the Project implementation and/or SLA due to illegality, the parties shall agree at that time whether, and if so during what period, the provisions of this Schedule shall apply.

viii. The parties shall ensure that their respective associated entities carry out their respective obligations set out in this Exit Management Schedule.

ix. The Exit Management Period starts, in case of expiry of Contract, 3 months before the Contract comes to an end or in case of earlier termination of Contract, on the date of service of termination orders to the Service Provider. The Exit Management Period ends on the date agreed upon by the tenderer or six months after the beginning of the Exit Management Period, whichever is earlier.

x. During this period, the Service Provider should:
   a. Deliver the services.
   b. Provide necessary support to the Tenderer's staff, nominated agency, or replacement Service Provider.
   c. Permit reasonable access to its employees and facilities to the tenderer and/or any replacement Service Provider for knowledge transfer.

xi. Payments during the Exit Management Period shall be made in accordance with the Terms of Payment Schedule.

xii. The handholding support will include but not be limited to, conducting detailed walkthrough and demonstrations for handing over all relevant documentation, addressing the queries/clarifications of the new agency with respect to the working / performance levels of the infrastructure, conducting training sessions etc.

xiii. The Service Provider shall permit the tenderer and/or any replacement Service Provider to have reasonable access to its employees and facilities as reasonably required by the tenderer to understand the methods of delivery of the Services employed by the Service Provider and to assist appropriate knowledge transfer.

xiv. Exit Management plan at the minimum adhere to the following:
   1. Three (3) months of the support to Replacement PIA post termination of the Contract
   2. Complete handover of the Planning documents, bill of materials, technical specifications of

all equipment, user manuals, guides, IPR, network architecture, change requests if any reports, documents, and other relevant items to the Replacement PIA / Tenderer

3. Certificate of Acceptance from authorized representative of Replacement PIA issued to the PIA on successful completion of handover and knowledge transfer
4. In the event of termination or expiry of the contract, Project Implementation or Service Level monitoring, both PIA and Tenderer shall comply with the Exit Management Plan.
5. During the exit management period, the PIA shall use its best efforts to deliver the services.

4.47 REVIEW AND EXTENSION OF O&M WORK DURING THE CONTRACT

I. **During the existing Contract duration**: GFGNL is expecting that the BharatNet network will be the captive network for the Government Services of Gujarat as well as for the public and private sectors over the time. Hence, Considering the rural centric model and the importance of digital infrastructure for the state, the PIA's performance should meet the Network uptime consistently above 90% of entire package. In Case of repetitive default in uptime of the network, and substantial delay in service provisioning, GFGNL reserve the rights to review (during the entire contract duration) the past one year performance of the selected bidder and may take strict actions including but not limited to disagreement of O&M continuations for the next eligible year as per the contract conditions to PIA. The bidder has to support on handover of the all network assets, spare inventories and associated services in healthy conditions- along with required training to the new onboarded agency as per the intimations from the GFGNL.

II. Contract Extension:

(a) The term of this Contract shall be as per Schedule mentioned in the factsheet and the milestones mentioned.

(b) GFGNL shall reserve the sole right to grant any extension to the term of work order above against the request of PIA and shall notify in writing to the PIA within 15 days of the request,whether it shall grant the PIA an extension of the term. The decision to grant or refuse the extension shall be at GFGNL's discretion. Accordingly, the Bank Guarantee of the same amount shall be extended up to extended period of the Contract, if required.

(c) Beyond 10th year, the equipment which is not EoSL (End of Support Life), can be continued along with the network for O&M as per decision of GFGNL/USOF/ DoT and also with the consensus of PIA. The OPEX payable after 10th year will be enhanced annually by 4% (i.e. 11th year will have OPEX of 6.76%, 12th year will be 7.02% and so on) till the continuity of the O&M of the network by PIA.

(d) Where GFGNL is of the view that no further extension of the term be granted to the PIA, GFGNL shall notify the PIA of its decision at least 3 (three) months prior to the expiry of the Term. Upon receipt of such notice, the PIA shall continue to perform all its obligations hereunder, until such reasonable time beyond the Term of the Contract within which, GFGNL shall either appoint an alternative Contractor or create its own infrastructure to operate such Services as are provided under this Contract. GFGNL shall make payment for work executed for the extended period post contract expiry.

4.48 SUPPORT FROM EXTERNAL AGENCY

I. Sub-letting/contracting of entire work or in part thereof is not permitted. The bidder needs to complete all the defined activities as per scope of work on its own. No Data/ Information should be sent out of the premise without obtaining prior written confirmation from the TENDERER. The successful bidder shall be allowed to obtain advisory support from within its organization towards legal or contractual vetting of drafts.

4.49 GFGNL'S RIGHT TO BAN BUSINESS DEALINGS

GFGNL reserves the right to ban business dealings with a bidder for a suitable period in case the bidder fails to honour its bid without sufficient grounds.

4.50 USE OF AGREEMENT DOCUMENTS AND INFORMATION

i. The Bidder shall not without prior written consent from TENDERER disclose the Agreement or any provision thereof or any specification, plans, drawings, pattern, samples or information furnished by or on behalf of TENDERER in connection therewith to any person other than the person employed by the Bidder in the performance of the Agreement. Disclosure to any such employee shall be made in confidence and shall extend only as far as may be necessary for such performance.

ii. The Bidder shall not without prior written consent of TENDERER make use of any document or information made available for the project except for purposes of performing the Agreement.

iii. All project related documents issued by TENDERER other than the Agreement itself shall remain the property of TENDERER and Originals and all copies shall be returned to TENDERER on completion of the Bidder's performance under the Agreement, if so required by the TENDERER.

4.51 PROJECT DELIVERABLES

The suggested (but not limited to) list of deliverables needs to be submitted to GFGNL / Authorized Representative as per the scope of work:

- Training manuals and user manuals
- RCA Documents
- Weekly Status Report & Monthly Status Report
- Additional details mentioned in various sections of RFP , deliverable milestones, MIS Reports, O&M measurement criteria's, etc

4.52 LIQUIDATED DAMAGES (LD)

I. Compensation of loss on account of late delivery (actually incurred as well as notional) where loss is pre-estimated and mutually agreed to is termed as Liquidated Damages (LD). The law allows recovery of pre-estimated loss provided such a term is included in the contract, and there is no need to establish actual loss due to late supply. However, it would strengthen the Procuring Entity's rights if it were established and kept on record that inconvenience and loss have been caused due to the delay in supplies, though the loss cannot be exactly quantified, and hence liquidated damages are applicable as a genuine pre-estimate of the loss.

4.53 QUANTUM OF LD

I. LD a sum equivalent to 0.5 (half) per cent of the delivered price (including elements of GST, freight and variations as per sub-para(2) below) of the delayed Goods and/ or incidental Works/ Services/ deliverables for each week of delay or part thereof until actual delivery or performance, subject to a maximum deduction of the 5% (or any other percentage if prescribed in the contract) of the total contract value. In case of inordinate delay (i.e., Inexcusable delays of more than one-fourth (25%) of the total completion period shall be treated as inordinate delays. Such inordinate delays may be treated as a breach of contract and shall be noted as deficient performance and held against the contractor in future tenders. A show-cause notice shall be issued to the contractor before declaring it a deficient performance. In case GFGNL decides to allow performance of contract, after inordinate delays, maximum limit on LD shall be 10% (instead of 5%) of the total contract value) this maximum deduction shall be 10% of the total contract value.

II. For purpose of GST, liquidated damages should be shown as deductions on the invoice value by the contractor.

4.54 TAXES & DUTIES

Bidder is liable for all taxes and duties etc. as may be applicable from time to time.

i. The quoted offer should be exclusive of Taxes. Taxes shall be paid extra on actual, as applicable. The taxes prevailing at the time of raising the invoice shall be paid. GFGNL shall deduct appropriate tax as applicable at source from the payment against the delivery &services and corresponding TDS certificate shall be issued at the end of respective quarter.

ii. Invoices should be raised in name of *"Gujarat Fibre Grid Network Limited"* only as per milestone mentioned above in the RFP related sections.

iii. All Invoices should be raised from the Gujarat.

iv. If any additional tax/cess/any government levy is applicable then reimbursement will be on actual basis submission of valid payment proof.

v. Payments should be subject to deductions of any amount for which the PIA is liable under the RFP conditions. Further, all payments shall be made subject to deduction of TDS (Tax deduction at Source) as per the current Income-Tax Act.

vi. The tax component i.e. Goods and Service Tax (GST) as applicable shall be mentioned separately and Payments shall be released only on satisfactory acceptance of the deliverables by GFGNL for each task for End-to-End connectivity for individual locations.

vii. All payments shall be released after certification of Delivery & Implementation and acceptance by GFGNL.

viii. Payment shall be released by the GFGNL against the invoices raised by bidder within 30 calendar days from the date of providing all the relevant documents and are complete in all reference.

ix. All payments shall be made through RTGS only.

x. Statutory variation in the rate of GST, taking place between the date of award of contract and the original / refixed delivery period or service period, shall be to the purchaser's account. For claiming any change in price due to such Statutory variation, the successful bidder shall have to lodge claim before the purchaser providing documentary evidence of change in rate of GST taking place after the date of award of contract and the date of supply within the original / refixed delivery period. Purchaser shall issue necessary amendment in the contract to enable generation of supplementary invoice or revised invoice as the case may be.

xi. No increase in price on account of statutory increase in the rate of GST taking place during the period of delivery period extension with liquidated Damages shall be admissible. Nevertheless, the purchaser shall be entitled to the benefit of any decrease in price on account of reduction in GST taking place during extended delivery period.

xii. If the PIA fails to furnish necessary supporting documents i.e. GST invoices in the name of GFGNL. and also fails to upload the information on GSTN in respect of the Duties/taxes for which input tax credit is available to the purchaser i.e. GFGNL (as applicable to this tender), the amount pertaining to such Duties/Taxes will be deducted from the payment due to the PIA.

xiii. Tax amount will be paid to the PIA only after PIA declares the details of the invoices in its return in GSTR-1 and GSTR-3B uploaded by the PIA and after submission of proofs of GST compliances.

xiv. TDS/TCS under Income Tax Act 1961 & GST Acts shall be deducted by GFGNL.

xv. GFGNL can adjust/ forfeit Bank Guarantee obtained from the PIA against any loss due to non compliances towards Tax Laws on account of PIA's default.

xvi. In case GFGNL has to pay GST on reverse charge basis, the PIA would not charge GST on its invoices. Further, the PIA undertakes to comply with the provisions of GST law as may be applicable.

4.55 SET OFF

Any sum of money due and payable to the Contractor (including security deposit refundable to him) under this contract may be appropriated by GFGNL or any other person(s) contracting through GFGNL and set off the same against any claim of GFGNL such other person or person(s) for payment of a sum of money arising out of this contract or under any other contract made by the Contractor with GFGNL or such other person(s) contracting through GFGNL.

4.56 FALL CLAUSE

I. At any time during the contract (a) if it comes to the notice of GFGNL regarding reduction of price for the same or similar works; and/ or (b) the prices received in a new tender for the same or similar works are less than the prices chargeable under the contract. The prices would be determined as follows:

a. The prices once fixed will remain valid during the scheduled time period except for the provisions in clause of “Price” of this RFP.

b. GFGNL, for the extended period, if any, will determine and intimate the new price, taking into account various related aspects such as quantity, geographical location etc., and the date of its effect for the balance works to the vendor. In case the vendor does not accept the new price to be made applicable during the extended period and the date of its effect, GFGNL on behalf of USOF, DoT shall have the right to terminate the contract without accepting any further works. This termination of the contract shall be at the risk and responsibility of the Contractor and GFGNL reserves the right to give work order for the balance works at the risk and cost of the defaulting vendor besides considering the forfeiture of its performance security.

c. The Contractor while applying for extension of time for works, if any, shall have to provide an undertaking as "We have not reduced the price, and/ or offered price the same or similar works to any person/organization including Department of central/state Government or any central/state PSU at a price lower than the price chargeable under the contract for scheduled time period."

d. In case undertaking is not applicable, the vendor will give the details of prices, quantity

etc. to GFGNL, while applying extension of delivery period.

4.57 ISSUE OF ADVANCE PURCHASE/WORK ORDER

i. The issue of an Advance Purchase/work Order shall constitute the intention of GFGNL as an agent of USOF to enter into contract with the bidder. It is clarified that issue of APO/WO does not mean that GFGNL is bound to issue purchase/work order.
ii. The bidder shall within 14 days of issue of the advance purchase/work order, shall give its acceptance along with performance security (PBG or insurance security bond) in conformity with proforma enclosed in the relevant section provided with the bid document.
iii. Non-submission of acceptance and PBG in the prescribed period will automatically result in withdrawal of APO or levy of penalty, alongwith other actions w.r.t. EMD/ business banning etc. unless the period of acceptance is extended by GFGNL subsequently.
iv. In case, the extension is given by GFGNL, the period of extension may lead to commensurate reduction in delivery timelines. The extension by GFGNL shall be in writing only.

4.58 SIGNING OF CONTRACT

i. After submission of acceptance of Advance PO/ Advance WO along with performance security; Agreement, signed between the successful bidder and GFGNL central Office (on behalf of USOF, DoT), shall constitute the award of contract to the successful bidder for the respective package.
ii. After signing of agreement for a package, Purchase Order(s)/ Work Order(s) shall be issued to the successful bidder (PIA) by the respective package.

4.59 VERIFICATION OF DOCUMENTS AND CERTIFICATES

I. The bidder will verify the genuineness and correctness of all documents and certificates, including experience/ performance certificates, issued either by the bidder or any other firm/ associate before submitting them in the bid. The onus of proving genuineness of the submitted documents would rest with the bidder.

II. As per requirement of the tender's conditions, if any document/ paper/ certificate submitted by the participant bidder is found to be false/ fabricated/ tempered/ manipulated at any stage during bid evaluation or award of contract, then the bid security of the bidder would be forfeited and the bidder would be disqualified from the tender. Action would also be taken for banning of business dealing with the defaulting firm. In case contract has already been awarded to the bidder, then PBG, would be forfeited and the contract would be rescind/ annulled and GFGNL would be at liberty to complete works from any other source at the risk and cost of the defaulting bidder. Action would also be taken for banning business dealing with the defaulting firm. The various actions which GFGNL shall be at liberty to take are more specifically set out in Appendix-1 of critical instructions to bidder

4.60 APPENDIX-1 - CRITICAL INSTRUCTIONS TO BIDDER

S. No.	Defaults of the bidder / vendor.	Action to be taken
A	B	C
1(a)	Submitting fake / forged	i) Rejection of tender bid of respective Vendor. ii) Banning of business upto 3 years which implies barring further dealing with the vendor for procurement of Goods & Services including participation in future tenders invited by DST//GFGNL upto 3 years from date of issue of banning order. iii) Termination/ Short Closure of APO/ PO/WO, if issued. This implies non-acceptance of further supplies / work & services except to make the already received material work/complete work in hand. iv) EMD, if submitted, shall also be forfeited, in case of default at para (c).
	a) Bank / Insurance surety bond Instruments with the bid to meet terms & condition of tender in respect of tender fee and/ or EMD;	
	b) Certificate for claiming exemption in respect of tender fee ;	
	(c) Bank Guarantee/ Insurance surety bond Instruments submitted towards performance security or any type of security and detection of default at any stage from receipt of bids till award of APO/ issue of PO/WO.	
	Note: - Payment for already received supplies/ completed work shall be made as per terms & conditions of PO/ WO.	
1(b)	Submitting fake / forged documents towards meeting eligibility criteria such as experience capability, supply proof,registration with Goods and Services Tax, Income departments other and any Tax supporting documents other towards terms & with the bid to meet conditions terms & condition of tender	
	(i) If detection of default is prior to award of APO	i)Rejection of Bid & ii) Forfeiture of EMD. iii) Banning of business for three years upto which implies Barring further dealing with the vendor for procurement of & Services Goods including participation in future tenders invited by DST//GFGNL for upto three years from the date of issue of banning order.
	(ii) If detection of default after issue of APO but before receipt of PG/ SD (DD, BG etc.)	i) Cancellation of APO, ii) Rejection of Bid & iii) Forfeiture of EMD, if submitted. iv) Banning of business for three years upto which implies Barring further dealing with the vendor for procurement of & Services Goods including participation in future

S. No.	Defaults of the bidder / vendor.	Action to be taken
A	B	C
		tenders invited by DST//GFGNL for upto three years from the date of issue of banning order.
	(iii) If detection of default after receipt of PG/ SD (DD,BG etc.) .	i) Cancellation of APO ii) Rejection of Bid & iii) Forfeiture of PG/ SD. However, on realization of PG/ SD amount,EMD, if not already released shall be returned. iv) Banning of business for upto three years which implies Barring further dealing with the vendor for procurement of Goods & Services including participation in future tenders invited by DST//GFGNL for upto three years from the date of issue of banning order.
	(iv) If detection of default after signing of Agreement/ issue of PO/ WO	i) Termination/ Short Closure of PO/WO and Cancellation of APO ii) Rejection of Bid & iii) Forfeiture of PG/ SD. However on realization of PG/ SD amount, EMD, if not released shall be returned. iv) Banning of business for upto three years which implies Barring further dealing with the vendor for procurement of Goods & Services including participation in future tenders invited by DST//GFGNL for upto three years from the date of issue of banning order.
	Note 3:- However, settle bills for the material received in correct quantity and quality if pending items do not affect working or use of supplied items.	
	Note 4:- No further supplies are to be accepted except that required to make the already supplied items work.	
2	If vendor or his representative uses violent/ coercive means viz. Physical / Verbal means to threatens GFGNL Executive / employees and/ or obstruct him from functioning in discharge of his duties & responsibilities for the following: a) Obstructing functioning of tender opening executives of DST/GFGNL in receipt/opening of tender bids from prospective Bidders, suppliers/ Contractors. b) Obstructing/ Threatening other prospective bidders i.e. suppliers/	Banning of business for 3 years which implies Barring further dealing with the vendor for procurement of Goods & Services including participation in future tenders invited by DST/GFGNL/ for 3 years from date of issue of banning order.

S. No.	Defaults of the bidder / vendor.	Action to be taken
A	B	C
	Contractors from entering the tender venue and/ or submitting their tender bid freely.	
3	Non-receipt of acceptance of APO/ AWO and SD/ PG by L-1 bidder within time period specified in APO/ AWO.	Forfeiture of EMD and banning of business, including a ban on participation in DST/GFGNL/ tenders, for a period of 1 year from date of issue of banning order.
4.1	Failure to supply and/ or Commission the equipment and /or execution of the work at all even in extended delivery schedules, if granted against PO/ WO.	i) Termination of PO/ WO. ii) Under take purchase/ work at the risk & cost of defaulting vendor. iii) Recover the excess charges if incurred from the PG/ SD and outstanding bills of the defaulting Vendor.
4.2	Failure to supply and/ or Commission the equipment and /or execution of the Work in full even in extended delivery schedules, if granted against PO/ WO.	i) Short Closure of PO/ WO to the quantity already received by and/ or commissioned in GFGNL and/or in pipeline provided the same is usable and/or the Vendor promises to make it usable. ii) Under take purchase/ work for balance quantity at the risk & cost of defaulting vendor. iii) Recover the excess charges if incurred from the PG/ SD and outstanding bills of the defaulting Vendor.
5.1	The supplied equipment does not perform satisfactory in the field in accordance with the specifications mentioned in the PO/WO Contract	i) If the material is not at all acceptable, then return the non-acceptable material (or its part) & recover its cost, if paid, from the o/s bills/ PG/ SD. OR ii) If the material is inducted in network & it is not possible to return it and/ or material is acceptable with degraded performance, the purchaser may determine the price for degraded equipment (Financial penalty = Price – price determined for degraded equipment) himself and/ or through a committee.

S. No.	Defaults of the bidder / vendor.	Action to be taken
A	B	C
		Undertake recovery of financial penalty from outstanding dues of vendor including PG/ SD.
5.2	Major quality problems (as established by a joint team / committee of User unit(s) and QA package) / performance problems and non-rectification of defects (based on reports of field units and QA package).	i) If the material is not at all acceptable, then return the non-acceptable material (or its part) & recover its cost, if paid, from the o/s bills/PG/ SD; OR ii) If the material is inducted in network & it is not possible to return it and/ or material is acceptable with degraded performance, the purchaser may determine the price for degraded equipment (Financial penalty = Price – price determined for degraded equipment) himself and/ or through a committee. Undertake recovery of financial penalty from outstanding dues of vendor including PG/ SD; and iii) Withdrawal of TSEC/ IA issued by QA Circle.
6	Submission of claims to GFGNL against a contract (a) for amount already paid by GFGNL. (b) for Quantity in excess of that supplied by Vendor to GFGNL. c) for unit rate and/ or amount higher than that approved by GFGNL for that purchase.	i) Recovery of over payment from the outstanding dues of Vendor including EMD/ PG & SD etc. and by invoking 'Set off' clause mentioned in the RFP or by any other legal tenable manner. ii) Banning of Business for 3 years from date of issue of banning order or till the date of recovery of over payment in full, whichever is later.
Note 5:-	The claims may be submitted with or without collusion of GFGNL Executive/employees.	
Note 6:-	This penalty will be imposed irrespective of the fact that payment is disbursed by GFGNL or not.	
7	Network Security/ Safety/ Privacy:- If the vendor tampers with the hardware, software/ firmware or in any other way that :	i) Termination of PO/ WO. ii) Banning of business for 3 years which implies barring further dealing with the vendor for procurement of Goods &

S. No.	Defaults of the bidder / vendor.	Action to be taken
A	B	C
	a) Adversely affects the normal working of GFGNL equipment(s) and/ or any other TSP/ISP through GFGNL. b) Disrupts/Sabotages functioning of the GFGNL network equipment such as Shelter,OFC, BSNL Ph-1 exchanges, Control equipments,Dark fibres, both acive and passive network elements,transmission equipment but not limited to these elements and/ or any other TSP/ISP through GFGNL. c) tampers with the billing related data/invoicing/ account of the Customer/User(s) of GFGNL/Ph-I BSNL and/ or any other TSP(s)/ISPs. d) hacks the account of GFGNL/Ph-I BSNL Customer for unauthorized use i.e. to threaten others/ spread improper news etc. e) undertakes any action that affects/ endangers the security of India.	Services including participation in future tenders invited by GFGNL/DST/ for 3 years from date of issue of banning order. iii) Recovery of any loss incurred on this account from the Vendor from its PG/ SD/ O/s bills etc. iv) Legal action will be initiated by GFGNL against the Vendor, if required.
8	If the vendor is declared bankrupt or insolvent or its financial position has become unsound and in case of a limited company, if it is wound up or it is liquidated.	(i) Termination/ Short Closure of the PO/ WO. (ii) Settle bills for the quantity received in correct quantity and quality if pending items do not affect working or use of supplied items. (iii) No further supplies are to be accepted except that required to make the already supplied items work. (iv) In case of turnkey projects, If the material is commissioned and is usable without any degradation of performance, then settle bills for the acceptable equipment/ material (or its part) (v) In case of turnkey projects, if the material is inducted in network & it is not possible to return it and/ or material is acceptable with degraded performance, the purchaser may determine the price for degraded equipment (Financial penalty = Price – price determined for degraded equipment) himself and/ or through a committee. (vi) Undertake recovery of financial penalty

S. No.	Defaults of the bidder / vendor.	Action to be taken
A	B	C
		from outstanding dues of vendor including PG/ SD.
9	In the event of the vendor, its proprietor, Director(s), partner(s) is / are convicted by a Court of Law following prosecution for offences involving moral turpitude in relation to the business dealings with GFGNL/DST.	i) Termination/ Short Closure of the PO/ WO. ii) Settle bills for the material received in correct quantity and quality if pending items do not affect working or use of supplied items. iii) No further supplies are to be accepted except that required to make the already supplied items work. iv) In case of turnkey projects, If the material is commissioned and is usable without any degradation of performance, then settle bills for the acceptable equipment/ material (or its part). v) In case of turnkey projects, If the material is inducted in network & it is not possible to return it and/ or material is acceptable with degraded performance, the purchaser may determine the price for degraded equipment (Financial penalty = Price – price determined for degraded equipment) himself and/ or through a committee. Undertake recovery of financial penalty from outstanding dues of vendor including PG/ SD.
10	If the vendor does not return/ refuses to return GFGNL's dues:	i) Take action to appoint Arbitrator to adjudicate the dispute.
	a) in spite of order of Arbitrator.	i) Termination of contract, if any. ii) Banning of business for 3 years which implies barring further dealing with the vendor for procurement of Goods & Services including participation in future tenders invited by DST/GFGNL/ from date of issue of banning order or till the date by which vendor clears the GFGNL's dues,whichever is later. iii) Take legal recourse i.e. filing recovery suite in appropriate court.

S. No.	Defaults of the bidder / vendor.	Action to be taken
A	B	C
	b) in spite of Court Orders.	i) Termination of contract, if any. ii) Banning of business for 3 years which implies barring further dealing with the vendor for procurement of Goods & Services including participation in future tenders invited by DST/GFGNL/ from date of issue of banning order or till the date by which vendor clears the GFGNL's dues, whichever is later.
11	If the Central Bureau of Investigation/ Independent External Monitor (IEM) / Income and Services Tax / Tax/Goods Custom Departments recommends such a course	Take Action as per the directions of CBI or concerned department.
12	The following cases may also be considered for Banning of business: (a) If there is strong justification for believing that the proprietor, manager, MD, Director, partner, employee or representative of the vendor/ supplier has been guilty of malpractices such as bribery, corruption, fraud, substitution of tenders, interpolation, misrepresentation with respect to the contract in question. (b) If the vendor/ supplier fails to execute a contract or fails to execute it satisfactorily beyond the provisions of Para 4.1 & 4.2. (c) If the vendor/ supplier fails to submit required documents/ information, where required. (d) Any other ground which in the opinion of GFGNL is just and proper to order for banning of business dealing with a vendor/ supplier.	i) Banning of business for 3 years which implies Barring further dealing with the vendor for procurement of Goods & Services including participation in future tenders invited by DST/GFGNL for 3 years from date of issue of banning order.
Note 7: The above penalties will be imposed provided it does not clash with the provision of other sections of this tender.		
Note 8:-In case of clash between these guidelines & provision of other sections of this tender, the provision of other sections shall prevail over these guidelines.		
Note 9: Banning of Business dealing order shall not have any effect on the existing/ ongoing works/ Annual Maintenance Contract(AMC) / Comprehensive Annual Maintenance Contract (CAMC) which will continue along with settlement of Bills.		

Table: Appendix-1 Critical Instructions to Bidder

4.61 NON-RELATIONSHIP CERTIFICATE

a. The bidder should give a certificate that none of his/her near relative is working in GFGNL or he may give list of near relatives employed in the GFGNL. In case of proprietorship firm, certificate will be given by the proprietor. For partnership firm, certificate will be given by all the partners. In case of limited company, certificate will be given by all the Directors of the company excluding Government of India/ Financial institution nominees and independent non-Official part time Directors appointed by Govt. of India or the Governor of the state and full time Directors of PSUs, both state and central. In case of consortium all the partners/ directors of consortium shall give non-relationship certificate as above.

b. Due to any breach of these conditions by the company or firm or any other person the tender will be cancelled and bid security will be forfeited at any stage whenever it is noticed and GFGNL will not pay any damage to the company or firm or the concerned person. The company or firm or the person will also be debarred for further participation in the concerned unit.

c. The near relatives for this purpose are defined as: -

    i. Members of a Hindu undivided family.

    ii. They are husband and wife.

    iii. The one is related to the other in the manner as father, mother, son(s) & Son's wife (daughter in law), Daughter(s) and daughter's husband (son in law), brother(s) and brother's wife, sister(s) and sister's husband (brother-in-law).

d. The format of the certificate to be given is "I……..s/o……r/o hereby certify that none of my relative(s) as defined in the tender document is/ are employed in GFGNL unit as per details given in tender document. In case at any stage, it is found that the information given by me is false/ incorrect, GFGNL shall have the absolute right to take any action as deemed fit/without any prior intimation to me."

4.62 TRAINING

a. The bidder shall provide training for supervisory staff of the purchaser or ultimate consignee or USOF, DOT free of cost where required for the purpose of Quality and Acceptance Testing.

b. The bidder shall provide training for the functioning of active elements like routers, SNOC elements, RFMS etc.

c. The training session frequency, duration and batch sizes shall be mutually decided so as to meet the actual requirement. It is anticipated that 1 man week training for every 200 GPs per year for first two years and 1 man week per 400 GP per year for subsequent years, should be sufficient. The training material including the videos around 100 hour per packages shall be shared by PIA to GFGNL and/or USOF and/or ultimate consignee, for further on line/offline training sessions as per the requirement.

d. The PIA has to arrange the training material, venue and all other arrangements except conveyance and stay arrangement.

4.63 DOCUMENTS REQUIRED FOR CLAIMING PAYMENT

4.55.1 For claiming payment the following documents are to be submitted to the paying authority.

a) Invoices in the name of “Gujarat Fibre Grid Network Limited” or any authority designated by them clearly indicating break up details of composite price i.e. Basic, Goods and Services Tax (GST), any other Duties and Taxes, etc.

b) QA Inspection Certificate of the material used (as applicable).

c) Proof of completion of work (AT certificate).

d) E-waybill as prescribed in the GST law in case of movement of goods (if applicable).

e) Proof of payment of GST, if applicable.

f) Timely uploading of correct and necessary information on GSTN portal is mandatory as prescribed in GST compliances.

Note:-
(1) If the PIA fails to furnish necessary supporting documents i.e. GST invoices in the name of “Gujarat Fibre Grid Network Limited” / Customs invoices etc. and also fails to upload the information on GSTN in respect of the Duties/taxes for which input tax credit is available to the purchaser i.e. GFGNL (as applicable to this tender), the amount pertaining to such Duties/Taxes will be deducted from the payment due to the PIA.

(2) Tax amount will be paid to the PIA only after PIA declares the details of the invoices in its return in GSTR-1 and GSTR-3B uploaded by the PIA and after submission of proofs of GST compliances.

(3) TDS/TCS under Income Tax Act 1961 & GST Acts shall be deducted by GFGNL on behalf of USOF, DOT under USOF PAN/TAN/ GSTIN as a Tax deductor of GFGNL at the prescribed rate, if any (as the case may be).

(4) GFGNL on behalf of USOF, DoT can adjust/ forfeit Bank Guarantee obtained from the PIA against any loss due to non-compliances towards Tax Laws on account of PIA's default.

(5) In case GFGNL has to pay GST on reverse charge basis, the PIA would not charge GST on its invoices. Further, the PIA undertakes to comply with the provisions of GST law as may be applicable.

4.55.2 No payment will be made for goods/ works/services rejected at the site on testing.

4.55.3 The PIA has to give the mandate for receiving payment costing Rs.5 lakhs and above electronically and the charges, if any, levied by bank has to be borne by the bidder/ PIA. The bidder company is required to give the following information for this purpose:-

a) Beneficiary Bank Name:

b) Beneficiary branch Name:

c) IFSC code of beneficiary Branch:

d) Beneficiary account No.:

e) Branch Serial No.(MICR No.):

4.55.4 GST Invoice:

i. All the details of PIA (name, address, GSTIN/ unregistered supplier, place of supply, SAC/ HSN code etc.) and other mandatory details shall be mentioned on the invoice.

ii. Invoice/Supplementary invoice/Debit Note/Credit Note/Receipt Voucher in the name of GFGNL need to be issued in compliant format and timely within the time prescribed under GST law.

iii. In case of any deficient/incomplete/rejected supply, GFGNL on behalf of USOF, DoT shall convey the same in reasonable time to enable the PIA to issue credit note and take tax adjustment.

iv. It would be the responsibility of the PIA to declare correct information on invoice and GSTN portal viz. the amount, the place of supply, rate of tax etc.

v. Registered location of both the parties i.e. GFGNL and PIA should be mentioned with GSTIN No. Further, PIA should raise invoices at the registered premise of GFGNL and ensure that the place of supply as per GST law is same as registered premise of at the premises of its agent GFGNL.

vi. PIA to raise invoices as per the supply location as per GST law.

vii. Invoice number should be mentioned on the e-way bill, if applicable.

viii. PIA shall be responsible for timely issuance and delivery of invoice/ DN/ CN on or before the stipulated time period provided by the GST law.

ix. It is the responsibility of the supplier to ensure that outward supply return (GSTR- 1) would be filed correctly. If not, than cost would be borne by supplier.

x. Reporting of correct outward supply by supplier in the outward return (GSTR-1) is the responsibility of the supplier. In case of mismatch because of supplier's fault, prompt amendments must be made by the supplier else supplier would be required to indemnify GFGNL,/USOF, DoT for the loss of credit (if applicable for this tender) due to mis-match. The compliances to be adhered by supplier includes(but is not limited to) the following:

i. Uploading appropriate invoice details on the GSTN portal within the stipulated time;

ii. Issuing GST compliant invoice / CN/ DN in the name of GFGNL should be referred by supplier for capturing information on the invoice.

iii. Supplier needs to pay the entire self-assessed tax on timely basis.

iv. Where invoice is not uploaded or incorrect upload of invoice detail on GSTN portal by supplier then credit on such invoice will be given provisionally subject to matching. So, acceptance of changes made by GFGNL on GSTN on account of non-upload or incorrect upload of invoice details on GSTN is to be submitted by supplier. Such changes w.r.t. the mismatch are required to be accepted by supplier with in the time limit prescribed under the GST law. It should be noted that in case supplier does not accept such changes within the time limit prescribed under GST law, the loss of input tax credit (if any) would be recovered from the supplier. In case of mismatch because of Supplier's fault, prompt amendments must be made by the supplier else supplier would be required to indemnify GFGNL for the losses of credit and interest paid due to mismatch.

(v) Supplier to issue all necessary documentation and perform all necessary compliances to GFGNL.

(vi) A self-declaration along with evidence that the bidder is not blacklisted by GST authorities. In case supplier gets black listed during the tenure of this contract, then supplier must indemnify GFGNL,DoT,USOF due to default of supplier.

(vii) Where the location agreed are more than one state, then separate invoice state wise shall have to be submitted.

(viii) It shall be the responsibility of the supplier to mention place of supply of goods/services in the invoice issued in the name of GFGNL and submitted to designated authority of GFGNL which is acting as a processing/ paying authority on behalf of USOF, DoT.

4.64 PRICES

The responsibility of the supplier. In case of mismatch because of supplier's fault, prompt amendments must be made by the supplier else supplier would be required to indemnify GFGNL for the loss of credit (if applicable for this tender) due to mismatch. The compliances to be adhered by supplier includes (but is not limited to) the following:

(i) Uploading appropriate invoice details on the GSTN portal within the stipulated time;

(ii) Issuing GST compliant invoice / CN/ DN in the name of GFGNL should be referred by supplier for capturing information on the invoice.

(iii) Supplier needs to pay the entire self-assessed tax on timely basis.

(iv) Where invoice is not uploaded or incorrect upload of invoice detail on GSTN portal by supplier then credit on such invoice will be given provisionally subject to matching. So, acceptance of changes made by GFGNL on GSTN on account of non-upload or incorrect upload of invoice details on GSTN is to be submitted by supplier. Such changes w.r.t. the mismatch are required to be accepted by supplier with in the time limit prescribed under the GST law. It should be noted that in case supplier does not accept such changes within the time limit prescribed under GST law, the loss of input tax credit (if any) would be recovered from the supplier. In case of mismatch because of Supplier's fault, prompt amendments must be made by the supplier else supplier would be required to indemnify GFGNL for the losses of credit and interest paid due to mismatch.

(v) Supplier to issue all necessary documentation and perform all necessary compliances to GFGNL.

(vi) A self-declaration along with evidence that the bidder is not blacklisted by GST authorities. In case supplier gets black listed during the tenure of this contract, then supplier must indemnify GFGNL due to default of supplier.

(vii) Where the location agreed are more than one state, then separate invoice state wise shall have to be submitted.

(viii) It shall be the responsibility of the supplier to mention place of supply of goods/services in the invoice issued in the name of GFGNL.

4.65 CHANGES IN PURCHASE ORDERS

4.65.1 GFGNL on behalf of USOF, DoT may, at any time, by a written order given to PIA, make changes within the general scope of the contract in any one or more of the following:

(a) drawings, designs or specifications, where works to be executed under the contract are to be specifically completed as per requirements conveyed by GFGNL.

(b) the services to be provided by the PIA.

4.65.2 If any such change causes an increase or decrease in the cost of, or the time required for the execution of the contract an equitable adjustment shall be made in the contract price or delivery schedule, or both, and the contract shall accordingly be amended. Any proposal by the supplier for adjustment under this clause must be made within thirty days from the date of the receipt of the change in order.

4.66 SUB-CONTRACTS FOR SERVICES

I. Sub- Contracting to any other agency can be done with prior approval of GFGNL (being an agent of USOF, DoT), only upto 70% of the contract value for services {not exceeding 70% CAPEX excluding material cost}.

II. The procurement & supply of material, hiring of machines with or without labor shall not be covered under sub-contracting.

III. The no. of Sub Contractors shall be limited to maximum 25 in case of packages.

IV. The eligibility conditions for the Sub Contractors shall be at least 50% of the proportionate technical eligibility mentioned in Eligibility Criteria for the proposed subcontracted works other than material supplies. While according to approval, GFGNL shall evaluate the Sub Contractors eligibility based on its technical experience considered against already approved sub-contracts in the same or any package of this project. If such sub-contracted works are completed, the experience can be re- considered.

V. Even in such cases, the PIA shall ensure the quality of goods and services as envisaged in this document, with robust mechanism of monitoring and quality check, as the responsibility of contract lies with the PIA. Sub- Contracting, even if approved by GFGNL shall not relieve the PIA from any liability or obligation under the Contract.

VI. After, the specific approval of Subcontracting of work to any Subcontractor is approved by GFGNL, the PIA shall further keep GFGNL updated, in writing, whenever, such approved subcontracts are awarded.

4.67 SELECTION CRITERIA & ALLOTMENT OF WORK

Package Participations: Bidder can submit bid(s) for both the package, but any successful bidder will get only maximum 1 package. If any Bidder wins in both 2 packages, then the GFGNL has the sole rights to allocate the one package without consultation with bidder. Therefore, it is expected that bidders are to be financial realistic while participating. The non acceptance of allocated by the selected bidder shall be observed very seriously by the tenderer.

Package Allocations: However, allocation at the end of tenderer side will be based on financial, Technical, and Operational convenience in the larger interest of the tenderer.

Rate Matching In Between Packages:

The packages will be different geography, terrain, Social economic conditions and associated ground conditions and hence the rates quoted in one package will not be comparable with other package/s rates. Therefore, to reduce complexities and procedural issues the rate comparing activity may not be of high relevance at here.

Rate Matching Within the packages:

Within the package, price matching criteria will be applicable. While rate matching process, the bidder may choose corresponding matching product and rate. The sequence shall be L1 then L2 then L3 and .....So on of that particular package there after the same process will be repeated for other package followed with the same sequence and later with cross package. For the Convenience and simplification.

a. There are separate financial bid tables provided for each package on (n)Procure website. Bidder wanting to participate in multiple packages will have to submit financial bids for each package separately in respective table. Evaluation will be done separately for each package. The Bidder with lowest bid (L1 – lowest sum total of “Financial bid” of any package) will be for each package. GFGNL reserves the rights to negotiate the rate of any line item(s) with selected Bidder(s).

b. Bidder has to ensure to fulfill the requirement with all features encorporated in this Bid document/RFP from OEM during the integration of site, failure of the features Bidder will be solely responsible to give the new product with define specifications and eligibility criterias to deliver the services with upgraded products without any further cost and delay in project to GFGNL, disallowing on the requirement will be the base ground to initiate the termination of contract or forfit the PBG.

c. In case GFGNL will find any issue in the implementation work of any successful Bidder in terms of quality or implementation timeline, GFGNL will have sole rights to exclude already allotted sites / customer locations from the scope of that Bidder and “Risk Purchase” clause will be applied in such situation.

4.68 RISK PURCHASE

i) If the selected Bidder of any particular package (referred to as H1 here in this clause) fails to perform its obligations (or any part thereof) under this scope of this RFP or if the scope of this RFP is terminated by the Tenderer due to breach of any obligations of the selected Bidder under scope of this RFP, the Tenderer reserves the right to procure the same or equivalent Hardware / Services / Deliverables from other sources as per options mentioned below.

1. from successful Bidder of other packages who agrees to execute the work at H1(Highest qualified bidders) discovered rate of H1 or L1 discovered rate of their respective package(s) whichever is lower.

2. from H2 / H3 /…Hn Bidder of the H1 package (where n is the total number of bids received in H1 package with the first Bidder out of H2 / H3 /…Hn who agrees to match the price of H1 discovered rate of H1 package.

3. from any other "alternate source". The procurement from "alternate source" shall be done, as far as possible, through Government's procurement guidelines as deemed appropriate by the tenderer.

ii) Above mentioned procurement will be done at the selected Bidder's (who has failed to perform its obligations & thus defaulted) risk, cost and responsibility. Any incremental cost borne by the Tenderer in procuring such Hardware / Services / Deliverables shall be borne by the selected Bidder (who has failed to perform its obligations & thus defaulted). Any such incremental cost incurred in the procurement of such Hardware / Services / Deliverables from other source will be recovered from the pending due and payable Payments / Security Deposit / Bank Guarantee provided by the selected Bidder (defaulted Bidder) under this scope of this RFP and if the value of the Hardware / Services / Deliverables under risk purchase exceeds the amount of pending payable payments / Security Deposit and / or Bank Guarantee, the same may be recovered, if necessary, by due legal process.

iii) In this case of risk purchase, H1 Bidder(s) of other package(s) or H2 / H3 /…Hn Bidder of the H1 package or any alternate source will have to submit performance bank guarantee @ 5% of the total value of the work allotted to the Bidder.

4.69 DELAYS IN THE CONTRACTOR'S PERFORMANCE

4.69.1 Performance of the services shall be made by the PIA in accordance with the time schedule specified in the purchase order/ work order.

(a) In case the works are not completed in the stipulated period, as indicated in the Purchase Order/ work order, GFGNL on behalf of USOF, DoT reserves the right either to short-close/ cancel the purchase order/ work order and/ or recover penalty.
(b) Before taking such action of short-closure/ cancellation of purchase order/ work order, GFGNL shall serve, four (04) written notices of default, to the PIA at an interval of ten(10) days after each notice.
(c) If the PIA does not remedy its failure within a period of 10 days after 4th notice, GFGNL may take action as mentioned in the relevant clause of RFP.
(d) The cancellation/ short-closing of the order shall be at the risk and cost of the PIA and GFGNL reserves the right to give work order for the balance works at the risk and cost of the defaulting PIA within one year from the date of short closure of the Purchase Order/ Work Order OR date of scheduled completion of the respective project phase (i.e. construction or O&M), whichever is later.

4.69.2 Delay by the PIA in the performance of its works obligations shall render the PIA liable to any or all of the following sanctions:

(a) forfeiture of its performance security,
(b) imposition of penalty, and/ or
(c) Short- closure of the contract in part or full and/ or termination of the contract for default.

4.69.3 If at any time during the performance of the contract, the PIA encounters condition impending timely performance of service (execution of work), the PIA shall:

(a) Promptly notify to GFGNL in writing the fact of the delay, effect on SLAs and its likely duration and its cause(s). As soon as practicable after receipt of the PIA's notice, GFGNL shall evaluate the situation and may at its discretion extend the period for performance of the contract(by not more than 04 weeks or as per provisions in respected clause of RFP) or grant relaxation in SLAs as per provision given below :

(b) If the work is not completed as per the milestone, applicable penalties/ LD shall be levied. However, the PIA need not seek delivery period extension till the delay of 10 weeks from the milestone. PIA shall request for delivery period extension, Work Order wise, after delay of 10 weeks as per project milestones. However, GFGNL reserves the right to short close any time beyond delivery period. The PIA has to submit their request for extension in time along with the undertaking as per clause mentioned in RFP certificate at least two weeks before the expiry of time period. The PIA shall also submit unconditional acceptance of the conditions for time period extension i.e. applicability of penalties, prices to be provisional and to be regulated and submission of additional BG, wherever applicable. The decision regarding extension shall be communicated within four weeks of the receipt of request and after receipt of the unconditional acceptance and the undertaking mentioned above.

(c) In case extension is being granted beyond 04 weeks then the PIA shall submit additional BG while seeking extension. For piecemeal works (package wise) the amount of additional BG shall be 3 % of the value of balance quantity of works to be done for which extension in time period has been sought. The additional BG shall be valid for six months beyond extension of scheduled period sought and shall be discharged after the works has been completed and made over to the ultimate consignee within the last extended scheduled period on submission of inspection certificate from designated officer's receipt without prejudice to the other remedies available to GFGNL.

4.69.4 If the works are not completed in the extended time period, the purchase/work order shall be short-closed and both the Performance securities i.e. PBG and additional BG shall be forfeited. The decision of GFGNL shall be final.

4.70 INCIDENTAL SERVICES

The PIA/supplier may be required to provide any or all of the following services:

(a) Performance or supervision of on-site assembly and/ or start-up of the supplied Goods;
(b) Furnishing of tools required for assembly and/ or maintenance of supplied Goods;
(c) Performance of supervision or maintenance and/ or repair of the supplied Goods, for a period of time agreed by the parties provided that this service shall not relieve the supplier of any warranty obligations under this contract.

Annexure A Conciliation through Outside Expert Committee (OEC)

A. If any dispute, difference, question or disagreement arises between the parties hereto or their respective representatives or assignees, in connection with construction, meaning, operation, effect, interpretation of the third party contract or breach thereof which parties are unable to settle mutually, the same may first be referred to conciliation through Outside Expert Committee ("OEC") as provided in the Conduct of Proceedings through OEC in *Annexure B* below.

B. The venue of the OEC meeting shall be as decided by USOF/ GFGNL.

C. OEC members will be paid fees and provided facilities as per prevalent guidelines.

D. Parties are free to terminate the conciliation proceedings at any stage as provided under the Arbitration and Conciliation Act, 1996.

E. Subject to terms and conditions contained in the above paras, the provisions of the Part III of Arbitration and Conciliation Act, 1996 shall be applicable to the conciliation proceedings and the parties and the OEC members shall be bound by the same.

Annexure B Conduct of Conciliation Proceedings by OEC

I. Proposal for OEC

c. The Claimant shall give notice for conciliation to the other parties. The notice shall be given to the concerned officer(s) named for the other parties in the third-party contract, clearly bringing out the points of dispute and the amount claimed with documents in support of the claim and the party concerned shall not raise any issue thereafter. It shall be ensured by parties that no parallel proceedings relating to dispute under the same contract are going on in any Court/ Forum /Tribunal. In case, if any dispute is pending relating to the same Contract, then both the parties shall either withdraw the proceedings from the Court/ Tribunal / forum or shall keep the case in abeyance.

II. Constitution of OEC

a. The OEC shall comprise of atleast 3 members, appointed by USOF/ GFGNL.

b. In case of vacancy created because of the resignation/recusal of any member, or if any OEC member is not available to attend further OEC Meetings, the vacancy shall be filled by the nomination by the USOF/ GFGNL.

c. The OEC members shall give a declaration of independence and impartiality (as per Appendix) to both the parties before the commencement of the OEC proceedings.

III. Constitution of OEC

a. The claimant shall submit its statement of claims to OEC members, and to the other party(ies) (hereinafter referred as "Respondents") prescribed in the appointment letter within 30 days of the issue of the appointment letter (as per Appendix, placed below clause 21).

b. The respondents shall file its reply and counter claim (if any) within 30 days of the receipt of the statement of claims.

c. Parties may file their rejoinder/additional documents if any in support of their claim/counter claim within next 15 days. No documents shall be allowed thereafter, except with the permission of OEC.

d. OEC will commence its meetings only after completion of the pleadings.

e. In case of 3 members OEC, 2 members will constitute a valid quorum and the meeting can take place to proceed in the matter after seeking consent from the member who is not available. However, OEC Recommendations will be signed by all Members. Further, efforts must be made for unanimous recommendations. In exceptional circumstances such as death/serious illness of OEC member or if any OEC member has resigned/recused himself from the case during OEC proceedings and non-appointment of any other member in the place of vacancy so caused, then with the consent of all the parties, two OEC members shall give and sign the recommendations. At the conclusion of OEC proceedings, OEC members shall give its recommendations for resolution of disputes based on material before it with proper justification and reasons. Failure report or recommendations without reasons shall not be construed to be a recommendation by the OEC.

f. The parties shall be represented by their in-house employees/executives. No party shall be allowed to bring any advocate or outside consultant/advisor/ agent to contest on their behalf. Ex-officers of GFGNL and/or USOF who have handled the matter in any capacity are not be allowed to attend and present the case before OEC on behalf of Contractor.

g. Solicitation or any attempt to bring influence of any kind on either OEC Members or GFGNL or USOF is completely prohibited in conciliation proceedings and USOF/ GFGNL reserves the absolute right to close the conciliation proceedings at their joint discretion if they apprehends any kind of such attempt made by the Contractor or its representatives.

h. Parties agree to rely only upon documentary evidence in support of their claims and not to bring any oral evidence in the OEC proceedings.

i. OEC will give full opportunity of hearing to the parties before giving its recommendations.

j. OEC will conclude its proceedings in generally 4 meetings, and give its recommendations within 60 days of its first meeting. OEC will give its recommendations to all the parties recommending possible terms of settlement. USOF/ GFGNL may extend the time/ number of meetings, in exceptional cases, if OEC requests for the same with sufficient reasons.

k. Parties shall not claim any interest on claims/counterclaims from the date of notice invoking conciliation till execution of settlement agreement, if so arrived at. In case, parties are unable to reach a settlement, no interest shall be claimed by either party for the period from the date of notice invoking conciliation till the date of OEC recommendations and 30 days thereafter in any further proceeding.

IV. Actions after OEC Recommendations

a) The recommendations of OEC are non-binding and the parties may decide to accept or not to accept the same. Parties are at liberty to accept the OEC recommendation with any modification they may deem fit.

b) Each party shall communicate its comments/response on the Recommendations given by the OEC along with its decisions whether the recommendations are acceptable or not, to the other parties within a period of 15 days from the electronic receipt of the recommendations of OEC. If recommendations are acceptable by all the parties, a settlement agreement under Section 73 of the Arbitration and Conciliation Act, 1996 will be signed within 15 days of last communication of the period ending 15 days within which the decision of the parties has to be communicated, and same shall be authenticated by all the OEC Members. The Agreement so signed and authenticated shall have the same effect as an award passed under Section 30 of the Arbitration and Conciliation Act, 1996.

c) The timelines mentioned in the above guidelines are with an objective to achieve expeditious conclusion of OEC proceedings. However, it does not mean that any action beyond the timelines will be invalid. However, the party concerned will make all efforts to complete the actions within the stipulated time.

d) The parties shall keep confidential all matters relating to the conciliation proceedings including minutes of OEC meeting and Recommendations of OEC. Parties shall not rely upon them as evidence in any arbitration / court proceeding whether or not such proceedings relate to the dispute that is the subject of the conciliation proceedings, views expressed or suggestions made by the other party in respect of a possible settlement of the dispute;

i. admissions made by the other party in the course of the OEC proceedings.
ii. proposals made by the OEC.
iii. the fact that the other party had indicated his willingness to accept a proposal for settlement made by the OEC.

e) Confidentiality extends also to the settlement agreement, except where its disclosure is necessary for purposes of implementation and enforcement. This stipulation will not apply to disclosure made by GFGNL or USOF to Govt. of India or its authorities, if required.

f) The OEC members shall be entitled to the Fee as applicable.

Appendix: Declaration of independence and impartiality by OEC Member

To,

1. GFGNL
2. USOF
3. Contractor

Subject: Declaration of independence and impartiality by Outside Expert Committee (OEC) Member in the dispute under Contract No _.

I, the undersigned, hereby accept to act as Member of the Expert Committee and conciliate in the disputes under reference between the parties above named, I confirm that I am aware of the requirements of law particularly of the Arbitration and Conciliation Act, 1996, to act as a conciliator, I am able to act as conciliator and am available to act as Member of the Expert

Committee, I hereby declare that I am independent of each of the parties and have no ownership interest in any part of the contract under reference or any financial interest in the said contract. I have no interest in the outcome of the dispute or its settlement.

I hereby affirm that I shall act with honesty, integrity, diligence, and will remain independent and impartial while discharging my duties as conciliator/OEC Member. I will disclose any interest or relationship with the parties or the subject matter which might compromise in any manner my ability or capacity to remain impartial and independent in the matter.

I further, being a member of the OEC, agree to abide by the terms and conditions of Clause

and conduct the proceedings as per Clause of the Contract/Agreement No. .

(Signature)
Name: Address:
Phone:
Email:
Date:

4.71 PUBLIC PROCUREMENTS

a. In accordance to guidelines of GoI issued vide No. P-45021/2/2017-PP(B.E.-II) dated 16th September, 2020, No. P-45021/102/2019-BE-II- (part(I) (E-50310) dated 04.03.2021 and Department of Telecommunications Gazette notification dated 29th August 2018 along with instructions as amended from time to time by Govt. of India, in order to encourage make in India and promote manufacturing and production of goods and services in India, preference will be given to domestically manufactured equipment envisaged to be procured through this tender. A copy of the aforesaid Notifications/ Guidelines/ Amendments can be downloaded from Department of Promotion of Industry and Internal Trade website i.e. URL www.dipp.gov.in. Purchase preference for domestic manufacturer, methodology of its implementation, value addition to be achieved by domestic manufacturers, self-certification and compliance and monitoring shall be as per the aforesaid Guidelines/ Notifications. The Guidelines may be treated as an integral part of the tender document.
b. As per aforementioned guidelines there shall be three categories for manufacturers/ suppliers:
    I. Class-I Local Supplier: A supplier or service provider whose goods, services or works offered for procurement meets minimum 'Local Content' of 50%.
    II. Class-II Local Supplier: A supplier or service provider whose goods, services and works offered for procurement meets minimum 'Local Content' of 20% but less than 50%.
    III. Non-Local Supplier: A supplier or service provider whose goods, services and works offered for procurement has 'Local Content' less than 20%.
c. The Local Content shall mean the amount of value added in India which shall be the total value of item procured (excluding net domestic indirect taxes) minus the value of imported

content in the item (including all custom duties) as a proportion of the total value, in percent. DPIIT letter dated 16.09.2020 & 04.03.2021 shall be referred for calculation of Local Content of bid.

d. The provisions of the Public Procurement (Preference to Make in India) Order 2017 dated June 15, 2017 (or subsequent revisions, if any) by Department of Industrial Policy and Promotion, GoI shall apply to this tender to the extent feasible. However, the participation is open to all i.e. Class-I, Class-II and to Non-local suppliers including foreign suppliers

e. It is mandatory for the bidder to submit a self-certification as per proforma in Annexure and an undertaking in Annexure format, along with the bid that the items (Excluding Services (I&C) and AMC value) offered as package in this tender meets the minimum local content and shall give details of the locations at which the local value addition is made. In addition, such bidder is also required to provide a certificate from the statutory auditor or cost auditor of the company giving the percentage of local content in accordance to DPIIT letter dated 16.09.2020 & 04.03.2021. Furnishing of false information on this account shall attract penal provisions as per the Guidelines/Notification. Bidders may note that whereas GFGNL may at its discretion choose to randomly verify any of the documents submitted towards fulfilment of claims of PMI under this clause, it is under no obligation to verify the self-declaration of bidder and/or certificate of Chartered Accountant/Cost Accountant regarding the bidder meeting the criteria to be eligible for class I / class II status in this tender. Acceptance of the documents furnished by the bidder as part of the bid by GFGNL in this regard shall not amount to endorsement of their content by GFGNL, and consequences of false declarations if any, discovered at any stage before or after award of work shall completely fall on the bidder.

f. All instructions/ amendments on the subject of PMI issued by DPIIT or any other department of Government of India, up to the date of bid shall be applicable for this tender, and bidders claiming any benefits under subject provisions must ensure full compliance by furnishing the necessary documents, beyond the list of documents mentioned in this tender.

g. No relaxation in this shall be given and any delay in achieving the milestone shall attract penalties as per the provision of the tender.

h. The PIA shall submit the Field Trial test schedule; covering all the technical specifications as per the tender; to GFGNL for approval.

i. The TSEC and field trial shall not absolve the PIA for offering the individual equipment for acceptance testing after installation.

j. Being a turn-key project, the responsibility of the PIA shall be to meet all the performance parameters, functional requirements and SLA benchmarks during the entire contract period. In case, the router or any other equipment does not meet these requirements during Acceptance Testing and/ or O&M period, the PIA shall be bound to replace such equipment with appropriate equipment meeting all the requirements specified in the tender for entire contract period on its own cost.

k. Any bidder from a country which shares land border with India will be eligible to bid if the bidder is registered with the competent authority as specified in the annexure of O.M. No. 7/10/2021-PPD(1) Dated 23.02.2023 from Department of Expenditure, Ministry of Finance. The bidders shall submit an undertaking in this regard as per format provided, of this tender document.

l. The Mandatory Testing and Certification of Telecom Equipment (MTCTE) guidelines require that every telecom equipment must undergo mandatory testing and certification prior to sale, import of use in India.

m. The supplied products under this project shall meet the extant guidelines on MTCTE issued by TEC from time to time for various telecom equipment.

n. The instructions regarding supply of ‘Trusted products’ as mandated by DoT vide File no- 20-271/2010 AS-I (Vol-III) dated 10.3.2021, along with its amendments, issued from time to time,

shall have to be complied for this tender. The bidder/ OEM shall not be in the notified list of designated sources, from whom no procurement can be done, as per above letter.

o. Routers and RFMS, to be supplied under this tender, should comply “Trusted Products” before delivery. In case, the make/ model is not approved as “Trusted Product”, then, the bidder/ OEM shall obtain the approval for the tendered products from the designated office.

p. Alternatively, the bidders can provide all documents/ information to GFGNL for application on trusted portal, in their technical bid. The format for submission of information (to be submitted with technical bid) is enclosed.

q. In case of imported products, OEM should have a registered office and Service Support Centre in India to provide after sales service support in India.

r. The bidder is required to submit a certificate to this effect, as part of its bid.

SECTION-5 SCOPE OF WORK

5.1 SCOPE OF WORK

The EPC contractor is responsible for delivering a fully operational network, adhering to performance, scalability, and regulatory standards. This approach ensures seamless integration of technology, from backbone infrastructure to last-mile connectivity, supporting voice, data and enterprise services. Telecom EPC projects often encompass both greenfield and brownfield developments, focusing on the deployment of cutting-edge network solutions while also upgrading existing infrastructure to meet future demands. The contractor assumes full responsibility for the project's execution, ensuring timey delivery, cost efficiency, and network performance to meet service-level-agreements (SLAs) and customer needs in a rapidly evolving digital landscape.

To implement the BharatNet Phase III in Gujarat the Broad level scope of work would involve,

a) **Implementation of IP-MPLS Network:** To deploy the IP-MPLS network for GFGNL under the BharatNet program across the state.

b) **Construction:** To build network infrastructure across remaining Gram Panchayats (GPs), Revenue-Villages and Block locations to establish the IP-MPLS network.

c) **Upgradation:** To upgrade the existing network infrastructure from linear to IP-MPLS based ring topology across GPs and Block locations.

d) **Operation and Maintenance (O&M):** To operate and maintain both the existing and the newly deployed network infrastructure as per the defined SLA.

e) **Establishment and Upgrade of State Network Operation Center (NOC):** This will be addressed by separate tender to upgrade the existing NOC, including hardware and software licenses, and to integrate both the existing and new network devices for monitoring, supervision and O&M to meet the desired SLAs.

f) **State Data Center (SDC):** All blocks/TC-DC/Shelter locations to be connected to SDC and all active infrastructure, as defined further under Detailed Scope of Work to be provisioned at SDC.

g) **Network Monitoring and Service Provisioning:** To provide comprehensive network monitoring and service provisioning to enable retail, enterprise and wholesale services as per the requirement of GFGNL across the Contract Period.

The scope of work for the Project Implementation Agency (PIA) shall cover across the state of Gujarat and it is to be noted that number of Gram Panchayats (GPs) as indicative in below table, and PIA shall undertake the Scope of Work across all Gram Panchayats (GPs) identified post survey and approved by GFGNL.

Sl.	Scope	Total Counts	Phase-I Counts	Phase-II Counts
1	District HQ	33	11	22
2	Block HQ	252	117	135
3	Gram Panchayat	14654	6617	8037
4	Revenue Villages	4387	-	-
5	No. of Exchange (Ring Block)	660	259	401

Note: Above figures are tentative in nature as per present status.

5.2 DETAILED SCOPE OF WORK

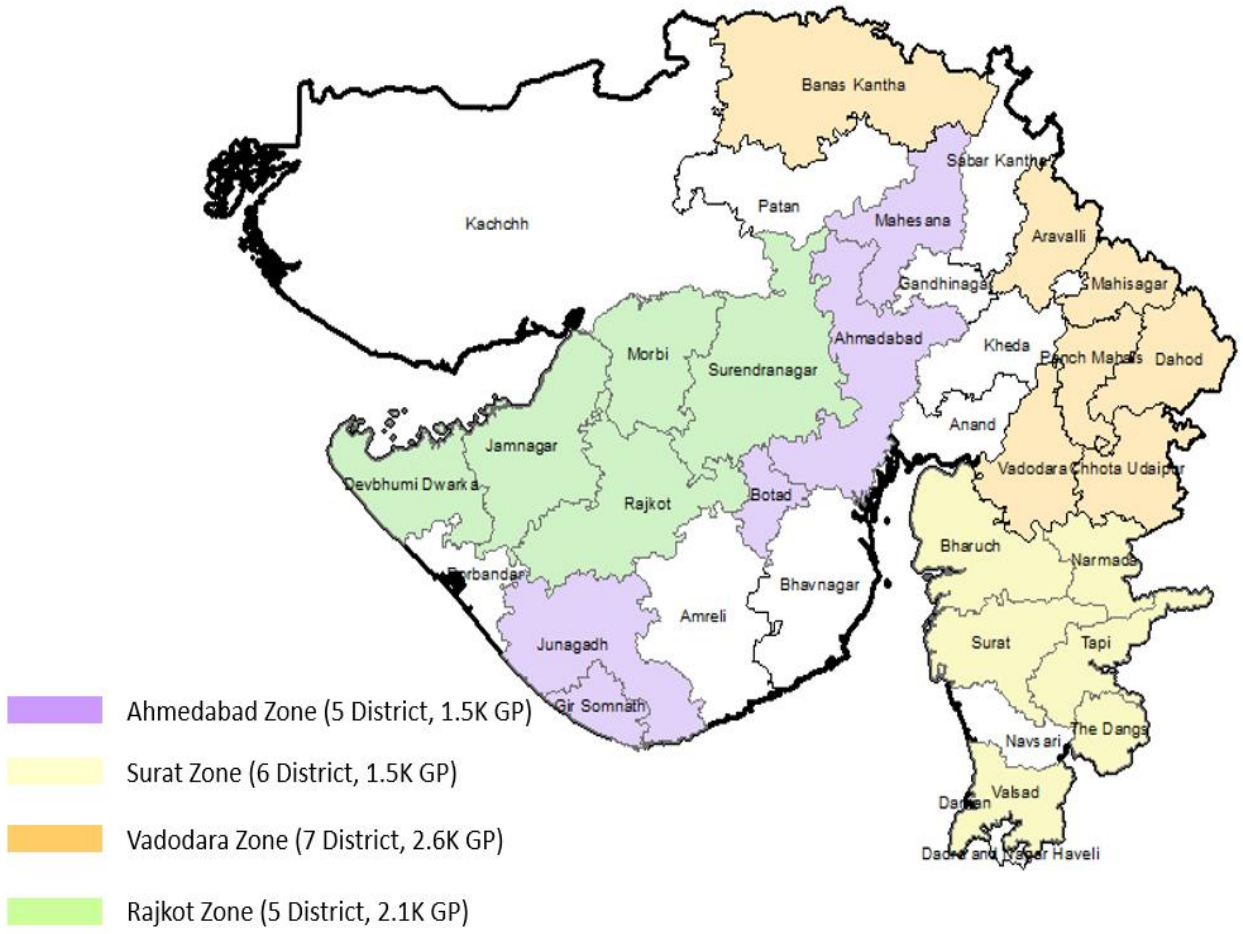
i. The scope of work includes,

- Upgradation of linear network onto ring network of Phase-I and Phase-II GPs where it is Constructed in Linear)
- Village connectivity beyond GPs on demand basis for revenue villages on alternate technology like RF/UBR, FSO and Aerial linear OFC connectivity from GP
- O&M for 10 years including three years of construction period inclusive of existing Phase-I and Phase-II network.

ii. BBNL has implemented BharatNet Phase-I in **11 districts** (Gandhinagar, Kheda, Anand, Navsari, Bhavnagar, Amreli, Sabarkantha, Patan, Kachchh, Porbandar, Dadar and Nagar Haveli) and has implemented in partial talukas of 4 districts (Bharuch, Vadodara, Valsad and Mehsana).

iii. GFGNL has implemented BharatNet Phase-II in **18 districts** (Ahmedabad, Surendranagar, Botad, Morbi, Rajkot, Jamnagar, Junagadh, Gir Somnath, Devbhumi Dwarka, Banaskantha, Arvalli, Mahisagar, Panchmahal, Dahod, Narmada, Surat, Tapi, Dang) and has implemented in incomplete talukas of **4 districts** (Bharuch, Vadodara, Valsad and Mehsana) from Phase-I. GFGNL has implemented BharatNet Phase – II network in Gujarat in two different packages. Package – A has three islands in Rest of Gujarat and Package – B has one island in Saurashtra region. Package – A has 12 districts & Package – B has 10 districts. Further, both the packages are divided into two zones. Package A has two zones i.e., Vadodara zone & Surat zone and Package B has two zones i.e., Ahmedabad zone & Rajkot zone.

Existing BharatNet Phase-I & II coverage:



Note – Mentioned GP counts are approximate numbers, white color marked districts are of BharatNet Phase-I and BharatNet Phase-II districts are divided into four zones marked on above map.

iv. Proposed BharatNet Phase-III Zones on Gujarat Map:

For contiguous geography and integration of Phase-I districts, Gujarat will distribute in 6 x zones (Ahmedabad, Gandhinagar, Surat, Vadodara, Rajkot, Bhavnagar)

New Package-A comprises of Gandhinagar, Vadodara and Surat Zones.
New Package-B comprises of Ahmedabad, Rajkot and Bhavnagar Zones.

Ahmedabad	2113
Bhavnagar	2271
Rajkot	2399
Gandhinagar	2634
Surat	2491
Vadodara	2746
Grand Total	14654

Package	Zone	Scope Counts of			
		Districts	Blocks	Gram Panchayats	Revenue Villages
Package-B	Ahmedabad	4	38	2113	176
	Bhavnagar	5	40	2271	110
	Rajkot	6	39	2399	434
Package-A	Gandhinagar	5	42	2634	1096
	Surat	7	45	2491	1224
	Vadodara	6	45	2746	1391
Grand Total		**33**	**249**	**14654**	**4431**

Package	Zone	Scope Counts of Phase-I			
		Districts	Blocks	Gram Panchayats	Revenue Villages
Package-A	Gandhinagar	3	22	1327	379
	Surat	2	17	1102	262
	Vadodara	4	24	1244	719
Package-B	Ahmedabad	2	18	993	106
	Bhavnagar	2	23	1393	73
	Rajkot	2	13	783	387
Grand Total		**15**	**117**	**6842**	**1926**

Package	Zone	Scope Counts of Phase-II			
		Districts	Blocks	Gram Panchayats	Revenue Villages
Package-A	Gandhinagar	2	20	1307	717

	Surat	5	28	1389	962
	Vadodara	2	21	1502	672
Package-B	Ahmedabad	2	20	1120	70
	Bhavnagar	3	17	878	37
	Rajkot	4	26	1616	47
Grand Total		**18**	**132**	**7812**	**2505**

Note –

a) Above figures are indicative in nature and may vary as per actual scope during workorder.

b) As such, Strategic government locations of around 200 numbers connected on BharatNet Phase-II will also be part of this bid scope for which details will be shared separately.

v. PIA shall build Amendment Bharatnet Program (i.e., BharatNet Phase-III) network architecture to provide 1Gbps bandwidth per each Gram Panchayat which shall be scalable to 10Gbps bandwidth per each Gram Panchayat across Gujarat by ensuring to implement OFC route design and network design concepts provided in subsequent RFP sections.

vi. Bidder may advice to plan the new GP equipment in ring co-located at GUVNL/Discom sub-station wherever feasible in consultation with the GFGNL and serve the GramPanchayat through feasible technologies.

vii. PIA shall use existing OFC routes of Phase-I and Phase-II BharatNet network except leased routes for linear OFC to ring OFC topology to deliver at each GP of Gujarat.

viii. Bharat Net Phase-I has leased fiber from OLT (BSNL Exchange at Sub-block) to FPOI locations and underground fiber from FPOI to GP wherein BharatNet Phase-II has end to end fiber starting from OLT(Shelter location at Sub-block) to GP. Connecting all Phase-I and Phase-II GPs will require precise fiber network planning considering the ring topology, replacing leased fibers with underground OFC with minimum 24F/48F and implementing IP-MPLS routers at Existing OLT(Sub-block) location and implementing IP-MPLS routers at existing ONT (Gram Panchayats) locations. This will also include O&M of existing laid network along with reconstruction of damaged routes.

ix. New telecom grade shelters at block locations of BharatNet Phase-I to house all network equipment instead of BSNL exchanges and upgradation of the existing telecom trade shelters at block locations of BharatNet Phase-II will be addressed through the separate tender.

x. State/SIA will support space and power supply requirements for the equipment to be installed at GP as well as telecom grade shelters for BharatNet Phase-III network. Power consumption and Space usage outlook of network equipment for Phase-III including 10 years of O&M period requires to submit by PIA in financial bid format as a separate component.

xi. Selected PIA has to consider the Vadodara as a Disaster recovery (DR) at Vadodara State DR for Existing State Data center at Gandhinagar and should plan the OFC network in between the Vadodara and Gandhinagar.

xii. GFGNL's long term vision is to gather the government common asset for betterment of state and governance. In this regard, selected PIA has to support with their resources to utilize them in Amended BharatNet program (BharatNet Phase-III) during the entire contract duration without any further cost to GFGNL.

xiii. Selected bidder has to Fulfil additional requirements, if any, in the larger interest of the Government Network under BharatNet, such as dark fiber delivery, additional OFC work, and

other measures to enable optimal utilization of the network.

xiv. As part of the upgradation, the following activities shall be performed:

a. Upgrade existing BharatNet network to make it robust, redundant and carrier-grade.
- The PIA shall replace the existing GPON equipment with IP-MPLS routers (Access/ Aggregator)
- The existing OFC network shall be upgraded from linear to ring topology.

b. PIA shall integrate the existing (Phase I & II) GPs and newly covered GPs (to be created) under BharatNet network. PIA shall conduct a detailed survey to cover all the GPs in a package by forming GP rings. These rings may consist of existing (Phase I & II) GPs and newly covered GPs (to be created) under BharatNet.

c. PIA shall integrate existing BharatNet infrastructure with NOC as required to be implemented under the project. PIA shall integrate entire BharatNet infrastructure existing (Phase I & II) and newly created with the EMS and NMS to be deployed in State NOC. Further the NMS of State NOC shall be integrated with the NMS of centralized BharatNet NOC.

d. In Phase-1, GFGNL will be building shelter at Sub-Block level to host electronics. However, if situation arise where installation is to be done at BSNL exchange, bidder to consider one time shifting of OFC and electronics to GFGNL shelter once shelter is ready to use without any additional cost to GFGNL. For the same, bidder to ensure OFC & Chamber near tentative shelter location. Shifting should be completed within 10 calendar days of intimation except RoW challenges. Beyond which GFGNL may recover amount in proportionate to BSNL space & infra rent for each day from its next payables.

e. GFGNL will facilitate lease line for DCN for initial 6 month duration in phase-1 from agreement date (T0). For any bandwidth provisioning for each Block/ sub-block/master block, through network elements via provided leaseline of GFGNL the cost will be bared by the PIA post 6months. This would entail all connections including connection with IP-MPLS routers at Sub-block/block/Master block.

5.3 FIBERIZATION AND DESIGN PRINCIPLES

1. PIA has to ensure Sub-block to Sub-block ring on 48F Armored Ribbon straight fiber path (Spinal path) considering major road (NH/SH/DMR)
2. PIA has to ensure GP to GP ring on 24F LT Armored in case of Phase-I and 48F Ribbon Armored in case of Phase-II on shortest possible path to be terminated on Spinal fiber path of Sub-block to Sub-block ring for better uptime.
3. Preference for new fiber work should be ROW roads like shortest possible path on National highway, State highway and District major roads.
4. New OFC routes and last miles are to be built in such a way that it should be enroute to connect Government Schools, Police stations/chowki, Health centers, banks, post offices, forest offices, fair price shops, animal husbandry, Food and civil supplies, co-operative and government field offices, tourism destinations, community science centers, R&B toll booths, fisheries, Port and SEZ, GIDC, Telecom towers.
5. PIA has to refer baseline criteria, bestline criteria and Fiber loss guideline in case of using existing fiber network of Phase-I and Phase-II
6. Fiber loss guideline for each section should be following,

- For 1310nm : 0.34 dB attenuation per Km (1310 nm) + 0.1 dB / splice + 1 dB connector loss
- For 1550nm : 0.22 dB attenuation per Km (1550 nm) + 0.1 dB / splice + 1 dB connector loss

7. Baseline criteria of existing fiber for Phase-I should be as per following:

a) >60% of cores of existing optical fiber cable to be continuous in each section with OTDR report submission and meeting the fiber loss guideline with LSPM report submission.
b) Temporary Aerial cable should be 0 Mtr except routes where ROW and difficult terrain challenged for approved length.
c) Accessible joint closure to be housed in Manhole chamber along with route marker and should be 90% of accessible chamber.
d) As-built, Fiber splicing, ISP update in GIS should be 100%.

8. Baseline criteria of existing fiber for Phase-II should be as per following:

a) >90% of cores of existing optical fiber cable to be continuous in each section with OTDR report submission and meeting the fiber loss guideline with LSPM report submission.
b) Temporary Aerial cable should be 0 Mtr except routes where ROW and difficult terrain challenged for approved length.
c) Accessible joint closure to be housed in Manhole chamber along with route marker and should be 90% of accessible chamber.
d) As-built, Fiber splicing, ISP update in GIS should be 100%.

9. Bestline criteria of existing fiber for Phase-I should be as per following:

a) >90% of cores of existing optical fiber cable to be continuous in each section with OTDR report submission and meeting the fiber loss guideline with LSPM report submission.
b) Manhole accessibility should be 90% of total chambers in network.

10. PIA has to ensure for no any deviation found in engineering guideline (i.e.100% supply as quoted, No depth deviation other than declared, protection to less depth as per RFP, zero deviation or fault in installation & supply during inspection).
11. PIA has to keep loop at standard distance for better operations.
12. PIA has to ensure Ring Criteria as per below:

a) The number of GPs in a GP ring shall normally be around Six (6) to Seven (7).
b) The number of GPs in a child GP ring shall be maximum five (5).
c) First preference for parenting each GP ring to block routers shall be dual homed. It should be minimum 65:35 ratio i.e. 65% of GPs are dual homed means to be parented to two different Sub-blocks and 35% of GPs are single homed means to be parented to single sub-block.
d) Physical path for GPs and Sub-blocks should be on different route for ring connectivity i.e., Primary and secondary both should be on different road (Preferred) or on both side of road (Optional)
e) One path for GP ring should be on existing fiber path and another path for GP ring should be on new fiber path.

13. If any GP has single road connectivity, no need to connect that GP on same road on other side of the road for Ring.
14. Folded Path (IN-OUT on same path) for lastmile of GP, TC and DC should be allowed as per following.

a) GP last mile to be allowed for maximum 1000 mtr only.
b) DC/TC last mile to be allowed for maximum 250 mtr only.

15. PIA has to do fiber work for "**Repair-Reconstruct- Rectify-Replace"** of existing fiber of Phase-I and Phase-II on rates mentioned in the annexure-F,

a) For rectification or replacement of the % work scope is expected as below,

For Phase-I, In between of 10% to 20% of existing network,

For Phase-II, In between of 5 % to 10% of existing network .

b) Beyond the given above upper limit, any additional cost of repair or replacement will be in the scope of the bidder and Bidder shall be given access of network to ascertain health of existing network for the duration 2 Weeks and to made approximation of % scope to be declared in the technical qualifications criterias.

c) GPs already connected through 96F/48F ribbon type and 24F loose tube type fibre for underground OFC to be upgraded with the OF cable of same count of fibres across all Gram Panchayats (GPs).

d) The PIA shall also plan and lay 24F (in replacement of BSNL/Railtel leased fiber from block to FPOI) as per the requirement based on survey. Multiple FPOI in same route (from block to FPOI on existing BSNL fiber), may require 2x24 Fiber OFC, PIA shall lay 48F OFC in such routes.

16. **Linear UG OFC Work** excluding folded path should be allowed as per following.

a) For Kutch region, Linear UG OFC work shall allow at up to 10% of GPs scope considering international border and creek area.
b) For Rest region, Linear UG OFC work shall allow at up to 5% of GPs scope.
c) Redundant path for such linear OFC GP should be allowed with 1 Gbps/10G on alternate technology.
d) Depending on the feasibility of the OFC deployment, PIA may recommend to GFGNL to deploy suitable network architecture (linear) other than ring architecture for a maximum of upto 10% of the GPs scope in the Kutch region and up to 5% of the GPs scope in rest region of Gujarat. GFGNL shall approve the same based on the recommendation from the PIA. For cases, beyond 10% GPs, GFGNL shall examine the constraints in detail and take the final decision.

17. No of hop (Section) **with alternative technology should be allowed at** maximum 4% of the GPs scope having 10G capacity without diluting the SLA performance.

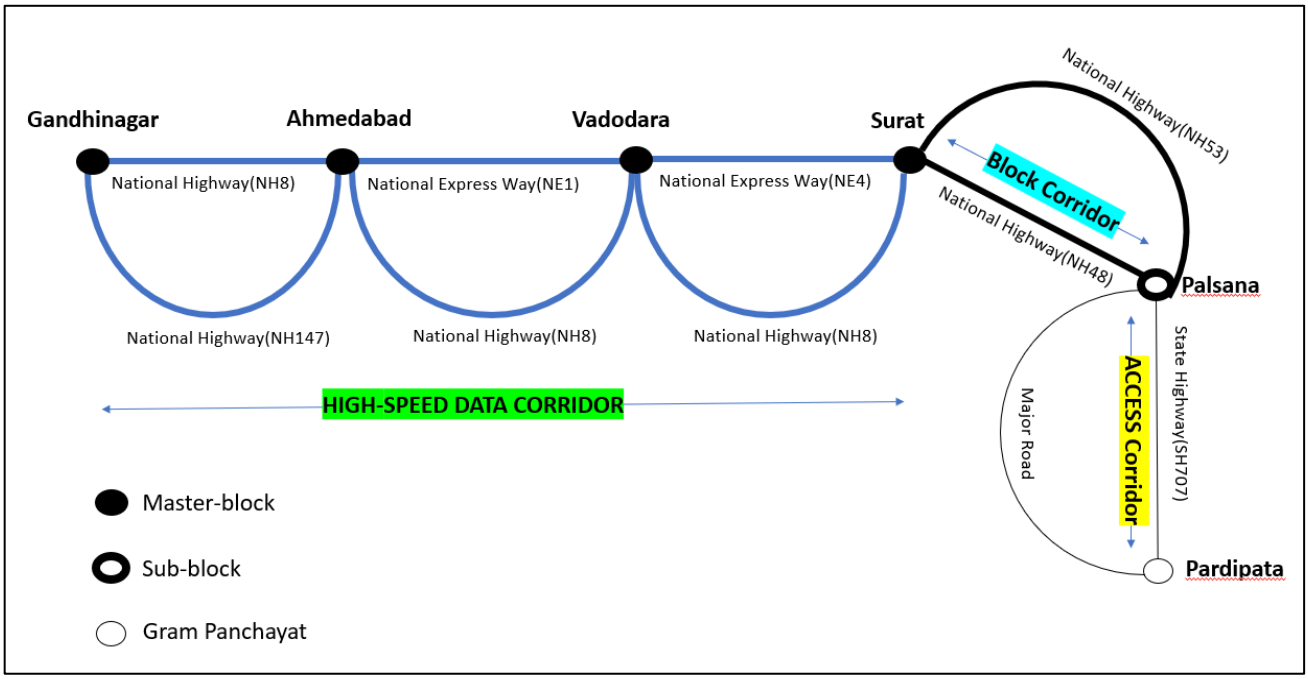
18. The project implementation shall follow underground (UG) optical fibre cable (OFC). Primarily, the PIA will plan for OFC construction through underground laying. However, where underground laying is not feasible, the preferred alternative will be the laying of ADSS (All-dielectric Self-Supporting) OFC, preferably utilizing existing electricity infrastructure, subject to approval by the local distribution company (DISCOM) in rural area. If existing infrastructure cannot be utilized, new pole infrastructure will be installed to support ADSS OFC laying.

19. The PIA is responsible for ensuring connectivity across all Gram Panchayats as per the attached GP annexure and upgrading the existing network infrastructure into a ring topology using IP-MPLS technology.

a) It is required that no more than 5% of the new roll out of OFC work in the GP-to-GP ring (below sub block to GP route) may be implemented using ADSS/OPGW technology subjected to permission availability from concern authority.
b) However, for Block-to-block traffic routes use of ADSS cable subject to GFGNL approval may be permitted based on submission of valid proof.
c) ADSS Technology will not be allowed in 50 Km areas from coastal line.

20. All UG OFC and ADSS OFC shall be armored and meet the technical specification.

21. Fiber route planning are shown in below illustrative diagram; However, Bidder/PIA will be responsible for end-to-end survey and network design in ring topology starting from State data center to Master-block to Sub-block to GP on straight path.



22. PIA shall follow the fiberization Principles for Phase-I network as stated below.

S. No.	Network Layer	Fiber Path Name	Fiber Work Type	New Fiber Type (Minimum Requirement)	Fiber topology (Termination/Spare)	Fiber path Protection on separate route
1	**HIGH-SPEED DATA CORRIDOR** (State Capital to District/Traffic Aggregation Junction)	SDC to Master-block / Master-block to Master-block *(Master block = Any one location in District and/or part of Sub-block and District Centre preferred)*	New work – Straight route	48F (Armoured – Ribbon)	All cores of fiber to be terminated in FDMS at Master-block in each path. 36F to be remain spare (free) end to end after utilizing in network topology	Minimum Three Path
2	**Block corridor** (District to Sub-block)	Master-block to Sub-block/**Sub-block to Sub-block**	New work – Straight route	48F (Armoured – Ribbon)	All cores of fiber to be terminated in FDMS at Sub-block in each path. 36F to be remain spare end to end	

S. No.	Network Layer	Fiber Path Name	Fiber Work Type	New Fiber Type (Minimum Requirement)	Fiber topology (Termination/Spare)	Fiber path Protection on separate route
					after utilizing in network topology	
3	**Access corridor** (Sub-block to GP)	**Sub-block to FPOI**	New work – Straight route	24F (Armoured - LT)	NA (Interim point) 16F to be remain spare end to end after utilizing in network topology	Minimum Two Path
4	**Access corridor** (Sub-block to GP)	Ring work for Gram Panchayat (Subblock/**FPOI to GP)**	New work + Repair work	24F (Armoured - LT)	8F cores to be terminated in FDMS at GP in each path. 16F to be remain spare end to end after utilizing in network topology	

23. PIA shall follow the fiberization Principles for Phase-II network as stated below.

S. No.	Network Layer	Fiber Path Name	Fiber Work Type	New Fiber Type (Minimum Requirement)	Fiber topology (Termination/Spare)	Fiber path Protection on separate route
1	HIGH-SPEED DATA CORRIDOR (State Capital to District/Traffic Aggregation Junction)	SDC to Master-block / Master-block to Master-block *(Master block = Any one location in District*	New work – Straight route	48F (Armoured – Ribbon)	All cores of fiber to be terminated in FDMS at Master-block in each path 36F to be remain spare (free) end to end after utilizing in	Minimum Three Path

S. No.	Network Layer	Fiber Path Name	Fiber Work Type	New Fiber Type (Minimum Requirement)	Fiber topology (Termination/Spare)	Fiber path Protection on separate route
		and/or part of Sub-block and District Centre preferred)			network topology	
2	Block corridor (District to Sub-block)	Master-block to Sub-block/**Sub-block to Sub-block**	New work – Straight route	48F (Armoured – Ribbon)	All cores of fiber to be terminated in FDMS at Sub-block in each path 36F to be remain spare end to end after utilizing in network topology	
3	Access corridor (Sub-block to GP)	Ring work for Gram Panchayat **(Sub-block to GP)**	New work – Straight route	48F (Armoured - Ribbon)	12F cores to be terminated in FDMS at GP in each path Rest of available fiber (min 24F or above) to be remain spare end to end after utilizing in network topology	Minimum Two Path

24. PIA has **Preference of methods for fiberization** should be followed.

a) New fiber work shall be terminated at existing / new healthy fiber tapping point considering fiber loss margin is maintained.

b) Considering high dependency on high-speed data corridor and block corridor, the path should be preferred on major road and to be avoided through enroute GP last mile. However, for third direction traffic it may be allowed.

c) Indicated fiber type is a minimum requirement to have uniform architecture across Gujarat; Bidder may use minimum or higher fiber cores to reserve spare (free) fibers for commercialization.

d) The ideology for the protection path is to achieve high network availability and hence to be design preferably in separate physical path. For the exceptional cases having ground challenges, same physical path may be used in protection after taking concern from GFGNL.

e) At Gram Panchayat level, 2+2 cores for GP ring, 2 cores for RFMS, 2 cores for Transport route third path or inter GP ring connectivity is assumed to be utilized and balance to be kept as spare (Free). End to end Spare / free cores in FPOI-GP & GP ring to be glass-through without FDMS patching at GP.

f) Fiber cores used in existing customer delivery (Dark Fiber) will be counted in spare (Free) cores.

g) New fiber path preference sequence is to have major network assets on demanding / high traffic routes with an aim to improve asset utilization. Bidder may choose optimum solution considering route length and given preference.

25. **Site Survey and Planning:** The PIA shall conduct an exhaustive site and route survey based on an optimal/shortest path to connect Gram Panchayat (GP), Master-block and Sub-block as defined under the scope of work for construction and upgradation of network. PIA shall perform the following activities for site survey and planning:

a) GFGNL shall provide the GIS details for site and route data of the Existing Network to the PIA on as is where is basis.

b) The PIA shall deploy a GIS based planning tool for desktop planning. The tool based on the Geo coordinates of the Block and the GPs shall provide the initial optimal path of the connectivity using road data. The PIA shall use such initial plan for physical site survey.

c) PIA shall conduct an actual Geographic Information System (GIS)-based survey for the area under scope of work.

d) The PIA shall record with photographs/ videos constraints about the changes in the desktop routes proposed based on physical survey. GFGNL may use such evidence for approval of the design and BoQ. The access of such GIS based planning tool shall be given to GFGNL also.

e) The PIA shall ensure that the GIS based file formats should be compatible with GFGNL's GIS platform. Furthermore, sharing and integration of GIS data under this project with the afore-mentioned platform shall be the responsibility of the PIA and GFGNL shall provide reasonable assistance in the same.

f) During the survey, the PIA shall consider connectivity till Gram Panchayat (GP) based on the optimal path for fibre layout covering maximum population en-route.

g) The PIA shall provide all the relevant drawings such as network diagram, As Build Diagram (ABD), related for the Development Works and/or the Upgradation Works for New Network and Existing Network to GFGNL and its designated agency. The network diagram shall include both High- and Low-Level Design (HLD & LLD).

h) The PIA shall create/update the relevant engineering drawings/design in case of future

upgradation, ensure updation of GIS platform and other relevant systems as required by GFGNL.

i) All engineering drawings/design and documents shall be created, updated and maintained by the PIA on its system/tool or portal and shall be accessible to GFGNL throughout the Contract Period. All these will eventually be handed over to GFGNL.

j) The PIA shall submit the Block wise **site survey reports** in line with the guidelines mentioned in this RFP. GFGNL shall approve the same. Format of Survey report is mentioned as per below.

Format of Survey Report:

Table-A

Format of Survey																			
S.No.	Block Name with LGD Code	Total No of GP	Main Ring		Child Ring		Existing OFC (FPOI to GP) to be used in Ring (in Km) – Phas	Existing OFC (Block shelter to SDC/Block shelter) to be used in Ring (in Km) – Phase-II	Existing OFC (Block Shelter to GP) to be used in Ring (in	Interconnect OFC for Phase-I OFC with Phase-II OFC to be laid in Ring (in Km)	Block to FPOI OFC length (to be replaced) in Km – Phase-I	OFC to be laid for Ring Formation (in Km)		Total OFC to be laid (in Km)		Count of SFP Required			Remarks
			Main Ring S.No.	Count of GP	Child Ring S.No.	Count of GP						24 F	48 F	24 F	48 F	10 Km	40 Km	80 Km	
1	2	3	4		5		6	7	8	9	10	11		12=9+10+11		13			11

Table-B

Infra Structure in GP									
S.No.	Block Name with LGD Code	Name of GP	GP LGD Code	Availability of Shelter Yes/No	Availability of space Yes/ No	Commercial Electric Supply Availability Yes/No	Availability of Power Supply in Hrs.	OLT Available/Not available	Remarks

k) Based on the approved site survey report and network design, the PIA shall be required to initiate OFC implementation and comply with specifications and standards, as per RFP Section

l) PIA shall also be responsible for supply, delivery, storage, warehousing, and handling of

optical fibre cable along with fittings and requisite items such as HDPE PLB duct, FDMS, joint enclosures, route markers (should be painted), etc.

m) PIA shall perform all activities required for end-to-end implementation of underground and aerial OFC, within the stipulated time.

n) For the routes, where ADSS is approved as implementation design, the PIA may leverage existing power distribution poles for stringing, jointing, live line installation and commissioning of optical fibre cable from the nearest Block to Gram Panchayat (GP) using appropriate pole clamping and accessories.

o) PIA shall perform end-to-end testing of the OFC laid till Gram Panchayat (GP) in accordance with good industry practice, specifications and standards, and acceptance testing template for quality assurance.

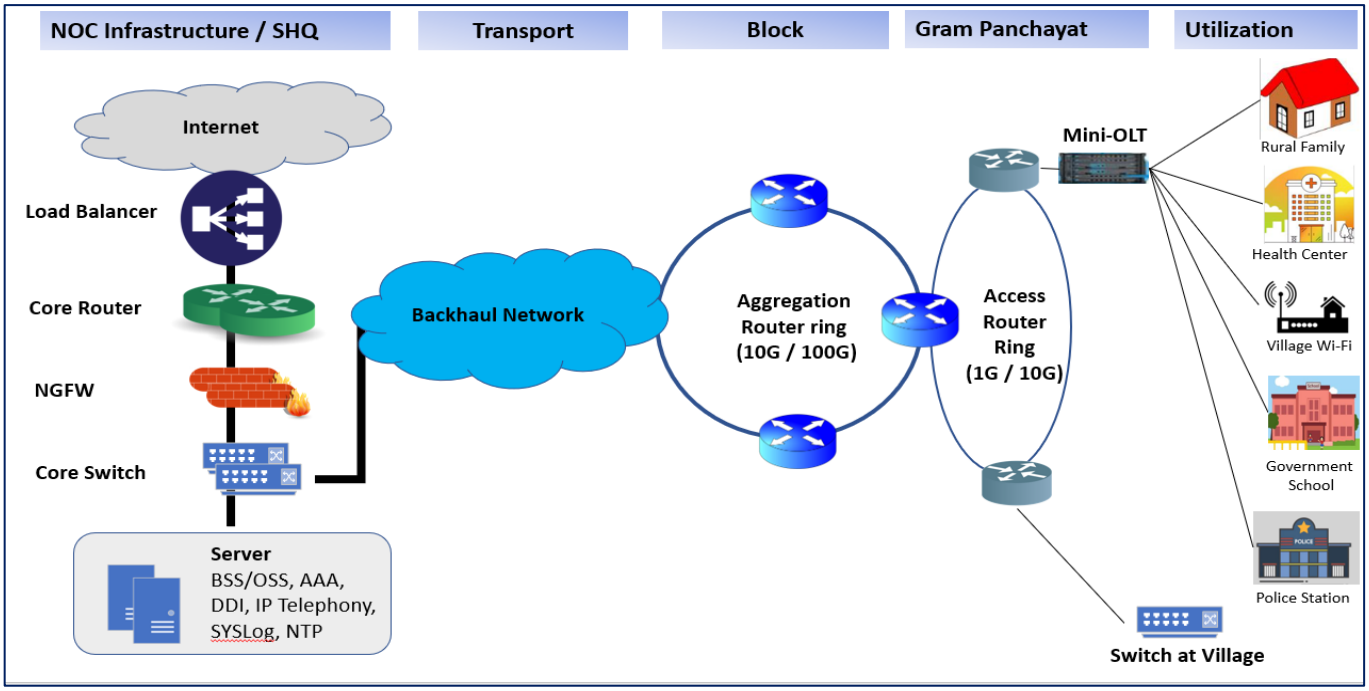
p) The Right of Way (RoW) for the project shall be granted as per the existing agreement with the State Government and facilitated by GFGNL through introduction letters for creation and upgradation of new and existing network respectively during the construction period.

q) During the Operation & Maintenance, the PIA shall also be facilitated RoW by GFGNL, only for replacement and repair of existing fiber deployed to maintain the new and existing network.

26. Network Design:

a) The Project Implementation Agency (PIA) shall be responsible for the survey, planning, design, supply, installation, end-to-end integration, and commissioning of newly deployed and upgradation of existing network infrastructure including Optical Fibre Cable (OFC) network. The PIA shall be responsible for connectivity across all Gram Panchayats (GP) of BharatNet Phase-I and Phase-II and ensure upgradation of the existing network infrastructure into ring topology with IP-MPLS network.

b) A simple schematic of the proposed network architecture is as given below:



c) Based on the network infrastructure to be deployed under this project, all permissions shall

be obtained by the PIA, as required under Applicable Laws, relevant Applicable Permits, license(s), authorization(s) and permissions from Department of Telecom / Government of India/ State Governments.

d) **The PIA shall build transport architecture in three major distinct categories for connectivity across all Gram-Panchayats of BharatNet Phase-I and Phase-II in ring architecture.**

Category-1: Access Layer (Gram Panchayat to Sub-Block),

- Access layer connectivity is between Gram-Panchayat to Sub-Block node.
- Each GP requires at least two OFC path(1CNO) for establishing ring connectivity to protect Gram-Panchayat router's traffic.
- The Network shall be made over Block wise with the GPs.
- PIA shall provide below listed equipment at each GP.
  - IP-MPLS Router with Cards and SFPs,
  - UPS with batteries having 6 Hrs power backup and solar panel.
  - Mini OLT,
  - Transmission Racks, Earthing, MCBs, FDMS etc.

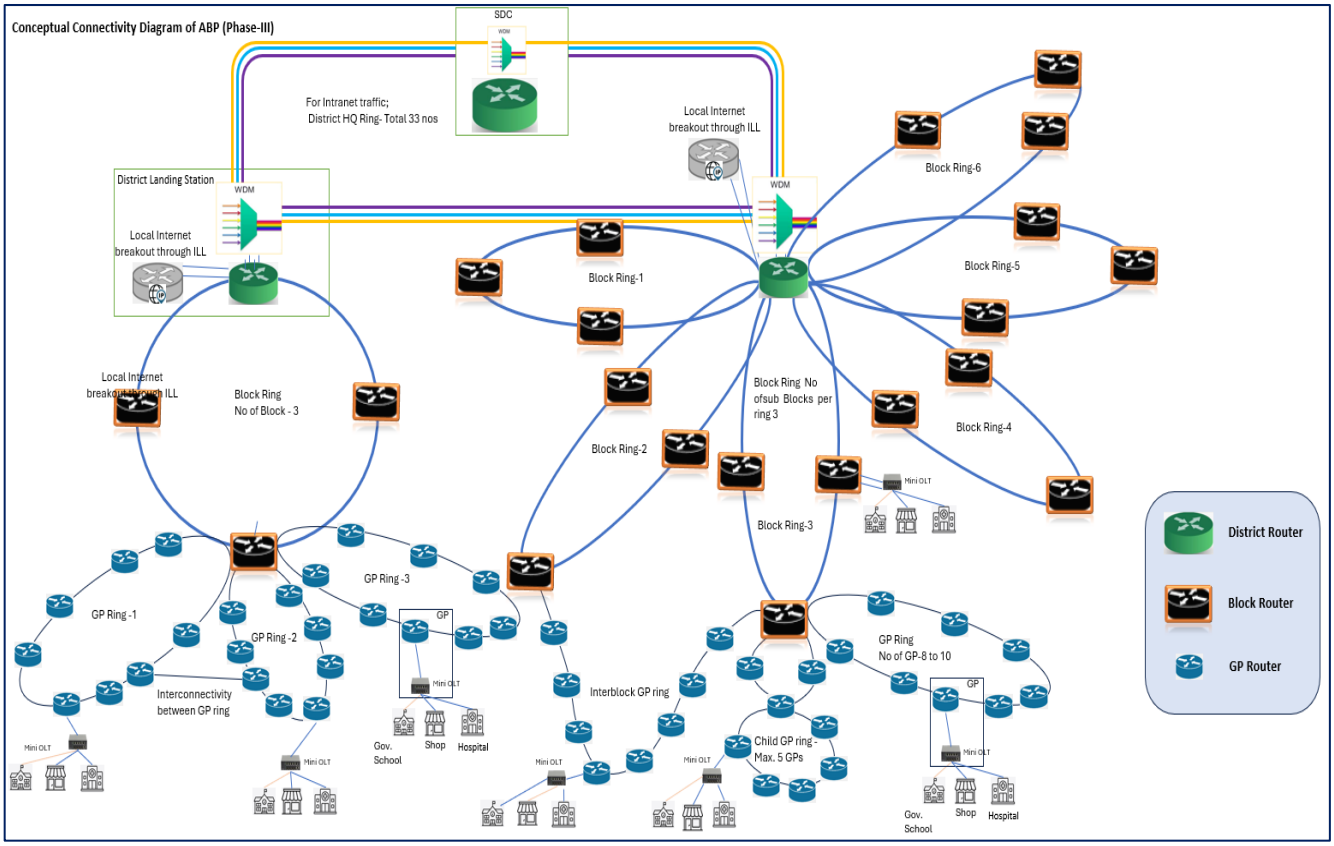
Category-2: Aggregation Layer (Sub-Block to Master-Block),

- Aggregation layer connectivity is between Sub-Block to Master-Block (DWDM node).
- Each block requires at least three OFC path (2CNO) to protect block router's traffic.
- The Routers and RFMS at Sub-block along with configuration, cards and SFPs shall be made over by the PIA.

Category-3: Express/Core Layer (Master-block to State Data Center),

- Express/Core Layer connectivity is between Master-Block to State Data Center.
- Backhaul Transport network from each district to State Data center is for Intranet traffic only and requires at least three OFC path (2CNO) to protect parenting block router's traffic.
- The Routers and RFMS at Master-block along with configuration, cards and SFPs for aggregation of sub-block network for internet breakout at district level shall be made over by the PIA.

e) A Conceptual connectivity diagram of Phase-III network is illustrated as per below.



f) The PIA shall connect all Gram Panchayat (GP) into ring topology with IP-MPLS aggregation/ access routers as per the technical specification in this document across the State/UT as per the scope of work through OFC connectivity.

g) The PIA shall design a redundant and robust OFC network infrastructure connecting all GPs, based on ring architecture/ topology. The number of GPs in a GP ring shall normally be around Six (6) to Seven (7).

h) The PIA may plan child rings only in case of the creation of GP ring directly from sub-block is not feasible due to distance from sub-block or any other justified reason. The PIA shall conduct a detailed survey and prepare the report for each case and submit it to GFGNL for approval of such Child Rings. Child GP ring is to be parented to one or two feasible GP router. The number of GPs in a child GP ring shall be maximum five (5).

i) First preference for parenting each GP ring to block routers shall be dual homed (i.e. Parenting of each GP ring should be to two different block routers to build node level redundancy)

j) The PIA shall observe the GPs facing power challenges and to take in Linear topology for less impact on ring topology GPs to avoid complete blackout and to maintain high network availability.

k) Maximum number of GP rings to be parented at Sub-Block shall be three (4).

l) PIA has to provision Internet Lease line bandwidth at Sub-blocks to carry Gram Panchayats traffic up to State capital i.e. State data center.

m) The PIA shall design a robust, fault-tolerant and high-performance carrier-grade network. Further, it shall ensure availability and reliability of the network as per KPIs. The network architecture must also be deployed to meet the following:

I. Redundancy across nodes and links (ports) to maintain higher uptime.

II. Optimal link utilization

III. Flexibility to allow easy insertion of new node/cards-

IV. From Day-1, the network shall support and enable retail, enterprise, and wholesale services as per the capabilities of the router, such as but not limited to the following:

n) All type of data and voice services, wireless back-haul traffic for 2G,3G,4G and 5G services, FTTx, layer2 VPN, layer3 VPN, point 2 Multipoint VPN and VPLS, IPTV and multicast VPN, Cable TV transmission services along with other bandwidth leasing services supported any to any, one to many, many to many kinds of services. The network created should have capability to establish end to end integration as per requirement up to State-Wide Area Network (SWAN) and National Knowledge Network (NKN). In this regard, GFGNL shall facilitate in provisioning of all necessary details and access for a smooth integration.

o) GFGNL's endeavor to connect all the villages across the State of Gujarat to foster growth and bridging the digital divide. Service delivery is the key priority for GFGNL, PIA shall be responsible to support services.

4S – Services

Service Portfolio,

Service provisioning,

Service Performance Monitoring,

Service Audit and Security Compliance

defined as following in deployed network but not limited to,

a) Service portfolio: Following Services should be supported in proposed solution.

- Grass root level E-governance,
- Digital enterprise,
- Internet peering service,
- Wireless broadband,
- Govt Network (SWAN),
- Enterprise VPN,
- Community Wi-Fi,
- Education content push from central,
- Bank and ATM connectivity related services,
- Videoconferencing for Tele-medicines and government administrative activities,
- Digital transformations,
- CCTV camera services,
- Open Network for Data Commerce (ONDC), e-Commerce and Internet of Things (IoT) , Industry 5.0, AI
- FTTH Value added services.
- Horizontal Customer Connectivity,
- Rural Public Institutions,
- And any other Widely expected services.

Sl. No.	Service Type	Service Outcomes	Network Expectations
1	**Telemedicine @ Primary Health center in Gram panchayat**	Enable seamless high-quality video calling & multi-party video consulting Transfer for Dicom (Digital Imaging and communication in Medicine) images for X ray, MRI	1. Unicast, Multicast and Broadcast services 2. Point to Point, Point to Multi Point and Multi point to Multi point service 3. Secure connectivity - MPLS service for any to any connectivity 4. Low latency on this service is mandatory 5. Real time service KPI monitoring and handling traffic accordingly 6. Service resiliency
2	**Enabling govt. schools with online education**	Enabling high quality content delivery from servers across the state Enabling interactive video education Teacher to teacher training and attendance marking	1. Unicast, Multicast and Broadcast services 2. Point to Point, Point to Multi Point and Multi point to Multi point service 3. High bandwidth for HD quality content 4. Low Jitter, delay free service 5. Monitor real time KPI of service and take action to ensure quality of service 6. Service resiliency
3	**Anganwadi office connectivity**	Data transfer from village to applications in Centralized location	1. High speed connectivity
4	**Govt. Offices**	Data transfer – Digital Sewa setu Video conferencing Cloud application access Internet access	1. Unicast, Multicast and Broadcast services 2. Point to Point, Point to Multi Point and Multi point to Multi point service 3. Secure connectivity - MPLS service for any to any connectivity 4. Low latency on this service is mandatory 5. Real time service KPI monitoring and handling traffic accordingly 6. Service resiliency 7. Service monitoring from govt office to service endpoint in real time with reporting 8. Data transfer including jumbo frames

Sl. No.	Service Type	Service Outcomes	Network Expectations
5	**Home broadband connectivity**	consistent internet delivery - Movie	1. Enable multiple LCO's & MSOs to connect to GFGNL 2. Internet traffic segmentation of different providers over GFGNL network 3. Secure internet peering with different operators at block locations 4. Internet route handling capacity across all active infrastructure for all operators 5. Internet peering capability
		internet access at high speed	
		ISP content delivery	
6	**Telco service**	Connecting remote telco towers	1. Enable multiple telco 's to interconnect 2. Support telco synchronization requirements 3. Interconnect & segment different telco traffic 4. 99.999% uptime for telco connectivity services 5. Service protection for telco to be automated
		Enabling segmentation for different telco operators from tower location	

b) Service provisioning (Automated):

Proposed Solution shall comply Zero-touch provisioning for all type of services. Proposed solution should support the end-to-end services from State capital to Last remote level entities as and when required to the following segments, but not limited to,

I. Government Segments (Panchayats, Schools, Agriculture, Animal husbandry, Community health, Anganwadi, Police, Food and civil supplies)
II. Power Segments (Electricity distribution, utilities, and solar companies)
III. Financial market (Cooperative banks, Private banks, non-banking finance companies and Insurance, Stock exchange intermediaries)
IV. Agriculture Segment (Fertilizer shops, Seeds and pesticides retail chains, Agriculture mandis, APMC, Commodity traders)
V. Education Segments (Digital aided learning centers, Private schools, Libraries, Hostels and even at rural citizen homes with “Har Ghar Education” campaign through FTTH partnership model)
VI. Business enterprises (Logistics and transport, Retail chain, Hotel chain, Digitization anywhere, Remote factories)
VII. TSP/ISP Segments and Households
VIII. As the network is being rolled out, ability of the network to monitor and run varied services on deployed network with service SLA’s and quality of experience is one of the base objectives.

Continuous and real time service provisioning and monitoring has become of paramount importance. The selected bidder needs to ensure that the proposed solution should seamlessly interwork with the details as given below.

IX. All the above defined services need to be provisioned in the network in an automated manner from the NOC (Network Operations Center). The key network functionalities which will enable these services to be delivered as per the requirements defined are mentioned below:

1) Proposed Solution should have the capability to provision L2 and L3 services against all the proposed active elements based on.
2) Enabling the Service definition to be defined with network functionalities, the solution proposed should have ability to visualize Segment Routing/MPLS-TE policies and VPN services as an overlay on the network topology map.
3) Proposed Solution must be able to provision and visualize EVPN and ELAN services.
4) Proposed Solution must support service specific constraints, such as bandwidth, latency, path diversity, and traffic engineering constraints, such as affinity, bandwidth, cost, latency coming from the network.
5) Proposed Solution must be able to provision QoS, Multicast and their VPN services.
6) Proposed Solution must visualize RSVP-TE and VPN services as an overlay on logical network and geographical maps.

c) Service Performance Monitoring (Qualitative Service Visibility):

Proposed solution shall populate the Network performance monitoring dashboard containing the network KPIs such as

I. Service UP/DOWN,
II. No. of Fiber cuts,
III. MTTR,
IV. Lossy Fiber,
V. Repetitive fiber cuts,
VI. Ageing for Service restoration,
VII. Quality of fiber splicing,
VIII. Classified performance measures,
IX. Real-time historical statistics and trouble-shooting events,
X. Throughput and Utilization,
XI. Latency, Jitter and Packet Loss

at administrative hierarchy to maintain like Village, Gram Panchayat, Block, District and State capital level on Daily-Monthly-Quarterly-Yearly basis for network troubleshooting as per SLA commitment as well as for Service performance visualization to various Government leadership team which should build transparency between the Government and Citizens on digital services.

Below are the key functional requirements to enable continuous network and service performance measurement across the GFGNL network.

I. The Proposed solution should have an architecture supporting ease of deployment, zero touch maintenance and seamless monitoring could be on premise or cloud based.
II. The Proposed solution should support following multiservice monitoring like Education service, Anganwadi service, tele health service, government applications and the following ISP, SaaS based applications, BGP prefix/routing, DNS, Multi Cloud, SD-WAN, Hybrid WAN, Network device health, VPN gateway, and VoIP.

III. The proposed solution should support synthetic network test at both ends of a monitored path (GP to NOC or GP to Internet), enabling testing of the path in either or both of two directions: source to target or target to source. It should provide standard network metrics: packet loss, latency, jitter, and optionally throughput--an improved form of the bandwidth metric--along with Path Visualization and path MTU.

IV. The proposed solution must support two options for the L3 service path tracing ICMP and TCP. Solution must support network path visualization: a time-correlated, unified view of all paths between any two points on your network. With visibility across network, application, routing, and device layers. Solution should support three(min) and ten(max) parallel path traces from each agent/vantage points on network to try and discover multiple paths leading towards the target.

V. The Proposed solution must support multiple integration with 3rd party Analytic platforms like ITSM platforms like ticketing tools using Webhook, API and Open telemetry.

VI. The proposed solution should be able to monitor the individual ISP Links for all hosted applications. Solution should have the ability to automatically detect Internet outages in ISP networks to help identify the problem area of outages.

VII. The proposed solution should support monitoring of Internet-based connectivity and Service from user / office to GFGNL NOC or SDC connectivity, the more thorough and capable path monitoring means faster trouble domain isolation, faster triage, and better escalation processes.

VIII. The proposed solution should monitor the cloud-based unified communication and collaboration platforms like MS teams, Webex, Zoom, Google meet etc. of any other defined for their performance monitoring.

IX. Real time visibility & monitoring of both Network and Application(s) for better co-relation of the Service impact pro-actively rather than re-actively. (Milli Second Level visibility: 20pps to 1000 pps for real time monitoring) for continuous real time KPIs and SLA reporting.

X. The proposed solution should be able to clearly visualize the Hop-by-Hop visibility of the Underlay Network at a granular level Sub-Second) for Identifying clear problematic sections on the Glass pane view.

XI. The proposed solution should be able to perform Predictive Analytics for Better Network Planning.

XII. The proposed solution should be able to perform Service Activation testing in an Automated way and provide easy downloadable reports for link handovers.

XIII. The proposed solution should have the Observability glass-pane which could ingest and demonstrate both network and Application SLA's on a Single glass-pane as per the requirement.

XIV. The service originating from end devices like routers at government offices or ONT at residence, the performance and quality measurement in terms of peak speed, total data consumption, server reachability should be monitored continuously in real-time and a dashboard for the same has to be created.

XV. Latency measurement of each service from end device at customer premise should be done in real time and actions should be taken to rectify is issues seen.

d) Service Audit and Security compliance:

7 PIA should match the industry standard and government specific security compliances for all type

of services to be provisioned in deployed network and should support all the service audit requirements.

8 Authentication of all the active devices in the network should be managed by a central authenticator, it should support role-based access, authentication, authorization and accountability capabilities.

9 All the changes made in any active network element has to be logged with timestamp and log in details for future audits.

10 All the software's used by the active network elements has to be validated by a software integrity check program and the ability of the active network elements to do the same has to be demonstrated by the bidder and his OEM.

11 Active network element should ensure that while the device boots there is a validation of the software being used by the device.

12 Network segmentation in terms of management network, operation network and out of band network for management access only has to be maintained in the network.

13 NOC security - Implement security measures as per industry best practices and CERT-in guidelines to fortify the NOC infrastructure against potential cyber threats or any other security lapses.

14 MD-5 (Message Digest Algorithm) route authentication for all static and dynamic routing protocols.

15 The NOC security solution shall be capable of discovering and prioritizing events occurring across the network. It shall also determine the risk level by identifying the assets that are affected and recommend and/or execute the appropriate remediation response mechanism.

16 Enable prevention and containment of threat based on abnormal activity through early notification/alerting of suspicious activity and also have the ability to quickly respond to a containment mechanism.

17 The Protocol and security compliance related to the supplied product has to be ensure by the Bidder and OEM as specified DoT/TRAI/GoG/CERT/etc. Thus, offered product /solution must adhere to security norms, prevailing security practices and it should not limit functionality of security activations.

5.4 ALTERNATE TECHNOLOGY IMPLEMENTATION

i. Wherever, the U/G or ADSS OFC laying is not possible, the PIA shall submit a note to the GFGNL detailing the constraints. The GFGNL or its authorized agency shall examine the same and if the same is found to be correct, the GFGNL, based on the recommendation shall forward the same to GFGNL who will approve the same to be implemented through Alternate Technology.

ii. However, the deployment on Alternate Technologies shall be permitted for not more than 4% of GP scope is allowed with alternate technology having 10G capacity and up to 5% of GPs scope (Redundant path allowed with 1 Gbps on alternate technology) without diluting SLA performance.

iii. In case of exigencies, if the PIA justifies connectivity of GPs on Alternate Technology beyond the above-mentioned limits, then PIA can submit such cases to GFGNL. GFGNL in consultation with USOF reserves the right to approve the use of Alternate Technology for

connecting GPs beyond the mentioned limits.

iv. The PIA shall work out the possible Alternate Technology solutions and submit the report, duly recommended to GFGNL. GFGNL shall approve such cases for implementation.

v. In case the alternate technology is decided as Unlicensed Band Radio (UBR) or Free Space Optic(FSO), the PIA shall supply, install & commission the same as per the technical specifications mentioned in the RFP.

vi. The PIA shall be bound to facilitate/ coordinate for implementation through agency selected by GFGNL on behalf of USOF, DoT and integration of the same with State NOC. The PIA shall also allow installation of EMS and/or any equipment in State NOC for integration with State NOC as well as Central NOC. No space and Infra charges shall be payable to the PIA for the same.

vii. Adequate spares, software updates and upgrades, L2/L3 support and Training as required to meet SLA shall be provided free of cost by the Alternate Technology provider.

viii. There will be one EMS (Element Management System) for each Alternate Technology proposed in this RFP i.e. Unlicensed Band Radio (UBR) or Free Space Optics(FSO). NMS shall be provided by GFGNL at CNOC -Gandhinagar

ix. The PIA shall design a robust, fault-tolerant and high-performance carrier-grade network.

x. Further, it shall ensure availability and reliability of the network as per KPIs. The network architecture must also be deployed to meet the following:

- Redundancy across nodes and links (ports) to maintain higher uptime
- Optimal link utilization
- Flexibility to allow easy insertion of new node/cards

From Day-1, the network shall support and enable retail, enterprise, and wholesale services as per the capabilities of the router , such as but not limited to the following:

- All type of data and voice services, wireless back-haul traffic for 2G, 3G,4G and 5G services, FTTx, layer2 VPN, layer3 VPN, point 2 Multipoint VPN and VPLS, IPTV and multicast VPN, Cable TV transmission services along with other bandwidth leasing services supported any to any, one to many, many to many kinds of services.
- The network created should have capability to establish end to end integration as per requirement up to State-Wide Area Network (SWAN) and National Knowledge Network (NKN).

xi. In this regard, alternate bidder has to ensure that technologies to be implemented in network shall facilitate in services with smooth integrations, GFGNL wherever possible may support with all necessary details and access for a smooth integration.

5.5. ACCEPTANCE TESTING (COMMISSIONING) FOR THE OPTICAL FIBRE NETWORK CONNECTIVITY

I. The final acceptance (commissioning) shall cover 100% of the network for the Gram Panchayat at Block level as well as at Gram panchayat (GP), after successful testing by State/SIA or its nominated agency.
II. FAT would include installations and commissioning of IT equipment and non-IT equipment at Block and Gram Panchayat, commissioning of all network links and necessary site refurbishments (Earthing, electrical connectivity, structure cabling etc. as applicable) as well as testing of traffic from the Gram Panchayat to Block and further to State NOC and BBNL NOC.
III. Acceptance testing would also include OTDR and LSPM testing of fibre cable.
IV. OFC attenuation testing is used to verify the initial performance of the installed link.
V. 100% of the installed OFC links have to be tested and must pass the acceptance criteria.
VI. The attenuation of the link is measured using the insertion loss method. This method uses an optical source and an optical power meter to compare the difference between two optical power levels.
VII. When testing Single Mode optical fibre links with a Light Source and a Power Meter, this measurement kit has to be capable of operating at 1550 nm and 1310 nm for Single Mode fibre.
VIII. The test scenario with a Light Source and a Power Meter shall be of the following for each link: Bidirectional testing @ 1550 nm and @ 1310 nm for single mode fibre and calculating average of both readings.
IX. When testing with basic optical source and power meter, the operator will fill up a report logging the time of the test, the link identification under test, the link length and attenuation.
X. The report shall also identify in which direction the testing was implemented.
XI. Acceptable link attenuation/loss in dB per link (between 2 locations) to be calculated as per below.

For 1310 nm : 0.34 dB attenuation / Km + 0.1 dB / splice + 1 dB connector loss

For 1550 nm : 0.22 dB attenuation / Km + 0.1 dB / splice + 1 dB connector loss

XII. The measured attenuation of the links shall have a lower value than the acceptable link attenuation calculated.
XIII. The PIA shall also provide bidirectional OTDR report for all fibre cores. Those tools are capable of producing a bidirectional report logging the time of the test, the link identification under test, the link length, the attenuation and the acceptable link attenuation. The report shall also identify in which direction the testing was implemented.

5.6 REVENUE SHARE MODEL

a. PIA's are encouraged to unlock opportunity of deploying earthen asset like duct/fibre without any additional financial burden on the GFGNL on revenue sharing basis mechanism.
b. It is well understood fibrizations work where majority of the cost is RoW, intangible support, digging and refilling cost, Operation and Maintenance cost of protecting fibre routes.
c. This model of allowing PIA's to lay additional assets while laying fibre in the scope of the work.
d. The above exception and model is not binding on any of the bidder to opt the same. This model is as part of risk and reward basis in anticipations of upward trade in digitalization, multifold growth in requirement of transmission of bids and future netigions.
e. The above exceptions is purely on creative wisdom of the PIA to assimilate opportunity in the ensuing the digital era and future demand of fibre as and emanse value propositions for the win-win situations for enabling telco laid digital eco system like ployfiliation of IoT, AI, Data laid economy, digital age society, mitigate digital divide in urban and rural areas and lastly opportunity of mask consumptions of digital laid economy and excluded unserved areas.
f. The above statements is aligned with possibility of data laid vision of 2047 of the State Government of Gujarat.
g. To provide simplify and numerical values, it is well understood cost and income numbers in

overall frame of mindset while providing this exceptions for capitalizing unearthen value.The cost side is as under,

In % form of overall cost to understand revenue streams thereafter

i. The one time cost of procuring and laying duct is approximately 10 % of total work including civil, RoW and workmanship cost.
ii. The one time cost of procuring and laying 24 or more core fibre with duct is 7 to 10 % of total work including civil, RoW(extra) and workmanship cost.

h. Looking at cost 20+% with above mentioned anticipated opportunity, the GFGNL revenue sharing model is applicable based on 50% -50%. Where Bidder has to share the 50% of revenue share to GFGNL.
i. This model is fundamental on mutual interest of private sector and Government for long term benefits of the creation of innovative opportunities, mutual internet of private, public sectors and nation moving towards vision 2047.
j. Above provision is only for dark fibre and duct and further it is on creativity of PIA to lay and activate the network for widespread utilizations in the Telco/ISP world.
k. This provision is applicable from Sub-block to sub-block and above(i.e., Sub block to master-block,etc.) and strictly not allowed below the Sub-block i.e., Sub block to GP/Villages.
l. Repair, shifting and re-construct of this laid network of PIA will be solely responsibility of PIA. There will be no additional financial burden to GFGNL.
m. This revenue model is attempt to re-gain lost history of combining and revitalizations of the unearthen value of un-seen assets through incorporations of exceptions without any financial burden on public sector with novel model of combining strength of private sectors and win-win situation for all and everyone without compromising on bid.
n. Within this model, selected bidders will be required to allocate a fixed 50% of the overall cost of RKM to GFGNL for the privilege of deploying their own OFC cable/duct within the same trench of GFGNL new network.
o. GFGNL support in relation to the state-level BharatNet model, aiding in RoW and trench costs during the execution of the BharatNet Ph-III project.
p. It must be stated that the network deployment flexibility will be exclusive to GFGNL, new network trench.
q. Bidders will be expected to provide GFGNL with their network deployment strategy, including the plans and drawings, well in advance.
r. Kindly note that GFGNL will not make any financial contributions towards both the deployment and O&M phase.
s. GFGNL reserves the right to request access to the network drawing, as-builts, GIS, and other documents relevant to the bidder's deployed project as part of this revenue-sharing model.
t. The responsibility of coordinating with various agencies, including but not limited to RoW, bridge authority, and forest, as detailed in section 5.10, rests solely with the bidder.
u. If the selected bidder deploys a new OFC network in GFGNL trench, bidder must ensure that it will not be used for GFGNL's Dark fibre/FTTx Revenue share Model/ customers connects either indirectly or directly with GFGNL network, in order to prevent any conflict of interest.
v. Any unauthorized or surreptitious deployment identified without prior intimation to GFGNL will be severely penalized with Rs 10,00,000/- RKM or part thereof. This will over and above cap limit of CAPEX / OPEX. Furthermore, any more than 3 reported incidences will be liable to discontinue of the sharing agreement with legal actions.
w. Without GFGNL's prior written consent, the selected bidder will not engage in any activities that conflict with our interests during the term.
x. Finally, bidders are required to acknowledge that they will not assign or transfer their rights under this agreement to a third party or engage in any sub-contacting/partnership that pertains to this agreement.
y. GFGNL aim is clear - no third-party interest shall be created.

5.7 ALTERNATE TECHNOLOGY IMPLEMENTATION

I. In cases where neither underground nor ADSS laying is feasible, the PIA may deploy alternate technologies to connect such Gram Panchayats (GPs).

II. Further, for difficult terrain non accessible routes, ROW challenges, etc. alternate technologies for connecting GP to GP or GP to sub-block route, alternate technologies link (hop) quantity up to 4% of the total GP's scope may be permitted, subject to meet the bandwidth delivery and SLA criteria commitment and with concurrence of GFGNL official.

III. In case of exigencies, if the PIA justifies connectivity of GPs on alternate technology beyond the above-mentioned limits, then, PIA can submit such cases to GFGNL.

IV. The deployment on Alternate Technologies shall be permitted for digital connectivity of revenue villages. The PIA shall work out the possible Alternate Technology solutions in consultation with I.E., and submit the report, duly recommended by the IE, to GFGNL. GFGNL shall approve such cases for implementation. In case the alternate technology is decided as Unlicensed Band Radio (UBR), Free Space Optics (FSO)/ Light Fidelity (Li-Fi) or Aerial OFC laying (ADSS), the PIA shall supply, install & commission the same as per the technical specifications mentioned in this RFP relevant section and annexure.

5.7 ELECTRONICS INSTALLATION

a) The PIA shall supply and install network solution or electronics infrastructure for the successful creation/ upgradation of a robust, redundant and carrier-grade network to support and enable retail, enterprise, and wholesale services.

b) It shall also be responsible for supply of new electronics infrastructure and its accessories to perform end to end implementation of the same across the network.

c) Adequate power back-up infrastructure shall be provided by the PIA to ensure network availability as per defined KPIs.

d) Further, the PIA shall perform end-to-end testing of the electronics infrastructure in accordance with good industry practice, specifications and standards, and acceptance testing template for quality assurance.

e) PIA shall be responsible for integration of existing Block OLT with Block router or any nearby available node created/to be created.

f) PIA shall prepare and maintain asset records listing the assets at site locations required for the performing the O&M and the same shall be shared with GFGNL every quarter.

g) KPIs shall be monitored and reported by the PIA to GFGNL on daily/ weekly/ fortnightly/ monthly /quarterly basis, as required.

h) In case of any defect, deficiency or deterioration in the project, poses a hazard to safety or risk of damage to property, the PIA shall promptly take all reasonable measures for eliminating or minimizing such danger.

i) **Provisioning Mini OLTs:** PIA shall require to be installed Mini OLT at each GP for existing and

upcoming connectivity from GP. The PIA is required to make provision for housing the same in the rack (cabinet) being provided by it as per technical specifications. Normally, the size of the Mini OLT is 1 RU. The PIA shall allow the power to the OLT to be tapped from the Power System being procured at the GP location. The PIA will also facilitate testing by the BNUs, whenever required, to ensure desired connectivity/ uptime to all the FTTH customers of the housed OLT. The PIA shall supply, configure, and integrate the Mini OLTs with the MPLS network for last mile connectivity. Selected bidder has to ensure the proposed mini-OLT should support atleast three (3) / Four (4) compatible ONT's for future network provisioning and avoid governance challenges.

j) **Modification in the Ring Architecture to meet increased Bandwidth Requirement**: Initially each ring is be designed for 10Gbps with around 6-7 nodes. However, if there is a requirement subsequently to increase the capacity due to increased bandwidth requirement, additional ring shall be created splitting the nodes using spare fibres and spare ports at the Block router. If required, additional Block router may need to be installed at the Block for which separate payment shall be made as per the finalized itemized rates.

k) For the Phase-I(At GP site) connectivity adding of L2 switch(minimum 24 port)/Mini OLT will be in the scope of selected bidder based on the concurrence of the GFGNL official.

l) PIA shall provision the bandwidth for the services mentioned in this document. The PIA shall also build up the dark fibre on end-to-end basis for provisioning the same for commercial use or providing village connectivity. To make dark fibre availability in BharatNet ABP network no additional cost will be paid to PIA.

5.8 VIDEOGRAPHY

1) Videography for all the works like trenching, fibre laying, splicing etc shall be conducted by PIA. The Video Recording (with Date/ Time stamping and GPS coordinates) of the OFC laying and Ducting works by the PIA shall be done in following phases as under-.

- Ducting - Video recording of Open Trenches is to be done using a Vertical Measuring Stick (Known as Measuring Staff in Civil Engineering Terms) at every 50 (Fifty) Mtr intervals. The depth reading in the Staff from top of the duct should be clearly recorded. In case of HDD (if the PIA is not using the machine recorded depth and produce the depth data), the depth of Entry & Exit pits should be Video recorded from top of the duct. The Couplers, Plugs and End Caps wherever required as per E.I. should also be captured in the video. Protection used as per E.I. in case of Low Depth should also be Video Recorded.
- OFC Blowing/ Pulling - The OFC blowing process should be Photographed (geo tagged with time stamp) clearly showing the drum and fibre meter reading details.
- Splicing- The splicing should be Photographed (geo tagged with time stamp)clearly showing that all 24F/48 F have been spliced and arranged in cassette.
- Man Hole/ Cable Chamber- The Cable Chamber of MH base should be Photographed (geo tagged with time stamp) clearly showing the base plate of 50 mm thickness, RCC joint Chamber and Top Cover as per E.I. The cable loop also to be video recorded – showing start and end readings.
- Route Markers- Route Markers should be Photographed (geo tagged with time stamp).

2) All Videos/ Photographs (geo tagged with time stamp) shall be submitted /uploaded with a unique location related name in a folder with file descriptions clearly indicating each of the above activities like Ducting, Blowing, Splicing, MH/CC & RM.

3) The MP4 Video should have 3 windows running concurrently for following views-

- Window 1 – Physical work being carried out with Lat/ Long and Date/Time stamp
- Window 2 – Location of the activity on Google Map.
- Window 3 – KMZ/KML file with chainage, OFC route, Depth, Offset from road center & Lat/ Long of Joint pits etc.

4) Each Video file should be of at least 2 minutes time duration capturing works being done for 40 Mtrs in case of Open Trenching and one shot in case of HDD. The size of each Video file should not be more than 30MB so that the same can be sent through mobile/mail etc.

5) The speed of movement of the camera while recording the Video should be maximum 20Mtr/Minute.

6) All Video recordings should be done in day light time without rain, fog, mist etc. Wherever, the video recording is not possible, photographs should be taken at every 10 meters with the approval of GFGNL.

7) The nomenclature of the files should be in the following format:- XXXX_YYYYY: 12345_67890: Work

XXXX is the Route Abbreviation as per the Work Order

YYYYY is the Package +District+Block Abbreviation as per the Work Order 12345 is the Chainage of start point of Video Recording

67890 is Chainage of end point of Video Recording

Work- OT Ducting- OTD, HDD, OFC Blowing- OFB, Splicing- OFC, MM/CC, RM etc.

8) Block end should be Chainage ‘0’ and GP end should be taken as the last Chainage.

9) The Backend team of the PIA should merge all the files of a section of 40 meters in succession or HDD shot and send to BharatNet BA team of the Package for review / verification of works and GIS NOC Delhi for linking the same with GIS.

10) PIA has to take the photos of Cable in and out with clearly visible images at the time of installations and backfilling.

11) PIA shall provide the adequate handset which can clearly take video/photos of trenching, depth, ducting and other specifications mentioned in ABP (BharatNet PH-III) RFP including geo-tagged, so that no rework to be done on field.

12) For field activities, GFGNL will support with GIS mobile application, It may have facility to create template. PIA executives shall furnish and support the template with the details asked and upload on applications with 100% accuracy.

13) The payments of the works as per payment schedule mentioned in the tender shall only be done if the videos /photographs (geo tagged with time stamp) of the same as per this SOP are submitted to both BharatNet BA team of the package and GIS NOC Delhi.

Note: GPS enabled Camera/mobile phone, that can record Video with live tracking of LAT LONG (GPS Coordinates) and Date/ Time Stamping shall be used by the PIA. Video output resolution

should not be less than 720dpi.

a. In HDD work description following videography to be done.

I. Social auditing: While carrying out the execution work of cable/Eqpt. , videography may be carried out on sample basis for duration of 15 to 30 minutes per Gram Panchayat which may also involve the local people of the Gram Panchayats and villages including the Gram Panchayat Pradhan (If possible) and same may be submitted in a form of CD along with the documentation sets for information.

b. Technical specifications for GIS mapping of OFC routes.

17.1 All the asset location on ground is to geo-tagged in either five photographs (one close- up and four from different directions covering road part and also landmarks, if visible) OR to be captured or videography (zoom& wide angle)to be taken so as to identify the exact point later on. There will be a practical situation where the route indicators will be found missing. In such situation a play card with the notional assets no. available RID/ABD to be placed on the identified point

5.9 MEASUREMENT

I. **Measurement Book (MB):** The measurement books are to be maintained by the PIA. The entry shall be made in ink. No entry shall be erased. If a mistake is made, it should be corrected by crossing out the incorrect words or figures and inserting the corrections, the corrections thus made shall be initialed & dated by the bidder. The measurement books shall invariably be consulted at the time of making final payments to the bidder.

II. Method of recording of nomenclature of items: Complete nomenclature of items, as given in the agreement need not be reproduced in the measurement book for recording the measurement but corresponding item code as provided, shall be used.

III. The measurements of various items of work shall be taken and recorded in the measurements book. The measurements shall be taken and recorded by bidder which will be countersigned by the authority appointed by GFGNL. The PIA shall be directly responsible for supervision of work and for accuracy of 100% of measurements. The IE will be responsible for conducting Acceptance Test (A/T) check of measurements at different locations on sample basis. The PIA shall re-do the work, wherever, the IE finds deviation from the entries in MB by the PIA or GFGNL at any subsequent stage during contract period. During subsequent inspection by GFGNL or any other agency, in case the sample measured data does not match with the measurement book entry up to a lesser depth of 5cm, penalty (equal to amount of difference of payment , so reduced due to lesser depth) shall be levied in addition to the reduction of payment due to lesser depth as per the approved formulae on each such default instance on the payment due for the link (waiver of penalty, if warranted, shall be decided by GFGNL on case to case basis) . The spirit is to ensure correct recording in the measurement book by PIA. GFGNL, on behalf of USOF, reserve the right to get the work done at the risk and cost of the PIA in case of lesser depth cases.

IV. **Method of measurement:** The measurement of the work shall be done activity-wise as and when the item of work is ready for measurement. The methods of measurement of various items are enumerated as under:

- **Measurement of Depth of Trenches**. The cable route shall be divided into a number of segments each of maximum 200 Meters length bounded by identifiable landmarks at both the ends of the segments. If landmarks are not available, length of segment may be maintained at 200 Meters. The measurement of depth shall be recorded at each point of measurement (POM)

in the measurement book in Meters in the multiples of 5 cms. For example 97 cms will be recorded as 95 cms and 103 cms as 105 cms. The points of measurements shall be at a distance of 10 Meters starting from 0 (Zero) Meter. For example, if the length of segment is 75 Meters, the POMs shall be at 0 M, 10 M, 20 M, 30 M, 40 M, 50 M, 60 M, and 70 M. The last POM shall be at 75th M to be recorded against residual POM. Normally the workers tend to dig shallow trenches due to effort involved. As standard depth of the trench is important for future life and protection of cables, this tendency has to be discouraged.

- **Measurement of lengths and profiles of strata and protection.** The measurements of length of trenches are on running Meter basis, irrespective of type of soil encountered while digging. The type of protection utilized (item code – wise) to include RCC Half Round and Full Round Pipe, DWC HDPE Pipe, GI Pipe, MS Weld Mesh etc in a segment shall be recorded in the measurement book in the sheet provided for this purpose.
- **Measurement of length of cable.** The length of cables laid in trenches, through pipes and through ducts shall be measured by use of OTDR for the purpose of accuracy of the identification of cuts during O&M. **The payment for such laying/trenching as per price schedule shall be made as per the RODO Meter readings and not as per the OTDR readings.** The length should be cross verified with the marking of lengths on the cables. The lengths shall be recorded in sheet provided in the measurement book.
- **Measurement of other items.** The measurement/ numerical details of other items shall be recorded in the sheets provided for respective items viz.

—Digging of joint pit/manholes and preparation of chambers along with details of its dimensions and location.

—Fixing, Painting and sign writing of route/joint indicators.

—Termination of Cable in equipment room and no. of joints.

—Record splice loss details for each joint.

- The bidder shall sign all the measurement recorded in the measurement book. This will be considered as an acceptance by the bidder, of measurements recorded in the MB. In case bidder fails to attend at the measurements or fails to countersign or to record the difference within a week, then in any such events the measurements taken by IE shall be final and binding on the bidder and the bidder shall have no right to dispute the same. In case of any difference of opinion in the measurement book between IE and the bidder, same shall be mutually discussed and agreed before making it final.
- Measurement of the work of cable for calculation of laying /trenching will be taken equal to the length of the pipe/ duct (as measured in the RODO meter) through which the cable has been pulled and not the total length of the cable pulled through pipe/duct.
- **Uploading of Depth Photographs:** The IE responsible for verification of MB shall take the photographs of the depth measurement being done at every 100 m in case of open trench work and at the entry / exit points in case of HDD method using BharatNet GIS App and upload the same on GIS platform.
- Compilation of the Measurement Book needs to be on real time basis while the work is being carried out.
- The details noted by the Contractor in the notebooks will be entered in the proper MB format in the computer on weekly basis and shared with GFGNL. These shall be checked by IE progressively so that as soon as the work of the route is complete, the MB is also ready.
- Depth AT and other tests/ observations to be done while the work is being executed. The PIA should ensure proper recording of all the details like drum Nos, duct roll numbers and length of shots etc.

5.10 LAST MILE CONNECTIVITY TO THE VILLAGES

The PIA shall provide the Last Mile Connectivity to the Village from the nearest GP for provisioning of Revenue Villages by GFGNL at the quoted/ finalized price. The rates to be quoted shall include both CAPEX and OPEX charges separately.

Following guidelines/ technical specifications shall be followed by the PIA: -

i. The PIA shall use 6F Overhead OFC as per TEC GR as mentioned in the table of TEC GRs in Annexure. Last Mile connectivity shall be implemented with 6F Aerial Drop Cable. However, the TEC GR mentioned for 12F/ 24F is applicable for 6F cable also.

ii. The OFC shall be laid using existing Electricity poles with required accessories wherever feasible and approved. TEC GR Standard No.: TEC 87060:2017 including its latest amendment, if any, may be referred.

iii. The payment, if any, to the electricity authority shall be done by GFGNL.

iv. Wherever, such electricity poles are not available/used, the PIA is required to erect wooden/ G.I. poles at the required intervals so that the OFC withstands normal climatic disturbances.

v. The PIA is required to terminate such OFC at an appropriate location in the village in a minimum 16 pair FTB and at the GP FDMS/FTB from where connectivity extended to revenue villages either with a new mini-OLT or using splitters and the mini- OLT installed at the GP.

vi. The PIA shall also be liable to maintain the above arrangement till the completion of the contract period.

vii. Payment of 40% of the quoted /finalized price shall be made after successful commissioning of first connection.

viii. Payment of 7.5% of the quoted/ finalized price shall be made every year, during next 8 years, after the completion of Financial Year in which the first village connection is provided. This payment shall be made quarterly as 1.875% only, on achievement of quarterly SLA of 97% or better for such connectivity, However, the payment will be reduced as per table below, if 97% uptime in the quarter is not maintained. No payment will be made for the quarter if the uptime for that village connectivity is below 80%.

S. No	SLA	Quarterly Payment as percentage of the quoted/ finalized price
1	=>97%	1.875 %
2	From =>95% to <97%	1.7%
3	From=>93% to <95%	1.4%
4	From=>90% to <93%	1.0%
5	From=>85% to <90%	0.5%
6	From=>80% to <85%	0.3%
7	<80%	Nil

ix. The O&M payment to the PIA for the concerned Block shall not be released, till all such revenue villages for which the work orders in the block have been issued are provided with connectivity within 30 days of the work order. A penalty of Rs 100/- per day of delay beyond

30 days shall be levied, unless the exemption is given by GFGNL on case-to-case basis with proper justification and valid documentation submission for the reasons beyond the control of the PIA.

x. Maximum penalty for delay in connectivity to the village shall be capped at 12% value of the O&M invoice for each quarter for that Block. Further, GFGNL, on behalf of USOF, shall have the right to get the work done at the risk and cost of the PIA in case work is not completed in 100 days.

xi. Wherever the existing electricity poles are not available; the PIA shall erect a 7 Meter RCC pole. Payment of the quoted/ finalized price, shall be made for such RCC Poles, including supply, installation and O&M for the entire contract period, on uploading of the Photos/video as per specifications. The PIA shall have to replace such poles damaged for any reason whatsoever during the contract period without any additional cost to GFGNL.

xii. For the Acceptance Testing of such last mile implementation, only the quality of the OFC, its termination at both the ends and measurement of optical power shall be done. The construction practice shall not be part of acceptance testing as the PIA shall be responsible for O&M of the entire end to end construction during the entire contract period.

xiii. If the implementation through OFC is not feasible, the PIA can plan the implementation using UBR or FSO at the quoted/ finalized price, or procured / supplied by GFGNL through other tender. However, if required, the PIA can use the poles as specified in on cost basis along with other terms and conditions.

xiv. The entire quoted/ finalized price of Last Mile Connectivity is split in the ratio of 68:32 against CAPEX: OPEX charges. Thus, 1% of the price shall be paid per quarter, as OPEX of that quarter and remaining 0.875% shall be paid against CAPEX out of total 1.875%.

xv. If GFGNL orders the Last Mile Connectivity to a village, after two years or later, from the appointed date, the left-over balance of the CAPEX part shall be paid in the last quarter of the contract period. It may be noted that this payment will be made after deduction of penalties over the contract period, if any. Thus, total payment over the entire contract period i.e. till termination or closure shall be 68% (as CAPEX) + 1% multiplied by number of quarters of completed O&M, (minus penalties).

xvi. In case of implementation of Last Mile Connectivity through OFC, the cable length shall be measured through OTDR for payment purpose. The point-to-point distance between GP and village shall also be calculated using GIS coordinates (Lat/Long) for verification. If, the OTDR measured length is more than the GIS length by 20% or more, GFGNL shall do the due diligence sample basis before making the payment based on OTDR length. This measurement (based on OTDR) is only for Last Mile OFC. Payment for Construction, O&M etc. (under middle mile network) shall be made as per actual route length based on rodo-meter.

5.11 RIGHT OF WAY

a. The Right of Way for the Project shall be granted as per the existing agreement with the State Government and supported by GFGNL through introduction letters for creation and upgradation of New Network and Existing Network respectively during the whole contract Period.

b. Based on network survey and design, or any other activities it may deem necessary, the PIA is

permitted to apply and obtain the Right of Way for the Project from the State Government and other related agencies from the Appointed Date.

c. PIA shall obtain necessary Right of Way (RoW) from State/Central agencies whichever applicable by completely following RoW application process of respective agencies. State/SIA shall support the PIA in obtaining the same. The PIA has to pay ROW charges to any agencies (Except Penalties for violation which PIA has to bear), then the GFGNL shall reimburse within 30 days on receipt of complete and relevant documents.

d. The bidder is responsible for obtaining RoW permissions. The office of GFGNL will facilitate with admin support if required and wherever possible in coordination with respective Government agencies, however, the PIA will be solely responsible to prepare proposals in requisite format, submit it to relevant agencies/ companies/ authorities for approval, and do necessarily follow up-meetings. In case, there are penalties for executing work without ROW permission, then PIA shall bear that. State government has waived ROW charges. However, approval for alignment with state agencies still needs to be done. PIA shall obtain ROW permissions from the central and state agencies such as national highways, Oil and gas pipelines, Railways etc. The PIA has to pay ROW charges to any agencies (Except Penalties for violation which PIA has to bear), then the GFGNL shall reimburse within 30 days on receipt of complete and relevant documents.

e. Selected bidder has to provide Project Management Tool including Workflow management, RoW Management and integrated with GFGNL's existing GIS, i.e. the web portal / project management should be ready with RoW tracking details and made live update on day0.

f. The PIA has to provide minimum 2 member's team per package for ROW applications and follow-ups and a dedicated 1 (one) ROW lead to act as a SPOC for GFGNL. All RoW team members has to understand the local geography and communicate fluently into local language to concern authority. For District and block level RoW related all communications/follow-ups shall be taken care by the district and block field level resources.

g. As there is no Single Window clearance for RoW. GFGNL may intimated the state bodies of the RoW requirements of this project. Central agencies shall be intimated by GFGNL in due course. The PIA shall provide a separate dedicated RoW team for filing, liaising, followup and escalation of RoW permission related matters. However, tentative timeline mentioned below will be applicable to selected bidder in case of any of the authority/ department excluded from the above intimation. Failure to this will create a base ground to invite the penalty to bidder above the cap limit of CAPEX and OPEX. Penalty will be calculated by deducting 5% Capex of number of GP's covered in planned route per missed milestone mentioned below in table. However, exclusion can be given with reference to submission of valid documentations from authorized agency of RoW .

#	Parameters	Timelines	Measurement Criteria
1	Appoint Nodal Officer	T1= T0+30 calendar days	Successful bidder shall notify to GFGNL over e-mail/letter and on the government portal the officer (by designation) who shall be the nodal point for the purposes of RoW, within thirty calendar days from the date of assigned workorder. Any replacement of such officer shall also be promptly notified on the government portal as well as to the GFGNL.
2	Survey and Submission of RoW application to concern authority	T2=T0+40 calendar days	Survey Report and Submission of received Office Copy(OC) of applied RoW of that route from authority. (*bidder has option to submit the primary route and ready with mitigation plan with alternate route or any other stragey applicable/feasible on field to avoid delay in approval of primary route ROW application rejection)*
3	Acknowledgement of RoW applications (DN of Applications) from concern authority	T3=T0 +50 calendar days	DN Number/ approved Application Number/ receipt/ other proper evidence of applications submission documents as specified under sub-rule (2) and in such form and manner as may be specified by that entity. (*a copy of the authorisation granted by the Central Government/State Government, details of the underground telecommunication network proposed to be laid) Bidder has to ready and submit the primary route and ready with mitigation plan with alternate route or any other stragey applicable/feasible on field to avoid delay in approval*

Table-0A

h. It is the sole responsibility of PIA to ensure compliance with RoW procedures as per the concerned authority's regulations. The authority may take between 6-8 months to complete the requisite procedures, and PIA must comply with the RoW procedure to be eligible for claiming the milestone (3/4) payment criteria. PIA must strictly adhere to the RoW procedure, and any non-compliances or actions from the authority due to PIA negligence will be PIA's sole responsibility. In the event of failure to comply with the RoW procedure, GFGNL's decision will be final and binding on PIA.

i. The PIA shall, at its own expense, apply for and obtain the Right of Way for the Project which shall include making and filing applications, paying associated costs related to RoW approval, liaising with Government Instrumentalities and agencies etc. for which PIA may engage suitable consultants. The PIA shall pay the ROW charges to be paid to the ROW agencies, if the same is upto Rs 50,000/-. The PIA shall claim the reimbursement of the same from GFGNL. If the amount is more than Rs 50,000, PIA shall have the option either to pay to the ROW agency and

seek reimbursement from GFGNL along with normal bills or ask GFGNL to pay directly to the ROW agency. The similar arrangement shall be applicable during the whole contract period for O&M also.

j. Further, it is being expressly agreed and understood that State Government/DST/GoG/DoT/ USOF/ GoI/ GFGNL or the State Government shall have no liability whatsoever in respect of survey carried out or work undertaken by the PIA on or about the Site (Route) of the New Network and Existing Network pursuant hereto in the event of Termination or otherwise.

k. GFGNL competent authority shall relax the penalties on delay due to ROW permissions with proper justification and valid evidence. No penalty shall be levied due to delay in RoW due to any reason whatsoever if the same is not solely attributable to the PIA.

l. Reinstatement charges based on the standard SOR rates of the District/ State authorities, if any, shall be payable by GFGNL either to the respective authority or shall be reimbursed to the PIA, if paid by the PIA after the same is approved by GFGNL. However, the delay on account of delayed payment/ non-payment of such reinstatement charges shall be on account of the PIA and no LD waiver for such delay shall be granted.

m. It is expressly agreed that the license granted hereunder with respect to Right of Way for the Project shall terminate automatically and forthwith, without the need for any action to be taken by GFGNL to terminate the license, upon the Termination of this Agreement for any reason whatsoever.

n. It is hereby clarified that the provisions of this Clause shall apply mutatis mutandis for any additional Right of Way that may be required for the Project in accordance with the provisions of this Agreement, and upon procurement thereof, such Right of Way shall form part of the Project, as the case may be.

o. It will be the bidder's responsibility to release the full amount of any refundable deposits or Bank Guarantees (BGs) to GFGNL before the transition to the full O&M contract period. However, in justifiable cases up to the satisfaction level of GFGNL, exemptions may be granted based on the submission of requisite valid documents and PIA's undertaking. In such cases, the same withheld amount will be deducted from the PIA's payable till the full amount is released by the authority. Any full/partial deductions made by the authority will be recovered from the PIA's payable or PBG."

Note: Installation of pole shall be in public land only with consideration of carring proper weight/heavier load for public safety.

5.12 POC(PROOF OF CONCEPT)

Bidder & OEM Responsibilities

I. Plan, design, and configure the supplied equipment in alignment with the provided layouts.

II. OEM along with the bidder has to ensure design and technical compliance of the proposed solution and has to ensure all service support during entire contract period.

III. The overall strategy of implementation is divided in two parts.

a. The one part is, technical configuration, right traffic engineering/re-engineering, identification of stress point, and overall solution within one jurisdiction and one pocket (i.e.one block and one district, internet breakout, Intranet) and with an objective to validate and freeze the technically implementable aspects with active role of expert which is OEM in this case.

b. The second part is, to replicate the above rightly defined model jointly concerned by OEM and GFGNL for further replicate with improvements if any by the bidder.

IV. The failure during this pilot pocket shall be the good reason for termination of the entire workorder without any scope of negotiation or doubts.

V. The bidder shall provide all the resources and handful intent to complete this round of work as per part of his quoted commitment.

VI. OEM has to ensure successful implementation of pilot block and pilot district first which will be replicated in rest geography by bidder.

5.13 Operation And Maintenance

The breakdown of the contract for maintaining a network after its set up.

I. As mentioned in the Factsheet, above, the overall/complete contract duration, including Supply, Installation, Testing, Commissioning, and Maintenance, will last for 10 years.
II. Until the entire network is running, any parts that are active will also be maintained, and payment for this will be determined on a proportional basis.
III. The maintenance, as per the service agreement, will continue for 7 years after the complete set up of the network, i.e. after the 100% go-live.
IV. Beyond 10th year(For contract extension), the equipment which is not EoSL (End of Support Life), can be continued along with the network for O&M as per decision of USOF/ DoT/ GFGNL and also with the consensus of PIA. The OPEX payable after 10th year will be enhanced annually by 4% (i.e. 11th year will have OPEX of 6.76%, 12th year will be 7.02% and so on) till the continuity of the O&M of the network by PIA.
V. Government of INDIA has launched CBuD (Call Before You Dig) for synegrgies between various stakeholders. PIA shall ensure to use CBUD application by his appointed agencies/vendors/employees prior to any field work commencement.
VI. The amount each GP receives is found by dividing the first year's maintenance cost for their package by the total number of GPs in that package covered under the BharatNet Phase-III project implementation on MPLS network at last mile.

Prorate to be paid for O&M before zero day = (50% of first year total O&M cost / total GPs on MPLS as last mile)

X (Total number of GPs made Live)

VII. A block network will only be considered active (100% go-live) when all GPs will be operational on MPLS network at last mile.

a. PIA shall undertake the responsibility for Operations & Maintenance (O&M) of the Existing Network including the existing leased OFC of Phase-1 (all the fibres in the

cable, although only one fibre is used in many cases) & in phase-2 till the same is replaced with the new laid network,

b. Incremental OFC laid under BharatNet, Maintenance of existing GPON equipment (OLTs, ONTs, all active and passive elements including Solar system) and New deployed Network under this RFP will be in the scope of selected bidder.
c. All expenditure required to perform O&M of the Existing Network and New Network shall be the responsibility of the PIA.
d. Arrangement of D.G. (Diesel generators) set, which are essential for providing reliable backup power to BharatNet infrastructure such as Shelter sites, any critical nodes, etc. will be in PIA scope for O&M to maintain the SLA.
e. Selected PIA shall undertake the responsibility for Operations & Maintenance (O&M) of the all active and passive elements fall under following categories,

1. Phase-I entire existing infrastructure till the same is replaced with new laid network.
2. Phase-II Existing Network infrastructure including the shelter infrastructure(Which includes stabilizers, racks, and GPON network elements with all releated active and passive accessories, splitters, FDMS etc.)immediately after the milestone mentioned in the RFP document of Handover-Takeover (HoTo) procedure.
3. Phase-I infrastructure immediately after completion of own infrastructure of leased sections as per milestone.
4. Intermediate/incremental sections (Connectivity between Phase-I and Phase-II, between intermediate island connectivity, 2CNO(two cut not out), ring shortening, etc.) and any other additional scope mentioned in this RFP after successful milestone completion.
5. Connecting/Shifting the remaining unconnected Gram Panchayats (GPs) under BharatNet Operation and Maintenance (O&M) of the existing as well as the newly deployed network, including proactive and reactive maintenance activities.
6. The establishment of governance framework, and escalation procedures & matrix for network and customer support service on 365 x 24 x 7 basis.
7. PIA shall support on extending access of the Network Management System or other equivalent systems along with network performance reports on a mutually agreed basis to State NOC of GFGNL, CNOC-BharatNet Delhi,and Bangalore NOC.
8. The services provided shall adhere and conform to applicable security policies and guidelines issued by DoT/TRAI/GoI/GoG/GFGNL - DST.
9. The PIA shall be responsible and bear costs for replenishment and upgrade of all active and passive infrastructure including all ancillaries required for smooth executions and operations & maintenance of project across the Contract Period.
10. In case of any defect, deficiency or deterioration in the Project poses a hazard to safety or risk of damage to property, the PIA shall promptly take all reasonable measures for eliminating or minimising such danger.
11. The PIA shall insure all the equipment at GP for theft, damages due to fire, flood,
    earthquake, storm etc for the entire project duration.
12. The basic Operation and Maintenance Guidelines/ directions released centrally through BSNL (RFP Number: *MM/BNO&M/BN-III/T-791/2024*) to be follow including their corrigendum's/addenda / clarification notes. The guidelines released through this RFP document will be supersedes to it.

The O&M performance will be measured out as per the SLA provided. The PIA shall be required to start O&M for newly connected individual Gram Panchayats (GPs) immediately after the date of commissioning and from the date of handover in case of existing BharatNet network.

Selected PIA will be solely responsible for following things but not limited to during their O&M phase,

I. Infrastructure

II. Network Inventory

III. Network Configuration/ Configuration Management

a) Network and Service provisioning

b) Server provisioning

c) User provisioning

IV. Fault Restoration Service

V. Methodology for Fibre Restoration /Fibre Cuts

VI. Periodic Maintenance

VII. Other Network O&M Parameters

VII. Geo fencing based attendance management system.

VIII. Hand-over/take-over existing Operation (For Phase-I & Phase-II Network)

IX. Capacity Augmentation

The PIA shall be responsible for the operations of the network entailing the following:

5.13.1 INFRASTRUCTURE

a) PIA shall undertake the responsibility for Operations & Maintenance (O&M) of the Existing Network including the GFGNL laid in BharatNet Phase-I & II including the existing leased OFC in Ph-I till the same is replaced with the new laid network, incremental OFC laid under BharatNet & also of both Phase-I & II networks GPON equipment (OLTs, ONTs), RFMS, and Solar Photo Voltaic Systems at the GPs, all active and passive elements like but not limited to fibre, duct, joint indicators, (single & three phase)Stabilizers, UPS at GP end, etc., Old infrastructure created under Bharatnet Phase-II including all GPON equipments and utilitity and New Network delivered against scope mentioned in this RFP.
b) PIA shall extend support on access of the Network Management System or other equivalent systems along with network performance reports on a mutually agreed basis to BharatNet Delhi and Bangalore NOC.
c) GFGNL has already installed Copper/electric SFP at Shelter, L2 switches at GP in BharatNet Phase-II network, selected PIA will be solely responsible to recover and migrate on suitable locations with an approval from the GFGNL. Selected PIA will be responsible to maintain the inventory and share to GFGNL as and when asked. GFGNL has the rights to utilize this

inventory for any other project also if required, selected bidder will be responsible to get the AMC for those inventories for entire contract duration.

d) In case of any defect, deficiency or deterioration in the Project poses a hazard to safety or risk of damage to property, the PIA shall promptly take all reasonable measures for eliminating or minimizing such danger.

e) Bidder has to ensure to follow the all governance law for GoI/Government of Gujarat network security, the port level security, mac binding, firewall with defining secure connectivity including but not limited to all active network elements as well as for services.

f) Bidder is responsible if any case change in NMS / EMS position/shifting of infrastructure, or changing the capacity, licenses, etc.

g) Prevent third party damages viz. theft or damage/s caused by other underground utility service provider.

h) Submission of Asbuilt, network layout change, observations need to update in GIS.

i) For any kind of sabotage in the network, primary PIA will be solely responsible.

j) From the project start in O&M phase to first two years in O&M of newly laid network there will be no claim accepted by GFGNL for fibre losey or rectifications except road widening and cases out of control from the bidder.

k) For all types of resources/material Spare arrangement, Hardware management, RnR (Remove/Repair and Replace) management, courier charges will be in the scope of new bidders.

l) At the end of each toll gate of Handover takeover(HoTo) process both the parties (ole and new PIA) will have to submit the signoff report to GFGNL Central Office-Gandhinagar with all evidence.

m) **Existing Infrastructure**: Site of the Existing Network shall include an inventory of existing network infrastructure across Blocks, Gram Panchayats (GPs) and Villages along with laid OFC infrastructure. The indicative information is described in section 5.9.1.1 for Bharatnet Phase-2.

However, Selected bidder has submit the following reports based on their actual survey on field.

Table A.1: Asset Summary – Package

BharatNet Phase-I & II	Package	No of Blocks	Total GPs (Connected on OFC)	Total OFC laid (Kms)	OLT installed (Nos.)	ONT installed (Nos.)

	A					
	B					

Note: Transport Equipment details covered in Scope/Introduction

Table A.2: Block / Gram Panchayat (GP) count under Package

BharatNet Phase-I & II	Total Blocks	GPs already created		GPs for Upgradation	GPs To be Connected	Total GPs to be connected in Ring Topology
		Phase I	Phase II			

n) Maintaining the network architecture and all its components, including fiber optic cables, switches, routers, and other equipment, including the number of nodes, connections, and transmission speeds will be in the scope of selected bidder.

o) Infrastructure developed through any authorized third party of GFGNL for BharatNet Phase-III ,like backhaul /network upgradation, power backup- utility upgradation will be manage by the selected bidder without any additional cost to GFGNL. In Summary, In case, if any other type of electronics equipment (to be installed at centralized as well as field locations) will be procured for this Network in future through separate tender, the selected PIAs will be responsible to perform O&M of those devices.

p) The PIA shall be solely responsible for ensuring network uptime and performance along with providing comprehensive support during the entire Contract Period for the network created/upgraded till village level/last mile created / infrastructure developed through this RFP.

q) This shall also include the establishment of governance framework, and escalation procedures & matrix for network and customer support service on 365 x 24 x 7 basis during the entire contract duration.

r) As part of the maintenance, PIA shall be required to maintain the upkeep of the medium of connectivity, restoration of services, any other maintenance job required to meet the redundancy and SLAs.

5.13.1.1 DETAILS OF EXISTING SET-UP, INVENTORY DETAILS ETC. OF BHARATNET PHASE-2

5.13.1.1(a) Details of Network equipment in Package-A

Equipment type	Model No	Make	Inventory Counts in NMS
Transport Device	DOT-F851X/DOT-F852X	D Link	79/9

Transport Switch (L2)	DGS-3000-28XS/10L/DGS-1210-12TS/ME	D Link	294
OLT	CDOT SCM	C-DOT	213
ONT	ONT11	C-DOT	4220
Access Switch (L2)	TJ1400P-M1-24TC-LS	Tejas	4220
RFMS	FG-750EX	EXFO	74
MOTAU	-	EXFO	115

5.13.1.1(b) Details of Network equipment in Package-B

Equipment type	Model No	Make	Inventory Counts in NMS
Transport Device	NPT-1010/NPT-1050/NPT-1800	ECI	27/11/2
Transport Device	OPT9603/OPT9608	ECI	67/5
OLT	TJ1400_Type-7SR	Tejas	191
ONT	TJ2100N	Tejas	3744
Access Switch (L2)	TJ1400P-M1-24TC-LS	Tejas	3766
RFMS	OTDRV3	VEE	179

5.13.1.1(c) Details of equipment in Package-A and B

SN	Vendor	Device Role	Make Model	PKG
1	Tejas	Switch	TJ1400P-M1-24TC-LS	PKG-A & B
2	CDOT	ONT	ONT11	PKG-A
3	Tejas	ONT	TJ2100N-11G	PKG-B
4	D-Link	Transport Switch	DGS-3000-28XS, DGS-1210-12TS/ME, DGS-3000-10L	PKG-A
5	CDOT	OLT	Cdot OLT	PKG-A
6	Tejas	OLT	TJ1400_TYPE_7SR	PKG-B
7	ECI	DWDM	Apollo 9608 & Apollo 9603, NPT-1010, NPT-1050i, NPT-1800	PKG-B
8	D-Link	DWDM	DOT-F851X, DOT-F852X	PKG-A

5.13.1.1(d) Package wise Details of all Equipments

PACKAGE Wise Details of All Equipments										
PKG	ISLAND	OTN/ NPT	LA/ ILA	LA+ OEO	OTN+ OEO	DWDM	OLT	ONT	Tejash Switch	Transport Switch
A	1	5	9	2	5	21	40	901	884	64
	2	16	7	4	6	33	84	1663	1636	85
	3	15	9	4	6	34	89	1662	1679	131
B	4	40	72	0	0	112	188	3758	3760	0

Total	76	97	10	17	200	401	7984	7959	280

Package Wise District, Block and GP Details				
PACKAGE	ISLAND	District	Block	GP
A	1	1	14	871
	2	4	27	1624
	3	7	33	1569
B	4	10	67	3639
Total		**22**	**141**	**7703**

The GP mainly contain Rack, ONT, FDMS, Switch, UPS with battery.
The Shelter mainly contain FDMS, OLT, Splitter, DWDM, NPT, RFMS, OTN, Switch, Power Plant, ILA/OLA, Servo Stabilizer.

5.13.1.1(e) Details of SDC equipment inventory in Package-A

Sl.No.	Device Serial #	Description	Device Model
1	RVOT1K5000134	D-link FDMS	DOT-FDCM80
2	RVOT1K5000143	D-link FDMS	DOT-FDCM80
3	RVOT1K5000122	D-link FDMS	DOT-FDCM80
4	RVOT1K5000098	D-link FDMS	DOT-FDCM80
5	RVOT1K2000091	D-link FDMS	DOT-FDCM80
6	RVOT1K2000093	D-link FDMS	DOT-FDCM80
7	SY2Y103000270	DGS-3000-10L Gigabit Ethernet Switch	DGS-3000-10L
8	SY2Y1J6000071	DGS-3000-10L Gigabit Ethernet Switch	DGS-3000-10L
9	SY2Y103000182	DGS-3000-10L Gigabit Ethernet Switch	DGS-3000-10L
10	SY341JC000003	DGS-3000-28XS Gigabit Ethernet Switch	DGS-3000-28XS
11	SY341JA000107	DGS-3000-28XS Gigabit Ethernet Switch	DGS-3000-28XS
12	RZYF205000046	DGS-3630-28SC Gigabit Ethernet Switch	DGS-3630-28SC
13	RVOT1K2000087	DOT-F852X-DWDM	DOT-F852X
14	RVOT1K5001534	DOT-F852X-DWDM	DOT-F852X
15	RVOT1K5001530	DOT-F852X-DWDM	DOT-F852X
16	AR-2419-30-3411	Tejas switch	TJ1400P-M1
17	RVOT1K2000106	DOT-F852-PWR-DC	DOT-F852X
18	RVOT1K2000073	DOT-F85-M16-02TE	DOT-F852X
19	RVOT1K2000071	DOT-F85-M16-02TE	DOT-F852X

Sl.No.	Device Serial #	Description	Device Model
20	RVOT1K2000025	DOT-FDMUX-8	DOT-F852X
21	RVOT1K2000038	DOT-FOA(PA)	DOT-F852X
22	RVOT1K2000055	DOT-FRB-BF	DOT-F852X
23	RVOT1K2000050	DOT-FRB-BF	DOT-F852X
24	RVOT1K2000042	DOT-FOA(PA)	DOT-F852X
25	RVOT1K2000021	DOT-FDMUX-8	DOT-F852X
26	RVOT1K2000088	DOT-F852-MSU-X	DOT-F852X
27	RVOT1K2000107	DOT-F852-PWR-DC	DOT-F852X
28	RVOT1K2000089	DOT-F852-MSU-X	DOT-F852X
29	RVOT1K2000108	DOT-F852-FAN-X	DOT-F852X
30	RVOT1K2000018	DOT-FDMUX-8	DOT-F852X
31	RVOT1K2000028	DOT-FOA(BA)	DOT-F852X
32	RVOT1K2000027	DOT-FOA(BA)	DOT-F852X
33	RVOT1K2000013	DOT-FDMUX-8	DOT-F852X
34	T212018122018812	D-link SFP	ACODE_XFP_S_64_5a
35	A20020034	D-link SFP	ACODE_XFP_S_64_5a
36	SA081K2000900	D-link SFP	Ethernet 1000BASE_LX
37	SA081K2000853	D-link SFP	Ethernet 1000BASE_LX
38	SA081K2000865	D-link SFP	Ethernet 1000BASE_LX
39	SA081K2000892	D-link SFP	Ethernet 1000BASE_LX
40	SA081K2000877	D-link SFP	Ethernet 1000BASE_LX
41	T212018122018815	D-link SFP	ACODE_XFP_S_64_5a
42	RVOT1K5000437	D-link SFP	ACODE_XFP_S_64_5a
43	SA081K2000890	D-link SFP	Ethernet 1000BASE_LX
44	SA081K2000899	D-link SFP	Ethernet 1000BASE_LX
45	SA081K2000886	D-link SFP	Ethernet 1000BASE_LX
46	SA081K2000856	D-link SFP	Ethernet 1000BASE_LX
47	RVOT1K5001501	DOT-F852-PWR-DC	DOT-F852X
48	RVOT1K5000483	DOT-F85-M16-02TE	DOT-F852X
49	RVOT1K5000467	DOT-F85-M16-02TE	DOT-F852X
50	RVOT1K5000513	DOT-F85-M16-02TE	DOT-F852X
51	RVOT1K5000587	DOT-FRB-BF	DOT-F852X
52	RVOT1K5000814	DOT-FOA(BA)	DOT-F852X
53	RVOT1K5001054	DOT-FDMUX-8	DOT-F852X
54	RVOT1K5000708	DOT-FOA(PA)	DOT-F852X
55	RVOT1K5001005	DOT-FDMUX-8	DOT-F852X
56	RVOT1K5001523	DOT-F852-MSU-X	DOT-F852X
57	RVOT1K5001502	DOT-F852-PWR-DC	DOT-F852X
58	RVOT1K5001510	DOT-F852-FAN-X	DOT-F852X
59	RVOT1K5000613	DOT-FRB-BF	DOT-F852X

Sl.No.	Device Serial #	Description	Device Model
60	RVOT1K5000835	DOT-FOA(BA)	DOT-F852X
61	RVOT1K5001066	DOT-FDMUX-8	DOT-F852X
62	RVOT1K5000711	DOT-FOA(PA)	DOT-F852X
63	RVOT1K5000946	DOT-FDMUX-8	DOT-F852X
64	RVOT1K5000338	D-link SFP	ACODE_XFP_S_64_5a
65	RVOT1K5000408	D-link SFP	ACODE_XFP_S_64_5a
66	SA08104000293	D-link SFP	Ethernet 1000BASE_LX
67	SA08102003101	D-link SFP	Ethernet 1000BASE_LX
68	SA08104000254	D-link SFP	Ethernet 1000BASE_LX
69	SA08104000272	D-link SFP	Ethernet 1000BASE_LX
70	SA08104000285	D-link SFP	Ethernet 1000BASE_LX
71	SA08104000279	D-link SFP	Ethernet 1000BASE_LX
72	SA08102003116	D-link SFP	Ethernet 1000BASE_LX
73	SA08104000255	D-link SFP	Ethernet 1000BASE_LX
74	RVOT1K5000356	D-link SFP	ACODE_XFP_S_64_5a
75	RVOT1K5000441	D-link SFP	ACODE_XFP_S_64_5a
76	SA081K2000878	D-link SFP	Ethernet 1000BASE_LX
77	SA08104000252	D-link SFP	Ethernet 1000BASE_LX
78	SA08102001650	D-link SFP	Ethernet 1000BASE_LX
79	SA08102003131	D-link SFP	Ethernet 1000BASE_LX
80	SA08104000262	D-link SFP	Ethernet 1000BASE_LX
81	SA081K2000868	D-link SFP	Ethernet 1000BASE_LX
82	SA08102001606	D-link SFP	Ethernet 1000BASE_LX
83	SA08104000267	D-link SFP	Ethernet 1000BASE_LX
84	RVOT1K5000375	D-link SFP	ACODE_XFP_S_64_5a
85	RVOT1K5000389	D-link SFP	ACODE_XFP_S_64_5a
86	SA08102001609	D-link SFP	Ethernet 1000BASE_LX
87	SY2008-BTC1290	D-link SFP	Ethernet 1000BASE_T
88	SA08102003122	D-link SFP	Ethernet 1000BASE_LX
89	SA08102001649	D-link SFP	Ethernet 1000BASE_LX
90	SA08102001613	D-link SFP	Ethernet 1000BASE_LX
91	SA08102001605	D-link SFP	Ethernet 1000BASE_LX
92	SA08104000270	D-link SFP	Ethernet 1000BASE_LX
93	SA08102003110	D-link SFP	Ethernet 1000BASE_LX
94	RVOT1K5001493	DOT-F852-PWR-DC	DOT-F852X
95	RVOT1K5000488	DOT-F85-M16-02TE	DOT-F852X
96	RVOT1K5000493	DOT-F85-M16-02TE	DOT-F852X
97	RVOT1K5000497	DOT-F85-M16-02TE	DOT-F852X
98	RVOT1K2000052	DOT-FRB-BF	DOT-F852X
99	RVOT1K5000830	DOT-FOA(BA)	DOT-F852X

Sl.No.	Device Serial #	Description	Device Model
100	RVOT1K5001031	DOT-FDMUX-8	DOT-F852X
101	RVOT1K5000778	DOT-FOA(PA)	DOT-F852X
102	RVOT1K5001682	DOT-FDMUX-8	DOT-F852X
103	RVOT1K5001520	DOT-F852-MSU-X	DOT-F852X
104	RVOT1K5001494	DOT-F852-PWR-DC	DOT-F852X
105	RVOT1K5001519	DOT-F852-MSU-X	DOT-F852X
106	RVOT1K5001503	DOT-F852-FAN-X	DOT-F852X
107	RVOT1K5000660	DOT-FRB-BF	DOT-F852X
108	RVOT1K5000826	DOT-FOA(BA)	DOT-F852X
109	RVOT1K5001064	DOT-FDMUX-8	DOT-F852X
110	RVOT1K5000793	DOT-FOA(PA)	DOT-F852X
111	RVOT1K5000947	DOT-FDMUX-8	DOT-F852X
112	RVOT1K5000346	D-link SFP	ACODE_XFP_S_64_5a
113	RVOT1K5000403	D-link SFP	ACODE_XFP_S_64_5a
114	SA08102001634	D-link SFP	Ethernet 1000BASE_LX
115	SA08102003118	D-link SFP	Ethernet 1000BASE_LX
116	SA08102003103	D-link SFP	Ethernet 1000BASE_LX
117	SA08102003108	D-link SFP	Ethernet 1000BASE_LX
118	SA08102003117	D-link SFP	Ethernet 1000BASE_LX
119	RVOT1K5000363	D-link SFP	ACODE_XFP_S_64_5a
120	RVOT1K8100004	D-link SFP	ACODE_XFP_S_64_5a
121	SA08102001617	D-link SFP	Ethernet 1000BASE_LX
122	SA08102003115	D-link SFP	Ethernet 1000BASE_LX
123	SA08102001638	D-link SFP	Ethernet 1000BASE_LX
124	SA08102003136	D-link SFP	Ethernet 1000BASE_LX
125	SA08102001621	D-link SFP	Ethernet 1000BASE_LX
126	SA08102003134	D-link SFP	Ethernet 1000BASE_LX
127	RVOT1K5000379	D-link SFP	ACODE_XFP_S_64_5a
128	RVOT1K5000391	D-link SFP	ACODE_XFP_S_64_5a
129	SA08102003139	D-link SFP	Ethernet 1000BASE_LX
130	SA08104000297	D-link SFP	Ethernet 1000BASE_LX
131	SA08102003102	D-link SFP	Ethernet 1000BASE_LX
132	SA08102003121	D-link SFP	Ethernet 1000BASE_LX
		Video Wall	

5.13.1.1(f) Details of SDC software inventory in Package-A

SN	Full Name of Software	Function or Purpose
1.	CDOT EMS application	EMS
2.	DWDM	EMS
3.	GP TESTING	EMS

4.	Dview Switch EMS	NA
5.	Iperf GP Testing Application	NA
6.	RFMS expo	EMS
7.	Tejas L2 EMS	EMS

5.13.1.1(g) Details of SDC equipment inventory in Package-B

SN	Device Serial #	Device Manufacturer
1	503393871	ECI
2	5503420483	ECI
3	5503420481	ECI
4	503385504	ECI
5	503385505	ECI
6	425192121	ECI
7	425192124	ECI
8	503383019	ECI
9	503384835	ECI
10	NA	ECI
11	NA	ECI
12	NA	ECI
13	NA	ECI
14	700655459	ECI
15	700655444	ECI
16	700646355	ECI
17	700558891	ECI
18	700639997	ECI
19	700679438	ECI
20	700640074	ECI
21	700679377	ECI
22	700639967	ECI
23	700639970	ECI
24	700675337	ECI
25	700675326	ECI
26	700679178	ECI
27	700679398	ECI
28	700645859	ECI
29	700621782	ECI
30	700621772	ECI
31	700646193	ECI
32	700645790	ECI
33	0303190452_V09M008X	ECI
34	0223181442_FJ0707310025	ECI
35	0306191125_V09M00MC	ECI

SN	Device Serial #	Device Manufacturer
36	0309191754_1903005142	ECI
37	1106182248_1845000090	ECI
38	1106182301_1845000066	ECI
39	0310181516_1863000929	ECI
40	1107180056_1845000098	ECI
41	0307192255_V10M0059	ECI
42	0306190125_V09M009T	ECI
43	0517191834_1905006696	ECI
44	1106182236_1845000148	ECI
45	0309181317_1862005559	ECI
46	0311181327_1863006190	ECI
47	0305190835_V09M00LT	ECI
48	0522181246_FJ1907310448	ECI
49	0427181122_FJ16073101C8	ECI
50	0307191303_V10M002W	ECI
51	0308190009_V10M005X	ECI
52	0302190135_V09M003L	ECI
53	0303192338_V09M00LN	ECI
54	0304190000_V06M001X	ECI
55	0309191502_1903004934	ECI
56	1128181120_TJB6120063	ECI
57	1128182149_TJB6120554	ECI
58	0306191907_1903003030	ECI
59	0319190931_1903029319	ECI
60	0319190931_1903029623	ECI
61	1128182140_TJB6120439	ECI
62	0319190931_1903029385	ECI
63	0319190931_1903029349	ECI
64	1128181447_TJB6120225	ECI
65	0319190931_1903029657	ECI
66	1128181457_TJB6120256	ECI
67	0124191121_1901036857	ECI
68	0311181327_1863006187	ECI
69	0311180441_1863000326	ECI
70	0308182230_1862002782	ECI
71	0309181848_1862004690	ECI
72	0517190947_1905006776	ECI
73	0517191728_1905006733	ECI
74	0517191835_1905006734	ECI
75	TMMA00SO910177	VeEX

SN	Device Serial #	Device Manufacturer
76	19 - 8569	R&M
77	19 - 8527	R&M
78	AI-0719-14-5342	TEJAS
79	AB-4818-13-9943	TEJAS
80	AB-2519-17-7052	TEJAS
81	AB-4818-13-9924	TEJAS
82	AB-2519-17-7103	TEJAS
83	AT-1619-22-0024	TEJAS
84	AT-1619-22-0021	TEJAS
85	AB-2419-14-0130	TEJAS
86	AI-0719-14-5342	TEJAS
87	BP184900010827	TEJAS
88	BP184900010829	TEJAS
89	BP184900011195	TEJAS
90	BP184900011186	TEJAS
91	BP184900011191	TEJAS
92	BP184900010229	TEJAS
93	BP184900011173	TEJAS
94	83T118401229	TEJAS
95	J221029117	TEJAS
96	IB20150134	TEJAS
97	BP184900011177	TEJAS
98	BP184900010295	TEJAS
99	BP184900010296	TEJAS
100	BP184900010297	TEJAS
101	BP184900010283	TEJAS
102	BP184900010286	TEJAS
103	BP184900010300	TEJAS
104	BP184900010230	TEJAS
105	STAP31192500159	TEJAS
106	83T118401788	TEJAS
107	544A4E57957BC08B	TEJAS
108	219B556001340	Missing Detail
109	12FX1918	Syrotac
110	WX19011702526	Taclink
111	WX19011702258	Taclink
112	OP-M74050GSFP18112403893	Optilink
113	OP-M74050GSFP18112403890	Optilink
114	6F3808BD4A75/741/r3	Microtik Router
115	6F38085E9DD4/741/r3	Microtik Router

SN	Device Serial #	Device Manufacturer
116	6F38089687B3/741/r3	Microtik Router
117	Ls48-c3L-TC-N-DD	APAC Opto
118	AR-1319-30-0276	Tejas
119	OP-M74050GSFP18112403899	Optilink
120	WX19011702538	Taclink
121	NA	ECI
122	NA	ECI
123	CYT3302R01G	Ruckus
124	CKM2514L03S	Brocade-Netlon
125	121173001BB0	AP-QUANTUM-QN-O-230
126	8AFF09A3D134/849/r3	Microtik Router
127	FG100FTK20032861	FORTIGATE 100F
128	NA	Cisco
129	FG100FTK20014087	FORTIGATE 100F
130	FG100FTK20014121	FORTIGATE 100F
131	2K5VB33	Dell
132	3K5VB33	Dell
133	4K5VB33	Dell
134	5K5VB33	Dell
135	7BZTB33	Dell
136	8BZTB33	Dell
137	9BZTB33	Dell
138	FOC2438L9CY	Cisco
139	FOC2441L2YK	Cisco
140	BRCEZL1932R01B	Dell
141	BRCEZL1932R01A	Dell

5.13.1.1(h) Details of SDC software inventory in Package-B

SN	Software Name	User Department	User Department Contact Details	Function or Purpose	Version	Quantity
1.	ORACLE	GFGNL	GFGNL	ECI DWDM n NPT	Oracle Linux base	1
2.	Windows	GFGNL	GFGNL	VeEX RFMS	WIN-2019	1
3.	Linux	GFGNL	GFGNL	Tejas OLT-ONT	7.5	1
4.	Linux	GFGNL	GFGNL	Tejas SWITCH	7.5	1

5.13.1.1(i) Details of EMS in Package-A

Sr	EMS	Current NODE	LICENCE
1	CDOT	OLT - 213,	OLT - 213,
2	CDOT	ONT - 4184	ONT - 4300
3	TEJAS	TEJAS SWITCH - 4146	4211 Nodes
4	EXFO	Route	750 Routes
5	DLINK	DLINK SWITCH - 280	525
6	DLINK	DLINK DWDM - 88	NA

5.13.1.1(j) Details of EMS in Package-B

Sl. No.	EMS	Currant Live Node	Capacity as per license
1	RFMS	44 RFMS	70 RFMS
2	RFMS	44 RFMS	70 RFMS
3	RFMS	46 RFMS	70 RFMS
4	RFMS	45 RFMS	70 RFMS
5	RFMS	NA	NA
6	Tejas OLT	188 OLT_3749 ONT	6000 weight (As per Tejas GPON EMS 188 OLT are integrated with 12.0*188=2256 weight for PTN and TDM 2.5 per OLT) (188*2.5=470 so finally 2256+470= 2726 is integrated out off 6000)
7	Data Base	NA	NA
8	EMS Server	3812 Switch	3973 Switch
9	ECI DWDM	NA	NA
10	ECI DWDM	NA	NA
11	ECI DWDM	72	1012
12	ECI DWDM	NA	NA
13	ECI DWDM	40 NE's	150 for NE's (where MCIPS300 for NPT 1050 22 is limit and 20 is under use, it is define as per NE license)
14	ECI DWDM	NA	NA

Note:

i. **Above mentioned inventory details are indicative in nature, Bidder is suggested to do the site/network survey before Pre-Bid meeting and final submission of this bid.**

ii. **Bidder must communicate to GFGNL official at H.O.-Gandhinagar and local GFGNL official with their authorized persons list with their contact details. The visit details should be in prior intimation atleast one day before the schedule date and subject to permission and availability of end site, in written including time schedule and location details.**

iii. Project is Trunkey in nature, based on the requirement client may purchase extra items on discovered rate. The successful bidder must perform a detail site survey and prepare final

Bill of Quantity and take necessary approval from Department or its representative before supply of items/equipment.

5.13.1.2 INFRASTRUCTURE HANDOVER TAKEOVER

a) For Phase-I

I. The selected bidder is responsible for following, but not limited to, activities for the of the overall Amendment BharatNet Program(ABP – BharatNet Ph-III) success including existing infrastructure handover takeover process.

Milestone	Activities
Initial Survey	Conduct a comprehensive survey of the existing infrastructure to assess its current state, identify potential issues like but not limited to Optical fibre losses through LSPM/OTDR report, identifications of Aerial OFC sections, and establish a baseline for future improvements if any in details. Submission of field survey input on this will be part of measurement (Minimum Sample field survey input mentioned in **Table-0B**, However, additional details may be considered)
Handover Takeover Process	Official transfer of responsibilities, including documents and necessary resources, from the existing PIA based on the milestones mentioned in details in section 5.13.3
Assessment of Infrastructure	Detailed evaluation of the existing infrastructure for capacity, performance, and necessary upgrades
Planning and Redesign	Where necessary, propose changes or enhancements to the infrastructure based on the needs (vision plan of the GFGNL) of the project and the assessment's outcomes
Implementation	Carry out the planned changes, which may include construction, installation of new equipment, implementation of new systems, etc.
Training	Train the tenderer/ end users on how to use and manage the updated relevant infrastructure, offer necessary support materials wherever applicable
Ongoing Maintenance and Support	Regular monitoring and maintenance of the existing infrastructure, resolution of issues, and performance assessment to ensure continuous service quality and submission of MIS reports.

Table-0A

II. The Network shall be made over Block wise with the GPs whose optical power is -25 dB or better at the GP end ONT. The same shall be ensured by the BSNL PIA of BharatNet Phase-I. The details of the equipment i.e. ONT,Solar, CCU, Battery (with replacement Date), Solar Panel, Enclosure, Earthing, and Splitter etc. will also be provided to the selected bidder.

III. Wherever feasible, The PIA shall be given access to NMS, GIS, so as to see the status and seek clarification, mention any observation in the HOTO Format.

IV. The PIA shall get the fiber health report from M/s BSNL-PIA as per the HOTO format. Restoration of fiber shall be done on mutual understanding among GFGNL, M/s BSNL and PIA.

a) **BHQ & POI End Equipment:**

I. Wherever feasible, The OLT along with make model, configuration, cards and PON diagram shall be made over by M/s BSNL to the PIA. However, PIA will be solely responsible to collect, analyze, correct and submit HLD and LLD of network. The PIA shall be responsible for maintenance of the same till the network is transferred to the MPLS router.

II. After transfer of network to the new equipment, the PIA shall make over the OLT to GFGNL.

b) **OFC Network:**

I. The OFC network corresponding to the GPs whose optical power is OK (-25 dB or better) and made over to the PIA by the ongoing agencies shall be transferred to the selected PIA for O&M on as is where is basis. The complete High level diagram(HLD), Low level diagram (LLD), KML file, asbuilt mentioning the routes shall be signed by the existing agency,selected PIA and GFGNL. Details of temporary restoration etc. shall also be marked. The PIA, if required, can mention its observations in the HOTO Format.

II. In the case of non-support from the Phase-I existing PIA, Selected PIA will be solely responsible to collect, analyze, correct and submit HLD and LLD of network based on the milestone designed in this RFP section 5.9.2.1(A1) with submission of ABD(as-built drawings), LSPM and OTDR report with time stamp including the survey input mentioned in Table-0. with all valid documentations

							GP to BSNL POI Route					BSNL POI to BHQ Route							
Ph-I	District	Blocks Name	Name Of GPs	LGD Code Of GP	OFC Route Name	BSNL POI Name	Link loss(Tx/Rx)	Route Length(Km)	Rectification Required if any (Km)	Aerial(Km)	UG(Km)	Link loss (Tx/Rx)	Route Length(Km)	Rectification Required if any (Km)	Aerial(Km)	UG(Km)	Remarks If any	Total GPs (Connected on OFC)	Total OFC laid (Kms)

Table-0B

III. GFGNL or its authorized agency has the rights to attend sample base field visit to check the accuracy of the input. Deviations on the input which will impact on quality and financial will be treated very strictly and authorized to GFGNL to apply penalty of against liquidity damage clause or penalty of twice of overall cost proposed on those section.

IV. The responsibility of attending the faults in the damaged OFC routes is with the ongoing agency as per the milestone defined in section 5.9.2.1(A1). The existing agency shall progressively make over such GPs whose optical power is made available (-25dB) to the PIA with details of the routes marked on the asbuilt (already available with the PIA). The equipment of such GPs shall be made over by the ongoing agency.

V. However, in cases, where, from the Date of first GP make over to the PIA, the existing PIA fails to make over some GPs within given milestones, the new PIA shall be bound to take over such GPs also. The PIA shall get the restoration charges as per the rates discovered in the existing PMA contract of BSNL.This RFP financial bid rate card.

VI. Any section which is in damaged condition or temporarily restored shall be clearly mentioned in the HOTO memo. For permanent restoration of such damaged sections/temporary restored sections, the PIA shall be paid as per the predefined rates or 90% of the present tender approved rate, whichever is lower, for the work up to 10% of the total taken over incremental OFC RKM (FPOI to GP).

VII. In case, such permanent restoration work is required to be taken up beyond 10% of the total taken over incremental OFC RKM, the PIA shall be paid at 80% of the present tender approved rates, in place of predefined rate, for the work carried out beyond 10%.

VIII. The replacement of damaged sections can be any section from Block to GPPIA shall be responsible for end-to-end network including all the network elements(both for active and passive) both at Block and GP level, till the network is transferred to the MPLS router.

b) For Phase-II

a) The selected agency will be responsible to complete the transfer of Knowledge & Handing/Taking over activity from existing agency within timeframe mentioned in related section.

b) The selected bidder is responsible for activities during the existing infrastructure handover takeover process of Bhartnet Phase-II network also as mentioned above in related section

c) **For the OFC network** the clauses mentioned above in related section will also be applicable. However, the survey input required in Table-0C with all valid documentations needs to submit from the onboarded PIA.

						GP to Block Route (ONT to OLT)					OLT to OLT Route / OLT (co-lo DWDM node to SDC Gandhinagar)								
District	Blocks(OLT) Name/ID	Name Of GPs	LGD Code Of GP	OFC Route Name	OLT Name	Link loss(Tx)	Route Length(Km)	Rectification Required if any (Km)	Aerial(Km)	UG (Km)	Block Name/ID	Link loss(Tx/Rx)	Route Length(Km)	Rectification Required if any (Km)	Aerial(Km)	UG (Km)	Remarks If any	Total GPs (Connected on OFC)	Total OFC laid (Kms)

Table-0C

d) After successful completion of Handover Takeover(HoTo) process, all supporting documents will be handed over to GFGNL officials through online and offline.

e) During HOTO, O&M charges will not be paid to Selected Agency. SLA or Penalty clause will not be applicable during the first **2 months** of Hand-over/Take-over process.

5.13.2 TIME LINES OF INITIAL SURVEY WITH HANDOVER FROM EXISTING PIA

The PIA shall conduct the initial survey as per survey milestones, mentioned below in the table below:

Survey Milestone No.	Period for completion of initial survey	No. Of GPs to be completed (% of Total GPs) (Ph-I)	No. Of GPs to be completed (% of Total GPs) (Ph-II)
I	T0+1 Month	15%	20%
II	T0+2 Month	35%	45%
III	T0+3 Month	50%	90%

IV	T0+4 Month	70%	Remaining in first 15 days or Part thereof
V	T0+5 Month	95%	
• T0: Appointed Date			

Any delay in above-mentioned timelines for initial survey shall attract a penalty of Rs. 100/- per shortfall GP per week or part thereof. There shall not be any relaxation in the timelines for Project Milestones, as mentioned above, on account of the survey timelines mentioned herein.

5.13.3 HAND-OVER/TAKE-OVER EXISTING OPERATION(APPLICABLE FOR PHASE-I & PHASE-II NETWORK)

a) Selected Agency will be responsible to provide confirmation about successful Handover/ Take over operations from existing agency at the end of milestone defined in section 5.9.2.1(A1) period to the GFGNL. The selected agency shall depute the required resources as per the requirements of tender document for carrying out the operations activity.

b) Selected bidder is required to issue Completion certification for completion of this HoTo process. Existing Agency will provide necessary handholding and transition support to new PIA- selected through this RFP wherever applicable. However, it will be sole responsibility of the selected bidder to coordinate end to end with the existing agencies and all relevant stakeholders involved in existing project.

c) Handover process will start Block wise, based on approval of tenderer. However, Based on the geographical condition or network requirement it may be initiate by Block Wise, lot wise, Route wise/GP Wise, and GFGNL will further release the Guideline/SOP once the selected PIA will get onboarded.

d) Successful Bidder must align FRT resources with attendance within 2 Months and in any case, if not able to arrange resources, penalty will be applicable as per RFP.

e) Handover/take-over will be conducted on toll-gate basis only.

Toll Gate based approach shall be implemented over period of 180 days for BharatNet Phase-I and 90 days for BharatNet Phase-II (considering the overall dependency and strengthen the project) in 3 different phases:

Phase 1: The existing PIA will run the operation and Maintenance and the new PIA will get the knowledge transfer.

Phase 2: The new PIA will run the operation and Maintenance under the supervision of the existing PIA.

Phase 3: Both the party will do the handholding work, documentation and sign-off the satisfactory transfer of work.

- New Agency/PIA shall be responsible to deploy sufficient manpower for network handover activity and do the signoff as per Project & RFP Guideline and both parties (OLD and New Agency) sign off report to be submitted at GFGNL Office.

f) The PIA shall be responsible for O&M of the taken over OFC network as well as eqipments installed/ infrastructure developed against

I. BharatNet Ph-I till GP end like newly developed OFC route from data centre to BHQ/Shelter to existing BSNL POI(in future may be shifted in new shelter) to GP, GPON, dark fibres, replacement of faulty resources(materials)(both active and passive), power resources UPS, Solar panels, spare management including the managing the spare materials.

II. BharatNet Ph-II till GP end like SDC - backhaul equipments, GPON, dark fibres, shelter including logistics, replacement of faulty resources/material (both active and passive), Co-located devices at GFGNL shelter (including Stabilizer and other accessories, power resources UPS, Solar panels spares management till MPLS routers are commissioned at the GP for bringing last mile in ring connectivity.

g) Bidder has to understand the existing Dark fibre cable customers details including but not limited to their splicing and traffic details. During the project as well as in operation phase Bidder is responsible to manage the dark fibres operations and ensure to achieve agreed SLA timelines with end customer. Also, ensure the minimum/no outage on dark fibre customer while working on joint chamber for revised splicing during O&M and ensure to inform to dark fibre customer in advance for smooth operations and satisfactions of dark fibre customers.

h) In accordance with the Bid Document, M/s BSNL shall hand over the Existing Network to the PIA for Phase-I, and GFGNL for phase-II through its existing O&M agencies, within a maximum time period defined in this RFP in “good condition” (*optical power is in the range -8 dBm to -25 dBm*).

i) The existing O&M agencies shall handover the network Block wise, for those blocks, where at least 50% GPs are having optical power as specified above.

j) The PIA shall take over all the GP locations of the block and will be responsible for O&M of the taken over OFC network as well as active and passive equipments including logistics, replacement of faulty active and passive equipments like but not limited to GPON/ Solar equipment, spares management as well as MPLS routers commissioned in replacement of GPON in the Block/GP.

k) The existing agency will be making over the rest of the OFC network of the block to PIA in “good condition” (*optical power is in the range -8 dBm to -25 dBm*) progressively. However, at the end of milestone/time line defined(*i.e., in section 5.9.2.1(A1)*)for handover takeover completion process, if any challenge on OFC network or any of the active and passive network elements missed to reach to acceptance level, selected bidder has to takeover the network as it as basis and manage the network. i.e., after completion of milestone *in section 5.9.2.1(A1)* from appointed date, the entire network shall be deemed to be handover to the selected PIA on as is where is basis.

O&M Payment for Non-functional routes after handover payment shall be made only for the routes which are made operational by PIA.

5.13.3.1 (A1) MILESTONES AND TIME LINES

Overall Milestones and Durations Summary and Process Steps:

Where T0 = Work order assigned to selected bidder by the GFGNL

Toll Gate	Milestone	Field Activity Planning and Managing SLA Phases
1	Pre-Handover Preparation	The existing MSP/PIA will run the operation and Maintenance, and the new MSP/PIA will get the knowledge transfer.
2	Handover Planning	The existing MSP/PIA will run the operation and Maintenance, and the new MSP/PIA will get the knowledge transfer.
3	Handover Execution	The new MSP will run the operation and Maintenance under the supervision of the existing MSP.
4	Post-Handover Support	Both the party will do the handholding work, documentation and sign-off the satisfactory transfer of work.

Table-0D

Toll Gate 1: Pre-Handover Preparation

Following are the minimum activities need to take care by the new bidder, where New selected bidder will be solely responsible,

1.1. Notification: The existing O&M Bidder shall notify the new O&M Bidder about the handover process, providing all necessary documentation and information to new selected Bidder. This includes the end to end network from SDC(state data Centre) Gandhinagar to end termination point till GP(Gram Panchayat) including the details mentioned in the field survey report of Table-0B and Table-0C.

1.2. Documentation Review: The new O&M Bidder shall review all documentation, including network diagrams, asset lists, asbuilts, inventories and maintenance records. New O&M Bidder will be solely responsible to modify as per the field conditions and update the records by preparing the valid documentations and approval from authorized GFGNL officals.

1.3. Site Visits: The new O&M Bidder shall conduct site visits to familiarize themselves with the network infrastructure and assets.

Toll Gate 2: Handover Planning

2.1. Handover Plan: The existing O&M Bidder shall prepare a detailed handover plan, including a timeline, milestones, and responsibilities.

2.2. Resource Allocation: The new O&M Bidder shall allocate necessary resources(FRT,Technical,etc.), including personnel, equipment, and vehicles, for the handover process.

2.3. Training and Knowledge Transfer: The existing O&M Bidder shall provide training and knowledge transfer to the new O&M Bidder on network operations, maintenance, and troubleshooting.

Toll Gate 3: Handover Execution

3.1. Network Takeover: The new O&M Bidder shall take over the network operations, maintenance, and troubleshooting responsibilities.
3.2. Asset Transfer: The existing O&M Bidder shall transfer all network assets, including equipment, spares, and tools, to the new O&M Bidder.
3.3. Testing and Validation: The new O&M Bidder shall conduct thorough testing and validation of the network to ensure it meets the required standards and specifications.

Toll Gate 4: Post-Handover Support

4.1. Support and Assistance: The existing O&M Bidder shall provide support and assistance to the new O&M Bidder for a period mentioned in Table-0D above to ensure a smooth transition.
4.2. Issue Resolution: The new O&M Bidder shall resolve any issues that arise during the post-handover period, with the support of the existing O&M Bidder.
4.3. Final Handover: The existing O&M Bidder shall formally hand over the network operations, maintenance, and troubleshooting responsibilities to the new O&M Bidder.

5.13.3.2 (B1) RESPONSIBILITY MATRIX FOR HOTO

RACI MATRIX			R	Responsibilities
			A	Accountability
			C	Consulted
			I	Informed
Task (For All Scope)	**Responsibility**	**Accountability**	**Consulted**	**Informed**
Geographical Boundary understanding and relevant database clarity	Existing PIA, Newly Selected PIA, Geographically Responsible DGM-GFGNL	Newly Selected PIA	GFGNL Internal Stakeholders(Existing PIA,DGM-District,DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant
Pre-Handover Preparation	Existing PIA, Newly Selected PIA, Geographically Responsible DGM-GFGNL	Newly Selected PIA	GFGNL Internal Stakeholders including Existing PIA,DGM-District,DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant

RACI MATRIX			R	Responsibilities
			A	Accountability
			C	Consulted
			I	Informed
Task (For All Scope)	**Responsibility**	**Accountability**	**Consulted**	**Informed**
Handover Planning	Newly Selected PIA, M/s BSNL	Newly Selected PIA	GFGNL Internal Stakeholders including Existing PIA,DGM-District,DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant
Handover Execution	Newly Selected PIA, M/s BSNL	Newly Selected PIA	GFGNL Internal Stakeholders including DGM-District,DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant
SDC / BSNL exchanges	Existing PIA, Newly Selected PIA, NOC-GFGNL, M/s BSNL	Newly Selected PIA	GFGNL Internal Stakeholders including Existing PIA, DGM-District, DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant, M/s BSNL	GM Package A & B, GFGNL Project Consultant
NOC (EMS-NMS- SLA Understanding)	Existing PIA, Newly Selected PIA, NOC-GFGNL	Newly Selected PIA	GFGNL including Existing PIA, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant
Fibre Network Topology	Existing PIA,Newly Selected PIA, Geographically Responsible DGM-GFGNL	Newly Selected PIA	GFGNL Internal Stakeholders including Existing PIA,DGM-District,DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant

RACI MATRIX			R	Responsibilities
			A	Accountability
			C	Consulted
			I	Informed
Task (For All Scope)	**Responsibility**	**Accountability**	**Consulted**	**Informed**
Network Traffic Engineering	Existing PIA, Newly Selected PIA, NOC-GFGNL	Newly Selected PIA	GFGNL Internal Stakeholders including Existing PIA,DGM-District,DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant
Shelter Infrastructure	Existing PIA, Shelter PIA,New selected PIA, Local DGM Package A & B, GFGNL, NOC-GFGNL	Newly Selected PIA	GFGNL Internal Stakeholders including Existing PIA,DGM-District, DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant
Inventory HoTo Details	Existing PIA, Newly Selected PIA	Newly Selected PIA	GFGNL Internal Stakeholders including Existing PIA,DGM-District,DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant
Invoicing Process	Newly Selected PIA	Newly Selected PIA	GFGNL Internal Stakeholders including DGM-District,DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant
Payment Process	Newly Selected PIA, GFGNL-Finance,GFGNL Project Consultant	Newly Selected PIA	GFGNL Internal Stakeholders including DGM-Zone, DGM-NOC,GM-Package-A, GM-Package-B, ,GFGNL Project Consultant	GM Package A & B, GFGNL Project Consultant

I. Selected bidder has to share their internal escalation matrix with the GFGNL/DST. And same also need to fix at every GP end with approval from GFGNL for better network manageability and co-ordination.

II. **Network design/Change Documentation handover:** Once the bidder is onboarded, selected bidder has to ensure to submission of following but not limited to within the first quarter of assigned WO/LoI:

i) Network Connectivity Diagram, configuration files
ii) Risk register
iii) Inventory register
iv) Transport network OSNR report/RSL Report
v) GPON Network structure along with RSL Report
vi) Network Traffic Flow
vii) Network IP Schema & DCN Engineering
viii) Repair and Return Process
ix) Escalation matrix for OEM
x) Network SLD and LLD
xi) Spare inventory of Active and Passive
xii) Network creation and customer traffic details.
xiii) Other report as per RFP clauses mentioned above including section 5.9.2.3. Indicative Summary of Reports.

GFGNL will support wherever possible from existing bidder, However, new selected bidder will be solely responsible to collect and preparation of these all documentations.

5.13.3.3 MIS REPORTS

Bidders are required to provide below mentioned MIS reports but not limited to:

Sr. No.	Report Type	Periodicity
1.	HoTo Field Survey Report	**Daily**
2.	Availability of Devices live vs faulty	**Daily**
3.	Daily Fibre cut brief details with location, affected sites, MTTR, etc.	
4.	Total No. of complaints raised	
5.	Ageing Report of issues/Complaints/Incidents	
6.	Summary of issues / complaints logged at the Help Desk	
7.	Summary of resolved unresolved and escalated issues / complaints	
8.	Summary of resolved unresolved and escalated issues / complaints to vendors/other Bidder/Service Provider.	
9.	Receive Signal Strength at LM including connectivity media(indicating an alert if the signal strength is below the defined threshold)	
10.	Bandwidth Utilization (max, min and average)	**Weekly**
11.	Issues/Complaints Analysis report for Network, call trend, call history, etc. Summary of systems rebooted.	
12.	Summary of issues / complaints logged with the OEMs.	

Sr. No.	Report Type	Periodicity
13.	Summary of changes undertaken in the Project including major changes like configuration changes, Parts Replacement, patch upgrades, database reorganization, storage reorganization, etc. and minor changes like log truncation, volume expansion user creation, user password reset etc.	
14.	Inventory and spare materials reports	
15.	Software upgrade/enhancement reports per network element	**Monthly**
16.	Network Availability Report. SLA compliances with all categories mentioned in RFP	
17.	Configuration change reports	
18.	Attendance report of field manpower	
19.	SLA compliance reports	**Quarterly**
20.	Preventive maintenance reports	
21.	Scheduled maintenance reports	
22.	Change Management Reports	
23.	Service Availability, Downtime, Usage/Utilization, Fault & rectification, Performance statistics-, Log of Network parameters along with Service down time and % uptime achieved	
24.	Summary of fault/complain reported and pending at different bucketization including at GFGNL end along with brief data details	**Daily/Weekly-Monthly Summary**
25.	Any other reports- As and when required by Tenderer	
Note: The selected bidder shall submit the all above reports as mentioned on a regular basis over e-mail and as per the prescribed formats provided by the GFGNL. Frequency and report types are indicative at may change as per the requirement. In addition of above GFGNL may ask to provide customized report as per customer requirement. Delay in the billing process due to non-adherence of above compliances/report submission will be sole responsibility of the Bidder.		

i. Quarterly review meeting with GFGNL internal stakeholders and selected bidders core team on performance review which includes network availability, spare, resources/manpower availability and payment criteria will be part of this and selected bidder appointed SPOC has to join and if ask with their stakeholders including OEM.

a) Change Management

The activities shall include the following, but not limited to the following:

I. Tracking the changes in hard / soft configurations, replacement of faulty equipment, changes to policies, applying of upgrades / updates / patches, etc.

II. Plan for changes to be made - draw up a task list, decide on responsibilities, coordinate with all the affected parties, establish, and maintain communication

III. Any changes (as and when required) at the architecture or configuration level for GFGNL related components is part of the O&M activity and it should be carried out by the O&M Agency.

IV. As GFGNL is upgrading the network and look after network utilization under different Projects like Horizontal connectivity, Dark fibre lease, etc, AGENCY is responsible to maintain all relevant active and passive component as per RFP guideline.

V. if GFGNL found, existing Resource / Team are not capable to meet MTTR/network SLA than Bidder have to increase the resource on his own cost to meet Network SLA/MTTR as per GFGNL Requirements. After demanding the Manpower if Bidder not providing the extra resource within given timeline penalty may applicable as per manpower penalty of section 6.5.

VI. Operation and Maintenance agency will assist in Software integration whenever required.

VII. After Change request approval Bidder must complete the rectification in maximum 30 days (workable time) as per Ground route scenario. meanwhile Bidder is responsible to maintain the network on Aerial/Temporary UG work done on his own cost. If not done in given timeline 5% penalties per week and 20% Max will be applicable in CR Value.

5.13.4 NETWORK INVENTORY

a. The PIA would be required to maintain an inventory of all the components used in the network and the spares available at the different levels and locations in the ERP software.

b. PIA shall prepare and maintain asset and/or inventory records listing the assets as per site locations required for performing the O&M and the same shall be shared with GFGNL every quarter and as & when asked.

c. At individual site, installed/integrated network elements inventory list should be stick properly and visible at shelter,SDC,GP or the sites those are part of the BharatNet Phase-III network under this RFP scope.

d. PIA has to develop centralized automated change management tool, which will shows the overall online inventory tool, which includes minimum but not limited to materials serial number, mac address, inventory used location, Quantity, summary report, etc. as and when required and will get reviewed every quarter first week. SOP will be shared alongwith workflow requirement for approval from GFGNL stakeholders to selected PIA once onboarded to GFGNL.

e. The PIA shall raise a request to reorder / replacements / replenishments / spares in case the stock level dips below specified % as specified in following table-0E or a faulty unit has been replaced with an operational one. The PIA needs to maintain the spare quantity for entire contract period. If spare quantity is used due to device fault/operational issue, the cost is to be borne by PIA (The discovery of cost for addition of spare will be done in case applicable).

f. All inventory real time report/dashboard including their spare material counts asked vs available, project performance report including following parameters but not limited to number of GP/Block/District on GPON and migrated on MPLS, GP wise network performance report(Daily-Monthly-Quarterly-Yearly)(fibre loss, latency, jitter, live vs down GPs (MPLS Vs GPON), RFMS report, active elements live vs down, Dark Fibre lease in Kilometers with customer names report per block/district etc. should be available centrally at GFGNL office in display either through suitable software or arranging API or through suitable mechanism. It should be customized based on the requirement of tenderer.

g. To meet the service obligation, selected PIA shall at all times maintain a surplus inventory at Taluka HQ / District HQ level with minimum % of material as mentioned below. PIA will be

responsible to maintain this stock as and when it is consumed in O&M activities during the entire contract duration.

Inventory Name	% Spare
OFC	2% of total Installed in Taluka
Duct	1% of total installed in Taluka
Main Hole (MH)	1% of total installed in Taluka
OLT	1 nu per District (Till the network migrated on MPLS on ring with full load traffic)
ONT	10% of total installed in Taluka (Till the network migrated on MPLS on ring with full load traffic)
Rack Mounted Splitters	5% of total installed in Taluka
Joint closures	10% of total installed in Taluka
Patch cords	5% of total installed in Taluka
UPS at GP	10% of total installed in Taluka
Stabilizer at shelter & DG Set	2% of total installed in Taluka
Transport Equipment's	5% of total installed in Network other then SDC
L2 Switch	10% of total installed in Taluka
New MPLS Router	5% of total installed in Taluka
RFMS	5% of total installed in project phase
Alternative Technology Network elements	Adequate spares, software updates and upgrades, L2/L3 support and Training as required to meet SLA shall be provided free of cost by the Alternate Technology provider

Table-0E

Transport/backhaul equipments installed at SDC must be 1:1 active and critical for the network, and hence sufficient spares should be available for entire contract duration

The PIA would be required to check all spares for faults half-yearly to make the site up and running to achieve SLA and after taking permission from GFGNL.

5.13.5 NETWORK CONFIGURATION/ CONFIGURATION MANAGEMENT

a) The PIA shall be responsible for Network provisioning, Server provisioning and User provisioning.

b) The PIA shall create a Maintenance Manual detailing the policies, procedures, techniques, and

tools to manage, evaluate proposed changes, track the status of changes, and maintain an inventory of system and support documents as the system changes.

c) The PIA and its resources shall be responsible for adhering to the processes mentioned in the Maintenance manual.

5.13.5.1. NETWORK AND SERVICE PROVISIONING

a) The services which are assigned to the customer (i.e., in the customer relationship management (CRM)) have to be provisioned on the network element which is enabling the service and allows the customer to actually use the service; the PIA would be responsible for the same.

b) The network shall enable retail, enterprise and wholesale services as per the requirement of GFGNL.

c) PIA shall provide all necessary support and facilitation to GFGNL,designated service provisioning agencies for provisioning and monitoring of services from NOC and as well as to the existing agencies of horizontal customer connectivity and the revenue sharing partners onboarded through GFGNL/DST.

d) The PIA shall ensure service assurance and accounting for all provided services from the network.

e) The network shall enable retail, enterprise and wholesale services as per the requirement of tenderer.

f) PIA shall provide all necessary support and facilitation to GFGNL and designated service provisioning agencies for provisioning and monitoring of services from NOC.

g) The PIA shall ensure service assurance and accounting for all provided services from the network.

5.13.5.2. SERVER PROVISIONING

a) Server (Computing) and Storage for all software applications like NMS along with all other applications such as ERP, Project management tool, web portal mobile, etc. will be provided by GFGNL.

b) Implementation, configuration and management is under PIA scope of work. Further, loading of the appropriate software (operating system, device drivers, middleware, and applications), appropriately customizing and configuring the system and the software to create or change a boot image for this server,devices including all network elements like router, switches,etc and then change its parameters, such as IP address, IP Gateway to find associated network and storage resources assignment is under PIA scope of work.

5.13.5.3. USER PROVISIONING

a) The PIA shall be responsible for change propagation, self-service workflow, consolidated user administration, delegated user administration, and federated change control; the PIA shall provide users access to data repositories/Software/Systems or grant authorization to systems, network applications and databases based on a unique user identity or as requested by GFGNL

b) The PIA shall be responsible for end-to-end provisioning including but not limited to necessary VLAN creation (if required), IP assignment and bandwidth provisioning for all customer services including horizontal customer connectivity, RSP, wholesale-retail-enterprise business.

c) The PIA shall be responsible for discovery of customer's device/port where bulk bandwidth is terminated from GFGNL Network and required SLA monitoring.

d) The PIA shall also ensure that all software upgrades / patches / updates are applied to the network elements in a timely manner as soon as these upgrades/patches/updates become available.

e) The PIA shall make available hardware resources, such as computers / laptops, mobile phones and tablets etc. required for the implementation and maintenance of the network for field resources as required.

f) The PIA would be responsible for ensuring compliance of all network elements, applications and personnel to standards as specified in this RFP or GFGNL/DoT/GoI/GoG/TRAI or any of applicable government laws for installations and provisioning of services.

g) PIA shall extend access of the Network Management System or other equivalent systems along with network performance reports on a mutually agreed basis either through API to existing available GFGNL's NMS or suitable mechanism to GFGNL-SNOC, BharatNet Delhi and Bangalore NOC.

h) The services provided shall adhere and conform to applicable security policies and guidelines issued by DoT/TRAI/GoI/GoG.

5.13.6 FAULT RESTORATION SERVICE

a) PIA may deploy a dedicated fault resolution team (FRT) at the Block level and at any suitable places like annexure-high speed corridor route atleast a one patrolling resource at every 250Km or it will be further decided by the GFGNL for effectively management and strengthen of network .This distance is indicative however, PIA has end to end responsibility to manage the SLA and resource can be increase to achieve SLA without further cost to GFGNL.

b) The Maintenance teams shall comprise of manpower, logistics, required tools/tackles/machinery & equipment.

c) The PIA shall provide OFC maintenance service on round the clock basis for attending & rectifying the OFC fault in minimum downtime (including travel time) from the time of lodging the complaint to the representative of PIA.

d) The PIA shall provide all assistance including providing manpower, transportation of men and materials etc. in the event of failure. The PIA has to provide minimum 2 member's team per district for ROW applications and follow-ups and a dedicated ROW coordinator to act as a SPOC for GFGNL

e) The PIA shall provide conveyance facilities for maintenance, for transporting the manpower, tools/tackles, Test/Measuring equipment and consumables like: OFC cable, Joint Closures, Jointing Pit, duct, couplers, etc. Suitable vehicle shall be available round the clock with each of the maintenance team. Vehicle should be in good working condition.

f) The PIA shall provide communication facilities viz. mobile phones to members of the maintenance teams.

g) The PIA shall be required to carry out maintenance activities which include identification of OFC fault/cut on ground, obtaining permission from local authorities if required, excavation of earth to expose cable, laying of required length of OFC with protection wherever required, splicing of OFC, installation of Jointing pit & back filling of pit with sand, supply and installation of cable Route Markers and Joint Markers as per specification, testing of OFC and updating of OFC as-built drawings etc.

h) The PIA shall arrange for logistics to provide facilities such as AC/DC power source, lighting arrangement, dewatering facility, DG sets etc., which may be required during the execution of maintenance job at site.

i) Optimum functionality of maintenance teams is a prime necessity to carry out day to day maintenance of OFC links. OFC and accessories spares to cater for repair of at least 10 fibre cuts shall be always maintained with each of these teams.

j) PIA shall take insurance for all the workmen engaged under this contract as per labour laws applicable from time to time.

k) Up to 50% of target achievement will be accepted in Rainy Season months i.e. July, August, September and beyond 50% for non-achievement of targets, Penalties shall be applied. In case of excessive rainfall declared by district collector and then monthly milestone count will be zero, no penalty will be levied for particular month, subjective to the GFGNL competent authority approval on submission of valid evidences on resulting in work cannot be executed. However, Situation can be monitor district wise and suitable decision can be taken.

5.13.7 METHODOLOGY FOR FAULT RESTORATION/FIBRE CUTS

Under OFC link cut condition, the following minimum activities shall have to be taken up by the PIA for its restoration for the end-to-end restoration of the network traffic/service.

I. On receipt of information of fault in OFC the team stationed shall move immediately for locating and rectifying fault as per the response time given below. The working fibres shall be restored first. Sufficient labour shall be engaged for speedy restoration. Adequate care shall be taken not to damage any other cable if laid in the same trench.

II. For the identification of exact fault location on immediate basis, the OTDR measurement of spare fibre shall be made from the nearest PoP. For better clarity, the OTDR measurement on spare fibre shall be taken at PoP / nearest OFC joints situated at both ends of cut and using dummy fibre spool of 1km, in case required.

III. After the OTDR measurement, the as-built drawing shall be referred and the physical site of fault on ground shall be located. It may be possible that data in as- built document or existing facilities in GIS for BharatNet Phase-II -GFGNL not be correct for the accuracy purpose. As-built drawing shall be taken as reference only. No claim of PIA will be entertained on account of this. Accordingly, locating the OFC fault, the job of excavation in all types of soil, identification of OFC, blowing of cable, construction of jointing pits, splicing of OFC, back filling of trench & jointing-pit shall be taken up as per the standard procedure. This should be incorporated in the cable route plan also. The splicing of fibres is to be carried out in line with the installed fibre and measurements are to be taken on spare fibres. In case the active fibres are to be used, precautions are to be taken with regard to the power launched on to the fibre. Restoration of site

shall be done to the entire satisfaction of GFGNL and detail asbuilt to be submitted and updated in GIS to avoid further mismatch on field for field database Vs GIS database.

IV. In case of OFC cut where it is not possible to pull the cable from either end, the PIA has to make two pits/ splicing joints between the required lengths of new OFC to be laid between the two joints. The spacing of joints/ pits shall be depending up on situation at site and shall be as decided by Site Engineer. Remaining OFC has to be coiled in both the pits. Wherever new joint is provided or existing joint is attended for rectification during the maintenance period, joint shall be buried to the depth of 1.2 Mtr. from the ground level in joint chamber.

V. For existing fiber infrastructure that is either aerial (above ground) or underground (UG), any expansions or repairs need to be taken care of by the Project Implementing Agency (PIA). The PIA has to ensure that the same size core fiber is used whether the infrastructure is underground or above ground/aerial. This is to maintain the standards set out in the infrastructure, Service Level Agreement (SLA) and avoid penalties. This will also help to ensure that customers receive their services without disruption and maintain network uptime.If the government authority develops the infrastructure in the field changing the aerial to underground, the PIA will have to work on it and shift it back to underground within a month.Failure to this, GFGNL has rights to take appropriate penalties to PIA.

VI. After the completion of site activities, the PIA shall ensure the restoration of the traffic from the associated Network Operations Center (NOC) and thereafter fresh OTDR measurement & traces shall be taken for all fibres & submitted to GFGNL representative. After the completion of site activities & hop test, the As-built drawing shall be updated by incorporating the new details like OFC loop used, Joint-pit location, etc. The length of loop in joint pit after fault restoration shall be incorporated in as built drawings and send to GIS for updation.

VII. After attending the fault & permanent restoration, a Fault-Rectification report jointly signed by GFGNL representative and PIA, shall be generated for the closure of the complaint. Any other job required for the restoration of the OFC fault/cut in totality is to be taken up by the PIA.

VIII. In case the site condition is not favourable for the immediate restoration of the fault, the temporary restoration of the service fibres shall be taken up immediately with the approval of GFGNL. Permanent restoration work will not be considered in downtime unless there is link break again during restoration job. Permanent restoration of joint pits is to be carried out by PIA within reasonable time of fault / OFC cut. In case the site is not conducive for permanent restoration, some arrangement of manpower has to be done by PIA for safeguarding exposed OFC till permanent restoration. No extra payment shall be given to PIA on account of deployment of additional manpower. In case of further cuts at exposed OFC location, PIA will be accountable for this additional downtime of OFC link. It is mandatory for the PIAs to install the jointing chambers after permanent restoration is done.

IX. In case of any breakdown in the OFC network, PIA shall be responsible for obtaining approval at his own cost from statutory authorities like Municipal Corporation, Development Authorities, Electricity Department PWD, NHAI and any other concerned authority as required for carrying out the repair. GFGNL may assist in getting permission for repair wherever possible in case of urgency. Drains, pipes, cables, overhead wires and similar services encountered in the course of the works shall be guarded by the PIA at his own cost, so that they may continue in full and uninterrupted use to the satisfaction of the Owners thereof.

X. Any damage be done by the PIA to any AC Power mains, utility pipelines cables or lines (whether above or below ground etc.) whether or not shown on the drawings, the Selection of PIA for BharatNet Phase-III GFGNL must make good or bear the cost of making good the same without delay to the satisfaction of the GFGNL.

XI. PIA shall follow all national and local laws, ordinances, rules and regulations and requirements pertaining to the work and shall be responsible for extra costs arising from violations of the same.

XII. PIA shall have at all times during the performance of the work, a competent supervisor at block level. Any instruction given to such Supervisor shall be considered as having been given to the

PIA.The PIA shall employ as many personnel as deemed necessary to comply with the local rules and administrative orders governing the Working Hours of Employment. The PIA shall be responsible for compliance with all statutory requirements including personnel related matters. In the event of urgency, the team has to move to the adjacent section. The minimum down time shall include time taken in restoration of fault/cut caused by any means like miscreant activity at day or night, due to work done by any other organization, development of high losses / break at existing joints, fault caused due to rodent, ant etc. In case of partial damage of the cable or development of high loss in the working and spare fibre or cable cut at any time (day/night) by miscreants or by any agency, the responsibility of repairing the defective fibre lies with the PIA.

XIII. In case PIA fails to completely restore the fault (as per original condition) or submit OTDR & test (power level in live equipment) records to establish completion of work, a penalty shall be levied for the work involved at site.

XIV. When finished work is taken down for the purpose of inspection for any reason, the MSI shall bear the entire expenses incidental thereto in the event that the said work is found to be defective. This situation may be applicable to both planned work as also to emergency restoration. During the maintenance or fault rectification work, should any damage occur to the other cables, PIA is solely liable to pay compensation as demanded by the respective authorities.

XV. Being a critical component of the network, Bidder has to ensure, RFMS solution must be deploy with full functionality across existing and new network for uniformity with addition of other active and passive network elements.

XVI. Standard Operating Procedure(SOP) will be shared to selected bidder once onboarded with GFGNL.

5.13.8 PERIODIC MAINTENANCE

a) **The periodic maintenance** of the network shall be done in such a way that atleast every site with all its component will be covered once in every month.

b) The periodic maintenance activity detail report with action taken/required must be submitted to GFGNL every 1st week of the month.

i) Periodical Maintenance is a part of Operation Activity along with all relevant reports as per RFP clause mentioned above. Indicative Summary of Reports to be handed over to new O&M BIDDER especially field related report ~~of last one year~~. (Monthly, Quarterly, and yearly).

ii) Selected bidder has to monitor the route periodically/daily during the O&M phase and take necessary advance safety precautions for the network availability including but not limited to Gujarat Water Supply & Sewerage Board (GWSSB), Govt/private Bidder work on same route/RoW

iii) This Existing bidder will try to hand over fully functional Network. However, any damaged or down devices selected bidder has to either fully repaired or replaced.

iv) To meet the service obligation, existing bidder shall at all times maintain a surplus inventory at Taluka HQ / District HQ level with minimum % of material as mentioned below. BIDDER will be responsible to maintain this stock as and when it is consumed in O&M activities.

The corrective maintenance of the network shall also to be done for ensuring the network availability/ uptimes as per the SLAs.

I. If any issue is reported by the end user (GP, Block or through NMS or the monetizing partner) with regards to the services, then the issue shall be reported to centralized help desk of NOC of State/SIA and if there is any issue in the network connectivity, the issue shall be forwarded to the respective BIDDER. These issues shall be rectified so as to restore the services as per the SLA. Issues pertaining to the OLT / ONT / Rack Mounted Splitter / FDMS / OFC / electrical utilities / other active or passive equipment installed by the BIDDER shall be handled by the BIDDER. However, if there are issues with State/SIA, it shall be reported to respective stakeholders. In case of theft/physical damage (Repair not possible -RNP) to the Network components / equipment, the equipment shall be replaced with equivalent or higher configuration/Capacity by selected Bidder.

II. Lodging of FIR will be done by the selected bidder and same to be submitted to GFGNL by PIA for reference. FIR launched by the Block/Gram Panchayat authorities followed pertains to this project will be followup by the selected bidder and same to be submitted to GFGNL by PIA for reference.

III. If the OFC cable cut is such that the cable has been damaged for distance more than ~~250~~ 300 meter by any external Bidder, then State/SIA shall bear cost of cable/PLBE. But the BIDDER shall bear the cost of workmanship and other store like splicing, jointing kits etc. Below ~~250~~ 300 mtr of damage, BIDDER will bear all the cost of restoration including material and workmanship.

IV. If the pole has fallen down or replaced by electricity department/external Bidder and cable has been damaged such that it cannot be used further, then State/SIA shall bear cost of cable, Pole (if required) and other pole kits. But the BIDDER shall bear the cost of workmanship and other store like jointing kits etc.

V. BIDDER will be responsible to replace a patch/route of OFC cable and/or duct for suitable length if optical losses are increased due to added splice joints or due to various cuts or due to wear and tear and damage by external agency/s or optical loss is below the standard threshold level(details mentioned in scope of work). GFGNL will not bear any kind of cost like but not limited to transport, permit, material and workmanship cost for above maintenance activity. However, routes should be updated in GFGNL GIS as well as reported in NMS with time stamp during the same quarter.

VI. During the O&M project duration, Bidder has to consider 1% of overall GP scope in shifting scope and no additional payment will be given by the GFGNL. For beyond 1% cases, Shifting scope till 50meter length/running meter from the nearby junction point to GP premises boundary end point will be in bidder's scope including dismantling, transportation, supply of installation material, integration/commissioning/(if in case revised configuration), and O&M of site. For beyond 50meter (running meter) shifting scope including dismantling, transportation and supply of installation material the PIA shall be paid at 90% of the present tender approved rates.

VII. If road widening work is taken up by Government department in future for field activities on Government infrastructure replacement or expansion for water pipelines, drainage lines, GAS Pipelines, etc. on any network stretch or there is work carried by government agencies or their Bidder on same trench and GFGNL network is damaged. For this cases, till 300meters of road/path length/running meter will be rectified by the bidder including shifting infrastructure /chamber shifting/rework/etc. without any additional cost to tenderer. For more than 300 meters road/path length/running meter, Selected bidder will be solely responsible for this additional/replacement work of fibre including shifting infrastructure /chamber shifting/rework that needs to be carried out. For this Cost (material as well as workmanship/labour cost) of all O&M activities will be borne by

State/SIA. In this State/SIA will pay 70% of labour as well as material cost on discovered rates from this tender.

The PIA shall get the separate work order from GFGNL for replacement of damaged section based on valid documentation submission. GFGNL or it's authorized agency has rights to take sample base field inspection of any affected route. The PIA shall be paid, for such replacement of damaged sections after getting firm work order. PIA may coordinate for raising demands from agencies requiring shifting of cables,if applicable, before taking approval for such replacement of damaged sections. In such case,the PIA will also be required to restore the GP using Aerial/Over head(OH) OFC on temporary basis within 12

Hrs, else, SLA penalty will be applicable.

Similarly,for the cases beyond 300 meters running meter where only fibre shifting and/or back pooling is required, selected PIA will be solely responsible and GFGNL will not pay any additional payment to PIA.

VIII. In any case GFGNL infrastructure is damaged by the third-party agency same will be treated as per clause above(VII).

IX. PIA should minimize network impact with chamber shifting within time.

X. During maintenance of the network, BIDDER will ensure that all fibre cores are spliced at the cut location (and not only live fibre cores) during rectification process. State/SIA/any third party as appointed may audit the health / continuity of all fibre cores at any time and BIDDER will have to facilitate this exercise by performing LSPM and OTDR testing in presence of this team.

XI. In above mentioned all different categories, BIDDER will raise request on time and GFGNL approve the respective request on case by case. Based on approved request and different category of pending work to be carryout by Existing BIDDER before handover the Network or same pending work amount will be deduct from existing BIDDER Operation BILL/SD of O&M as per Change Request rate/SOR rate as per Item wise discovered.

XII. All Operation activity should be handed over on GIS along with installed Operation inventory like Chamber, Route Marker, Cut Location, Route Change, Expansion of network etc.

The Preventive Maintenance: The Selected PIA shall undertake all preventive measures with the information to respective authorities for maintaining the end-to-end continuity of OFC cable, which shall include but not limited to the following:

- Regular surveillance of OFC route along the road should be carried to have proactive check to prevent OFC link disruptions.
- Attending to / safe guarding & rectification against any signs of damage or potential damage of OFC network and equipments/infrastructure of GFGNL.
- Attending breakdown/schedule maintenance within minimum time period. The preventive maintenance should be carried out with prior approval and during planned shutdown/maintenance window only.

For any / all issues pertaining to OFC/Accessories/Electronics etc. for whatever reasons, the fault has to be rectified or OFC/Accessories/Electronics etc. has to be replaced by PIA. The cost shall be borne by PIA for all such events.

The O&M Phase of GP in a block will start once the electronics at GP is commissioned and the GP

is discovered in NMS of centralized NOC and End-to-End Acceptance Test certificate has been issued for Fibre infrastructure and electronics for that GP. The O&M of all such GPs shall be provided proportionately till the Project Go-Live date.

The unifying date of start of Project O&M Phase for 7 years will start from Project Go-Live when the electronics for all the GPs covered under BharatNet Phase-III in the State of Gujarat are commissioned and discovered in NMS at centralized NOC and End-to-End Acceptance Test certificate has been issued for Fibre infrastructure and electronics.

5.13.9 OTHER NETWORK O&M PARAMETERS

a) The PIA will assist GFGNL in complying DoT legal requirements.

b) The PIA will be responsible for all field activities of required fibre tapings and e2e testing of fibre in case of delivery of dark fibres to customers / partners and SLA monitoring.

c) The PIA shall provide daily, weekly, fortnightly, monthly, quarterly, half-yearly and annual reports as detailed in NOC section.

d) SLAs shall be monitored (after 6 months from taking over) and reported by the PIA to GFGNL on daily / monthly / quarterly basis, as required. Based on the performance of the network in the prior quarter, the penalty shall be computed and shall be payable by the PIA.

e) In case of any defect, deficiency or deterioration in the Project poses a hazard to safety or risk of damage to property, the PIA shall promptly take all reasonable measures for eliminating or minimizing such danger.

f) PIA may deploy a dedicated fault resolution team (FRT) at the Block level and at any suitable places like annexure-high speed corridor route atleast a one patrolling resource at every 250Km for effectively management and strengthen of network .This distance is indicative however, PIA has end to end responsibility to manage the SLA and resource can be increase to achieve SLA without further cost to GFGNL.

g) The PIA shall insure all the equipment at GP for theft, damages due to fire, flood, earthquake, storm etc for the entire project duration.

h) The scope of work to be undertaken by the bidder for Operations & Management and Comprehensive Annual Maintenance Contract (CAMC) of the Active and Passive Infrastructure for the GFGNL is mentioned below.

i) PIA has to ensure to include all types of security measures to ensure the network's integrity and data privacy, such as:

- Firewall configuration and management
- NDR(Network Detection and Response) Solution
- DDI(DNS,DHCP,IP Address) Management
- Access control and authentication
- Encryption and decryption

I) PIA shall also be responsible for creating and maintaining physical security measures at field as well as critical sites like at Shelters, NOC(Network operating Center) by access control system as well as on field for fibre monitoring and rectifications through patroller/FRT team or by implementing any other technology to save the infrastructure.

j) Existing GP Powerbackup/UPS having 1 KVA capacity with 2 hours back up, Bidder needs to

upgrade it to achieve atleast minimum 8 Hours of Back up. This refresh needs to be done during the first quarter of the project only. The Uninterruptible Power Supply (UPS) should have the inbuilt functionality as a stabilizer. Further, if any issues arises such as the phase and neutral wires shorting out or any damage caused by voltage fluctuations, it will be the responsibility of the Project Implementing Agency (PIA) to handle it. This is to manage the uptime and ensure the network remains operational in power/electricity issues. Additionally, any need for extra wiring or other similar tasks will also fall under the scope and responsibility of the PIA.

k) There may be the case, many of the active and passive equipments are under or out of warranty period. Selected PIA has to ensure to take the warranty and AMC of both active and passive network elements for BharatNet Phase-I & II for the same duration as mentioned in the appropriate clause in this RFP document. Similarly, To mitigate risk from power fluctuation, or aging or other causes of device failure, the PIA shall besides keeping the spares (as mentioned in clause 5.7.2), also obtain necessary warranty and AMC support from the manufacturers of passive components.

l) Bidder needs to provide Shelter infra as per mentions specification of Shelter and as well as detail section of Shelter Infra upgradation.

m) Bidder needs to design the network for traffic diversion and future scalable options , bidder needs to supply, install, test, commissioning and O&M of any equipments/infrastructure developed into/for the requirement of Phase-3 Bharatnet network.

n) In case any equipment is down and fibre cut or infra damage, either reported by GFGNL or its designated agency or monitored through EMS/NMS, selected SI will attend the fault and rectify the same, Selected bidder will be solely responsible for this.

o) Bidder will have to supply license EMS (Element Management System) for each active components like but not limited to radios, router, switch, Li-Fi, Mini-OLT/ONT etc. used in network so that required alarms can be monitored and also remotely monitor to know atleast the OFC cut Issue, Power Issue(Utility),Equipment- cold Start, warm Start, link Down, linkUp, authentication Failure, latency, Jitter and Neighbor Loss status related performance parameters, Proactive alarms of each equipment from day-01 of device integration in network and mapped in Bidder's NMS on day-01.

p) Bidder has to provide all active elements and its network performance like but not limited to, Services, link performance- Availability(Up/Down) including reason of outage-alarm Management, Throughput, latency,packet drops, jitter,Tx-Rx level ,For Wireless (RSSI) etc. through EMS (preferably licencense based EMS) and integrate with GFGNL's NMS either through API or by providing suitable mechanism without any additional cost to GFGNL.

q) There should be an EMS for monitoring major parameters including Input & Output Voltages, Inside & Outside Temperature, Humidity, Alarms, % battery back up time left. It should also be possible to control/switch on/off Non-Critical Loads/ Extra fans. The monitor & Control should be possible from Central NOC in real time. Delay in any alarm incident will invite the penalty. For example, for any instance on delay in alarm will be penalized with 0.2% of quarterly O&M billing amount and this will be over and above the maximum O&M cap limit of the O&M billing amount.

r) Minimum Last 24 hrs (at least) Alarm & Access events must be stored with Date & Time stamp.

s) Existing GFGNL NMS (NMSWorks) will support interfaces such as SNMP/JAVA/CORBA/XML/REST API. Selected PIA needs to integrate all EMS with existing NMS of GFGNL only and no need to develop new NMS.

t) If the OFC cable cut is such that the cable has been damaged for distance more than 250 meter by any external agency then State/SIA shall bear cost of cable/PLBE. But the PIA shall bear the cost of workmanship and other store like splicing, jointing kits etc. Below 250 mtr of damage, PIA will bear all the cost of restoration including material and workmanship.

u) Prevent third party damages viz. theft or damage/s caused by other underground utility service provider.

v) Maintain condition of OFC with casing or with special arrangements near critical areas like but not limited to, major bridges, railway crossing, pipe line crossing, Forest, etc.
w) Maintenance and update of as-built drawing, information along the OFC route.
x) Maintaining history of events, analysis and reporting.
y) Public liaising with concerned authorities.

5.13.10 CAPACITY AUGMENTATION

(a) The PIA shall replace/ upgrade the SFP,Card based on the demand/ requirement during the contract period.
(b) The PIA shall provide the required spares and service support for the supplied equipment in the Project. In case of any solution/ equipment reaching End of Life (EoL)/End of Service(EoS)/End of Support during contract period, the PIA shall be responsible for its replacement with equivalent or its higher specifications/upgraded versions.
(c) In case of installation of products / material on account of capacity augmentation or replacement / repair the same shall be subject to Preliminary acceptance testing conducted by the PIA and GFGNL. Selected PIA has to extend the onsite warranty for those newly replaced / upgraded inventories till the end of contract.

5.13.11 STANDARD PRACTICE IN O&M

The Standard Operating Procedure (SOP) in fibre fault restoration typically includes the following steps:

1. **Fault Detection**: This is usually the first step, where the system notifies the operators of a fault. Modern fibre optic systems often include automatic fault detection systems. Selected PIA has to ensure to develop the system without human interventions to detect the faults as well as the monitoring of the asset covered under the RFP scope through either RFMS,NMS,EMS,GIS tools, Help desk system, etc.
2. **Fault Identification**: After being notified of a fault, the next step is to identify it. This can include identifying the type of fault, its location, and the equipment or part of the network element it affects. Selected bidder has to adopt the latest standard industrial practices like but not limited to use tools like visual inspection, etc.
3. **Isolation**: Once the fault has been identified, it should be isolated to prevent it from affecting other parts of the network. This could involve shutting down individual pieces of hardware or software, disconnecting certain parts of the network, or diverting traffic away from the fault. However, it should be time being and considering proactive approach, once restored same should be connect into the original conditions.
4. **Repair:** Once the fault has been identified and isolated, it is then repaired. This may involve replacing faulty equipment, repairing faulty cables, or correcting software errors.
5. **Restoration:** After the repair is completed, the part of the network affected by the fault is restored to normal operation. This usually involves turning the equipment or software back on, reconnecting any parts of the network that were disconnected, and making sure that everything is functioning correctly. Performance tests are conducted to ensure the network is up and running as it should.
6. **Documentations/Reporting and RCA(Root Clause Analysis):** After the fault is resolved, a detailed report is usually created. This report may include information about the fault, how it was detected, what steps were taken to isolate & repair it, and how the network was restored to normal operation. This report can assist in preventing similar faults in the future. Root Cause Analysis (RCA) methodology should be used to identify the fundamental origins of problems, incidents, or failures within an organization's processes, systems, or operations.

Selected PIA has to note, this is a general standard practices mentioned above, However, detail SOP will be shared with selected PIA once onboarded for better governance, betterment for network and organizations.

5.13.12 RESOURCE REQUIREMENT FOR FIELD OPERATIONS

Bidder is responsible for deployment of required qualified, skilled and experienced manpower defined below at the GFGNL (onsite) for the contract duration. Tenderer will provide sitting space, table, chair, internet connectivity only for the onsite team. Minimum required resources are defined below:

SN	Level	Designation	Qty	Desired Qualification	Roles & Responsibilities	Tool requirement
1	2	District Operation Manager	1 at each District	BE/BTech/Diploma plus Min. 5 years of Experience (only whole district)	Responsible for Day-to-Day operational Activities and SPOC for Technical Assistance and field engineer	Laptop
2	1	Field Engineer	1 at each block	ITI / Diploma plus Min. 3 Years of field level technical experience in telecom network operation management	Responsible for Day-to-Day operational Activities	Laptop, Hand blower, Multimeter, Power meter, Ethernet tester with minimum 10G, 100G interface/port
3	1	Technical Assistant	1 at each OLT	ITI / Diploma plus Min. 2 Years of field level technical experience in telecom network operation management	Responsible for Day-to-Day operational Activities	Laptop, Hand blower, Multimeter, Power meter,
4	N/A	Fibre Restoration Team (FRT) – composition including Patroller	1 at each 250 KM	Must have relevant experience and skill sets required for fibre restoration.	Take immediate action in case of faults. Carry out repairs and restoration of the fault so as to minimize downtimes.	Splicing Kit, OTDR, Laser Source Power meter, Vehicle GPS based tracking mechanism

SN	Level	Designation	Qty	Desired Qualification	Roles & Responsibilities	Tool requirement
					Coordinate with various agencies and central monitoring team with relevant Equipment's and Tools.	
5	1	Patrollers	1 at each FRT	Must have relevant experience and skill sets required	Periodically check Fibre Route etc. and report for any anomalies found.	Vehicle, GPS based tracking mechanism

Minimum Resource for One FRT:

4-wheeler MUV/SUV	01	T&M of FRT	01 set
Splicer	01	OTDR, LSPM, Extra Cable	01 set
Labour	02	Splicing for Ribbon Cable/Single tube cable	01 set
Patroller with Each FRT	01	Power Meter / Source Meter/AFL, ETC is required	01 set
Driver /Supervisor	01	Rope, Torch, Fluorescent jacket, Safety Tools and working Tools as per requirements.	01 set

5.13.13 RESOURCE REQUIREMENT AT CENTRAL LOCATION – STATE NOC

SN	Level	Designation	Qty	Desired Qualification	Roles & Responsibilities
1	3	Director - Operations	1 (from Each Package)	➢ Overall, in-charge of Project, O&M of the complete infrastructure. ➢ Coordinating with third party agencies and other package, vendors / operators, and software/equipment's vendors. ➢ Should be the single point contact (SPOC)	BE /B. Tech (EC or CS) Minimum 12/15 Years of Post Qualification Experience in large scale ICT infrastructure projects. Relevant Exp.: 8+ Years of experience as a project manager of large scale (1000 plus customer points) Telecom Projects having multiple cities/States/countries.

SN	Level	Designation	Qty	Desired Qualification	Roles & Responsibilities
				for managerial responsibilities and direct interface with GFGNL. ➢ Responsible for ensuring timely delivery of deliverables for each of the components.	
2	3	Dy. Director Operations (Field)	3 (From each Package)	➢ Overall, in-charge of Project, O&M of the complete infrastructure for respective Package. ➢ He will be stationed at location where DGM Projects–GFGNL will be sitting. ➢ Should be responsible for effective Technical Resource management, System & Resource planning, based on business forecast Responsible for ensuring timely delivery of deliverables for each of the components.	BE /B. Tech/Diploma (EC or CS) Minimum 10 Years of Post Qualification Experience in large scale ICT infrastructure projects. Relevant Exp.: 5+ Years of experience as a project manager of large-scale Telecom Projects (500 plus customer points) having multiple cities/States. Out of three(3) one manpower should be ME/M.Tech./MBA(Operation/Marketing /Telecom Infra/ or equivalent streams) at Gandhinagar H.O.

SN	Level	Designation	Qty	Desired Qualification	Roles & Responsibilities
3	2	Technical Manager cum Network Expert	1 (From each Package)	➢ Responsible for overall management of the IT Infrastructure of the project. ➢ Responsible for overall deployment, Integration upkeep and maintenance of all the IT components including hardware, software, Databases etc. ➢ Responsible for end-to-end functioning and uptime of NOC and its related infrastructures	BE/B.Tech (EC)/MCA/BCA/BSC-IT/Diploma with CCNA (or equivalent Network professional level certificate) Including 7 years' experience in IP and Transport network.
4	2	State NOC Monitors	5 (One from each Package for each shift)	➢ Overall, In-charge Operation and Maintenance of NOC. ➢ Co-ordination with various stakeholders / agencies for resolution of issues/problems etc. ➢ Assignment of trouble ticket or incident to respective team	BE /B. Tech (EC/IT)/Diploma network certification 3+ Years of Post Qualification Experience in large scale (200 plus customer points) ICT infrastructure projects. Relevant Exp.: Must have an experience of managing command and control centre having multiple sub-systems

SN	Level	Designation	Qty	Desired Qualification	Roles & Responsibilities
5	2	Network Engineers	5 (From each package -3 each in daytime shift, 1 each for night time two shifts.)	➢ Installation, commissioning, Troubleshooting, of all the network equipment Maintenance, Monitor & Support for network equipment ➢ Regular update of software patches, antivirus etc. Any other activities as and when required.	BE/B. Tech/Diploma (IT/CS/EC) with CCNA(or equivalent level certificate) or higher certification 2+ years of similar type post qualification experience
6	3	Security Expert	1 (From each Package)	➢ Plan and implement comprehensive security policies and practices for entire infrastructure. ➢ Signatures updating, blocking of unwanted traffic, Antivirus updates, Patch updates, managing the network security on day-to-day basis. Monitoring any flooding, DoS, Intrusion attempt in real time during the office hours.	BE /B. Tech with CISSP/CISM/CEH/CISA with 7+ years of similar type post qualification experience

Note: Agency must use dedicated resource for this project. All proposed manpower must not be deployed other than this project.

SECTION-6 PROJECT TIMELINES

6.1 PROJECT TIMELINES

Completion Timeline	Phase-I GPs and Revenue Villages Deliverable/Milestone	Phase-II GPs and Revenue Villages Deliverable/Milestone	Remarks
T	Issuance of Award of Work and work order	Issuance of Award of Work and work order	On selection of the PIA, Award of Contract and Work Order is issued
T+1 Month	Man and Material Mobilization	Man and Material Mobilization	PIA should apply for ROW permissions during this period as per the Approved Route Plans
T+2 Months	Man and Material Mobilization	Man and Material Mobilization	PIA should apply for ROW permissions during this period as per the Approved Route Plans
T+3 Months	Aggregate commissioning of 1% of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 2% of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+4 Months	Aggregate commissioning of 3% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 5% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+5 Months	Aggregate commissioning of 5% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 8% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report

Completion Timeline	Phase-I GPs and Revenue Villages Deliverable/Milestone	Phase-II GPs and Revenue Villages Deliverable/Milestone	Remarks
T+6 Months	Aggregate commissioning of 10% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 12% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+7 Months	Aggregate commissioning of 20% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 25% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+8 Months	Aggregate commissioning of 25% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 30% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+9 Months	Aggregate commissioning of 30% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 35% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+10 Months	Aggregate commissioning of 32% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 38% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+11 Months	Aggregate commissioning of 35 % GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 40% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+12 Months	Aggregate commissioning of 40% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 45% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report

Completion Timeline	Phase-I GPs and Revenue Villages Deliverable/Milestone	Phase-II GPs and Revenue Villages Deliverable/Milestone	Remarks
T+13 Months	Aggregate commissioning of 42% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 48% GPs of Phase-II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+14 Months	Aggregate commissioning of 45% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 50% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+15 Months	Aggregate commissioning of 48% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 52% GPs of Phase-II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+16 Months	Aggregate commissioning of 50% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 55% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+17 Months	Aggregate commissioning of 52% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 58% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+18 Months	Aggregate commissioning of 55% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 60% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+19 Months	Aggregate commissioning of 60% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 70% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report

Completion Timeline	Phase-I GPs and Revenue Villages Deliverable/Milestone	Phase-II GPs and Revenue Villages Deliverable/Milestone	Remarks
T+20 Months	Aggregate commissioning of 62% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 80% GPs of Phase- II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+21 Months	Aggregate commissioning of 65% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 85% GPs of Phase-II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+22 Months	Aggregate commissioning of 70% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 90% GPs of Phase-II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+23 Months	Aggregate commissioning of 75% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 95% GPs of Phase-II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+24 Months	Aggregate commissioning of 80% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of 100% GPs of Phase-II in a ring visible on the S-NOC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+25 Months	Aggregate commissioning of 85% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of Balance GPs on ring OFC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+26 Months	Aggregate commissioning of 90% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of Balance GPs on ring OFC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report

Completion Timeline	Phase-I GPs and Revenue Villages Deliverable/Milestone	Phase-II GPs and Revenue Villages Deliverable/Milestone	Remarks
T+27 Months	Aggregate commissioning of 93% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of Balance GPs on ring OFC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+28 Months	Aggregate commissioning of 96% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of Balance GPs on ring OFC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+29 Months	Aggregate commissioning of 100% GPs of Phase-I in a ring visible on the S-NOC with IP-MPLS with village connectivity	Aggregate commissioning of Balance GPs on ring OFC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report
T+30 Months	Aggregate commissioning of Balance GPs on ring OFC with IP-MPLS with village connectivity	Aggregate commissioning of Balance GPs on ring OFC with IP-MPLS with village connectivity	Site Installation Report, Testing Report, NMS Report, OTDR/LSPM link test reports, As Built Diagram (ABD report), Monthly Progress Report

Table 3.1

Note:

1. T is the date of Issuance of Award of Work
2. The prospective bidders should conduct a detailed site survey during the bidding stage.
3. Non-adherence to the aforementioned timelines/milestones shall attract penalty.
4. Above counts are indicative and notional value which include the revenue villages. It may very based on actual.
5. Non-adherence to the aforementioned timelines/milestones shall attract penalty

6.2 PAYMENT SCHEDULE OF PROJECT

1. Payments shall be released only on satisfactory acceptance of the deliverables for each Task as per the following schedule:

Sr. No.	Milestone	Linked Payment	Special Quality Criteria (Applicable for GP payment only)	Pre-requisites and Documentary Evidence
1	**Milestone – 1** Kick off meeting, Signing off MSA, demand of Mobilization Advance	10% of capex value	NA	To be paid as an advance upon submission of Additional Bank Guarantee (ABG) of 110% of the mobilization advance, valid up to 60 days after the Project Go-Live milestone.
2	**Milestone – 2** Digital Pre-defined and transparent Model(3D) for GP Lit **Delivery** (Material Supply), **Draw** (Fiber route laying) and **Discovery** (GP equipment visibility)	**For Phase-I GPs:** 30% of Capex value per GP **For Phase-I Revenue villages:** 30% of Capex value per Revenue village **For Phase-II GPs:** 25% of Capex value per GP **For Phase-II Revenue villages:** 25% of Capex value per Revenue village	**For Phase-I GP only:** — Additional 1% of capex value per GP will be paid for meeting bestline criteria.	**1. One existing path for GP:** Subject to meeting the baseline / bestline criteria. **2.** Lay the new fiber from Block to FPOI **3. D**igital Asset (Fiber route, Equipment etc) register for Lit GPs and Revenue villages. 4. Last mile connectivity for Revenue village from respective GP. **Documents submission:** — Draw - Digital As Built Diagram on GIS (ABD report), — RFMS (OTDR link test reports) report — Discovery - GP Equipment (Router, UPS, Mini-OLT), "Sub-Block end RFMS, Router" and/or "Equipment for Lastmile connectivity of Revenue village" visibility on NMS using Lease line

Sr. No.	Milestone	Linked Payment	Special Quality Criteria (Applicable for GP payment only)	Pre-requisites and Documentary Evidence
				or backhaul transport network at Sub-blocks. — Proof of application of ROW submission for respective routes including GP, Sub-blocks and Master-blocks.
3	**Milestone – 3** Sub-block to Sub-block Ring closure	**For Phase-I and Phase-II GPs:** 20% of Capex value per GP **For Phase-I and Phase-II Revenue villages:** 20% of Capex value per Revenue village	**For Phase-I GP only:** — Additional 1% of capex value per GP will be paid for meeting bestline criteria.	1. Each Sub-block must be connected on ring new fiber path of straight spinal path and functional up to State Data Center through Master-block (Refer Fiberization principles in section 5.3) 2. PIA has to make straight fibers for creating spinal sub-block to sub-block path using existing fiber routes of Phase-II (Refer Fiberization principles in section 5.3) 3. Subject to meeting the baseline / bestline criteria while using existing fibers of sub-block to sub-block. **Documents submission:** — Draw - Digital As Built Diagram on GIS (ABD report), — RFMS (OTDR link test reports) report — Discovery - Sub-Block equipment (RFMS, Router) and/or “End

Sr. No.	Milestone	Linked Payment	Special Quality Criteria (Applicable for GP payment only)	Pre-requisites and Documentary Evidence
				equipment for GP and Revenue villages" visibility on NMS using backhaul transport network at Sub-blocks or lease line of adjacent sub-block.
4	**Milestone – 4** GP ring closure and Service testing	**For Phase-I GPs:** 20% of Capex value per GP **For Phase-I Revenue villages:** 20% of Capex value per Revenue village **For Phase-II GPs:** 25% of Capex value per GP **For Phase-II Revenue villages:** 25% of Capex value per Revenue village	— Withholding 5% of capex value per unit (GP/Revenue Village) if service testing not done through State capital via GFGNL transport node exemption only for ROW challenges or justifiable case to GFGNL. **For Phase-I GP only:** — Additional 1% of capex value per GP will be paid for meeting bestline criteria. **Partial Go-Live For Phase-I & II:** After successful GP ring closure and service testing, 50% O&M value per GP will be paid up to maximum 3 months. Same is applicable for revenue village also and O&M of existing old network will be discontinued.	1. Each GP parenting to Sub-block must be connected on ring fiber path by laying new fiber for GP lastmile and functionally tested for Dual homed or Single homed parenting. 2. Subject to meeting the baseline / bestline criteria while using existing fibers. **Documents submission:** — Draw - Digital As Built Diagram on GIS (ABD report), — RFMS (OTDR link test reports) report — Discovery - GP Equipment (Router, UPS, Mini-OLT) and "Sub-Block end RFMS, Router" and/or "Equipment for Lastmile connectivity of Revenue village" visibility on NMS using backhaul transport network only.

Sr. No.	Milestone	Linked Payment	Special Quality Criteria (Applicable for GP payment only)	Pre-requisites and Documentary Evidence
				— Update on application status of ROW submission for respective routes including GP, Sub-blocks and Master-blocks. — PIA shall perform Service provisioning (Includes but not limited to FTTH, Digital Sevasetu, MPLS), Network visibility in S-NOC, Qualitative KPIs report (Includes but not limited to Latency, Jitter, Packet loss), Network Dashboard visualization (Includes MTTR, No. of Cuts, Lossy fiber) and obtain WCC (Work Completion Certificate) / FAT (Field Acceptance Test) certificate from GFGNL.
5	**Milestone – 5** Inspection and end deliverables of the project	**For Phase-I GPs:** 20% of Capex value per GP **For Phase-I Revenue villages:** 20% of Capex value per Revenue village **For Phase-II GPs:** 20% of Capex value per GP **For Phase-II Revenue villages:** 20% of Capex value per Revenue village	**Phase-I GP only:** - Additional 2% of capex value per GP will be paid for meeting bestline criteria.	**Documents submission:** 1. Handover of the entire district to relevant stakeholders including all ROW permission approved documents for relevant OFC routes must be successfully completed. 2. Each Master-

Sr. No.	Milestone	Linked Payment	Special Quality Criteria (Applicable for GP payment only)	Pre-requisites and Documentary Evidence
				block/Sub-block parenting to neighboring Master-block/Sub-block or State capital must be connected on ring fiber path with minimum 2CNO (3-Paths) fiber path protections and functional to meet the agreed service level agreement (SLA) over GFGNL backhaul transport network. 3. Virtual Inspection and Physical Inspection reports along with dashboard summary. 4. Applicable after 90 days of cooling period and linked with performance parameters (KPI) post successful completion and fully operational of entire Sub-block (Atleast 95% of GPs and linked revenue villages scope in one Sub-block). 5. All services must be tested, and the network should be live with confirmed end-to-end connectivity. A final completion certificate issued by the GFGNL/TPA/IE and confirmation from the S-NOC of complete

Sr. No.	Milestone	Linked Payment	Special Quality Criteria (Applicable for GP payment only)	Pre-requisites and Documentary Evidence
				functionality will be required. 6. The Full Go-Live confirmation must also include any final quality checks, testing and validation as per the SLAs.
6	**O&M Cost**	1. Post Go-Live of Sub-block. 2. Go-live of Sub-block should be considered on successful completion of atleast 95% of GPs scope in respective Sub-block and will be eligible for 100% O&M.	NA	1. 100% of O&M value of respective year for specified package of the project to be paid in equal instalments on Quarterly basis, based on SLA achievements after deducting penalties if any. **Documents submission:** — Monthly SLA reports from NMS, Inventory report, Attendance report, O&M related reports, Helpdesk report, end customer feedback, e-mail, observations if any

Note:

I. All payments shall be released after certification of Delivery and Implementation Milestones by GFGNL

II. Since the project timelines are of utmost importance, DoT shall reserve the right to take over the project implementation, in case of the project milestones delayed by over 60 days of its agreed time. In this regard, the decision of the Empowered Committee shall be final and binding.

III. All Payments shall be made in Indian Rupees Only.

IV. Invoices for payments of GP installations shall be submitted to GFGNL on a weekly basis.

V. Payment shall be released by the Tenderer against the invoices raised by PIA within 30 calendar days on providing all the relevant documents timely and are complete in all reference.

VI. All payments shall be made through RTGS only.

VII. Payments should be subject to deductions of any amount for which the PIA is liable under the RFP conditions. Further, all payments shall be made subject to deduction of TDS (Tax deduction at Source) as per the current Income-Tax Act.

VIII. The TENDERER shall certify actual implementation. The SP has to ensure proper handholding & support of the system.

IX. SP shall raise the component wise invoice as per the milestones achieved as mentioned above in the payment schedule & submit the invoice to TENDERER.

X. TENDERER shall verify the Invoice raised against the milestone achieved & shall make the payment after deduction of penalty, if any.

XI. The SP's request(s) for payment shall be made to TENDERER along with the 2 original copies of invoice and necessary documents. The invoice should be in English language and Gujarat based.

XII. Payment shall be made in Indian Rupees. While making payment, necessary income tax and service tax deductions will be made.

XIII. Rates for O&M existing network before partial go-live or 100% go-live will be paid as below fixed rate for maintaining of all active and passive assets of the BharatNet network.

BharatNet Phase (I/II)	O&M Rate per GP/day (INR)(Excluding Taxes)
Phase-I	163
Phase-II	415

XIV. Any components, services, which is discontinued or putting hardstop/standby the proportionate amount of this components will be reduce from OPEX value.

6.2.1 DEFINITION OF PARTIAL GO-LIVE AND 100%GO-LIVE

i) Partial go-live: Applicable for sub-block wise completion for one quarter (3 months)

a) GP commissioned in the ring with full accessories including all safety precautions and meeting engineering guidelines at site, meeting at least 95% of sub-block GP scope and linked revenue villages.
b) Submission of valid Site documentations/as-builts including but not limited to all field items Photos/Videos (including GPS co-ordinates linked) (which covers all field site's elements including but not limited to site Rack, active & passive components, For **Wireline and alternate technology** trench/OFC laid from source to destination with lat-long, depth measurement at every 100 mtrs, link throughput, LSPM, OTDR and WCC reports, etc.
c) Rate of O&M for existing Phase-I/Phase-II network connected linearly will be applicable at pre-defined rates and before partial Go-Live stage. Once GP is connected in ring and transit into partial Go-live based on bidder's valid submission, new O&M charges at 50% of discovered rate through this RFP will be applicable and hence old O&M rates for managing existing phase-I & II network will be discontinued.

Note:

I. The Partial go-live is basically a practical requirements of the network because of gap in between network deployment and go-live stage. Considering this as a practical scenario at ground a special window make over partial go-live into full go-live site. In case, PIA is not able to make over to partial go live to full go-live in specified timeline then it is the responsibility of PIA to service and continue O&M without any financial ask to GFGNL.
II. SLA & penalty will be applicable as per go-live with 50% relaxation during partial go-live period.
III. During partial go-live, any rectification, repair, relocation or replacement of existing component including OFC will be in scope of bidder only without any additional cost to GFGNL. RoW application is in scope of bidder, and hence bidder should select routes with proper coordination of agencies so that OFC deployment is not impacted in near future (project duration) due to expansion plan.
IV. If the bidder is failed to move in 100% go-live even after one quarter duration post completion of partial go-live period or found major failures in managing services on ground than GFGNL has right to recover payment against partial go-live from his balance payables.

ii) **100% Go-live:**

a) Clearing all observations come from above partial-go-live stage or during field observations, customer feedback, IE/TPA/GFGNL authorized agency's etc.
b) All links network topology on ring with trace of adjacent physical neighbor nodes with confirmation on GFGNL NOC.
c) If block level atleast 95% of GP live in ring then it will be considered as block 100% go-live.
d) Completion of Field AT and submission of all valid documentations mentioned above and asked in this RFP.
e) All payments shall be released after certification of Delivery and Implementation Milestones by GFGNL official and/or Appointed agency from GFGNL.
f) GFGNL will make payment of the bill within 1 month once all required all valid documents are submitted by the Bidder along with bill to the satisfaction of GFGNL. GFGNL will make payment after deduction of any applicable penalties.

Note:

I. Prior to fully 100% go-live ownership of existing assets will be responsibility of the bidder

including the any OFC rectifications or OFC shifting or OFC replacement due to row change, any third-party damage, etc.

II. Once the 100% go-live is declared and once the GP entered in O&M phase, the only discovered rate of O&M will be applicable.

III. Bidder should note that different GPs will be lit at different times as per the timeline for project implementation.

IV. The O&M phase shall begin only after all GPs in the scope have been lit.

V. Nonetheless, the PIA shall be responsible to do O&M for the partially lit GPs which will be paid in part on prorate basis.

VI. Prorate will be calculated as per below.

- Prorate to be paid for O&M before zero day = (50% of first quarter total O&M cost / total GPs) X (Total number of GPs made Live)

VII. Payment will be released within 30 days of submission of valid invoices subject to the condition that invoice and all supporting documents are in order and work is performed as per the scope of the project and meeting SLA criteria. GFGNL shall be entitled to withhold the payment of a disputed invoice or part of it delivered by the PIA, when GFGNL disputes such invoice, or part of it, provided that such dispute is bonafide.

VIII. Bidder will be responsible to submit the all required valid documentations to smooth payment for O&M billing like but not limited to warranty, MAF, As-built, Photo's as per ask in videography section, clearance of any open/punch point during implementations, acceptance test, synthetic traffic report, etc. Failure to this will invite penalty to bidder and PIA has to adhere to it. GFGNL authority's decision will be consider as final.

SECTION-7 SERVICE LEVEL AGREEMENT(SLA) & PENALTY

The purpose of this Service Level Agreement (hereinafter referred to as SLA) is to clearly define the levels of service, which shall be provided by the SP to tenderer for the duration of the contract for providing Applications, Operation and Maintenance support against the stated scope of work. Tenderer shall regularly review the performance of the services being provided by the SP and the effectiveness of this SLA.

7.1 DEFINITIONS OF SLAS

For purposes of this Service Level Agreement, the definitions and terms as specified in the contract along with the following terms shall have the meanings as set forth below:

a. "Incident" refers to any event / abnormalities in the functioning of TENDERER specified services that may lead to disruption in normal operations of TENDERER services.

b. "Response Time" shall mean the time taken after the incident has been reported at the concerned reporting center in resolving (diagnosing, troubleshooting and fixing) or escalating to (the second level, getting the confirmatory details about the same and conveying the same to the end user), the services related troubles during the first level escalation.

c. The resolution time: the resolution time is the time taken for resolution of the problem and this includes provisioning of the work around to immediately recover the situation. The resolution time shall vary based on the severity of the incident reported.

7.2 CATEGORIES OF SLAS

This SLA document provides for minimum level of services required as per contractual obligations based on performance indicators and measurements thereof. The SP shall ensure provisioning of all required services while monitoring the performance of the same to effectively comply with the performance levels. The services provided by the SP shall be reviewed by TENDERER against this SLA. The SP shall:

- Discuss escalated problems, new issues and matters still outstanding for resolution.
- Review of statistics related to rectification of outstanding faults and agreed changes.
- Obtain suggestions for changes to improve the service levels.

The following measurements and targets shall be used to track and report performance on a regular basis. The targets shown in the following table are applicable for the duration of the contract.

7.3 PROJECT SLA AND PENALTY

Project Penalties:

Following penalties are applicable in case of in case of non-compliance with delivery timelines/milestones as defined in Project implementation schedule.

For Phase-I Deliverable Milestones

Completion Timeline	Penalty % of the CAPEX value of the pending GPs based on aggregate milestones							
	>0%-<=10% Pending	>10% - <=20% Pending	>20% - <=30% Pending	>30% - <=40% Pending	>40% - <=50% Pending	>50% - <=60% Pending	>60% - <=75% Pending	>75% Pending
T	NA	NA	NA	NA	NA	NA	NA	NA
T+1 Month	NA	NA	NA	NA	NA	NA	NA	NA
T+2 Months	NA	NA	NA	NA	NA	NA	NA	NA
T+3 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+4 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+5 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+6 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+7 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+8 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+9 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+10 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+11 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+12 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+13 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+14 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+15 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+16 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+17 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+18 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+19 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%

Completion Timeline	Penalty % of the CAPEX value of the pending GPs based on aggregate milestones							
	>0%-<=10% Pending	>10% - <=20% Pending	>20% - <=30% Pending	>30% - <=40% Pending	>40% - <=50% Pending	>50% - <=60% Pending	>60% - <=75% Pending	>75% Pending
T+20 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+21 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+22 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+23 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+24 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+25 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+26 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+27 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+28 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+29 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+30 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+31 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+32 Months Onwards	5%	5%	10%	10%	15%	15%	20%	20%

For Phase-II Deliverables:

Completion Timeline	Penalty % of the CAPEX value of the pending GPs based on aggregate milestones							
	>0%-<=10% Pending	>10% - <=20% Pending	>20% - <=30% Pending	>30% - <=40% Pending	>40% - <=50% Pending	>50% - <=60% Pending	>60% - <=75% Pending	>75% Pending
T	NA	NA	NA	NA	NA	NA	NA	NA
T+1 Month	NA	NA	NA	NA	NA	NA	NA	NA

Completion Timeline	Penalty % of the CAPEX value of the pending GPs based on aggregate milestones							
	>0%-<=10% Pending	>10% - <=20% Pending	>20% - <=30% Pending	>30% - <=40% Pending	>40% - <=50% Pending	>50% - <=60% Pending	>60% - <=75% Pending	>75% Pending
T+2 Months	NA	NA	NA	NA	NA	NA	NA	NA
T+3 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+4 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+5 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+6 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+7 Months	0.500%	0.750%	1.000%	1.250%	1.500%	2.000%	2.500%	3.000%
T+8 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+9 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+10 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+11 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+12 Months	0.500%	0.750%	1.50%	2%	2.50%	3%	3.50%	4%
T+13 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+14 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+15 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+16 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+17 Months	0.500%	0.750%	1.50%	2%	2.50%	3.5%	4.0%	5.0%
T+18 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+19 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+20 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+21 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%
T+22 Months	1.000%	1.500%	2.00%	2.5%	3.00%	4%	5.00%	7%

Completion Timeline	Penalty % of the CAPEX value of the pending GPs based on aggregate milestones							
	>0%-<=10% Pending	>10% - <=20% Pending	>20% - <=30% Pending	>30% - <=40% Pending	>40% - <=50% Pending	>50% - <=60% Pending	>60% - <=75% Pending	>75% Pending
T+23 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+24 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+25 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+26 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+27 Months	2.00%	3.00%	4.00%	5.00%	6.00%	8.00%	10.00%	15.00 %
T+28 Months Onwards	5%	5%	10%	10%	15%	15%	20%	20%

Notes:

a. **GFGNL do understand the complexity and interdependency in between stakeholders. Considering the scope and timelines in addition to penalties, GFGNL also introduce award criteria while evaluating the performance throughout the project. Thus, the selected bidder, who penalized during the initial period of the project milestones/ time lines those penalties will get waived off at the end of the project, based on the successfully completion of the overall defined project timelines/milestones in terms of overall scope of the project .**
b. The above table describes the penalty to be levied in case the PIA is unable to complete the specified GPs within the timelines.
c. T is the date of issuance of award of work order. The project is stipulated to end by the 36th Month.
d. The penalty would not be levied for the 1st two months of implementation timeline, as the PIA is expected to mobilize the team and machinery in field locations, take approvals for ROW in 2 months.
e. The cumulative GPs pending till that month, would be penalized at the rate applicable for the current month.
f. Up to 50% of target achievement will be accepted in Rainy Season months i.e. July, August, September and beyond 50% for non-achievement of targets, Penalties shall be applied. In case of Access rainfall declared by district collector and then monthly milestone count will be zero, no penalty will be levied for particular month.
g. Penalty for deviation in delivery timelines / milestone to be achieved will be ceiling capped at 15% of total CAPEX of respective package.
h. In case of delay in delivery milestone of GPs due to RoW approval not received in a month from the date of complete RoW application such GPs shall be excluded from calculation of penalties.
i. Un-recovered penalty from previous bills would be recovered in subsequent bills submitted by the PIA. This clause shall be applicable to all penalties listed in this section.

7.4 THIRD PARTY DAMAGE

a) If the PIA damages other Private Service provider's cables /sewage line/ Government or public properties, such as electricity cable or roads etc., the damage charges/penalty will be paid by the PIA only as per the claim of such third party. GFGNL/USOF, DoT will not be liable to pay any penalty or any damage charges made by the PIA as per the indemnity clause below:

b) PIA shall either pay to third parties all expenditure incurred for restoring services which are damaged by it while carrying out the work or the same amount will be deducted from his bills. Such expenditure shall be intimated to the PIA either by Engineer in- charge or concerned third parties in writing. The amount deducted by GFGNL from his bill shall be paid to concerned third parties by the designated authority of GFGNL."

7.5 PENALTY FOR CAUSING INCONVENIENCE TO THE PUBLIC

The bidder shall not be allowed to dump the empty cable drums/waste materials in Govt/public place, which may cause inconvenience to Govt/ Public. If the bidder does not dispose off the empty cable drums/waste materials within 3 days of becoming empty, GFGNL is at liberty to dispose off the drum in any manner deemed fit and the costs incurred by GFGNL in disposing off such materials shall be borne by the Bidder. USOF, DoT/DST/ GFGNL may also levy a **penalty up to Rs One Thousand for each such default**.

7.6 PENALTY FOR CUTTING/DAMAGING THE OLD CABLE

a) During excavation of trench, utmost care is to be taken by the bidder, so that the existing underground cables of GFGNL are not damaged or cut. In-case any damage/ cut is done to the existing cables of GFGNL, a penalty as per the schedule given below will be charged from the bidder or the amount will be deducted from his running bills. Penalty shall be levied @20% of the penalty amount as per table below in case the repair of damages is carried out within 72 hours and submission of No Objection Certificate within 10 days of occurrence is received by PIA.

Sr. No.	Size of existing UG/OF cables Cut/ Damaged	Amount of penalty per Damage instance
1.	Copper UG cable	Rs 50,000.00 (Fifty Thousand)
2.	OFC of any size	Rs 1,00,000 (one Lakh)
3.	Misc. (to include electrical cable, drainage/sewage pipe, water pipe belonging to state govt or local municipal agency etc.)	Rs 1,00,000 (One Lakh)

The bidder shall carry out such repairs for restoration of the damaged cable free of charge. The cost of jointing kit shall also be borne by the bidder. If bidder fails to repair the damage, the cost of repair (including cost of labor + jointing kit) shall be recovered from the bidder in addition to the penalty as prescribed.

b) In accordance with Indian telegraph act, If any person, willfully or negligently damages telegraph line, he shall be liable to pay the expenses (if any), as may be incurred in making good such damage.

c) PIA shall settle all such claim raised by other operators/ agencies regarding cutting/ damaging their cables or other infrastructure without any cost to USOF, DoT/ DST/GFGNL.

7.7 PROTECTION OF LIFE AND PROPERTY AND EXISTING FACILITIES

a. The bidder is fully responsible for taking all possible safety precaution during preparation for and actual performance of the works and for keeping the construction site in a reasonable safe condition. The bidder shall protect all life and property from damage or losses resulting from his construction operations and shall minimize the disturbance and inconvenience to the public.

b. If the excavation of trench alters the outlines of the ground around road and highway crossing in such locations dangerous to traffic, the bidder shall at his own cost, take all necessary precautions to protect public and shall comply with all USOF/GoI/GoG/Telecom/TRAI/DoT/GFGNL regulations as to placing of warning boards (minimum size 3' x 2'), traffic signals, barricades, flags etc., at such location. If the bidder does not put the warning signal as per above directions, then a penalty of Rs 1000/- per day shall be levied on the bidder, till the directions are complied by the bidder. The bidder shall take due precautions to avoid damages to other pipe lines, water mains, sewers, telephones, telegraphs and power conduits, laid wires poles and guy wires, railways, highways, bridges or other underground or above ground structure and/or property crossing or adjacent to the cable trench being excavated.

c. Attention of the bidder is drawn to the rules regarding laying of cables at road crossing, along Railways Bridges, highways safety precautions while working in Public Street as per Engineering Instructions.

d. The bidder shall be solely responsible for location through approved non-destructive means and ensuring the safety of all existing underground pipeline, electrical cables, and or other structures.

e. The bidder shall be solely liable for all expense for and in respect of repairs and/or damages occasioned by injury of or damage to such underground and above structures or other properties and undertake to indemnify USOF, GoI/GoG/Telecom/TRAI/DoT/GFGNL from and against all actions, cause of actions, damages, claims and demands what-so-ever, either in law or in equity and all losses and damages and costs (inclusive between attorney and client), charges and expenses in connection therewith and/ or incidental thereto. The bidder shall take all responsibilities and risk in crossing other pipelines and cables and shall be responsible for protecting all such existing pipelines, poles, electric lines, sewers, cables or other facilities from damage by the bidder's operation in connection with the work. The bidder without cost of USOF, GoI/GoG/Telecom/TRAI/DoT/GFGNL shall promptly repair any damage incurred.

f. The current market value of any commodities lost as a result of any damage to the aforesaid existing facilities shall be paid by the bidder together with such additional sums necessary to

liquidate the personal of property damages, resulting there from.

7.8 PENALTY FOR DEVIATION FROM STANDARD ENGINEERING INSTRUCTIONS FOR FIBRE LAYING (UNDERGROUND AND AERIAL)

A) Underground Fibre Cable Laying

Normally depth of the trench should 1.65 m in normal & mix soil and 1.2m in hard soil. Deviations due to field conditions will be required to have necessary protections in case of less depth. The cases and solutions are as following;

1. Minimum depth of burial in general shall be 1.65m
2. In rocky area (including Murrum & soil mixed with stone or soft rock) depth of burial shall be 1.2m at the minimum.
3. In case of utility where depth is 90 to 120 cm then DWC protection is to be used in normal/mix soil case.
4. In some areas where the depth is 60cm, in those cases reinforced concrete casing of 4"(Four inch) round should be provided.
5. For hard strata/rock soil layer for 60 to 90 cm cases DWC with wire mess and PCC is to be used. However, for depth relaxation photograph (with GPS) proof and justification is required.
6. Above ground installation of ducts shall be limited to culvert and bridge crossings only. At such locations, ducts shall be installed inside GI pipe or HDPE DWC pipes with metal sheet protection (GI sheet wrapping) of appropriate size (4” to 6”) suitable for number of ducts to be installed

The relaxation by the competent authority prescribed below shall be obtained giving reasons for not achieving standard depth;

In case, the Successful Bidder does not adhere to the mentioned Engineering Instructions (Annexure B) and does not provide requisite protection, then the Bidder is liable to penalty as per below as per below criteria :

1. PIA has to do a self-declaration of depth achieved in GIS report and installation report submitted and separate marking shall be done for depth achieved as per the soil strata type.
2. GFGNL or its authorized agency may do sample base on-field / virtually measurement by means of sample pits (2 pits per Kms.) Average depth will be calculated on per Km. basis and will be compared against the depth required for that respective soil type.
3. This may include main trunk cable route as well as distribution cable from Rack Mounted splitter to GP.
4. For penalty calculation purpose under this clause, Per Km. approved rate shall be considered at rate of 1,93,000/- Rs. per Km.
5. Based on the assessment in sample pits if non-adherence to the depth is identified then

penalty will be applied on per running Km. basis as per below table and the identified amount shall be deducted against the invoice raised during that billing payment cycle.

#	Depth (For Soft Strata) (A)	Depth (For Hard Strata including Murmur & Mix soil) (B)	Protection Required	Less Payment in case of Self-declared depth (with Proper Protection)	Less Payment in case of Self-declared depth (without Proper Protection)	Less Payment in case of major deviation found by GFGNL or its authorized agency in depth (with Proper Protection)	Less Payment in case of major deviation found by GFGNL or its authorized agency in depth (without Proper Protection)
1	> 165 cm	> 120 cm	Protection (DWC/RCC/GI) Required @ Builtup Areas/ Road Cross/Railways /RoWs/ as per RoW Approving Authorities or GFGNL	0	0	0	0
2	< 165 cm to ≥ 150 cm	< 120 cm to ≥ 105 cm		12%	12% + Discovered Unit rate of Protection Material	12% + Rs. 20000 Per pit with deficiency	12% + Rs. 20000 Per pit with deficiency + Discovered Unit rate of Protection Material
3	< 150 cm to ≥ 130 cm	< 105 cm to ≥ 90 cm		20%	20% + Discovered Unit rate of Protection Material	20% + Rs. 20000 Per pit with deficiency	20% + Rs. 20000 Per pit with deficiency + Discovered Unit rate of Protection Material
4	< 130 cm to ≥ 100 cm	< 90 cm to ≥ 70 cm	* None till 120 cm in A & 90 cm in B * DWC for A in lesser depth(120cm-90cm) * DWC + Wire mesh + PCC in lesser depth in B	35%	35% + Discovered Unit rate of Protection Material	35% + Rs. 20000 Per pit with deficiency	35% + Rs. 20000 Per pit with deficiency + Discovered Unit rate of Protection Material
5	< 100 cm to ≥ 90 cm	< 70 cm to ≥ 60 cm	* DWC for A in lesser depth(120cm-90cm) * DWC + Wire mesh + PCC for B	45%	45% + Discovered Unit rate of Protection Material	45% + Rs. 20000 Per pit with deficiency	45% + Rs. 20000 Per pit with deficiency + Discovered Unit rate of Protection Material

#	Depth (For Soft Strata) (A)	Depth (For Hard Strata including Murmur & Mix soil) (B)	Protection Required	Less Payment in case of Self-declared depth (with Proper Protection)	Less Payment in case of Self-declared depth (without Proper Protection)	Less Payment in case of major deviation found by GFGNL or its authorized agency in depth (with Proper Protection)	Less Payment in case of major deviation found by GFGNL or its authorized agency in depth (without Proper Protection)
6	< 90 cm to ≥ 60 cm	< 70 cm to ≥ 60 cm	* DWC + Wire mesh + PCC for both case	45%	45% + Discovered Unit rate of Protection Material	45% + Rs. 20000 Per pit with deficiency	45% + Rs. 20000 Per pit with deficiency + Discovered Unit rate of Protection Material
7	< 60cm	< 60cm	* GI / DWC + Wire mesh + PCC as per available approval at GP / Utility Crossing	45%	45% + Discovered Unit rate of Protection Material	45% + Rs. 20000 Per pit with deficiency	45% + Rs. 20000 Per pit with deficiency + Discovered Unit rate of Protection Material
8	Above Ground	Above Ground	* GI / DWC + Wire mesh + PCC as per available approval at GP / Utility Crossing	100%	100% + Discovered Unit rate of Protection Material	100% + Rs. 20000 Per incedence with deficiency	100% + Rs. 20000 Per incedence with deficiency + Discovered Unit rate of Protection Material

Table 3.7

6. Penalty for deviation from Standard Engineering Instructions for fibre laying (Underground), is capped at 10% of CAPEX cost of the package. This penalty is separate and applicable in addition to 20% of penalty capping applied for non-compliance in delivery timeline or milestones achievement as per table 3.5 of this section.

Note: In case of depth below 1.2m, instructions as per latest EI and instructions for protection etc. will be followed.

Illustration:

Assuming that the standard depth required is 165 cm and as per consideration of fibre laying charges per running kms. is Rs.1,93,000/- for the standard depth (applicable for standard

depth for different soil strata type as well).

Based on the sample based field survey by GFGNL or its authorized agency if in case deviation identified in 2 pits per kms. and average depth identified is 100 cm., then penalty applicable is = (1,93,000*0.35)+(20,000)+(20,000) for that span and this penalty shall be deducted from the invoice raised by PIA during that billing period.

B) Aerial Laying

The pole installation and alignments will be recorded as per the Engineering Instruction. The Successful Bidders shall be required to provide all articles used for Aerial OFC laying. In case the Successful Bidder does not use any mandatory article, he shall be required to implement the articles mentioned as per Annexure and the payment will be not processed until the proper rectification has been completed.

7.9 O&M SLA FOR GP NETWORK AVAILABILITY

7.9.1 SLA FOR THE O&M OF THE EXISTING NETWORK (PH-I & PH-II), TILL THE COMMISSIONING OF IP-MPLS ROUTERS AND NEW RINGS

Proposed SLA Uptime Per GP & penalties thereof		
Sr. No.	**Network Uptime**	**% Penalty****
1	>= 98.5%	No Penalty
2	>= 97.5% to < 98.5%	1.0%
3	>= 96.5% to < 97.5%	2.0%
4	>= 95.5% to < 96.5%	4.0%
5	>= 94.5% to < 95.5%	6.0%
6	>= 93.5% to < 94.5%	8.0 %
7	>= 92.5% to < 93.5%	10.0%
8	>= 91.5% to < 92.5%	12.0%
9	>= 91.5% to <= 90.0%	15.0%
10	>=70% to <90.0%	20 .0%
11	<70%	No Payment

Illustration:

I. At 98.5% availability, the penalty is zero and from 98.5% to 95.5% availability, penalty will be proportionate to SLA availability. For example, for availability of 97.56 %, it will be rounded off to single digit after decimal i.e. 97.6 and penalty will be 98.5-97.6=0.9% applied.

II. SLA will be calculated GP wise (i.e. all the GPs under AMC connected to the Block) month wise.

II. There will be a performance-based relaxation in the penalties mentioned in the Table above for the period of one year from the appointed date. The relaxation will be as below:

- **NODE Threat (Service Interruption)**

If any active node such as DWDM/IP-MPLS, RFMS, or Power-conversion system (Other than GP) experiences a threat, outage, or software reporting error due to full or partial equipment faults (either hardware or software related or its subcomponents/slots/network/ service), a penalty will be charged.

SN	Activities	Penalty
1.	Upto 12Hrs	No Penalty
2.	>12 Hrs to <=24 Hrs	Rs 2000/- per instances
3.	>24 Hrs	Rs 3000/- per 24 Hrs on each instances

Relaxation for Phase-I only:

S. N.	Period from the sign of Work Order	Average block wise GPs availability/ Up Time	Rebate on Penalty
1	Up to 3 Months	>=90%	No Penalty
		<90%	Discount of 40% of the applicable penalty up to 80% uptime and 20% rebate in case of below 80% uptime
2	3 to 6 months	>=95%	No Penalty
		<95%	Rebate of 30% of the applicable penalty up to 85% uptime and 20% rebate in case of uptime below 85%.

— There shall be no relaxation beyond six month from completion of HOTO timeline and the penalty shall be applicable as mentioned in the Table of Penalties.

— There is no any relaxation for Phase-II.

Note:

I. Successful bidder shall follow GFGNL's in house Trouble Ticket Module for capturing the fault status which will in turn be used for SLA calculation through the SLA module.

II. SLAs to be calculated Block wise and penalties to be imposed on monthly basis on O&M charges of the block network.

III. PIA shall ensure above SLAs else the corresponding penalties will be imposed.

IV. Keeping availability of power/infra with their backup is in the scope of selected bidder and hence GPs down time due to Block/GP being down due to Power issues /media failure or equipment failure will also be part of SLA calculation. However, following situation will be considered as beyond control of the PIA,

   a. electricity outage/failure from DISCOM or utility department (more than 6 Hrs in a day(24Hrs)),
   b. The situations/activities included in the Force Majeure clause.
   c. Government intimation for shutdown

   And hence, will be considered as exclusion in SLA by submission of valid evidences-documentations proof to GFGNL.

V. Wherever electric connection is available in GP but not in the building- The PIA can shift the equipment. If no suitable building is available, GFGNL will support administratively wherever feasible with State Authorities for getting Electricity connection. Till it is provided, down time during power unavailability to be excluded from SLA the case will be only applicable for additional GP cases only.

VI. The shutdown taken for maintenance of fibre by PIA shall be excluded from SLA. However, such shutdown time in a month for a link/ring cannot be more than 8 hours. Further, there should not be more than 1% of links taken for shutdown in a month.

VII. No exclusion except above or force majeure cases will be permitted.

VIII. The PIA and GFGNL or it's authorized ageny shall take the OTDR traces, jointly, on a fort-nightly or sample basis, from the Block and/or GP ends, for all the cases where SLA relaxations are sought by the PIA till RFMS deployment is not completed to achieve the automatic measurement. Selected PIA has to support all field and backend related resources like but not limited to field manpowers (labours), tools(OTDR,LSPM),etc. whenever required by the GFGNL without any additional cost.

7.9.2 SLAS FOR NETWORK AVAILABILITY AT BLOCK/DISTRICT LEVEL FOR RING/N*CNO (N>=2) TOPOLOGY

S. No	Measurement Criteria	Definition	Quarterly Target	Penalty as %age of Quarterly O&M Payment of the Block
1	Network Availability at Block/District level/N*CNO nodes(N>=2)	Availability of Block router (aggregation)-and for the N*CNO nodes(N>=2)	≥99.5 %	No Penalty
			≥98.5 % to <99.5 %	1%
			>= 97.5% to < 98.5%	2%
			>= 96.5% to < 97.5%	4%
			>= 95% to < 96.5%	7%
			<95%	7%+((95%-%Uptime)/0.20)*1% 1% additional penalty on account of each 0.20% reduction in uptime

7.9.3 SLAs for Network Availability at GP on Ring(After Go-Live):

SLA will be considered per GP, i.e. last mile equipment -Router/ switch or anything other manageable devices (as per future planning) to be mapped GP wise, payment as per actual SLA achievement of end device availability at last mile equipment will be considered.

Network Uptime	% Penalty For GP
>= 98.5%	No Penalty Incentive scheme : >=98.5% to < 99% : 0.5% >=99 % : 1% (%Incentive will be set-off against penalty of same quarterly offered GP's of district subject to overall average availability of district is >95%)
>= 97.0% to < 98.5%	1.50%
>= 96% to < 97%	2.50%
>= 95% to < 96%	4.00%
>= 94% to < 95%	6.00%
>= 93% to < 94%	8.00%
>= 92% to < 93%	10.00%
>= 91% to < 92%	12.00%
>= 90% to < 91%	15.00%
<90.0%	15%+(90%-% uptime)*3 (3% additional penalty on account of each 1% reduction in uptime)

- **OFC Cut and MTTR :** OFC related penalty clause will remain same as before 100% Go-live
- **Change Request(CR):** If not done within 30 days timeline 5% penalties per week and 20% Max will be applicable in CR Value
- **Exclusion**: a. electricity outage/failure from DISCOM or utility department (more than 6 Hrs in a day(24Hrs)),
  b. The situations/activities included in the Force Majeure clause.
  c. Government intimation for utility shutdown

a) The definition for equipment availability is common for all network equipment i.e. availability in Block, (Aggregation) and Gram Panchayat (Access) level Network equipment availability for a Quarter is defined as total time (in minutes) in a Quarter - total down time (in minutes) in a Quarter excluding planned network downtime during that Quarter. The network is considered available when all the services in full capacity are available. However, the downtime of GP router due to downtime of Block/sub-block router shall be excluded from the downtime of GP router for SLA/Penalty purpose.

*Network Availability (%) = (Total minutes during the Quarter – Planned downtime minutes during the Quarter – Unplanned downtime minutes during the Quarter) *100 / (Total minutes during the Quarter- Planned downtime during the Quarter)*

b) Planned downtime: details related to the planned downtime shall be agreed with GFGNL

And shall be communicated well in advance. The downtime of the Block and GPs commissioned during the implementation phase shall be calculated on pro-rata basis. Based on district-level and block-level customer/traffic data, Dark Fibre customer cases GFGNL may grant approvals for undergo scheduled maintenance. The standard downtime/maintenance window for backhaul should align with considering standard industrial practices for Scheduled Downtimes (DT) and GP ends for access-related issues. While sending an approval, Bidder has to mention the details and impact analysis in advance. For the cases which have not been approved, they will be subject to penalty/outage criteria. A minimum of 6 hours notification prior to any scheduled maintenance is required. The downtime of the Block and GPs commissioned during the implementation phase shall be calculated on pro-rata basis.

c) Measurement Tool: Reports from NMS (OSS) duly approved by GFGNL or its appointed agency, feedback from end customers, valid e-mail, helpdesk, feedback from GFGNL officials. PIA shall submit Quarterly reports on the performance and adherence to the SLAs while the penalties shall be charged on quarterly basis.

d) Keeping availability of power/infra with their backup is in the scope of selected bidder and hence GPs down time due to Block/GP being down due to Power issues /media failure or equipment failure will also be part of SLA calculation. However, following situation will be considered as beyond control of the PIA,

i. electricity outage/failure from DISCOM or utility department (more than 12 Hrs in a day(24Hrs)),
ii. The situations/activities included in the Force Majeure clause.
iii. Government intimation for shutdown
iv. Major/critical Breakdown

And hence, will be considered as exclusion in SLA by submission of valid evidences-documentations proof to GFGNL.

e) To avoid the electricity and manual switching off the equipment following are the best practices need to adopt by the bidder but not limited to,

I. To separate out the power connection from other utilities (like fan, bulb etc) in such a way that the BharatNet equipment is not switched off whenever someone switches off other utilities during, night, weekend, holiday periods etc.
II. Wherever, the daily average availability of electricity is less than 8 Hrs, it is presumed that the Battery may not get fully charged and be able to run the equipment continuously. As overall utility infrastructure for power backup will be in the scope of bidder and hence, Such sites may be captured at the survey stage itself. Bidder has to deploy alternate on field and provisioned for such sites without any additional cost to GFGNL for 24*7*365 days network uptime. However, the same needs to be informed and submit to GFGNL HO for field inventory.

III. Above arrangement shall leave little chance for asking SLA exclusion due to Electricity Issues. PIA shall ensure availability of alternative power arrangements, where electricity is not available beyond 12 hours in a GP.

Dark Fibre Penalty

Proposed SLA Uptime Per Dark Fibre & penalties thereof		
Sr. No.	**Network Uptime**	**% Penalty****
1	>= 99%	No Penalty
2	>= 97% to < 99%	5.0%
3	>= 95% to < 97%	10.0%
4	>= 90% to < 95%	15.0%
5	>= 80% to < 90%	30.0%
6	<80%	100.00%

- %Penalty will be levied on base of Quarterly or part thereof Revenue received of end Customer link / DF leased customer.
- Dark Fibre Penalty will be Over and above maximum penalty cap limit
- Expected Customer Delivery Time Line is average 7 Calender Days,
- In case of the delay- for any particular case beyond 15 calendar days purely attributed to bidder GFGNL may have rights to recover the 0.5% revenue loss per week or part thereof from it's payable if the bidder justification for the delay is not satisfactory.
- In Case of Churn of customer due to end faults pertains to PIA, opportunity cost of two quarter will be recovered from PIA's next O&M Payable.

7.9.4 PENALTY CALCULATION ILLUSTRATION

I. Bidder is bound to perform to adhere to SLA of >=98.5% to avoid the any O&M penalty. However, there will be 0.5% additional payment(incentive) in OPEX charges will be applicable on achieving >=98.5% uptime. Furthermore, for the cases where SLA is >=99% then bidder will get 1% incentive in OPEX charges. These incentives will be set-off against penalty of same quarter subject to overall availability of all GP's of that package is having more than 95% network availability.

II. Suppose upto 98.5% availability, the penalty is zero and from 98.5% to 95.5%, the penalty is proportionate, 95.5% to 90%, the penalty is twice the proportionate and below 90%, it is thrice the proportionate. Then, the maximum penalty in slab 98.5%-95.5% shall be 3%, slab 95.5%-90% shall be 3%+10%=13%.

III. Illustrations of penalty calculation(*7.9.1 SLA FOR THE O&M OF THE EXISTING NETWORK (PH-I & PH-II), TILL THE COMMISSIONING OF IP-MPLS ROUTERS AND NEW RINGS*) under different availability

   i. If the availability is 97.56 %, it will be rounded off to single digit after decimal i.e.97.6 and penalty will be 98.5-97.6=0.9%.

   ii. If the availability is 92.43 %, it will be rounded off to single digit after decimal

i.e.92.4 and penalty will be 3% +2*(95.5-92.4)%=9.2%.

iii. If the availability is 82.67 %, it will be rounded off to single digit after decimal i.e.82.7 and penalty will be 3% +10%+3*(90-82.7) %=34.9%.

iv. If the availability is 61 %, the penalty will be 3% +10%+3*(90-61)%=100%.

v. The penalty shall never be more than 100%

vi. For less than 60% network uptime there will be no payment to PIA.

7.9.5 SERVICE PROVISIONING SUPPORT BY PIA

I. From Day-1, the network shall support and enable retail, enterprise, and wholesale services as per the capabilities of the router, such as but not limited to the following: All type of data and voice services, wireless back-haul traffic for 2G, 3G,4G and 5G services, FTTx, layer2 VPN, layer3 VPN, point 2 Multipoint VPN and VPLS, IPTV and multicast VPN, Cable TV transmission services along with other bandwidth leasing services supported any to any, one to many, many to many kind of services, IoT/ Industrial Internet of Technology(IIoT), etc.

II. The network created should have capability to establish end to end integration as per requirement up to Gujarat State-Wide Area Network (GSWAN) and National Knowledge Network (NKN).

III. In this regard, GFGNL shall facilitate in provisioning of all necessary details and access for a smooth integration.

IV. Selected PIA has to design and propose the solution based on above requirement, Selected PIA will be responsible for end-to-end provisioning during the migration of Ph-I, II and inter connectivity between islands (including the Ph-I & II) and the scope covered under this RFP with good quality and low latency till the 100% go-live of GPs.

V. However, for end customer delivery once the block declared 100% go-live, GFGNL through their inhouse agency may support on service provisioning for centralized service provisioning and selected PIA has to support with their resources for end to end delivery for field and backend technical/non-technical support.

#	Definition	Target	Penalty
1	Provisioning and monitoring of services from GFGNL(S-NOC)	Up to 48 hours	No Penalty
		> 48 hours	5% of opportunity cost lost per link or Rs 100/- per day per link whichever is maximum

- Service provisioning will be in scope of PIA for entire project duration (Throughout project & O&M duration).
- Service Provisioning has to be done from S-NOC centrally.
- PIA to ensure all requisite API integration with provided GFGNL NMS.

7.9.6 GP DOWNTIME SLA FOR CONSECUTIVE DAYS

SN	GP Downtime	Penalty**
1.	< 24 Hrs	No Penalty
2.	< 48 Hrs. to > 24 Hrs.	2000 Rs
3.	< 72 Hrs. to > 48 Hrs.	5000 Rs
4.	> 72 Hrs.	No Payment

** of the Quarterly OPEX of respective GP

7.9.7 PENALTY FOR LATENCY

a) SLA allows a maximum of 90ms in the connectivity between the State Head Quarter to all the GramPanchayats.
b) SLA allows a maximum of 120ms in the connectivity between the State Head Quarter to all the Horizontal Customer Connectivity.
c) If the Latency is more than the permissible as mentioned above, Successful bidder has to analyze report and escalate to various stakeholders within 2 hours of incident reported. If Successful Bidder fails to analyze, report and escalates to various stakeholders within 2 hours of incident reported, Rs. 1000 per 30 minute or part thereof thereafter will be levied. If the Latency issue not resolved within 24 Hrs Rs. 2000 per Day per instances will be levied or part thereof.

7.9.8 PENALTY FOR PACKET LOSS

i) The Packet Loss on the network shall be maintained typically at less than 1%.
ii) If the packet loss is more than 1% measured on a monthly basis as mentioned above, selected bidder has to detect, analysis and report to various stakeholders within 2 hours of incident reported.
iii) Selected bidder has to take corrective action and resolve the issue within 6 hours of incident reported.
iv) If Selected Bidder fails to detect, analysis, report and report to various stakeholders within 2 hours of incident reported, Rs. 1000 per 30 minute or part thereof thereafter will be levied.
v) If Selected Bidder fails to take corrective action and resolve the issue within 6 hours of incident reported, Rs. 2000 per 30 minute or part thereof thereafter will be levied.

7.9.9 OTHER LINK/ SOFTWARE SUPPORT RELATED PENALTY

i) Any patch/ new fixes released by the OEM needs to be applied to the corresponding product within 24 working hours. Any delay in applying the patch will attract penalty of Rs. 2000/- per day.
ii) Any Software/firmware bug/ application related issue identified by GFGNL/ selected Bidder will be classified in types:
- **Priority #1:** System outage/ performance related issue effecting the overall functionality of the application.
- **Priority #2:** Having bearing on the day to day functioning of the deployed system/ availability of application (part functionality) for the GFGNL users, for example:
  - Unable to provide /fetch the necessary parameters/details to other software system of GFGNL like NMS, GIS, etc.
  - Unable to generate MIS, reports or perform any billing transactions
- **Priority #3 :** Not having bearing on the day to day functioning of the deployed system

Type of Issue	Resolution time (from the time of reporting of incident in the system or ticketing tool)	Penalty amount (exceeding resolution time)
Priority #1	2 hours	Rs. 4000/- (per hour)
Priority #2	4 hours	Rs. 2000/- (per hour)
Priority #3	24 hours	Rs. 500/- (for every 24 hour or part thereof)

Resolution time & the penalty component for the bug fixing is given below (applicable on 24 * 7 basis):

Note:

a. For the calculation of SLAs, the GP shall be taken as Unit.

b. The performance report for all above shall be generated from the Measurement Tool (NMS, Helpdesk tool).

c. BIDDER shall submit the reports on the performance and adherence to the SLA through these tools as per the MIS reports identified in relevant section

d. All incidences reported by NMS should be registered in the Help Desk with Ticket ID.

e. SLA below 95% for network as a whole, consecutively for three months will be a good ground to initiate termination of contract for default.

f. Payment shall be made (after deducting suitable penalty) as percentage of actual Uptime achieved.

g. Per GP OPEX will be total OPEX divided by number of GPs.

h. 12 Hours of downtime per software per quarter is permissible for all software scheduled maintenance and 2 hour of downtime per device per quarter at GP level is permissible.

i. Following will not be considered for downtime calculation:

- Link down due to power failure and ONT (Optical Network Terminal) switch off at Gram Panchayats. (GPs)
- Schedule maintenance by vendor with prior information to GFGNL

j. Network SLA can be monitored separately for GP network.

k. For any Gross negligence during the contract period, a sum of Rs. 10,00,000/- will be levied for each event of gross negligence and/or for each delayed week or part thereof till resolution. Event can be anything causing substantial impact on services for which the Bidder is responsible.This will be all and above the cap limit of O&M quarterly penalty.

l. The payment shall be made on quarterly basis. For the Calculation of SLA's, the GP shall be taken as Unit.

7.9.10 OFC CUT RESTORATION AND ASSOCIATED PENALTY CALCULATION

BIDDER teams will have to maintain required quantum of patrolling on field to protect GFGNL OFC Network from damage due to other organizations' activities. As per Telecom standard, number of OFC cuts per 1000 Km OFC Network per quarter must not increase 10 Nos/Quarter. If OFC cuts increase beyond 10 Nos/Quarter., then GFGNL will levy below mentioned penalties to BIDDER.

OFC cut penalty based on No of cut:

#	Number of OFC cuts per 250Km OFC Network per Quarter	Penalty to be levied to BIDDER team (Rs.)
1.	<=10 nos.	No Penalty
2.	> 10 nos. & <= 20 nos.	1,000 per each cut
3.	> 20 nos. & <= 30 nos.	2,000 per each cut
4.	> 30 nos.	3,000 per each cut

7.9.11 MTTR PENALTY

BIDDER teams will have to maintain MTTR (Mean Time to Repair) of 4 Hrs. for restoration of fibre cuts. In case, BIDDER teams are not able to maintain 4 Hrs. of MTTR, then below mentioned penalties will be levied to BIDDER.

OFC cut penalty based on Time:

Measurement	Quarterly Target for MTTR on each fibre cut restoration (Hrs)	% Penalty deducted on Qtrly Billing Amount(INR)
Mean Time To Repair (MTTR) for Fibre	up to 4 hrs	No Penalty
	≥ 4 hrs to 8 hrs	500 per additional Hrs
	≥ 8 hrs to 12 hrs	750 per additional Hrs
	≥ 12 hrs	1,000 per each delay of beyond 12Hrs

a) Maximum penalty ceiling for any particular site / location shall be equal to 20% of the total quarterly OPEX charges to be paid for respective site.
b) **Over and above maximum penalty cap limit,** Back-to-back penalties will be levied to BIDDER i.e., whatever financial penalty will be levied to GFGNL by its dark fibre leasing customer due to downtime, GFGNL will recover same penalty from BIDDER back-to-back.
c) In addition, for nontangible reputational losses to GFGNL, GFGNL will levy below mentioned penalties to BIDDER.

7.9.12 DARK FIBER READINESS AND CUSTOMER SERVICE PROVISIONING PENALTIES

i) New O&M Bidder is expected to deliver – 1) Service provisioning 2) Dark fiber readiness, in BharatNet network as per asked GFGNL's customer requirement within average 7 calendar days only.

ii) In case of the delay- for any particular case, beyond 15 calendar days purely attributed to bidder GFGNL may have rights to recover the 0.5% revenue loss per week or part thereof from it's payable if the bidder justification for the delay is not satisfactory.

iii) Due to Gross negligence by new O&M Bidder in service delivery, If GFGNL's customer order may cancel, then customer order value shall be levied as a penalty to new O&M Bidder.

iv) Bidder has to create the required facility to Deliver and maintain dark fibre like additional fibre splice joints , introduction of new chamber, fibre loops ,etc without any additional cost to GFGNL.

7.4.12 Fibre heath SLA After 100% Go-Live

i) PIA is supposed to maintain healthiness of the all fibre cores during the O&M period, PIA has to submit health report (Digitally generated OTDR/RFMS report) quarterly to GFGNL team within a first week of completing quarter. It is expected more than 80% fibre health of each section is to be under permissible loss (i.e, healthy conditions) and will be taken district as a unit to map all fiber length to GP payment.

ii) The %gap of healthy fiber will reduce GP O&M payment proportionately as withholding amount. PIA shall be given next quarter (90 days) to release this withhold amount by restoring fiber health, beyond one quarter time he won't be eligible to claim amount to GFGNL. However this does not limit GFGNL to hold payment for next quarter till the fiber health is not restored.

7.9.13 NETWORK AND SERVICE PROVISIONING

(a) The network shall enable retail, enterprise and wholesale services as per the requirement of GFGNL.

(b) PIA shall provide all necessary support and facilitation to GFGNL and designated service provisioning agencies for provisioning and monitoring of services from NOC.

(c) The PIA shall ensure service assurance and accounting for all provided services from the network.

7.9.14 PENALTY ON SPARE NON AVAILABILITY

i) For non -availability of spare quantities mentioned in this RFP document section's relevant clause, additional penalty will be invited to the bidder, and 10% of total actual invoice amount of the quarterly O&M bill will be deducted.

ii) In case any equipment is not repairable due to non-availability of the spares, PIA shall replace the supplied products with equal or upgraded/ higher version during life time of contract (10 years) at free of cost.

7.9.15 MANPOWER PENALTIES

If successful bidder does not deploy the required specified quantity & quality manpower as per tender document/RFP or a person deployed is not reporting to the duty, there would be a penalty per person per day as defined below and will be deducted from the quarterly payment without any maximum penalty cap. If the above incidence occurs two times in one year, Tenderer reserves the right to terminate the contract and no payment would be made for the services rendered in that Quarter.

Manpower penalties during the Operations Phase		
SN	**Penalty Clause**	**Penalty**
1	• Successful bidder must ensure that the number of personnel required as per Manpower clause at the various operational levels of project. • The successful bidder shall ensure that alternate arrangements are made and leave for a staff is pre-sanctioned by Tenderer. If not, the penalties described in the following column shall apply (Any deviation in qualification or in experience of the deployed manpower will be treated as non-deployment for the purpose of penalty calculation)	1. Manpower Penalty per person for Level-3 Rs. 7000/- per day, Level-2 Rs.3000 Per Day, Level-1 Rs.1000 for un-sanctioned/ non-reporting. FRT Team: Rs. 10000 per day per FRT team of unsanctioned leave or non-reporting or non-deployment.

Note:

1. Prior intimated leave of absence will be allowed: 24 days per designated post in a year.
2. If a resource preceding on leave or becoming absent is replaced with a resource approved by authority, then such substitution will not be treated as absence.
3. In exceptional cases, the tenderer may allow longer period of absence without penalty, provided prior approval is obtained.

7.9.16 EXCLUSION

For the purpose of calculating SLA, the following faults or outage hours shall be excluded.

i) Periods where the GFGNL office staff is inaccessible to confirm the status of the system after fault clearance by the Bidder.

ii) Periods where any link is switched off at GFGNL or Govt. Office due its own reasons. The onus lies on GFGNL or respective Govt. establishment to ensure that the on-site equipment is powered ON and / or the Network Monitoring tools, if any, that are used by GFGNL should be able to filter out the time period of link being voluntarily switched off from the down time calculations.

iii) Periods where the failure of any components or equipment belonging to GFGNL / Govt. office.

iv) Periods where the official ROW application submitted till the approval notes/communication received from departmental official/authority.

v) These all exclusions will be applicable only after submission of valid documentations /proof to GFGNL.

7.9.17 PROCESS TO MEASURE THE SLA AND PENALTY

All above mentioned SLAs are to be derived based on EMS alarm system.

a. Penalty calculations shall be calculated on accumulated non-compliance for all of the above SLAs.
b. Total Time shall be measured on normal office hours of Gujarat Government.
c. Any planned downtime for maintenance shall be with prior written permission from TENDERER and must be intimated to all users.
d. Any availability/uptime requirements under SLA shall be subject to standard downtime, the time lost due to any of the following reasons will not be considered while calculating the availability/ uptime requirement as per the SLA clause:
e. Time lost due to power or environmental failures;
f. Time taken to recover the system because of power or environmental failures;
g. Time taken for scheduled maintenance/ troubleshooting either for preventive purposes or improvement in function or other purposes;
h. Time taken for reconfiguration or other planned downtime situations;
i. Scheduled shutdowns as required by SDC/ tenderer.

Note:

a) The quarterly operational penalty is capped at 20% of quarterly actual invoice value for clause mentioned above . However, if such value of 20% is reached for any Two Quarters consequently during the contract period, then the TENDERER will have the right to terminate the contract.
b) In any case for GP-end network uptime is <90% in consecutive two(2) quarters then GFGNL has full rights to take serious actions against PIA. GFGNL decision will be consider as final decision on this.
c) There should be an EMS for monitoring major parameters including Input & Output Voltages, Inside & Outside Temperature, Humidity, Alarms, % battery back up time left. It should also be possible to control/switch on/off Non-Critical Loads/ Extra fans. The monitor & Control should be possible from Central NOC in real time. Delay in any alarm incident will invite the penalty. For example, for any instance on delay in alarm will be penalized with 0.2% of quarterly O&M billing amount and this will be over and above the maximum O&M cap limit of the O&M billing amount.

SECTION-8 FINANCIAL BID

FINANCIAL BID FORMAT

PACKAGE - A

S/ No.	Description of Item	UoM	Qty	Total Without Tax (INR)	Taxes as applicable C (%)	Total With Tax(INR) (%)
			(A)	(B)		
1)	One-time charges for Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of all GPs in IP-MPLS Ring architecture included in **Package A, including** OFC, Router, Mini-OLT, RFMS, UPS, FDMS, Couplers, and all other material as per the scope of work, functional and technical requirement specified in the bid document. **– Phase-I GPs**	Lumpsum	1			
2)	One-time charges for Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of all GPs in IP-MPLS Ring architecture included in **Package A, including** OFC, Router, Mini-OLT, RFMS, UPS, FDMS, Couplers, and all other material as per the scope of work, functional and technical requirement specified in the bid document. **– Phase-II GPs**	Lumpsum	1			
3)	Lastmile connectivity for Revenue Villages in **Package-A**	Lumpsum	1			
4)	Total Notional Space Consumptions (Notional Value) at total sites for 10 Years considering proposed network solution.(*Bidder has	Lumpsum	1			

S/ No.	Description of Item	UoM	Qty	Total Without Tax (INR)	Taxes as applicable C (%)	Total With Tax(INR) (%)
			(A)	(B)		
	to consider all sites part of solution in this Bid)					
	Overall Space consumption at Site = U Size *(Multiply) Rs 143/- *(Multiply) *365 days * 10 Years					
5)	Total Notional electricity power Budget Consumptions (Notional Value at full load) at total Sites end for 10 Years considering proposed network solution. (*Bidder has to consider all sites part of solution in this Bid)	Lumpsum	1			
	Overall Active devices power consumption at Site = KWH (unit per hour) *(Multiply) Rs 12/- *(Multiply) 24Hour *(Multiply) *365 days * 10 Years					
6)	Operations and Maintenance for all GPs in **Package-A** for first 5 years at maximum 5.50 % of the capex* after 100% Go-Live.	Lumpsum	1			
	*Capex is considered as sum of capex of S.No. 1,2 and notional capex of S. No.10					
7)	Operations and Maintenance for all GPs in **Package-A** for next 5 years at maximum 6.50 % of the capex* after 100% Go-Live.	Lumpsum	1			
	*Capex is considered as sum of capex of S.No. 1,2 and notional capex of S. No.10					
8)	Operations and Maintenance for all Revenue villages in **Package-A** for first 5 years at	Lumpsum	1			

S/ No.	Description of Item	UoM	Qty	Total Without Tax (INR)	Taxes as applicable C (%)	Total With Tax(INR) (%)
			(A)	(B)		
	maximum 5.50 % of the capex* after 100% Go-Live. *Capex is considered as S.No. 3					
9)	Operations and Maintenance for all Revenue villages in **Package-A** for next 5 years at maximum 6.50 % of the capex* after 100% Go-Live. *Capex is considered as S.No. 3	Lumpsum	1			
Grand Total						
10)	Notional Capex of **Package-A** for existing Phase-I and Phase-II BharatNet Network as is where is basis.			1416 Cr		

PACKAGE - B

S/ No.	Description of Item	UoM	Qty	Total Without Tax (INR)	Taxes as applicable C (%)	Total With Tax(INR) (%)
			(A)	(B)		
1)	One-time charges for Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of all GPs in IP-MPLS Ring architecture included in **Package B, including** OFC, Router, Mini-OLT, RFMS, UPS, FDMS, Couplers, and all other material as per the scope of work, functional and technical requirement specified in the bid document. **– Phase-I GPs**	Lumpsum	1			
2)		Lumpsum	1			

	One-time charges for Survey, Planning, Supply, Installation, end to end integration, testing and commissioning of all GPs in IP-MPLS Ring architecture included in **Package B, including** OFC, Router, Mini-OLT, RFMS, UPS, FDMS, Couplers, and all other material as per the scope of work, functional and technical requirement specified in the bid document. **– Phase-II GPs**					
3)	Lastmile connectivity for Revenue Villages in **Package-B**	Lumpsum	1			
4)	Total Notional Space Consumptions (Notional Value) at total sites for 10 Years considering proposed network solution.(*Bidder has to consider all sites part of solution in this Bid) **Overall Space consumption at Site** = U Size *(Multiply) Rs 143/- *(Multiply) *365 days * 10 Years	Lumpsum	1			
5)	Total Notional electricity power Budget Consumptions (Notional Value at full load) at total Sites end for 10 Years considering proposed network solution. (*Bidder has to consider all sites part of solution in this Bid) **Overall Active devices power consumption at Site** = KWH (unit per hour) *(Multiply) Rs 12/- *(Multiply) 24Hour *(Multiply) *365 days * 10 Years	Lumpsum	1			
6)	Operations and Maintenance for all GPs in **Package-B** for first 5 years at maximum 5.50 % of the capex* after 100% Go-Live.	Lumpsum	1			

	*Capex is considered as sum of capex of S.No. 1,2 and notional capex of S. No.10					
7)	Operations and Maintenance for all GPs in **Package-B** for next 5 years at maximum 6.50 % of the capex* after 100% Go-Live. *Capex is considered as sum of capex of S.No. 1,2 and notional capex of S. No.10	Lumpsum	1			
8)	Operations and Maintenance for all Revenue villages in **Package-B** for first 5 years at maximum 5.50 % of the capex* after 100% Go-Live. *Capex is considered as S.No. 3	Lumpsum	1			
9)	Operations and Maintenance for all Revenue villages in **Package-B** for next 5 years at maximum 6.50 % of the capex* after 100% Go-Live. *Capex is considered as S.No. 3	Lumpsum	1			
Grand Total						
10)	Notional Capex of **Package-B** for existing Phase-I and Phase-II BharatNet Network as is where is basis.			1415 Cr		

Instructions to fill the Financial Bid:

1. Prices in Financial Bid should be quoted in the provided format. All prices should be quoted in Indian Rupees and indicated both in figures and words. Price in words shall prevail, in the event of any mismatch.
2. Bidder should provide all prices as per the prescribed format under this Annexure. Bidder should not leave any field blank.
3. All the prices are to be entered in Indian Rupees ONLY (%age values are not allowed)
4. Tenderer reserves the right to ask the Bidder to submit proof of payment against any of the taxes, duties, levies indicated.

5. Tenderer shall take into account that all Taxes, Duties & Levies shall be paid as per actual.
6. For the purpose of evaluation of Financial Bids the Tenderer shall make appropriate assumptions to arrive at a common bid price for all the Bidders. This however shall have no co-relation with the Contract value or actual payment to be made to the Bidder. The soft copy of the financial bid should be in excel format to be uploaded online.
7. During the initial installation phase, post go-live of an individual GP upto the overall go-live for all the GPs within a package, the O&M paid to the PIA up to the overall go-live will be limited to 50% for 3 months on the O&M rate of first five years to individual GPs. The apportionment to individual GPs will be calculated as – Year 1 O&M for respective package / number of GPs in the respective package.

PIA:

Signature ----------

Name ----------

Designation ----------

Company Seal ----------

#: Quantity is notational and for calculation purpose. Actual order will be placed separately.

*: Separate work order will be placed as and when required.

Note:

I. The Total amount of the "Grand Total (D)" shall be evaluated for financial bid.

II. The Operation Cost for O&M of 10 years (i.e., O&M contract duration) covering existing and new BharatNet network should not be greater than 60% of total Bid value.

III. The O&M for 10 years will be distributed as 45% in initial 5 years and 55% in next 5 years quarterly installment.

   a. For Example, Any GP after 100% go-live, come in O&M phase will be charged with Rs 100/-, which will be distributed for entire contract duration as per below.

GP Rate	For Initial Five Years	Next Five Years
Rs 100/- For 10 Years	Rs 9/- for each Year	Rs 11 for each year

IV. Any components , services, which is discontinued or putting hardstop/standby the proportionate amount of this components will be reduce from OPEX value.

V. In case, if any other type of electronics equipment (to be installed at centralized as well as field locations) will be procured for this Network in future through separate tender, the PIAs of respective packages will be responsible to perform O&M of these devices. For this, 1% of centralized equipment cost and 2% of field equipment cost will be paid to respective PIAs per annum as O&M charges. This clause will apply only in case of equipment procured and set up in uplink layer above GP Router including revenue village level. For horizontal connectivity at village level or from GP Router or revenue village level, this clause will not apply.

VI. The Items mentioned above is notational and for calculation purpose. However, the Tenderer may reduce or ask for additional quantity as per it's actual requirements. The proportionate cost will be considered as per requirement. Tenderer may derive per unit cost on pro-rata basis for it's requirements. Payment shall be disbursed accordingly.

VII. The above quoted applicable rates shall be valid for entire contract duration or any subsequent extensions.

VIII. Above charges should be inclusive of all applicable taxes & GST.

IX. The bidder should submit authorization certificate of Original Equipment Manufacturer (OEM) specific to OS, Database, other software requirement for running the solution etc. being supplied under this project. The bidder should have a back- to-back support agreement/arrangement for OS, Database, other mandatory software/hardware requirement of the solution, for services including upgrades, updates, patches, any other support requirements etc. with the OEMs of products which includes the post-sales support activities for the entire project period.

X. The above-mentioned GP scope and quantities are notional value, payment will be given based on the actual feasibility and execution of the work. However, GFGNL/DST will have the rights to assign the scope for execution for additional revenue villages/ GP / TC/DC under the same rate on BOQ basis during the entire contract duration.

8.1 Rights to Vary Quantities:

i. GFGNL on behalf of USOF, DoT will have the right to increase or decrease up to 25% of the overall quantity of works in any packages specified in the schedule of requirements, without any change in the unit price at the time of time of award of the contract or during the contract period

ii. Additional quantities up to 50% of works contained in the running tender/ contract can be ordered during the contract execution stage or within a period of twelve months (earliest one)from date of commissioning of 90% of GPs (and 100% blocks) at the same rate or a rate negotiated (downwardly) with the existing contractors considering the reasonability of rates based on prevailing market conditions and the impact of reduction in taxes and material/services to be obtained within time period scheduled afresh.

iii. In exceptional situation where the requirement is of an emergent nature and it is necessary to ensure continued works from the existing contractors, GFGNL reserves the right to place repeat order up to 100% of the quantities of material/ services contained in the running tender/ contract during the contract execution stage or within a period of twelve months from the date of completion of project at the same rate or a rate negotiated (downwardly) with the existing contractors considering the reasonability of rates based on prevailing market conditions and the impact of reduction in duties and taxes etc.

iv. GFGNL will have full power to accord internal approval to procure any equipment/material in any quantity by any means in the exigencies of services and interest of GFGNL.

v. The Work Orders shall be issued for the quantities finalized through surveys, approved by GFGNL. The Work Order quantities shall not be related to Advance Work Order quantities in any manner. The Quantity variation clauses stated above shall be applicable on the basis of total of quantities mentioned in all the Work Orders issued in a package based on actual quantities as per survey.

vi. The Tenderer may at any time, by a written order given to the Bidder, make changes to the

scope of the Contract as specified.

vii. Change in scope means only addition of a new gram panchayat. Any variation in path for fibre lying or consequent change in route kilometre or change in GPON equipment set up will not be considered as change in scope – this being the EPC contract. Similarly changes in trenching / ducting / extra protection deliverables due to terrain; delays or route changes due to ROW challenges; or other reasons will not be considered as change in scope.

viii. In the case of increase or decrease in the number of GPs, payment would be done at per GP derived cost as mentioned below.

Per GP derived cost=(Total Package Cost)/(Total no.of GPs in that package)

SECTION-9 ANNEXURES & FORMATS

9.1 Format I (Covering Letter)

Proposal Covering Letter

(To be on the Bidder's letterhead duly Signed by Authorized Signatory)

Tender Ref No:

To
GM (----------)
Gujarat Fibre Grid Network Limited.
Block No: 6, 5th Floor, Udyog Bhavan, Sector-11, Gandhinagar 382010

Ref: RFP for selection of Service Provider for providing ---------- for a period of ------- Years

Dear Sir,

We …… (Name of the bidder) hereby submit our proposal in response to notice inviting tender document no. xxxxxxxxxx Dated: xx.xx.xxxx and confirm that:

1. All information provided in this proposal and in the attachments, is true and correct to the best of our knowledge and belief.
2. We shall make available any additional information if required to verify the correctness of the above statement.
3. Certified that the period of validity of bids is 180 days from the last date of submission of proposal, and
4. We are quoting for all the items (including services) as per the price bid format as mentioned in the RFP.
5. We the Bidder are not under a declaration of Ineligibility for corrupt or fraudulent practices or blacklisted by any of the Government agencies.
6. We have an office in the state and relevant documents for the same are attached. We undertake that if the local presence is not there in the state, that we shall establish an office at Gandhinagar/ Ahmedabad, within 45 days from the date of the award of contract.
7. Gujarat Fibre Grid Network Limited (GFGNL) may contact the following person for further Information regarding this tender:

a. Name & Designation:
b. Full address of office
c. Email ID & Contact No.

8. We are uploading our Response to the RFP (Eligibility, technical and financial bid documents) as per the instructions set out in this RFP.

Yours Sincerely,

(Signature)

Name of Authorized Signatory: Designation:
Date:
Name of the bidder:

[SIGN OF BIDDER]

9.2 Format II (Power Of Attorney)

Format for Power of Attorney

(To be provided in original on stamp paper of value required under law duly Signed by 'bidder'**)** Dated:

POWER OF ATTORNEY

To Whomsoever It May Concern

Know all men by these presents, we (name and registered office address of the Bidder) do hereby constitute, appoint and authorize (Name of the Person(s)), domiciled at _____ Mr./Ms./Mrs.

_____

(Address), acting as_____(Designation and the name of the firm), as Authorized Signatory and whose Signature is attested below, as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our Proposal for award of Contract "RFP for selection of Service Provider for providing ———————————————— for a period of ———— Years" , vide RFP (Tender Document) Document No._____dated _____ , issued by Gujarat Fibre Grid Network Limited (GFGNL), including Signing and submission of all documents and providing information and responses to clarifications / enquiries etc. as may be required by Gujarat Fibre Grid Network Limited (GFGNL) or any governmental authority, representing us in all matters before Gujarat Fibre Grid Network Limited (GFGNL), and generally dealing with GFGNL in all matters in connection with our Proposal for the said Project. We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

For .....
(Signature)
(Name, Title and Address)
Accept (Attested Signature of Mr./Ms./Mrs._____
(Name, Title and Address of the Attorney)

Notes: To be executed by the Bidder - The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure. - Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a resolution / power of attorney in favour of the Person executing this Power of Attorney for the delegation of power hereunder on behalf of the executants(s).

9.3 Format III (EMD)

Bank Guarantee format for Earnest Money Deposit

To Dated:

GM (----------)
Gujarat Fibre Grid Network Limited
Block No: 6, 5th Floor, Udyog Bhavan, Sector-11,
Gandhinagar 382010

Whereas ---------- (here in after called "the Bidder") has submitted its bid dated ---------- in response to the Tender no: xxxxxxxxxxxxxxxxxx for _____ KNOW ALL MEN by these presents that WEhaving our registered office at (hereinafter called "the Bank") are bound unto the_____, Gujarat Fibre Grid Network Limited in the sum of for which payment well and truly to be made to Gujarat Fibre Grid Network Limited (GFGNL) , the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this ---------- -----day of --2025.

THE CONDITIONS of this obligation are:

The EMD may be forfeited, In case of a Bidder if:

1) The bidder withdraws its bid during the period of bid validity.
    a. The Bidder does not respond to requests for clarification of their Bid.
    b. The Bidder fails to co-operate in the Bid evaluation process.
    c. The bidder, fails to furnish Performance Bank Guarantee in time.
2) The bidder fails to Sign the contract in accordance with this RFP
3) The bidder is found to be involved in fraudulent and corrupt practices

We undertake to pay to the GFGNL up to the above amount upon receipt of its first written demand, without GFGNL having to substantiate its demand, provided that in its demand GFGNL will specify that the amount claimed by it is due to it owing to the occurrence of any of the above-mentioned conditions, specifying the occurred condition or conditions.

This guarantee will remain valid up to 6 months from the last date of bid submission. The Bank undertakes not to revoke this guarantee during its currency without previous consent of the GFGNL and further agrees that the guarantee herein contained shall continue to be enforceable till the GFGNL discharges this guarantee The

Bank shall not be released of its obligations under these presents by any exercise by the GFGNL of its liability with reference to the matters aforesaid or any of them or by reason or any other acts of omission or commission on the part of the GFGNL or any other indulgence shown by the GFGNL or by any other matter or things.

The Bank also agree that the GFGNL at its option shall be entitled to enforce this Guarantee against the Bank as a Principal Debtor, in the first instance without proceeding against the SELLER and not withstanding any security or other guarantee that the TENDERER may

have in relation to the SELLER's liabilities.
Dated at_____on this_____day of_____2025. Signed and delivered by

For & on Behalf of
Name of the Bank & Branch & Its official Address with seal

Approved Bank: All Nationalized Bank including the public sector bank or Private Sector Banks or Commercial Banks or Co-Operative & Rural Banks (operating in India having branch at Ahmedabad/ Gandhinagar) as per the G.R. no. EMD/10/2020/42/DMO dated 19.10.2020 issued by Finance Department or further instruction issued by Finance department time to time.

9.4 Format IV (PBG)

PERFORMANCE BANK GUARANTEE

(To be stamped in accordance with Stamp Act)

Ref: Bank Guarantee No.

Date:

To,

GM (----------)

Gujarat Fibre Grid Network Limited

Block No: 6, 5th Floor, Udyog Bhavan, Sector-11, Gandhinagar 382010

Dear Sir,

WHEREAS..... (Name of Bidder) hereinafter called "the Bidder" has undertaken, in pursuance of Agreement dated, (hereinafter referred to as "the Agreement for "RFP for selection of Service Provider for providing ---------- for a period of ------ Years ***(Tender No. xxxxxxxxxxxxxxxx Dated: xx.xx.xxxx)*** for the Department of Science & Technology, Government of Gujarat.

AND WHEREAS it has been stipulated in the said Agreement that the Bidder shall furnish a Bank Guarantee ("the Guarantee") from a scheduled bank for the sum specified therein as security for implementing PROJECT.

1. WHEREAS we____("the Bank", which expression shall be deemed to include it successors and permitted as Signs) have agreed to give the Gujarat Fibre Grid Network Limited ("GFGNL") the Guarantee:

THEREFORE, the Bank hereby agrees and affirms as follows:

The Bank hereby irrevocably and unconditionally guarantees the payment of all sums due and payable by the Bidder to GFGNL under the terms of their Agreement dated_____.

Provided, however, that the maximum liability of the Bank towards GFGNL under this Guarantee shall not, under any circumstances, exceed

_____ in aggregate.

2. In pursuance of this Guarantee, the Bank shall, immediately upon the receipt of a written notice from GFGNL in that behalf and without delay/demur or set off, pay to GFGNL any and all sums demanded by GFGNL under the said demand notice, subject to the maximum limits specified in Clause 1 above. A notice from GFGNL to the Bank shall be sent by Registered Post (Acknowledgement Due) at the following address:

_____

_____

_____

Attention Mr._____.

3. This Guarantee shall come into effect immediately upon execution and shall remain in force for a period of months from the date of its execution. The Bank shall extend the Guarantee for a further period which may be mutually decided by the bidder and GFGNL.

The liability of the Bank under the terms of this Guarantee shall not, in any manner whatsoever, be modified, discharged, or otherwise affected by:

- Any change or amendment to the terms and conditions of the Contract or the execution of any further Agreements.
- Any breach or non-compliance by the Bidder with any of the terms and conditions of any Agreements/credit arrangement, present or Future, between Bidder and the Bank.

4. The BANK also agrees that GFGNL at its option shall be entitled to enforce this Guarantee against the Bank as a Principal Debtor, in the first instance without proceeding against the BIDDER and not withstanding any security or other guarantee that GFGNL may have in relation to the Bidder's liabilities.

5. The BANK shall not be released of its obligations under these presents by reason of any act of omission or commission on the part of GFGNL or any other indulgence shown by GFGNL or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the BANK.

6. This Guarantee shall be governed by the laws of India and the courts of Gandhinagar shall have jurisdiction in the adjudication of any dispute which may arise hereunder.

Dated this ……. Day of..... ,2025

Witness

(Signature)
(Name)
(Name)
(Official Address)
Plus Attorney as per Power of Attorney No.
Dated:

(Signature)
Bank Rubber Stamp

Designation with Bank Stamp

Approved Bank: All Nationalized Bank including the public sector bank or Private Sector Banks or Commercial Banks or Co-Operative & Rural Banks (operating in India having branch at Ahmedabad/ Gandhinagar) as per the G.R. no. EMD/10/2020/42/DMO dated 19.10.2020 issued by Finance Department or further instruction issued by Finance department time to time.

9.5 Format V

Earnest Money Deposit Details

Sr. No.	Item	Amount (In Rs.)	Name of the Bank & Branch	Demand Draft No.
1	Earnest Money Deposit (E.M.D.)			

Eligibility Criteria

Form No. A: Company Registration

Sr. No.	Name of Bidder	Certificate of Incorporation	Document Submitted or Not?
1			

Note: Please fill this form and upload the supporting documents.

Form No. B: Office in GUJARAT

Sr. No.	Address	Contact Person	Contact Nos.	Type of supporting document attached
1				

Note: You may mention more than one office (if applicable) by adding multiple rows which may be added by "NUMBER OF ROWS TO ADD".

Form No. C: Work Experience

Sr. No.	Project	Project Details	Period of Contract	Contact details of client	Type of supporting document attached
1					

Note: You may mention more than one project by adding multiple rows which may be added by "NUMBER OF ROWS TO ADD".

Financial Details of the Bidder

Turnover (INR: In Lakh)		
2020 – 21	2021 – 22	2022-23

Note:
1. Submit the audited financial statement/ audited annual report of the above-mentioned financial years.

Name:
Designation:
Signature of the Authorized Signatory (with seal):

9.6 Format VI(Performa of compliance)

Performa of Compliance Letter

(Submit copy on Bidder's letterhead duly signed by Authorized signatory)

Date : *dd /mm /yyyy*

To,
GM (----------)
Gujarat Fibre Grid Network Limited
Block No: 6, 5th Floor, Udyog Bhavan, Sector-11, Gandhinagar 382010

Sub. : Compliance with the tender terms and conditions, specifications and Eligibility Criteria.

Dear Sir,

With reference to above referred tender, I, undersigned <<Name of Signatory>>, in the capacity of
<<*Designation of Signatory*>>, is authorized to give the undertaking on behalf of <<*Name of the bidder*>>. We have to inform you that we have read and understood the technical specifications and total requirements of the above-mentioned bid submitted by us on <<*Date*>>. We hereby confirm that all our quoted items meet or exceed the requirements and are absolutely compliant with specifications mentioned in the bid document.

We also explicitly understand that all quoted items meet technical specifications of the bid and that such technical specifications override the brochures/standard literature if the same contradict or not indicated in brochures.

We are not banned or blacklisted by any Government institution of India.

In case of breach of any of the terms and conditions of the tender or deviation from bid specifications other than already specified as mentioned above, the decision of GFGNL Tender Committee for disqualification will be final and accepted by us.

Thanking you,

For <Name of the bidder>>
<<Authorized Signatory>>
<<Stamp of the bidder>>

9.7 Format VII(Not Banned/Blacklisted/Debarred)

Declaration Letter

Physical submission on Company's letter head.

FORMAT OF UNDERTAKING for Non-Blacklisting of the Bidder
(whole revised format as per Amendment No. 7)

(to be provided on Non – judicial stamp paper of INR 100/- or such equivalent amount and duly attested by notary public)

Place: Date:

To,
_____
_____

Ref: Tender No. ____ issued on ____.
Subject: Declaration Letter for Non-Blacklisting of the Bidder. Sir/Madam,

We, the undersigned, hereby declare that we are not blacklisted/ debarred with Ministry of Communication or GFGNL or debarring order issued by Department of Expenditure (DOE), Ministry of Finance (MOF) covering all central Ministries/ Departments as per provision of OM No.F.1/20/2018-PPD by Department of Expenditure (DoE), MoF dated on 2nd Nov 2021, as on Bid submission date.

For and on behalf of Signature:
(Authorized Signatory) Name of the person: Designation:
Name of the Respondent:
Address of the Respondent: Company seal:

9.8 Format VIII(Land Border)

On letterhead of Bidder/ESP/OEM

Undertaking as per guidelines published by Ministry of Finance, Dept. of Expenditure, Public Procurement division dated 23.07.2020

Mr. undersigned authorized representative of M/s <<*Name of Bidder/ESP/OEM*>> has read clause regarding restriction on procurement from a bidder of a country which shares a land border with India; I certify that <<Name of Bidder/ESP/OEM>> is not from such a country or, if from such a country, has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I hereby certify that <<Name of Bidder/ESP/OEM>> fulfills all requirements in this regard and eligible to be considered. [Where applicable, evidence of valid registration by Competent Authority shall be attached.]

If given information is found to be false, this would be ground for immediate termination and further legal action in accordance with law.

(Signature)

Authorized representative of <<Name of Bidder/ESP/OEM>>

9.9 Format IX(MAF)

Format of MAF/OEM Authorization

AUTHORIZATION CERTIFICATE FROM OEM

Details of Manufacturer Authorization Form (MAF)

The Bidder should submit valid letter (MAF) with undertaking from their OEM(s) whose product is being quoted by the bidder, as per format given below:

Manufacturer Authorization Form

To,
……..,
……..,
……
Subject: Manufacturer Authorizations Letter for Tender Enquiry No. ……

Sir,
We, <OEM Name> having our registered office at <OEM address>, hereinafter referred to as OEM are an established manufacturer of the following items quoted by <Bidder Name> having their registered office at <Bidder address>, hereinafter referred to as Bidder:
<name of items>…
……

We <OEM Name> authorize <Bidder's name> to quote our above-mentioned item(s) for above mentioned tender.

We confirm that we have understood the delivery & installation timelines defined in the tender. We confirm that we have worked out all necessary logistics and pricing agreement with <bidder>, and there won't be any delay in delivery, installation and support from our side. Our full support as per pre-purchased support contract is extended/ applicable in all respects for supply, warranty and maintenance of our products. We also ensure to provide the required spares and service support as pre-purchased for the supplied equipment for a period of 10 years (includes 3 years implementation) from date of supply of the equipment as per tender terms. In case, the PMA (GFGNL on behalf USOF/ DoT) requires to extend the period of contract with PIA beyond 10 years, we, as OEM, also undertake to provide support for this extended period also, in case, the supplied product is supported anywhere globally.

In case of any difficulties in logging complaint at bidder end, user shall have option to log complaint at our call support centre.

In case PIA is unable to fulfil the obligations given under this tender, OEM shall be responsible to complete its obligations towards project with any other PIA appointed by the purchaser.

In case it is required to change authorized agent of OEM, the OEM shall ensure that the alternate Authorized Agent in this case shall abide by all the terms & conditions laid down under the tender/ Contract with the bidder for the quoted OEM products.

In case of PIA exits from the Project for any reason, including but not limited to default, insolvency, termination of its Agreement with the purchaser, or other circumstances resulting in the inability of PIA to fulfill its obligations under the Agreement, OEM shall be obligated to continue providing the services to purchaser in accordance with the terms and conditions outlined in the agreement, between OEM and the bidder including commercials.

We also agree that in case of any default by us in meeting out the obligations as mentioned above, purchaser may debar us for a period upto 3 years.

If any product is declared end of sale, we shall proactively ensure that a suitable equivalent or

higher roll over product is offered through the PIA to GFGNL for due approval, contract and order executions thereafter.

We understand that any false information/ commitment provided here may result in <OEM's Name> getting blacklisted/debarred from doing business with GFGNL.

We <OEM Name>, hereby provide this undertaking with regard to the Agreement executed between <Name of bidder> and <OEM Name> during the submission of the Bid for <Project Name>

Thanking You

For <OEM/ Manufacturer name>

< (Authorized Signatory of OEM)>

Name: Designation: Contact Details:
Seal of the Company NOTE:
1. The letter should be submitted on the letter head of the manufacturer / OEM and should be
counter-signed by the authorized signatory of the bidder.
2. Any deviation would lead to summarily rejection of bids.

9.10 Format X(Affidavit)

Affidavit Format

(This should be on Rs. 300/- duly notarized Non-Judicial Stamp Paper)

I, _____<<Name of the bidder>> on behalf of <<Bidder's Company Name>> herewith confirm that <<Bidder's Company Name>> has ---- nos. of employees on company's payroll of specific domain asked under this RFP, which are working for the past one year.

Whatever stated above is true and correct to the best of my knowledge and belief.

Signed & Sealed by an authorized Signatory.

[SIGN OF BIDDER]

9.10.1 ANNEXURE TO BID FORM

#	Member of consortium	Total Average Annual Turnover (in Rs Crores)	Turnover to be considered for this package. (in Rs Crores)	Technical experience regarding EPC OFC Network Construction		Technical experience regarding O&M of OFC network		Technical experience regarding Telecommunication equipment installation and commissioning	
				Total experience (in Kms)	Experience to be considered for this package (in Kms)	Total experience (in "Year Kms)	Experience to be considered for this package (in Year Kms)	Total experience (No. of Active Nodes)	Experience to be considered for this package (No. of Active Nodes)
A	B	C	D	E	F	G	H	I	J
1	Lead bidder								
2	Consortium								
	TOTAL								

We undertake that we will abide by the above submissions, especially the figures of experience and turnover to be considered and consumed against this package (<Package Serial No.>) from the total experience & turnover possessed by each of us and shall not represent against disqualification arising in any further package(s) due to shortfall of experience and/ or turnover due to consumption of the same in this package.

Signature (Authorized signatory)

Lead Member

Signature (Authorized signatory)

Consortium Partner - X

Signature (Authorized

Consortium Partner -Y

NOTE: Bidders possessing the minimum requisite average annual turnover & technical experience for participation in all the 16 packages, may fill only the total average annual turnover & technical experience figures I.E. Columns- C, E, G & I, only.

[SIGN OF BIDDER]

9.11 Format-XI (EMD)

BID SECURITY/ EMD Guarantee

(To be typed on Rs.100/- non-judicial stamp paper)

Sub: Bid Security/EMD guarantee.

Whereas M/s……..……R/o…….…… ……. (Hereafter referred to as Bidder) has approached us for giving Bank Guarantee of Rs /- (hereafter known as the "B.G. Amount") valid up to …../……/ 20….. (hereafter known as the "Validity date") in favour of "Gujarat Fibre Grid Network Limited" for participation in the tender of work of vide tender no. .....

Now at the request of the Bidder, We..... …..Bank

…….Branch having ……. ……..

……. (Address) and Regd. office address as……

....

…… (Hereinafter called 'the Bank") agrees to give this guarantee as hereinafter contained:

2. We the Bank do hereby undertake to pay the amounts due and payable under this guarantee

without any demur, merely on a demand from GFGNL stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by GFGNL by reason of breach by the said bidder(s) of any of terms or conditions contained in the said Agreement or by reason of the bidder (s) failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee where the decision of GFGNL in these counts shall be final and binding on the bank. However, our liability under this guarantee shall be restricted to an amount not exceeding the "B. G. Amount".

3. We undertake to pay to GFGNL any money so demanded notwithstanding any dispute or disputes raised by the bidder(s) in any suit or proceeding before any court or tribunal relating thereto our liability under this present being absolute and unequivocal. The Payment so made by us under this bond shall be valid discharge of our liability for payment there under and the bidder(s) shall have no claim against us for making such payment.

4. We the Bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of GFGNL under or

by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till GFGNL Certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said bidder(s) and accordingly discharge this guarantee. Unless a demand or claim under this guarantee is made on us in writing or before the expiry of Validity date from the date hereof, we shall be discharged from all liability under this guarantee thereafter.

5. We the Bank further agree with GFGNL that GFGNL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said bidder(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by GFGNL against the said bidder(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Bidder(s) or for any forbearance, act or omission on the part of GFGNL or any indulgence by GFGNL to the said bidder(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. Notwithstanding anything herein contained ;

(a) The liability of the Bank under this guarantee is restricted to the "B. G. Amount" and it will remain in force up to its Validity date specified above.

(b) The guarantee shall stand completely discharged and all rights of GFGNL under this Guarantee shall be extinguished if no claim or demand is made on us in writing on or before its validity date.

7. In case GFGNL demands for any money under this bank guarantee, the same shall be paid through banker's Cheque in favour of "AO (Cash) GFGNL CO" payable at New Delhi.

8. The Bank guarantees that the below mentioned officer who have signed it on behalf of the Bank have authority to give this guarantee under its delegated power.

Place:.....

Date: ……..(Signature of the Bank Officer) Rubber stamp of the bank)

Authorized Power of Attorney Number: …….

Name of the Bank officer: ……..

Designation:

..... Complete Postal

address of Bank: …… Telephone

Numbers ……...

Fax numbers.....

9.12 Format-XII(ISB)

BID SECURITY IN FORM OF INSURANCE SURETY BOND

(To be submitted on non-judicial stamp paper of appropriate value)

Insurance Surety Bond for Bid Security

Whereas M/s ..... R/o .... (Hereafter referred to as Principal) has approached us for giving a Surety of Rs. ……/- (hereafter known as the "Surety Amount") valid up to …../……/ 20….. (hereafter known as the "Validity date") in favour of …….(e.g. "Gujarat Fibre Grid Network Limited")(Hereafter referred to as GFGNL) for participation in the tender of work of…….. vide tender no.....

Now at the request of the Principal, We ..... Insurance Company Limited,registered under the Insurance Act, 1938, with its Corporate office, ……..and Registered/Head Office ..... (the "Surety") to transact the business of Surety Insurance under the powers conferred under Section 14 (2) (i) of IRDA Act, 1999 & IRDA Guidelines issuedvide IRDAI/NL/GDL/SIC/01/01/2022 3rd January, 2022, agreed to give this Surety Bond by way of performance guarantee as hereinafter contained:

2. We, the Surety, do hereby undertake to pay the amounts due and payable under this Surety without any demur, merely on a demand from the GFGNL stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the GFGNL by reason of breach by the said Principal of any of terms or conditions contained in the said tender Agreement or by reason of the Principal's failure to honour its bid submitted to perform the said works. Any such demand made on the Surety shall be conclusive as regards the amount due and payable by the Surety under this Surety where the decision of the GFGNL in these counts shall be final and binding on the Surety. However, our liability under this Surety shall be restricted to an amount not exceeding the "Surety Amount".

3. We, the Surety, undertake to pay to the GFGNL any money so demanded notwithstanding any dispute or disputes raised by the Principal in any suit or proceeding before any court or tribunal relating thereto our liability under this present being absolute and unequivocal. The Payment so made by us under this bond shall be valid discharge of our liability for payment there under and the Principal shall have no claim against us for making such payment.

4. We the Surety, further agree that the Surety herein contained shall remain in full

force and effect during the period that would be taken for the performance of the said tender agreement and that it shall continue to be enforceable till all the dues of the GFGNL under or by virtue of the said tender Agreement have been fully paid and its claims satisfied or discharged or till GFGNL Certifies that the terms and conditions of the said tender Agreement have been fully and properly carried out by the said Principal and accordingly discharge this Surety. Unless a demand or claim under this Surety is made on us in writing or before the expiry of Validity date from the date hereof, we shall be discharged from all liability under this Surety thereafter.

5. We the Surety further agree with the GFGNL that the GFGNL shall have the fullest liberty, without our consent and without affecting in any manner our obligations hereunder, to vary any of the terms and conditions of the said tender Agreement or to extend time of performance by the said Principal from time to time or to postpone for any time or from time to time, any of the powers exercisable by the GFGNL against the said Principal and to forbear or enforce any of the terms and conditions relating to the said tender agreement
and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Principal or for any forbearance, act or omission on the part of the GFGNL or any indulgence by the GFGNL to the said Principal or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. Notwithstanding anything herein contained:
   (a) The liability of the Surety under this Surety bond is restricted to the "Surety Amount" and it will remain in force up to its Validity date specified above.
   (b) The Surety shall stand completely discharged and all rights of the GFGNL under this Surety shall be extinguished if no claim or demand is made on us in writing on or before its validity date.

7. In case GFGNL demands for any money under this Surety Bond, the same shall be paid through Banker's Cheque in favour of "AO (Cash) "Gujarat Fibre Grid Network Limited" " payable at New Delhi or by any other mode such as NEFT/RTGS, etc., as indicated by GFGNL in its demand letter.

8. The Surety declares that the below mentioned officer who have signed it on behalf of the Surety, have authority to give this Surety under its delegated power.

Place: .....

Date: ……..(Signature of the Insurance Company Officer)
Rubber stamp of the Insurance Company

Authorized Power of Attorney Number: ……..
Name of the officer: ……
Designation: ……
Official Email ID:……

Complete Postal address of Insurance Company: ……..
Telephone Numbers ……..
Fax numbers ……

Name, Address, Contact number and official Email ID of the Controlling Office of the Surety Issuing Branch or any web portal link, from whom / where the Surety Bond can be got confirmed by GFGNL.

.....
.....
.....
.....

9.13 Format-XIII (PBG)

In consideration of the "Gujarat Fibre Grid Network Limited" (hereinafter called 'GFGNL') having agreed to exempt (hereinafter called 'the said contractor(s)') from the demand under the terms and conditions of an agreement/Advance Purchase Order No…….
dated…… made between …….. and ……
……..for
……. the supply of …….(hereinafter called "the said agreement "), of security deposit for the due fulfilment by the said contractor (s) of the terms and conditions contained in the said Agreement, on production of the bank guarantee for
…….we, (name of the bank)
……(hereinafter refer to as "the bank") at the request of (contractor (s)) do hereby undertake to pay to GFGNL an amount not exceeding against any loss or damage caused to or suffered or would be caused to or suffered by GFGNL by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

2. We (name of the bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demure, merely on a demand from GFGNL by reason of breach by the said contractor(s)' of any of the terms or conditions contained in the said Agreement or by reason of the contractors(s)' failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee where the decision of GFGNL in these counts shall be final and binding on the bank. However, our liability under this guarantee shall be restricted to an amount not exceeding .

3. We undertake to pay to GFGNL any money so demanded notwithstanding any dispute or disputes raised by the contractor(s)/supplier(s) in any suit or proceeding pending before any court or tribunal relating thereto our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be valid discharge of our

liability for payment there under and the contractor(s)/supplier(s) shall have no claim against us for making such payment.

4. We(name of the bank)further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of GFGNL under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till (office/ Department)

GFGNL certifies that the terms and conditions of the said Agreement have been fully or properly carried out by the said contractor(s) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the expiry of Two YEARS (as specified in P.O) from the date hereof, we shall be discharged from all liabilities under this guarantee thereafter.

5. We (name of the bank) further agree with GFGNL that GFGNL shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by GFGNL against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act or omission on the part of GFGNL or any indulgence by GFGNL to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s)/ supplier(s).

7. We (name of the bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of GFGNL in writing.

Place Date

(Signature of the Bank Officer) …….. Rubber stamp of the bank:……. Authorized Power of Attorney Number:…….. Name of the Bank officer:…….. Designation:…… Complete Postal address of Bank:……. Telephone Numbers…….. Fax numbers……..

9.14 Format-XIV PG Surety Bond

(To be submitted on non-judicial stamp paper of appropriate value)

To ,
……
GFGNL,
……

Surety Bond No :

Surety Bond Issue dt :
Surety Bond Amt. :INR…….. Bond : .....

Valid upto
Bond Claim Period :.....

Dear Sir / Madam,

Whereas ……(e.g. Gujarat Fibre Grid Network Ltd)(hereafter referred to as GFGNL) has issued an APO/AWO no. ……..Dated……awarding the work of …… …… (the "Agreement")to M/s……., R/o…… (hereafter referred to as "Principal") and GFGNL has asked Principal to submit a performance guarantee in favour of …… (e.g. Gujarat Fibre Grid Network Ltd) of INR …… (hereafter referred to as "Bond Amount") valid up to dd.mm.yyyy(hereafter referred to as "Validity Date")

Now at the request of the Principal, We..... Insurance Company Limited,registered under the Insurance Act, 1938, withits Corporate office,…….and Registered/Head Office …… (the "Surety")to transact the business of Surety Insurance under the powers conferred under Section 14 (2)
(i) of IRDA Act, 1999 & IRDA Guidelines issuedvide IRDAI/NL/GDL/SIC/01/01/2022 3rd January, 2022, agreed to give this Surety Bond by way of performance guarantee as hereinafter contained:

2. The Surety do hereby undertake and assure to the GFGNL that, if in opinion of GFGNL the Principal in any way fails to observe or perform the terms and conditions of the Agreement or commits any breach of its obligations there-under, the Surety shall on demand and without any objection or demur pay to the GFGNL such sum or sums up to an aggregate sum of the Bond Amount or such lesser amount as GFGNL may demand without requiring GFGNL to have recourse to any legal remedy that may be available to it to compel the Surety to pay the same.

3. Any such demand from the GFGNL shall be conclusive as regards the liability of Principal to pay to GFGNL or as regards the amount payable by the Surety under this Surety Bond. The Surety shall not be entitled to withhold payment on the ground that the Principal

had disputed its liability to pay or has disputed the quantum of the amount or that any arbitration proceeding or legal proceeding is pending between Principal and GFGNL regarding the claim.

4. The liability of the Surety under this Surety Bond is restricted to the Bond Amount and this Surety Bond shall come into force from the date of its issue and shall remain in full force and effect up to its Validity date.

5. The Surety further agrees that the GFGNL shall have the fullest liberty without the consent of the Surety and without affecting in any way the liability of the Surety under this Surety Bond to vary any of the terms and conditions of the Agreement or to extend the time for the performance contained in the Agreement from any of the powers exercisable by GFGNL against the Principal and to forebear from enforcing any of the terms and conditions relating to the Agreement and the Surety shall not be relieved from its liability by reason of such failure or extension being granted to Principal or through any forbearance, act or omission on the part of GFGNL or any indulgence by GFGNL to Principal or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of relieving or discharging the Surety.

6. In case GFGNL demands for any money under this Surety Bond, the same shall be paid through banker's Cheque in favour of "Gujarat Fibre Grid Network Limited" payable at New Delhi or by any other mode such as NEFT/RTGS, etc., as indicated by GFGNL in its demand letter.

7. The Surety guarantees that the below mentioned officers who have signed it on behalf of the Surety have authority to give this Surety Bond under its delegated power.

Notwithstanding anything contained herein above:
1. Our Liability under this Surety Bond shall not exceed
INR ……..(Rupees: ……. Only).

2. This Surety Bond shall be valid upto……(Validity date)

3. Further a claim period of 3(three)months from the Validity date of the Surety Bond is available to make a demand under this Surety Bond. We are liable to pay the Bond Amount or any part thereof under this Surety Bond only and only if you serve upon us a written claim or demand on or before …….. (Date of claim period if any).

4. At the end of expiry of the Validity Date (including claim period), unless an action to enforce the claim under this Surety Bond is initiated before the Court or Tribunal on or before 12 months after the expiry of the Validity Date (including claim period), all your rights under this Surety Bond shall stand extinguished and we shall be relieved and discharged from all our liabilities and obligations under this Surety Bond irrespective of return of original Surety Bond

Place: ……

Date: …….. (Signature of the Surety)

Rubber stamp of the Surety

Authorized Power of Attorney Number: ……. Name of the Surety officer: …….. Designation: ……
Complete Postal address of Surety: ……
…… Telephone Numbers …….. Fax numbers ……
Email ID (only official Email ID) ……..

Name, Address, Contact number and official Email ID of the Controlling Office of the Surety Issuing Branch or any web portal link, from whom/ where the Surety Bond can be got confirmed by GFGNL.
……..
…….
…….

9.15 Format-XV(ABG)

MOBILIZATION ADVANCE SECURITY GUARANTEE BOND FORMAT OF MOBILIZATION ADVANCE BANK GUARANTEE"

Sub: Advance Bank Guarantee no. ……for value…… [Insert ABG value here]……. in respect……of……Purchase Order No……..("PO"):……Dated……for value [Insert total PO value]

In consideration of "Gujarat Fibre Grid Network Limited" (hereinafter called "GFGNL") agreeing to make advance payment of [Insert ABG value in figures and words] ("Advance Payment") to [Insert the name of the Contractor with address, contact person's telephone/mobile number and email address], having its registered office at {Insert the full address
}"hereinafter called 'the said contractor') which has been unequivocally accepted by the contractor and the contractor having agreed to provide an irrevocable Advance Bank Guarantee ["Advance Bank Guarantee"] in accordance with the terms and conditions of the said PO, we, {Insert the Issuing Bank name and address}("the Bank") hereby unconditionally agree and undertake to hold at your disposal, [Insert ABG value] and agree with you as follows:

1. Under the terms of the said GFGNL has agreed to pay to the contractor an advance payment of [insert the ABG value in figures and words)…… being …..% of the basic value/total value of the said PO, against furnishing of an Irrevocable Advance Bank Guarantee of equivalent amount by the Supplier.

2. The Bank at the request of the contractor has agreed to give this unconditional and irrevocable Advance Bank Guarantee and agree and undertake not to revoke the same.

3. The Bank, hereby guarantee that the Supplier will duly comply and faithfully perform all their obligations and responsibilities under the said PO, failing which we, the Guarantor, do hereby unconditionally undertake to pay to the Purchaser ON MERE DEMAND AND WITHOUT ANY DEMUR AND WITHOUT RECOURSE TO THE SUPPLIER such amount or amounts as the Guarantor may be called upon to pay not exceeding in the aggregate a sum of [insert ABG value in figures and words]…….

4. The Advance Bank Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Supplier but shall in all respects and for all purposes be binding and operative until payment of all monies due to GFGNL under the Advance Bank Guarantee are paid.

5. The decision of GFGNL that any sum has become payable shall be final and binding on the Bank.

6. The Advance Bank Guarantee shall be governed by the laws of India.

7. We (Bank Name) , shall on simple demand from the Purchaser pay immediately to the Purchaser, the said amount of (Insert ABG value in figures and words)……. without any demur and without requiring the Purchaser to invoke any legal remedy that may be available to them, to compel the Guarantor to pay the Advance Payment amount, even if

the Supplier considers such demand of the Purchaser is unjustified.

8. Any notice by way of request, demand or otherwise hereunder may be sent by courier, fax or by post to the Bank on or before the expiry date of the Advance Bank Guarantee. GFGNL may lodge request/demand in writing at our branch ……..[Insert specific branch name and full address with telephone/fax numbers] at on or before the expiry of the Advance Bank Guarantee as stated under clause no.9.

9. We (Bank Name) undertake to pay to GFGNL any money so demanded notwithstanding
any dispute or disputes raised by the contractor(s)/supplier(s) in any suit or proceeding pending before any court or tribunal relating thereto our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the contractor(s)/supplier(s) shall have no claim against us for making such payment

10. Our liability under the Advance Bank Guarantee is restricted to a sum of [Insert ABG value in figures and words) and the Advance Bank Guarantee shall remain in force until ..... (date) or such extended period as may be required by GFGNL & Contractor and unless a claim under the Advance Bank Guarantee is lodged with us within three months from the date of expiry of the Advance Bank Guarantee at our branch i.e. on or before ……(date) or such extended period as the case may be, all your rights under the Advance Bank Guarantee shall be forfeited and we shall be relieved and discharged from all liabilities under the Advance Bank Guarantee.

11. We (name of the bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of GFGNL under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till (office/ Department)

12. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s)/ supplier(s).
13. We (name of the bank)…….. lastly undertake not to revoke this guarantee during its currency except with the previous consent of GFGNL inwriting.

Place
Date (Signature of the Bank Officer)
Rubberstamp of the bank: Authorized Power of Attorney Number: Name of the Bank officer: Designation:

Complete Postal address of Bank:

9.16 Format- XVi(INTEGRITY PACT)
(To be typed preferably on letterhead of the company)

FORMAT OF INTEGRITY PACT

(To be submitted on Plain Paper)

INTEGRITY PACT

Between

Gujarat Fibre Grid Network Limited (GFGNL) / hereinafter referred to as “The Principal”

and

……..hereinafter referred to as “The Bidder/Contractor”

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s for ----------. The Principal values full compliance with all relevant laws, rules and regulations, and economic use of resources, and of fairness and transparency in its relations with its Bidder(s) and/ or Contractor(s).

In order to achieve these goals, the Principal will appoint an Independent External Monitors (IEMs) who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

(1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

(a) No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which he/she is not legally entitled to.
(b) The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
(c) The Principal will exclude from the process all known prejudiced persons.

(2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the relevant Anti-Corruption Laws of India, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/Contractor(s)

(1) The Bidder(s)/Contractor(s) commit themselves to take all measures necessary to prevent corruption. The Bidder(s)/Contractor(s) commit themselves to observe the following principles during his participation in the tender process and during the contract execution.
(a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material or immaterial benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
(b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices,

specifications, certifications, subsidiary contracts, submission or non- submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

(c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant Anti-corruption Laws of India; further the Bidder(s)/Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically and commit any offence under Indian Penal code (IPC)/Prevention of Corruption (PC) Act.

(d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly the Bidders/Contractors(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any.

(e) The Bidder(s)/Contractor(s) will, when presenting their bid, disclose any and all payments made, is committed to or intends to make to agents, brokers or any other in connection with the award of the contract.

(f) Bidder(s)/Contractor(s) who have signed the Integrity Pact shall not approach the Courts while representing the matter to Independent External Monitors (IEMs) and shall wait for their decision in the matter.

(g) To disclose and transgression with any other company that may impinge on the anti corruption principle.

(2) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/Contractor(s), before contract award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or take action as per the defined procedure in GFGNL Procurement Manual, which is in-force on the date of Publication of tender.

Section 4 – Compensation for Damages

(i) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit / Bid Security.

(ii) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor the amount equivalent to liquidated damages (LD) of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee (PBG) in addition to any other penalties/ recoveries as per terms and conditions of the tender.

Section 5 – Previous transgression

(i) The Bidder declares that no previous transgression occurred in the last 3 years with any other Company in any country conforming to the Anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
(ii) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the defined procedure.

Section 6 – Equal treatment of all Bidders/Contractors/Subcontractors

(i) The principal will enter into agreements with identical conditions as this one with all Bidders/Contractors.
(ii) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors, a commitment in conformity with this Integrity Pact.

(iii) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidder(s)/Contractor(s)/Subcontractor(s)

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor, which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to Chief Vigilance Officer.

Section 8 – External Independent Monitor/Monitors

1. Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

2. The monitor is not subject to instructions by the representatives of the parties and performs his/her functions neutrally and independently. The Monitor would have access in all contract documents, whenever required. It will be obligatory for him/her to treat the information and documents of the Bidders/Contractors as confidential. He/she reports to the GFGNL.

3. The Bidder(s)/Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/Contractor(s)/Subcontractor(s) with confidentiality.

Notwithstanding anything contained in this Section, the Bidder(s)/Contractor(s) shall have no obligation whatsoever to provide any internal costing mechanisms or any internal financial or commercial data pursuant to any audit or review conducted by or on behalf of the Principal. Further, the Bidder(s)/Contractor(s) shall not be required to provide any data relating to its other customers, or any personnel or employee related data.

4. The Monitor is under contractual obligation to treat the information and documents of the Bidders/Contractor(s) /Sub-contractor(s) with confidentiality. The Monitor has also signed declarations on "Non-Disclosures of Confidential Information" and of "Absence of Conflict of Interest". In case of any conflict of interest arising at a later date, the Independent External Monitor (IEM) shall inform GFGNL Official and recuse himself/herself from that case.

5. The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

6. As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit non- binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

7. The Monitor will submit a written report to the Chairperson of the Board of the Principal within 4 to 6 weeks from the date of reference or intimation to him by the 'Principal' and, should the occasion arise, submit proposals for correcting problematic situations.

8. If the Monitor has reported to the GFGNL Official, a substantiated suspicion of an offence under relevant Anti-Corruption Laws of India, and GFGNL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Corporate Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

9. The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the contract, and for all other Bidders 6 months after the contract has been awarded. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.

If any claim is made/ lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by GFGNL official.

Section 10 – Other provisions

(1) This agreement is subject to Indian Law. Place of performance and jurisdiction is the Registered Office of the Principal, i.e. New Delhi. The arbitration clause provided in the tender document / contract shall not be applicable for any issue /dispute arising under Integrity Pact.

(2) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

(3) If the Contractor is a partnership, this agreement must be, signed by all partners.

(4) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intensions.

(5) Issues like Warranty/Guarantee etc. shall be outside the purview of IEMs. For the Principal For the Bidder/Contractor

Place……
Witness 1 : ……
Date ……
Witness 2 : ……

9.17 Format-XVII Bidder's / SUPPLIER Profile

SUPPLIER Particulars for <NIT NUMBER>
dated
<DD/MM/YYYY>

S. No.	Area of the details to be provided	Responding Firm's/Comp any Details to be provide d
1.	Name of the SUPPLIER	
2.	Address of the SUPPLIER	
3.	Telephone number of the Firm/company	

S. No.	Area of the details to be provided		Responding Firm's/Company Details to be provided
4.	SUPPLIER's RFP number and date		
5.	Name of the contact person to whom all references shall be made regarding this RFP		
6.	Designation of the person to whom all references shall be made regarding this RFP		
7	Address of the person to whom all references shall be made regarding this RFP		
8.	E-mail address of the Firm/company		
9.	Fax number of the Firm/company		
10.	Website address of the Firm/company		
11.	Details of Registration	1.Registratio Number of the Firm/company 2.Name of the place where the firm/company was registered	
12.	Goods and Service Tax Registration No. (GST No.)		
13.	PAN No.		
14.	Average Annual Turnover for the last three (3) audited financial Years (2020-21, 2021-22 & 2022-23 or 2021- 22, 2022-23 & 2023-24)		
15.	Details of ownership of the firm (Name and Address of the Board of Directors, Partners etc.)		
16.	Name of the authorized signatory who is authorized to quote in the RFP and enter into the Contract (Power of Attorney to be submitted)		
17.	Name of the Bankers along with the branch (as appearing in MICR cheque) & Account #		
18.	Status of Firm/company like Pvt. Ltd. etc.		

S. No.	Area of the details to be provided	Responding Firm's/Comp any Details to be provide d
19.	Locations and addresses of the offices. The corporate address The official address of the service delivery centre.	
20.	Name and contact details of the Project Manager Name of the Project Manager assigned for Contact details viz; telephone number, official address of the Project Manager assigned.	

Witness:

Signature ----------

Name ----------

Address ----------

Date ----------

SUPPLIER:

Signature ----------

` Name ----------

Designation ----------

Company Seal ----------

Date ----------

9.18 Format-XVII Annexure II Declaration Proforma-2 UNDERTAKING & DECLARATION

For understanding the terms & condition of Tender & Specifications of work

a) Certified that:

1. I/ We have read, understood, and agreed with all the terms and conditions, specifications included in the tender documents & offer to execute the work at the rates quoted by us in the tender form.

2. if I/ We fail to enter into the agreement & commence the work in time, the EMD/ SD deposited by us will stand forfeited to GFGNL.

3. no addition/ deletion/ corrections have been made in the terms & conditions of downloaded tender enquiry document and bid is being submitted against tender enquiry document which is identical to the tender document appearing on tender Portal.

b) The tenderer hereby covenants and declares that:

1. All the information, documents, photo copies of the documents/ certificates enclosed along with the tender offer are correct.

2. If anything is found false and/or incorrect and/or reveals any suppression of fact at any time, GFGNL reserves the right to debar our tender offer/ cancel the LOA/ Purchase/ work order if issued and forfeit the EMD/ SD/ Bill amount pending with GFGNL. In addition, GFGNL may debar the contractor from participation in its future tenders.

c) In addition to above, it is certified that I/ We have also understood the following from perspective of network design:

1. That the existing made over GPs working on satellite (as mentioned in SoR item sr. no. 2.2) are covered under new GP creation

2. That the existing BSNL fibre taken on lease under BharatNet Phase– I from Block to FPOIs shall no more be part of BharatNet network once the network is upgraded to ring architecture in that Block.

3. That the planning of OFC in ring architecture shall be based on optimal feasible path.

4. That, there will be an option to utilize the existing optical fibre cable of any TSP/ISP/IP-1 license holders for the construction of the uncovered GPs (as mentioned in SoR item sr. no.1.2a)

5. That the conditions of field trial for the Class I/ Class II local suppliers of routers shall be applicable.

Date: ……

Signature of Authorized signatory Place: ……
Name of bidder Along with date & Seal

9.19 Format-XVIII- Check list

#	Particulars of documents to be submitted	Page No and Documents	Comment
	Off Line Bid Documents		
1	Demand Draft/ Bankers cheque in favour of GFGNL, drawn on any nationalized / scheduled bank and payable at New Delhi, submitted towards tender fee/ cost of the tender documents.		
2	A proof regarding registration of MSE (Micro & Small Enterprises) with Appropriate Authority, if claiming exemption in tender fee or Bid Security		
3	Original copy of the Bid Security		
	Techno Commercial Bid Documents		
4	Scanned copy of "Demand Draft/ Bankers cheque in favour of Gujarat Fibre Grid Network Limited, drawn on any nationalized/ scheduled bank and payable at Ahmedabad/Gandhinagar, Gujarat, towards tender fee/ cost of the tender documents		
5	Scanned copy of proof regarding registration of MSE (Micro & Small Enterprises) with Appropriate Authority, if claiming exemption in tender fee or Bid Security		
6	Scanned copy of the Bid Security		
7	Declaration that no addition/deletion/ corrections have been made in the downloaded tender document being submitted and it is identical to the tender document appearing on tender Portal and all amendments /corrigendum/ clarifications issued by GFGNL have been taken into account.		
8	Non-Relation Certificate duly signed by all Directors of Company		
9	Bid form duly filled & signed		
10	List of all Directors including their name(s), Director Identification Number(s) (DIN) and address (es)along with contact telephone numbers of office and residence.		
11	Undertaking duly signed by the bidder stating that it shall be liable for due performance of the contract		
12	A signed undertaking from Authorized Signatory of the bidder certifying that all components/ parts/ assembly/ software used in the Desktops and Servers like Hard disk, Monitors, Memory etc. shall be original, new components/ parts/ assembly/ software and that no refurbished/ duplicate/second hand components/ parts/ assembly/ software are being used or shall be used		
13	For supply of any software i.e. operating system or any applications software the bidder should submit a Certificate Of Authenticity (COA), issued by the respective OEM and duly signed by Authorized Signatory of the bidder stating that all Software supplied are authentic and legal copy is/are being supplied.		
14	Clause-by-clause compliance.In case of deviations, a statement of the deviations and exception to the provision of the Technical Specifications and Commercial Conditions shall be given by the bidder		

#	Particulars of documents to be submitted	Page No and Documents	Comment
15	Scanned copy of notarized Power of Attorney for signing the bid document and authorization for executing the power of attorney as per clause 14.4 of Section II along with Attestation of the specimen signatures of such authorized signatory of the bid by the Company's/ firm's bankers		
16	Integrity Pact		
17	Certificate of Incorporation and Memorandum & Article of Association		
18	Self-attested Copy of PAN & GSTIN registration		
19	Completion Certificate issued & signed by the competent authority of the client entity along with the supporting documents such as Work order/ Purchase order OR Contract clearly highlighting the scope of work Bill of Material and value of the contract/ order.		
20	Undertaking from the bidder as per format given in Section XII that bidder is not blacklisted/ debarred with Ministry of Communication or GFGNL or debarring order issued by Department of Expenditure (DOE), Ministry of Finance (MOF) covering all central Ministries/ Departments as per provision of OM No.F.1/20/2018-PPD by Department of Expenditure (DoE), MoF dated on 2nd Nov 2021		
21	Audited/ Unaudited financial statements for networth and average annual turnover as per eligibility criteria		
22	Certificate from the Statutory Auditor for networth and average annual turnover for the financial year preceding the Bid Date as per eligibility criteria		
23	Copies of valid TSEC/ TAC or proof of having applied for TSEC/ TAC (BSNL registered QF-103 or TEC Form-B) for active & Passive components		
24	A Self-declaration for not being declared as non- performer in any USOF project(s),		
25	A Self-declaration for not being declared as non- performer in any USOF project(s),		
26	Joint bidding agreement, if Bidder is a consortium member		
27	Self-declaration certificate by the Bidder that the(excluding Services (I&C) and AMC value) offered as package in this tender meets the minimum local content		
28	items (excluding Services (I&C) and AMC value) offered as package in this tender meets the minimum local content		
29	Land border sharing if bidder is from a country which shares land border with India		
30	In case of imported products, certificate from OEM that it has a registered office and Service Support Centre in India to provide after sales service support in India.		
31	Unpriced detailed BOM		
32	Letter of Authorization for attending bid opening		
33	Manufacturer Authorization Form (MAF)		
34	Bidders /Supplier profile & questionnaire duly filled & signed as per format		

#	Particulars of documents to be submitted	Page No and Documents	Comment
35	Undertaking & declaration duly filled & signed (Certificate for having understood the terms & conditions of tender and specification of work)		
36	Detailed summary of experience certificate (EPC work and O&M of IFC network) in excel format		
37	Detailed summary of turnover/ net worth details in excel format		
38	Scanned copy of signed & stamped Financial Bid as per format for the respective package		
39	Price Bid in BoQ as per CPP Portal		

Notes:

I. All the pages of bid documents should be numbered and arranged accordingly. The Bidder shall combine all the bid documents in the order, before uploading, as mentioned in the table above.

II. All other documents which are not mentioned in the table above but are required against any of the clause of RFP are necessarily to be submitted to make the bid compliant. These other documents shall be placed after the documents mentioned in the table above, while numbering and arranging the documents.

III. The bid documents (to be uploaded on the e-tendering portal) should be numbered in order of Check list in Annexure-III. An index in first folder with file names should be submitted for easy location.

9.20 Format-XIX Self-declaration regarding Local Content (LC) for Telecom Product

FORM-1

Format for Self-declaration regarding Local Content (LC) for Telecom Product, Services or Works (As per clause 9 (b) of DPIIT order No P-45021/2/2017-B.E-II dated 15.06.2017, certificate from statutory auditor / cost auditor of the company is mandatory for all bids of a value more than Rs 10 crore)

Date:

I, ... S/o, D/o, w/o ....., Resident of ..... do hereby solemnly affirm and declare as under.

That I agree to abide by the terms and conditions of Department of Telecommunications, Government of India issued vide Notification No. ..... dated.....
That the information furnished hereinafter is correct to best of my knowledge and belief and I undertake to produce relevant records before the procuring entity or any other authority so nominated by the department of Telecommunications, Government of India for the purpose of assessing the LC.

Percentage of LC claimed:……..%

That the LC for all inputs which constitute the said Telecom Product/Services/Works has been verified by me and I am responsible for correctness of the claims made therein.

That in the event of the LC of the Telecom Product/Services/Works mentioned herein is found to be incorrect and not meeting the prescribed LC norms, based on the assessment of an authority so nominated by the Department of Telecommunications, Government of India and I will be liable as under clause 9 (f) of Public Procurement (Preference to Make in India) Order 2017.

I agree to maintain all information regarding my claim for LC in the Company's record for a period of 2 years and shall make this available for verification to any statutory authorities.

i. Name and details of the Local supplier (Registered Office, Manufacturing unit location, nature of legal entity)
ii. Date on which this certificate is issued.
iii. Telecom Product/Services/Works for which the certificate is produced.
iv. Procuring agency to whom the certificate is furnished.
v. Percentage of LC claimed.

vi. Name and contact details of the unit of the manufacturer.

vii. Sale price of the product.

viii. Ex-Factory Price of the product.

ix. Freight, insurance and handling

x. Total Bill of Material.

xi. List and total cost value of inputs used for manufacture of the Telecom Product/Services/Works.

xii. List and total cost of inputs which are locally sourced. Please attach LC certificate from local suppliers, if the input is not in-house.

xi. List and cost of inputs which are imported, directly or indirectly.

For and on behalf of _
(Name of Firm/Entity)

Authorized signatory
(To be duly authorized by the Board of Directors)
<Insert Name, Designation and Contact No. and date>

9.21 Format-XX: Undertaking w.r.t. Local content declaration in view of allowing multiple OEMs

(only applicable if bidder is claiming Preference as Class-I Local category bid for award of work)

We have offered multiple OEMs for active & passive components in our bid for the Package No…… of tender enquiry No. ……..

We hereby claim Preference as Class-I Local category bid for award of work for the package and have worked out our bid's Local content (LC) in such a manner that our claim for Local content will always remain under Class-I category with the offered OEMs during bidding stage as well as during the supplies.

We have also taken cognizance of the DPIIT guidelines dated 16.09.2020 and the Gazette notification dated 29th Aug 2018 issued by DoT on PMI Policy is also complied for calculation of local content of products of our OEMs, whose product has been offered in our bid.

(Authorized signatory)

9.22 Format-XXI Certificate to be submitted by Bidders

(On Company's Letter Head)

Reference 1: GFGNL Tender No.
Reference 2: Department of Expenditure Office Memorandums (OMs) No. 7/10/2021- PPD (1) dated 23rd February 2023 and its subsequent Clarification, if any.

I, in capacity of authorized signatory of M/s……...having Regd. office at……...being a participant bidder in GFGNL T.E cited at reference 1 above, hereby declare that I have read and understood the clause regarding Restrictions under Rule 144(xi) of the General Financial Rules (GFRs) 2017 on grounds of Defence of India and National Security issued vide OM cited at reference 2 above, on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries.

I, hereby, further certify that our Company is not from such a country which shares a landborder with India and in light of conditions & restrictions imposed vide cited OMs, we fulfil all the requirements in this regard to become eligible to be considered in the subject Tender Enquiry by GFGNL.

(Name of the authorized signatory)

Signature Designation in Company Seal / Stamp of Company
Counter signed by Company Secretary of the Company

9.23 Format-XXII: Power of Attorney for signing of Bid

(To be executed on Stamp paper of appropriate value)

Know all men by these presents, We .....(name of the firm and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorize Mr/Ms (name), ... son/daughter/ wife of…… and presently residing at....., who is presently employed with us and holding the position of…… , as our true and lawful attorney (hereinafter referred to as the "Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our Bid for the……. Project proposed or being developed by GFGNL including but not limited to signing and submission of all applications, bids and other documents and writings, participate in Pre-Bids and other conferences and providing information/ responses to GFGNL, representing us in all matters before GFGNL, signing and execution of all contracts, undertakings consequent to acceptance of our bid, and generally dealing with GFGNL in all matters in connection with or relating to or arising out of our bid for the said Project and/ or upon award thereof to us and/or till the entering into of the contract with GFGNL.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

In witness whereof we, ... , the above named principal have executed this power of attorney on this .....day Of …… 20…..

For .....

(Signature, name, designation and address)

To be submitted in original by the Bidders before within 7 days of Bid Due Date.

Witnesses:

1.

2.

Accepted

..... (Signature)

(Name, Title and Address of the Attorney)

(Notarized)

Notes:

- The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.
- Wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a board or shareholders' resolution/ power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.

9.24 Format-XXIII: Joint Bidding Agreement

(To be executed on Stamp paper of appropriate value)

THIS JOINT BIDDING AGREEMENT is entered into on this the …… day of ……. 20…

AMONGST

1. ……. Limited, a company incorporated under the Companies Act, 1956/2013 and having its registered office at ……. (hereinafter referred to as the "First Part" which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

2. ……. Limited, a company incorporated under the Companies Act, 1956/2013 and having its registered office at ……. (hereinafter referred to as the "Second Part" which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

3. ……. Limited, a company incorporated under the Companies Act, 1956/2013 and having its registered office at ……. (hereinafter referred to as the "Third Part" which expression shall, unless repugnant to the context include its successors and permitted assigns)

WHEREAS

,

(A) Gujarat Fibre Grid Network Limited having its head office at" Block No.6, 5th Floor, Udyog Bhavan, Sector-11, Gandhinagar-382011, Gujarat, India" (hereinafter referred to as the "GFGNL" which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited applications (the Bids") by its Request for Proposal No. …… dated …… (the "RFP") for selection of Bidder for Development (Creation, Upgradation and Operation & Maintenance) of BharatNet through Design, Build, Operate and Maintain (DBOM) Model in the Licensed Service Area of State/UT name on Design, Build, Operate and Maintain (DBOM) Model (Package XX) (the"Package").

(B) The Parties are interested in jointly bidding for the package as members of a Consortium and in accordance with the terms and conditions of the RFP document and other Bidding Documents in respect of the package, and It is a necessary condition under the RFP document that the members of the Consortium shall enter into a Joint Bidding Agreement and furnish a copy thereof with the Bid.

NOW IT IS HEREBY AGREED as follows:

1. Definitions and Interpretations

In this Agreement, the capitalized terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the RFP.

2. Consortium

2.1 The Parties do hereby irrevocably constitute a consortium (the "Consortium") for the purposes of jointly participating in the Bidding Process for the package.

2.2 The Parties hereby undertake to participate in the Bidding Process only through this Consortium and not individually and/ or through any other consortium constituted for this package, either directly or indirectly or through any of their Associates.

3. Covenants

The Parties hereby undertake that in the event the Consortium is declared the selected Bidder and awarded the package, the Lead Member shall enter into a Contract Agreement with the GFGNL and for performing all its obligations as the PIA in terms of the Contract Agreement for the package.

4. Role of the Parties

The Parties hereby undertake to perform the roles and responsibilities as described below:

(a) Party of the First Part shall be the Lead member of the Consortium and shall have the power of attorney from all Parties for conducting all business for and on behalf of the Consortium during the Bidding Process and until the expiry of the Defects Liability Period under and in accordance with the Contract Agreement;

(b) Party of the Second Part shall be {the Technical Member of the Consortium;

(c) Party of the Third Part shall be {the Technical Member of the Consortium;

5. Joint and Several Liability

5.1 The Parties do hereby undertake to be jointly and severally responsible for all obligations and liabilities relating to the package and in accordance with the terms of the RFP and the Contract Agreement.

5.2 The Parties do hereby undertake and declare that the Lead Member shall represent all the members of the Consortium and shall at all times be liable and responsible for discharging the functions and obligations of the Consortium; and that each member of the Consortium shall be bound by any decision, communication, notice, action or inaction of the Lead Member on any matter related to this Agreement and the GFGNL shall be entitled to rely upon any such action, decision or communication of the Lead Member. The GFGNL shall have the right to release payments solely to the Lead Member and shall not in any manner be responsible or liable for the inter se allocation of payments among members of the Consortium.

6. Representation of the Parties

Each Party represents to the other Parties as of the date of this Agreement that:

(a) Such Party is duly organised, validly existing and in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Agreement;

(b) The execution, delivery and performance by such Party of this Agreement has been authorised by all necessary and appropriate corporate or

governmental action and a copy of the extract of the charter documents and board resolution/ power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Consortium Member is annexed to this Agreement, and will not, to the best of its knowledge:

i. require any consent or approval not already obtained;
ii. violate any Applicable Law presently in effect and having applicability to it;
iii. violate the memorandum and articles of association, by-laws or other applicable organisational documents thereof;
iv. violate any clearance, permit, concession, grant, license or other governmental authorisation, approval, judgement, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or
v. create or impose any liens, mortgages, pledges, claims, security interests, charges or encumbrances or obligations to create a lien, charge, pledge, security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement;

(c) this Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and

(d) there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Associates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfilment of its obligations under this Agreement.

8. Termination

This Agreement shall be effective from the date hereof and shall continue in full force and effect until the expiry of the Defects Liability Period under the Contract Agreement, in case the package is awarded to the Consortium. However, in case the Consortium is either not qualified for the package or does not get selected for award of the package, the Agreement will stand terminated in case the Bidder is not qualified or upon return of the Bid Security by the GFGNL to the Bidder, as the

case may be.

9. Miscellaneous

9.1 This Joint Bidding Agreement shall be governed by laws of India.

9.2 The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the GFGNL

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED	SIGNED, SEALED AND DELIVERED	AND DELIVERED

Notes:

1. The mode of the execution of the Joint Bidding Agreement should be in accordance with the procedure, if any, laid down by the Applicable Law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.
2. Each Joint Bidding Agreement should attach a copy of the extract of the charter documents and documents such as resolution / power of attorney in favor of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Consortium Member.
3. For a Joint Bidding Agreement executed and issued overseas, the document shall be legalised by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney has been executed.

9.25 **Format for essential information for applying to NSCS**

(Trusted Telecom Portal)

1	Project Name	:			
2	Type of Project	:	1. New Roll Out 2. Expansion 3. Upgrade		
3	Are your procurements from India registered vendor only for this project?	:	o Yes o No		
4	Do you intend to procure from non-India registered vendor for this project?	:	o Yes o No		
5	Remarks on the Project Criticality, if any,				
6	Details of Equipment:				
	Asset (one to be selected)	Equipment Name	Company Name/Vendor	Product Name	Model Name

	a) Support System b) Transport		Name of Contact person: E-mail ID: Mobile No.		

SECTION-10 SPECIAL TECHNICAL CONDITIONS

1. Relevant TEC GRs for Technical specifications of material to be supplied are mentioned in **Annexure- A**.
2. Detailed Technical Specifications of following Network components are mentioned in **Annexure-B**
    I. Network
    II. Routers
    III. eMS of Routers
    IV. DWDM transport nodes
    V. RFMS
    VI. Rack at Block and GP
    VII. UPS at GP
    VIII. Telecom grade Shelter (New) and Upgradation of existing shelters
    IX. Unlicensed Band Radio (UBR)
    X. Free Space Optics (FSO) / Light fidelity (Li-Fi)
3. Engineering Instructions for Under Ground Optical Fiber Cable Laying Works is attached as **Annexure-C.**
4. Technical Specification for GIS Mapping of OFC Routes is attached as **Annexure-D.**

Annexure A: TECHNICAL SPECIFICATIONS

TEC-GR Standards list:

S. No.	Type of Material	Technical Specifications
1	Armoured Optical Fibre Cable for underground application	TEC GR Standard No.: TEC 85170:2011 Although in this TEC/GR only optical fibre of G.652 D is mentioned but vendor shall have liberty to use G.657A1 also as per ITU-T recommendation.
2	Aerial OF Cable (ADSS Cable): 48/24F ADSS on power lines	TEC GR Standard No.: TEC 85190:2022 (Type- A-I & A-II) with latest amendments
3	24F Aerial Drop Optical Fibre Cable with Installation Accessories (For Last mile applications)	TEC GR Standard No.: TEC 85200:2022 with latest amendments if any (2005 for LMC)

S. No.	Type of Material	Technical Specifications
4	Fixed Attenuator	TEC GR Standard No.: TEC 88040:2014, with latest amendments if any (Type to be used as per site requirement)
5	Splitters (1:2, 1:4, 1:8, 1:16)	TEC GR Standard No.: TEC 72010:2023 with latest amendments (Type to be used as per site requirement)
7	Battery	TEC GR Standard No.: TEC 67030:2016 with latest amendments if any a. Lithium Ion Battery of 2400 VAH to be used.
8	Patch Cord	TEC GR Standard No.: TEC 87070:2009, with latest amendments if any.
9	Splice Closure for Optical Fibre Cables	TEC GR Standard No.: TEC 87080:2010 with all amendments if any. Size to be used as per OFC used at site
10	Fibre Termination Box	TEC GR Standard No.: TEC 87030:2010, with latest amendments if any. Fibre Termination BoxSize to be used as per OFC used at site
11	PLB HDPE Duct	TEC GR Standard No.: TEC 72030:2019 with latest Amendments if any
12	PLB HDPE Duct Accessories Push fit Coupler	PLB GRTEC/GR/FA/CDS-008/04/AUG-19 with latest amendments if any
13	End Cap	PLB GRTEC/GR/FA/CDS-008/04/AUG-19 with latest amendments if any
14	Installation Accessories and fixtures of Self-Supporting Metal free Optical Fibre Cable	TEC GR Standard No.: TEC 87060:2017, with latest amendments if any
15	FDMS (Indoor)	TEC GR Standard No.: TEC 87010:2007, with Amendment Dated 02.05.2012 and with latest amendments if any (Fibre Termination Box/FDMS Type-IIIA & IIIB – 48F at GP locations) Fibre termination in GP can be accomodated in a rack used for router and other equipment. 01 No. 48 fibre rack mount shelf to be used for fibre termination as per GR 87010:2017.
16	FDMS (Outdoor)	TEC GR Standard No.: TEC 87050:2012, with latest amendments if any The No. of trays in case of 48 Fibre ribbon OFC will be 4. No. of sleeves will be 25% extra than the required

S. No.	Type of Material	Technical Specifications
		joints i.e. 20 Nos.
17	Tension/Suspension Pole Assembly Set	TEC GR Standard No.: TEC 87060:2017, with latest amendments if any
18	MPLS Router	TEC/GR 48050:2024 Standard with latest amendments if any or
20	Ethernet electrical to optical media converter	TEC GR Standard No.: TEC 48080:2014, with latest amendments if any
25	UPS	TEC GR Standard No.: TEC 66140:2019 with latest amendments, if any
26	Radio Modem in ISM band for UBR	TEC GR Standard No.: TEC 38050:2023, with latest amendment, if any
27	EMS for UBR	TEC GR Standard No.: TEC 52006:2016, with latest amendments, if any
28	Fibre Distribution Frames for UBR	TEC/GR/TX/FDF-01/02/May-2010 TEC GR Standard No.: TEC 87000:2010, with latest amendement, if any
29	FTTx based Broadband Access Applications using Gigabit Passive Optical Network (GPON) Technology with Mini-OLT	TEC/GR/FA/PON-002/02/NOV-18 Standard with latest amendments if any
30	Remote Fiber Monitoring System (RFMS)	TEC 88150:2015 with latest amendment.

Annexure B: TECHNICAL SPECIFICATIONS OF NETWORK AND ITS COMPONENTS

I. Network

1. General requirements:

a. The network should support successful fibre connectivity to rural areas of the country, connecting to all GPs and Villages and accessible on a non-discriminatory basis to all service providers to enable them to provide services in rural areas.
b. The network should be built to provide the following:
i. Higher Network Uptime
ii. Complete Centralized Visibility of Network
iii. Segregation of Traffic and QOS in line with Industry standards
iv. Better Network Management (Provisioning, Activation, Fault, Performance etc.)
c. The network should have the capability and facility for seamless integration with all other components required to build a digital backhaul.
d. Network must support next generation architecture to support future technologies like 5G, 6G etc.
e. Devices must support the dynamic redundancy protocol for better convergence.
f. Network Convergence methods like Fast reroute and bidirectional failure detection must be deployed to achieve faster convergence.
g. Network must support segregation of traffic using Virtual Routing and Forwarding (VRF).
h. QoS enables a network to provide improved service to selected network traffic. The Network must support IPMPLS QoS features.
i. All Gram Panchayat (GP) nodes should have the capabilities to program the queues into logical queues to offer multiple services to the end customers.
j. The mapping of QoS should be done on the basis of COS, IP prec, TOS, IP address, VLAN etc.
k. All nodes in network must support Hierarchical Quality of Service for granular QoS.
l. Network should have multicast capabilities and should support at all layers.
m. High QoS, Uptime, Security, L3, L2 and Multicast Services from edge where the nodes are connected should be ensured as it will be connecting to MSOs, SP and Telcos.
n. Packet clock, 1588 should be supported for connecting Telco.
o. IP/MPLS NNI with telcos and other Service providers for traffic exchange at all nodes should be supported.
p. Interoperability between OEM for non-vendor locking should be supported at all nodes. Proposed technology partner / OEM for active infra to provide an undertaking to take responsibility of ensuring interoperability with other vendors.
q. All nodes in network must support protocol for management information sharing so that devices can discover and reach to each other.
r. Any changes in topology should be automatically learnt by all the devices in network.
s. No manual intervention should be required in case of any physical link failure.

t. Scalable dynamic protocol should be supported for transferring of customer network information across all service edge devices.
u. The network must provide detailed Change monitor or baseline deviations applications, source and destinations. The change monitor dashboard must compare changes in applications, source and destinations in terms of percentage increase/decrease for last 15 mins/ 30 mins/ one hour/ one day against historical time period of 24 hours/ 7 days/ one month etc.
v. OEM must provide performance, throughput and features evidence. GFGNL reserves the right for asking the bidder to do a PoC that validates all technical compliance as submitted in the tender document.
w. The network must support end to end SLA guarantee with features to automate the path based on latency and Jitter.
x. The network must support Zero Touch Provisioning capability & Automated node provisioning.
y. Network Should have integrated capability to monitor link and services.

2. QoS Architecture

a. Low latency Queuing should be deployed to ensure CIR guarantee to all Critical Traffic
b. Minimum 4 Class-of-Service Model should be supported:
c. Matching of traffic should be based on ACL, IPP, DSCP & MPLS EXP
d. Marking of traffic Should be based on MPLS EXP
e. Should also support weighted random early detection in the network to avoid congestion.

3. **Traffic Engineering Capabilities**

a. Standard based protocols to automatically map packets onto the appropriate traffic flows should be supported.
b. Should Support transport of traffic flows across a network using IP/MPLS forwarding.
c. Should support the determination of routes for traffic flows across a network based on the resources the traffic flow requires and the resources available in the network.
d. Should Employ '', segment routing'' in which the path for a traffic flow is the shortest path that meets the resource requirements (constraints) of the traffic flow.
e. Should support QoS on Traffic engineering paths or LSPs.
f. Should support Recovery of link or node failures that change the topology of the backbone by adapting to a new set of constraints.
g. Providing bandwidth guarantee for critical real-time applications in the control plane
h. Optimized utilization of redundant
i. Handling of unanticipated load in the network
j. Fast reroute to provide fast convergence for critical real-time application traffic.

4. Network - MPLS VPN

All Service edge nodes in network should support:

- Layer 2 MPLS VPN
- Layer 3 MPLS VPN: Layer 3 MPLS VPN can be broadly classified into Hub and Spoke VPN, MESH VPN, Extranet VPN, Multicast VPN
- Above specifications are minimum. Any additional feature or futuristic upgradation shall be allowed.

II. Technical Specifications for OFC

#	Parameters	Optical Fibre Cable -Minimum Specifications
1.	Fibre count	48F/96F G.657.A1 cable will be accepted considering high bending redius shall support for both aerial and underground cable.
		Under Ground : 48F/96F (Armored Optical Fibre Cable(Type: Ribbon) for underground application) 24F Armored Optical Fibre Cable Loose Tube
		Aerial : 24F ADSS unarmored cable
2.	Standard	**Under Ground**: ITU-T-G.657 (G.657A1) (TEC GR Standard No.: TEC 85260:2024 with latest amendment.) or with latest amendment if any
		Aerial: TEC 85220:2022 (Aerial Drop) (Loose tube with jelly compound & Water swellable tape / yarn) with latest amendment **Aerial cable on Powerline:** TEC 85190:2022 (Type-A-I semi dry Without Ice loading) with latest amendment
3.	Jacket Material	HDPE
4.	Strength member	FRP
5.	Application	Cable must be suitable for outdoor as well as indoor applications.
6.		Cable must be suitable for machine blowing as well as manual pulling in duct in case of UG application.
7.		Cable must be suitable for UG as well as aerial installation.

#	Parameters	Optical Fibre Cable -Minimum Specifications
8.	Cable/Making Indicator On Both Aerial & UG Cable	"GFGNL OFC" should be engraved on it.

III. Technical Specifications for FDMS

FDMS/FTB	
Parameter	**Specification**
FDMS (Indoor) TEC	TEC GR Standard No.: TEC 87010:2007, with Amendment Dated 02.05.2012 and with latest amendments if any. Fibre termination in GP can be accommodated in a rack used for router and other equipment. 01 No. 48 fibre rack mount shelf to be used for fibre termination as per GR 87010:2017.
FDMS (Outdoor) TEC	TEC GR Standard No.: TEC 87050:2012, with latest amendments if any The No. of trays in case of 48 Fibre ribbon OFC will be 4 No. of sleeves will be 25% extra than the required joints i.e. 20 Nos.
Type	Rack Mount
Space	48 fibres per 1U
Connector Type	LC-PC/SC-APC
Material	Steel & aluminium powder coated
Compliance	Free of halogen, Fully compliant with 2011/65/EC (RoHS)
Ports position	Front side only

IV. Technical Specifications for Routers

Block Routers Minimum Capacity: Type-A = 800 Gbps, Type-B = 300Gbps
GP Routers Minimum Capacity: Type-C = 80 Gbps, Type-D = 40Gbps

#	Parameters	Minimum Specifications for IP-MPLS at GP Router	Minimum Specifications for IP-MPLS Block Router
1	Compliance	TEC/GR 48050:2024 Standard with latest amendments if any or	TEC/GR 48050:2024 Standard with latest amendments if any or
2	Certification	MTCTE, NCCS	MTCTE, NCCS

#	Parameters	Minimum Specifications for IP-MPLS at GP Router	Minimum Specifications for IP-MPLS Block Router
3	Switching Capacity	40Gbps at GP location, 80Gbps at GP location where Child ring parented or GP-GP ring is connected	300Gbps at Sub-block location, 800Gbps at Master-Block location
4	Ports, Interfaces, Wavelength Distance Criteria	For Switching capacity >=40Gbps • 3 ports of 10G (Pluggable will be in scope of bidder as per solution design), • 3 ports of 1G/10G Pluggable will be in scope of bidder as per solution design • 4 Port of Electrical GE(RJ45 without SFP) For Switching capacity >=80Gbps • 4 port of 10G(Pluggable will be in scope of bidder as per solution design), • 4 port of 1G/10G (Pluggable will be in scope of bidder as per solution design)and • 4 Port of Electrical GE, P.N. : 1) These above is minimum indicative requirement. However, bidder has to select product and port configuration aligning with bid requirement in totality without any cost to GFGNL. 2) The Router should support 10G with 10km,40km,80km pluggable and 1GE optical port for	For Switching capacity >=300Gbps • 3 ports of 100G (Pluggable will be in scope of bidder as per solution design), • 16 ports of 10G (Pluggable will be in scope of bidder as per solution design), • 6 ports of 1G/10G (Pluggable will be in scope of bidder as per solution design), For Switching capacity >=800Gbps • 4 ports of 100G or 4 ports of 200G or 2 ports of 400G (Pluggable will be in scope of bidder as per solution design), • 18 ports of 10G/25G (Pluggable will be in scope of bidder as per solution design), • 6 ports of 1G/10G (Pluggable will be in scope of bidder as per solution design), P.N. : 1) These above is minimum indicative requirement. However, bidder has to select product and port configuration aligning with bid requirement in totality without any cost to GFGNL. 2) The router should support all 400G,100G ports for 100m, 10km, 40km & 80KM pluggable, and 10G ports for 100m, 10km, 40km & 80KM pluggable.

#	Parameters	Minimum Specifications for IP-MPLS at GP Router	Minimum Specifications for IP-MPLS Block Router
		100m, 10km pluggable support.	
5	Power supply and FAN redundancy	1+1 and Hot-swapable	1+1 and Ho t-swapable
6	Input power and Surge Protection	AC (110 V to 280 V), Surge protection of 2KVA	DC (-40 V to -72 V), Surge protection of 2KVA
7	Power Consumption	Up to 100W	Up to 500W
8	Temperature Range	The routers shall be installed in the buildings without air conditioning where adequate ventilation may or may not be available. Therefore, the routers shall meet the Temperature and Humidity Requirements as per Category B of QM-333 standard.	The routers shall be installed in the buildings without air conditioning where adequate ventilation may or may not be available. Therefore, the routers shall meet the Temperature and Humidity Requirements as per Category B of QM-333 standard.
9	Space requirement	1 RU (Rack Unit)	2 RU (Rack Unit)
10	Ipv4 / Ipv6 Routes to be supported	The router should have capability of minimum 20k Ipv4 / Ipv6 routes	The router should have capability of minimum 2 lakh Ipv4 / 1 lakh Ipv6 routes.
11	Clock Support	Router should support NTP, Sync E, IEEE 1588v2 PTP (including G8265,G8273 ,G8275 profiles as applicable)and NTP. It should have internal Stratum 3E clock with holdover time of at least 4 hours.	Router should support NTP, Sync E, IEEE 1588v2 PTP (including G8265,G8273 ,G8275 profiles as applicable)and NTP. It should have internal Stratum 3E clock with holdover time of at least 4 hours.

#	Parameters	Minimum Specifications for IP-MPLS at GP Router	Minimum Specifications for IP-MPLS Block Router
12	Security Features	Router should support Control-plane and management plane protection, Authentication, Authorization, and Accounting (AAA), RADIUS, Terminal Access Controller Access-Control System Plus (TACACS+),Secure Shell (SSH),Layer 2 and Layer 3 ingress Firewall filters (ACL),Unicast Reverse Path Forwarding (Unicast RPF)	Router should support Control-plane and management plane protection, Authentication, Authorization, and Accounting (AAA),RADIUS, Terminal Access Controller Access-Control System Plus (TACACS+),Secure Shell (SSH),Layer 2 and Layer 3 ingress Firewall filters (ACL),Unicast Reverse Path Forwarding (Unicast RPF)
13	Management and Troubleshooting	Device should have CLI,GUI,Console, Telnet and Web for management ,Software upgrades through Web ,SNMPv2 and SNMPv3 ,xtensive debugs on all protocols ,Real-time traffic-interface/sub interface statistics, Zero-Touch Provisioning (ZTP)	Device should have CLI,GUI,Console, Telnet and Web for management ,Software upgrades through Web ,SNMPv2 and SNMPv3 ,xtensive debugs on all protocols ,Real-time traffic-interface/sub interface statistics, Zero-Touch Provisioning (ZTP)
14	L2 and L3 VPN Services	The Router Should support L2 MPLS VPN,L3 MPLS VPN, EVPN (Ethernet Virtual Private Network)	The Router Should support L2 MPLS VPN,L3 MPLS VPN, EVPN (Ethernet Virtual Private Network)
15	Segment Routing	The router should support Segment Routing (SR) with all standard features such as Segment routing traffic engineering SR-TE, SR Polices etc.	The router should support Segment Routing (SR) with all standard features such as Segment routing traffic engineering SR-TE, SR Polices etc.
16	Additional Protocol requirements	The router should support standard IGP & EGP Protocol such as OSPF,IS-IS,BGP etc with all standard features.	The router should support standard IGP & EGP Protocol such as OSPF,IS-IS,BGP etc with all standard features.
17	Service Performance monitoring	Path analysis for delay, jitter, latency, topology wise path visibility, packet loss,	Path analysis for delay, jitter, latency, topology wise path visibility, packet loss

#	Parameters	Minimum Specifications for IP-MPLS at GP Router	Minimum Specifications for IP-MPLS Block Router
18	Quality of Service (QoS) and Traffic Management	Hierarchical QoS, Virtual Output Queueing (VOQ), Policing and Shaping, Multi-level priority queuing,Traffic Classification, The mapping of QoS should be done on the basis of COS, IP prec, TOS,IP address, VLAN etc. QinQ based services, IEEE 802.1p	Hierarchical QoS, Virtual Output Queueing (VOQ), Policing and Shaping, Multi-level priority queuing,Traffic Classification, The mapping of QoS should be done on the basis of COS, IP prec, TOS,IP address, VLAN etc. QinQ based services, IEEE 802.1p

I. Technical specifications of Network and its Components

a. The network should support successful fibre connectivity to rural areas of the country, connecting to all GPs and Villages and accessible on a non-discriminatory basis to all service providers to enable them to provide services in rural areas.

b. The network should be built to provide the following:

i. Higher Network Uptime

ii. Centralised Visibility of Network

iii. Complete Segregation of Traffic and QOS in line with Industry standards

iv. Better Network Management (Provisioning, Activation, Fault, Performance etc.)

c. The network should have the capability and facility for seamless integration with all other components required to build a digital backhaul.

d. Network must support next generation architecture to support future technologies like 5G etc.

e. Devices must support the dynamic redundancy protocol for better convergence.

f. Network Convergence methods like Fast reroute and bidirectional failure detection must be deployed to achieve faster convergence.

g. Network must support segregation of traffic using Virtual Routing and Forwarding (VRF).

h. QoS enables a network to provide improved service to selected network traffic. The Network must support IPMPLS QoS features.

i. All Gram Panchayat (GP) nodes should have the capabilities to program the queues into logical queues to offer multiple services to the end customers.

j. The mapping of QoS should be done on the basis of COS, IP prec, TOS, IP address, VLAN etc.

k. All nodes in network must support Hierarchical Quality of Service for granular QoS.

l. Network should have multicast capabilities and should support at all layers.

m. High QoS, Uptime, Security, L3, L2 and Multicast Services from edge where the nodes are connected should be ensured as it will be connecting to MSOs, SP and Telcos.

n. Packet clock , 1588 should be supported for connecting Telco.

o. IP/MPLS NNI with telcos and other Service providers for traffic exchange at all nodes should be supported.

p. Interoperability between OEM for non-vendor locking should be supported at all nodes. Proposed technology partner / OEM for active infra to provide an undertaking to take responsibility of ensuring interoperability with other vendors.

q. All nodes in network must support protocol for management information sharing so that devices can discover and reach to each other.

r. Any changes in topology should be automatically learnt by all the devices in network.

s. No manual intervention should be required in case of any physical link failure.

t. Scalable dynamic protocol should be supported for transferring of customer network information across all service edge devices.

u. The network must provide detailed Change monitor or baseline deviations applications, source and destinations. The change monitor dashboard must compare changes in applications, source and destinations in terms of percentage increase/decrease for last 15

mins/ 30 mins/ one hour/ one day against historical time period of 24 hours/ 7 days/ one month etc.

v. OEM must provide performance, throughput and features evidence. GFGNL reserves the right for asking the bidder to do a PoC that validates all technical compliance as submitted in the tender document.

w. The network must support end to end SLA guarantee with features to automate the path based on latency and Jitter.

x. The network must support Zero Touch Provisioning capability & Automated node provisioning.

y. Network Should have integrated capability to monitor link and services.

2. QoS Architecture

a. Low latency Queuing should be deployed to ensure CIR guarantee to all Critical Traffic

b. Minimum 4 Class-of-Service Model should be supported:

c. Matching of traffic should be based on ACL, IPP, DSCP & MPLS EXP

d. Marking of traffic Should be based on MPLS EXP

e. Should also support weighted random early detection in the network to avoid congestion.

3. Traffic Engineering Capabilities

a. Standard based protocols to automatically map packets onto the appropriate traffic flows should be supported.

b. Should Support transport of traffic flows across a network using IP/MPLS forwarding.

c. Should support the determination of routes for traffic flows across a network based on the resources the traffic flow requires and the resources available in the network.

d. Should Employ ", segment routing" in which the path for a traffic flow is the shortest path that meets the resource requirements (constraints) of the traffic flow.

e. Should support QoS on Traffic engineering paths or LSPs.

f. Should support Recovery of link or node failures that change the topology of the backbone by adapting to a new set of constraints.

g. Providing bandwidth guarantee for critical real-time applications in the control plane h. Optimized utilization of redundant

h. Handling of unanticipated load in the network

i. Fast reroute to provide fast convergence for critical real-time application traffic

4. If OEM has additional ports, GFGNL has rights to utilize them without any financial burdern to GFGNL.

4. Network - MPLS VPN

All Service edge nodes in network should support:

a. Layer 2 MPLS VPN

b. Layer 3 MPLS VPN: Layer 3 MPLS VPN can be broadly classified in to Hub and Spoke VPN, MESH VPN, Extranet VPN, Multicast VPN

GFGNL has procured additional equipment through a separate tender. Therefore, the bidder is required to plan the housing of this equipment within the same rack (cabinet), including provisions for power, space, and coordination. The objective is to create synergy among multiple vendors for seamless collective functioning.

V. Technical Specifications for EMS of Routers

S. No.	Parameter	Specification
1	System Architecture	Distributed, scalable, and modular architecture with centralized management for multi-vendor devices.
2	Protocol Support	SNMPv1/v2/v3, CORBA, XML, CLI, NETCONF, TL1, Telnet, SSH, and HTTPS for network device communication.
3	Fault Management	Real-time detection, correlation, and root cause analysis of faults with alarm classification (Critical, Major, Minor).
4	Configuration Management	Auto-discovery of devices, configuration backup/restore, version control, and support for parameter template validation.

S. No.	Parameter	Specification
5	Performance Management	Monitoring of key performance indicators (KPIs) such as bandwidth, latency, jitter, throughput, and packet loss.
6	Security Features	Role-based access control (RBAC), multi-factor authentication, audit logs, and secure communication using HTTPS and SSH.
7	Topology Management	Automatic discovery and visualization of logical and physical network topology with dynamic updates.
8	Inventory Management	Comprehensive tracking of hardware and software resources with versioning and lifecycle management.
9	Notifications and Alerts	Configurable alerts via SMS, email, and push notifications for critical events, with escalation mechanisms.
10	Database Support	Compatible with relational databases such as Oracle, PostgreSQL, or MySQL, with high-availability support.
11	System Requirements	Server Specs: Minimum: 4-core CPU, 16 GB RAM, 500 GB SSD. Recommended: 8-core CPU, 32 GB RAM, 1 TB SSD.
12	Platform Compatibility	Cross-platform support for Linux and Windows, compatible with virtualized and cloud-based environments.
13	Reporting	Customizable and pre-defined reports on network performance, fault trends, SLA compliance, and inventory.
14	Backup and Recovery	Automated backups, disaster recovery, and failover support for uninterrupted management.
15	Integration	Open API support for integration with NMS, OSS/BSS, trouble ticketing systems, and other third-party tools.
16	Time Synchronization	NTP-based synchronization to ensure accurate event and log timestamping.
17	Compliance	Adherence to ITU-T M.3010, M.3020, and TEC standards TEC/SD/IT/EMT-001/01/MAR-2016 and TEC/GR/SW/EMS-001/02/NOV-09.
18	Scalability	Capable of managing up to 10,000 network elements with support for clustered and distributed deployment models.
19	User Interface	Intuitive, web-based GUI with customizable dashboards, multilingual support, and role-specific access.
20	Maintenance and Support	24x7 technical support, periodic updates, and SLA-based response times.

S. No.	Parameter	Specification
21	Testing and Certification	Conformance tested for interoperability with multi-vendor devices and certified per TEC GR standards.

VI. Technical Specifications for Mini-OLT

S. No.	Parameters	Minimum Specifications for Mini-OLT
1	Compliance	TEC/GR/FA/PON-002/02/NOV-18 Standard with latest amendments if any or
2	Technology	Layer 2 GPON
3	Certification	MTCTE, NCCS
4	Uplink Port	4*10/100/1000M and 2*10G
5	GPON/EPON Port	4 GPON
6	Physical Interface	SFP Slots
7	Max Splitting Ratio	1:128
8	Attributes of the PON Interface	Class B+ and Class C+ GPON module
9	Standards	ITU-T G.984/G.988
10	Layer 2 Protocol	Should support Spanning Tree,IEEE 802.1Q, VLAN,IEEE 802.1w, RSTP,IEEE 802.3ad physical link static/dynamic aggregation,Support OMCI Encryption enabled / disabled for ONT,Support OMCI authentication for ONT,(LACP),QoS,Multicast, Reliability, DHCP
11	Network Security	Limiting the maximum number of users on each port,Port isolation, Packet storm control,Flow-based ACL access control function Transmission data encryption on the,PON interface, Supports TACAS+
12	Configuration Management	Various management modes such as CLI, SNMP and TELNET, Conducting software upgrade through TFTP Debug output
13	Backplane Bandwidth (Gbps)	64 Gbps
14	Power Supply	AC 110V to 280V,
15	Operating Environment	0°C-60°C;

S. No.	Parameters	Minimum Specifications for Mini-OLT
16	Max ONU Support	128
17	Services	Triple-Play, VPN, IP Camera, Enterprise LAN and ICT applications
19	Transmission Distance	Up to 20 Km
20	Data rate	Downstream: 2.5 Gbps, Upstream: 1.25 Gbps
21	Power Consumption	Up to 30W
22	Interoperability	Can support at least two or more different OEM for ONT and OLT
23	Features	The Mini-OLT shall be designed to have protection of power transient, power-surge and power blowouts. The equipment shall be adequately protected in case of voltage variation beyond the range as specified above and also against input inverse polarity.
24	Other	- Static and dynamic IP allocation should be supported - DBA(Dynamic Bandwidth Allocation), Multicast,QoS,SNMPv2C/V3 support

VII. Technical Specifications For ONT(Optical Network Terminal) manageable

Sr. No.	Parameters	Minimum Specifications
1.	Optical port	ITU-T G.984/G.988,with 2.488 Gbps Downstream and 1.244 Gbps Upstream , SMF single port interface, 28dB (Class B+)
2.	Ethernet port	10/100/1000 Mbps -2 port and 1* PON (SC/APC)
3.	Distance support	Upto 20Km (depending on Splitting Ratio)
4.	Operating temperature	0 to 50 ˚C
5.	Others	Dual band Wi-Fi 6 supports ONT, Type 1. Home-ONT (H-ONT) for FTTH applications. 64 MAC addresses, 16 VLAN
6.		Should work in non AC environment
7.		Support SNMP V3, Remote management, OMCI, TR69 should have facility to set password for local & remote login, ITU-T G.984.1/2/3/4, 32 Tcont,128 Gemport, Support FEC (Forward Error Correction) downstream and upstream, support SBA/DBA

Sr. No.	Parameters	Minimum Specifications
8.	LEDs	Should show status of link, full / half duplex, speed, and power on
9.	Manageability	MQTT/Modbus TCP/IP, Simple Network Management Protocol (SNMP), support SSH, SNMPv3, Telnet, and HTTPS, support WEB /TR069/TELNET/CLI, support DHCP functions like DHCP Server and DHCP Relay
10.	Power	Should be supplied with power adapter so that it can work on 230 V AC power, compatible with all India Power Standards.
11.	GPON equipment:	TEC-GR-FA-PON-002-02-NOV-18 /TEC 72050:2021or latest with all amendments
12.	Safety standard	UL/IEC/ MTCTE and NSDTS certified

VIII. Technical Specifications for LAN Switch

TEC GR Standard No.: TEC 48060:2023, with latest amendments if any or NDPP certified

Sr. No.	Parameters	Minimum Specifications
1.	Switch Performance & Throughput	The Switch should support a minimum of 40 Gbps Switching Fabric Capacity. • The switch should have forwarding rate of min 40 Mpps
2.	No. of Ports	For 24 Port Switch: 24 ports of 10/100/1000 BaseT (out of 24 ports, 4 ports should be PoE supported with PoE power support of minimum 80W) and 2 Uplink ports of 1GE (10/100/1000Mbps) with RJ45 without SFP and with sperate optical SFP For 8 Port Switch : 8 PoE ports of 10/100/1000 BaseT with PoE power support of minimum 60W
3.	MAC	Support for minimum 16K MAC entries
4.	Features	DHCP, IGMP V3, IEEE 802.1Q VLAN, QandQ, encapsulation, 802.1d (Spanning tree), 802.1w (RSTP), 802.1s (MSTP) Should support minimum 1000 active VLANs.
5.	Security	• IEEE 802.1x, RADIUS. • Telnet, Secure Shell (SSH) Protocol, and

Sr. No.	Parameters	Minimum Specifications
		Simple Network Management Protocol Version 3 (SNMPv3).
6.	Operation Temperature	0 to 50 ˚C
7.	Power input	230 V AC, 50-60 Hz
8.	Safety standard	UL / IEC / MTCTE and NSDTS certified

IX. Remote Fibre Management System (RFMS)

Parameter	Specifications
Ports	24
Space in Rack	2U
Connector Type	LC/SC (Front position preferable)
Power input	Dual DC/AC (As per site availability)
Wavelength Supported	1650 nm, 1550 nm, 1310 nm
Dynamic Range	40 dB or higher
Event dead zone	<= 1 m
Attenuation dead zone	<= 4 m
Optical Distance Accuracy	± (0.75 + 0.0025% x distance + sampling resolution)
Optical Test Cycle	Minimum 10 Million
Pulse Width	6 ns to 20 us
Max Power Consumption	10W
Certifications	CE, CSA-UL, RoHS
EMS H/W	Server/Storage/Firewall
EMS S/W	Application/ License
MISC	Parent-Child /Otau type solution is not allowed
	The system should have high availability feature with automatic switchover from active server to backup server in case of failure.
	System should be able to create users and manage passwords from centralized tool
	The Administrator will be placed at NOC and manage the system. The solution should support upto 50 numbers of concurrent users having view/edit rights It should be possible for the system administrator of fiber monitoring system to see all the connected users with their IP address in a single window. All the user's activity should be stored in the database and can be displayed with the audit log function. EMS should be able to integrate with other third-party NMS via Rest API or SNMP

Parameter	Specifications
	The RFTS system will be able to provide alarm, alert notification, and automatic generation of customized reports to provide timely and valuable information on the fiber network health, availability, and provide historical trends of these performance indicators. This capability would be extended to Operation In-charge of each RTU location via web browser (Google chrome etc.) on mobile/tablet/laptop or any device which supports web browser (Google chrome etc.). The RFTS system must have a mobile application operating on android and iOS for remote P2P tests.
	Software upgrades from the Server and client should be done remotely. Software upgrades on Remote Test Units shall be done from the server which will contact every RTU automatically for up-gradation. This can be done in bulk and at a specific time.
	For each monitored fiber, it should be possible to obtain fiber performance versus time. This graph should show the evolution of the fiber optic budget. The graph can be displayed for the last hour, day, week, month or year. By viewing the evolution of the fiber budget, user should immediately know whether this alarm is caused by a long term or short term effect.
	The system shall have a provision to tag .KMZ/.KML files to be associated to the relevant routes/ports to derive the co-ordinates of the fault or Google map link which can open in google map app which can be installed on PC/Tablet/Mobile phone.
	GFGNL's GIS server for the entire fiber network is in-service. The RFTS system shall be linked with GIS system. All faults should be displayed on the screen of GIS. RFTS system should be able to take the GIS coordinate provided by third party GIS and incorporate in the email alert and SMS alert. The RFTS EMS vendor shall help the GIS vendor to get the RFTS EMS system integrated with the GIS system via REST API or SNMP.
	Integrated cable Management System for Inside and outside plant. Optical Inventory Module for logical and Physical network for port-to-port connectivity, Route search and service provisioning

X. Minimum Technical specifications for Uninterrupted Power Supply (UPS) System at GP

#	Functional Req.	Parameter
1	Type	Online , TEC GR 66160:2024 or latest updates (Release in June 2024)
2	Technology	Rectifier with double conversion
3	Backup time	Minimum 6 Hrs with Full load
4	Load	500 Watt
5	Capacity	Minimum 1 KVA
6	Input Voltage Range	110-280 V
7	Output Voltage	AC: 230 V
8	Electrical Safety	Isolation transformer for Source isolation
9	IP standard	IP 21 & above
10	Creast Factor	3:1
11	Temperature range limitation	Max. Up to 55
12	Input Frequency	50 HZ (+/- 6% at Mains mode) 50 HZ (+/- 1% at Battery mode)
14	Output Frequency	50Hz +/- 1%
15	Input Power Factor	Greater Than 0.9
16	Waveform	Pure Sine wave
17	Alarm	On battery,Low Bttery, UPS verload,Temprature
18	Alarm Execution method	RJ45 With SNMP at SNOC / CNOC
19	AVR(Auto Voltage Regulators)	In built (6 stages)
20	Overload Protection	Required
21	Certification	ISO,BIS,UL,CE,VE
22	UPS Auto Start on Deep Discharge	Required

#	Functional Req.	Parameter
23	UPS body	Metal/Plastic
24	Battery Technology	LI-ion
25	Battery type	As per load
26	No.of Batteries	As per load
27	Battery Replacement cycle	Min. 6Hrs Backup must be required for 7 year ,if perfomance reduce than battery need to be replace.
28	Recharge time	6 to 8 Hrs in Offline mode
29	Battery warranty	EOL(End of Life)
30	Wiring	Avg. 15 Mtr wiring with end to end Commissioning at both Input and Output End
31	Anti theft Mechanism	Anti theft screw and cabinet/rack etc
32	Visibility	The PIA shall make suitable provision in the UPS to connect the same with the network elements for extending the UPS related alarms, lie but not limited to, battery, solar charge controller to the SNOC and CNOC

XI. Unlicensed Band Radio (UBR)

Parameter	Specifications
Operating Frequency Band	5.X GHz band
Polarization	Should Support Dual polarized
Throughput Support	1Gbps throughput with appropriate backplane capacity with supported distance and geographical environmental conditions
Ports	2 x 100/1000BaseT Ethernet electrical port or 1 GE SFP optical ports (1310nm, all with auto-negotiation, 5 Km range SFPs) shall be provided for FO.
Latency	< 10 ms

Parameter	Specifications
VLAN Support	Comprehensive VLAN support: 802.1Q, Q-in-Q, Access, Trunk, Transparent, Quality of Service (QoS)
Security	WPA-PSK, AES 256-bit encryption; IPv4 and IPv6 supported
Electrical Requirement	Power over Ethernet (PoE)
Management	GUI-based system with SNMPv3, jumbo frame (9000 bytes) support, dynamic optimization, and advanced interference mitigation
	Automatic channel selection and dynamic auto-optimization
Compliance	WPC NSDTS and MTCTE certified
	Conforms to TEC specifications TEC/GR/R/ISM-MOD-001/04 (March 2016)
Environment Requirements	Operating temperature: -10°C to +60°C, above IP65 rated, wind survivability up to 150 km/h
Protection	DC surge immunity as per IEC 61000-4-5, Level 2
Monitoring & Reporting	Detailed Ethernet and wireless interface monitoring via NMS
	Real-time counters for Tx/Rx data rates, packet loss, and performance data,Power Issue(Utility),Equipment- coldStart, warmStart, linkDown, linkUp, authenticationFailure, and link utilization, performance, latency,etc.EMS/NMS ,Syslog Support atleast : fault, configuration, accounting, performance and security
Advanced Features	GPS synchronization, MAC-level authentication, device alerts, wall/pole mounting, MIMO technology, 1024QAM modulation
Product Lifecycle	Entire Contract duration with extended warranty and end-of-life management , Comprehensive warranty and AMC support for integration and system maintenance till the contract period
Antenna	Dual polarization ensures system operation even if one fails
System Architecture	Full Outdoor (FO) system
System Configuration	Configurable via local terminal using Ethernet
	Browser-based GUI for performance monitoring with PMON/RMON
Integration & Compatibility	Compatible with GFGNL's nationwide EMS/NMS
	Supports SNMP v3
	Dual-stack support for IPv4 and IPv6 addressing
Radio Features	QPSK to minimum 1024 QAM for spectral efficiency
	Automatic Transmit Power Control (ATPC)
	Dynamic channel and data rate selection
	GPS-based synchronization

Parameter	Specifications
Link Planning Tool	Free tool for generating reports (link budget and path profiles) based on GIS MAP data
Upgrade & Maintenance	Software/hardware upgrades without service disruption
	Field upgrades and bulk firmware updates
EMS System	Full integration with NMS
	Internal and external alarms
	Traffic/statistical reporting with offline generation
Installation & Spares	Includes installation materials, spares, and consumables
	Grounding cables, fixers, weatherproofing materials included
PoE Switch Features	Managed 4-port PoE switch
	10/100/1000Base-T and optical GE ports
	IPv4 and IPv6 support, full QoS features, PoE management, RADIUS authentication
Performance & Reliability	System availability target: 99.9% annually
	High fault tolerance and reliability for all network elements
Other	All type of data and voice services, wireless back-haul traffic for 2G, 3G,4G and 5G services, FTTx, layer2 VPN, layer3 VPN, point 2 Multipoint VPN and VPLS, IPTV and multicast VPN, Cable TV transmission services along with other bandwidth leasing services supported any to any, one to many, many to many kind of services. The network created should have capability to establish end to end integration as per requirement up to State-Wide Area Network (SWAN) and National Knowledge Network (NKN)
Product Provenness	Minimum 1 year to be considered from the date of ETA/MTCTE. Minimum 1K Links deployment in last 1 year on proposed product.

XII. Free Space Optics (FSO) / Light fidelity (Li-Fi)

Sr. No.	Parameters	Minimum Specifications
1	Operating Optical Wavelength	785 - 1550nm
2	Distance support	For 10Gbps : Upto 3Km For 1Gbps : Upto 10Km
3	Throughput support	Should support Minimum 1 Gbps per link and support upto 10Gbps per link

Sr. No.	Parameters	Minimum Specifications
4	Ports	For 10G : 1 X 100/1000-BASE-T Ethernet (RJ45) for Configuration/Manangement Fiber interfaces with SC multi or single mode options Interface with 10G SFP+ For 1G : 1 X 100/1000-BASE-T Ethernet (RJ45) for Configuration/Manangement Fiber interfaces with SC multi or single mode options Interface with 1G SFP+
5	Electrical requirement	AC 100 – 240 V, 50 – 60 Hz and DC 48 ± 12 V
6	Management	System must provide alarm and control capabilities via Simple Network Management Protocol (SNMP) traps/ MIB File / IP-Firmware, IP monitoring, Spatial stabilization system (auto tracking), Full duplex
7	Environment requirements	Operating Temperature support: -20 degrees C to +60 degrees C (in installed condition)
8		Working Humidity support: between 10% - 95%, non-condensing at all operating temperatures
9		It should be IP65 and above , Wind survivability for minimum 150 Kmph
10		System should be suitable to withstand continuous exposure to rain and sunlight.
11	Safety Classification	Laser safety IEC 60825, Class 1M
12	Latency	<7 ms
13	Compliances	IEEE 802.15.7 ITU-T G.653.b,G.654.b
14	MTU	Jubmo frame upto 9600 bytes

XIII. Rack at GP Locations

#	Parameters	Specifications
1	Size	Minimum 19U Floor Mount
2	Dimensions	600 mm (W) X 600 mm (D)
3	PDU	10 no. of 5/15A sockets
4	Sliding Trays	2 Nos.
5	IP rating	IP 55 and above
6	Misc.	Front Door Steel Full Proof with lock
7		Should have sufficient perforation for ventilation of air with necessary Fan module at top
8		To be provided with cable manager & patch panel
9		Minimum 600 mm above from Floor level. Required fabrication stand to be made by PIA.

#	Parameters	Specifications
10		As per site requirement with provision for minimum 20% additional space for future expansion.
11		All enclosure panels are single walled boltable from inside with earthing to be done on all flat parts
12		Front single door with 4-point locking system and rear panel boltable from inside in single walled construction with door stay,
13		The housing should be equipped with DC/AC operated cooling Axial Fans, self-starting, double ball-bearing, temperature-controlled operation via controller. Noise level maximum 65dB.
14	Cooling	The cooling fans should be on a fan tray for ease of access and easy fault identification and diagnosis. N+1 Configuration fans Standby fan operates automatically when inside temperature exceeds 60°C OR any of the fans fails.
15	Certificate	ISO 9001, 14001, ISO45001 and IS 13252/BIS IP55: IS/IEC 60529: 2001.
16	Frame Material	Zinc magnesium coating with 25mm system punching in the roof and base frame plus vertical sections with two mounting levels, rolled out of a single sheet.Powder coated with UV Resistant pure polyester RAL 7035 Matt super durable with painting thickness of 80 to 120 microns minimum.
17	Enclosure Flat Parts Material:	Enclosure Flat parts material: Galvanized sheet steel 1.5mm / 2 mm thick of 120 GSM / Front single door with 4-point locking system and rear panel boltable from inside in single walled construction with door stay, Side panels left and right in single walled construction boltable from inside, Rain canopy of 75mm height with projection all around, with 300 mm base plinth of 3mm thick, The enclosure Flat parts to be gasketed with Outdoor Polyurethane foam gasket, the fasteners will be of SS 304 grade suitable for outdoor application.

XIV. Technical Specifications for 8.0/ 7.0-meter long RCC pole working load of 115 Kgs

The specification covers manufacture, curing, testing and supply of 8.0/7.0 meter long RCC poles, are generally as per drawing enclosed with the specification and are intended to be used. The materials manufactured shall

conform strictly to the requirement of relevant INDIANSTANDARDS and latest addition of IS using the best quality of materials and workmanship. The Cement used in the manufacture of RCC Poles shall be of good quality and confirming to the relevant ISS either ordinary or rapid hardening Portland cement conforming to IS: 269. Aggregate used for the manufacture of RCC Poles shall confirm to IS:

383. Reinforcing bars and wires used in the manufacture of RCC Poles shall be as below: -

i) Mild steel and medium tensile steel bars and hard drawn steel wire confirming to IS- 432/1960

ii) The steel of Tor-50 grades conforming to latest edition of IS: 1786

iii) Quality of MS Rounds used for stirrups shall comply with the requirements of IS:226

The reinforcing bars used shall be of required length as per drawing and no joint shall be allowed. All joints and stirrups shall be welded properly. If no welded, the lap length shall not be less than 40 times the diameter of the bars. The cover of concrete over the reinforcement shall be 30mm under normal working conditions and shall not be under any circumstances less than 20mm.

The sand shall be of the quality fit for use in RCC works i.e., river sand and sieved and free from alkaline/acidic materials. The ratio of cement concrete shall be 1:2:3 and shall comply with the requirements of IS:456.

The standards adopted for various materials manufacture shall be as follows:

i) The RCC poles shall conform to the requirement of IS:785/1964

ii) The quality of concrete shall be to the requirements of IS:456/1964

iii) The testing of proto-type poles shall be as per requirements of IS:2905/1966

The RCC Poles shall be manufactured as per the drawing mentioned below.

The poles shall take working load 115 Kgs for 8.0/7.0 meters, long RCC pole acting at 0.6 M from top with factor of safety of 2.5 respectively and

The tests for transverse strength, torsion strength, measurement of cover and uprightness shall be carried out in the presence of a representative of BSNL/IE.

1.1 % of the total number of poles ordered and selected at random shall be tested as per the

BIS standard referred above. The PIA or the manufacturer of poles shall offer a lot of upto 500 poles to BSNL QA team for testing. The QA team will draw a sample of 1% of the offered lot and carry out the tests as per test standards referred above . The tests for which the test facilities are available at the manufacturer premises may be carried out and tests for which test facility is not available in the manufacturer premises, sample may be sent to external

lab. After testing the offered lot may be cleared by BSNL QA based on test results as per norms of QA .

No payments will be made for the poles, which fail or tested to destruction.

Earthing shall be provided for the poles. By having a continuous separate length of SWG GI wire embedded in concrete during manufacture and the ends of wire left projecting from the narrower end of the poles and 150mm below the ground level. The arrangements for termination of the earth wire to the bolt and nut shall be as indicated in the concerned drawing. The G.I. Wire used for embedding shall comply with requirement of IS: 2141/1968.

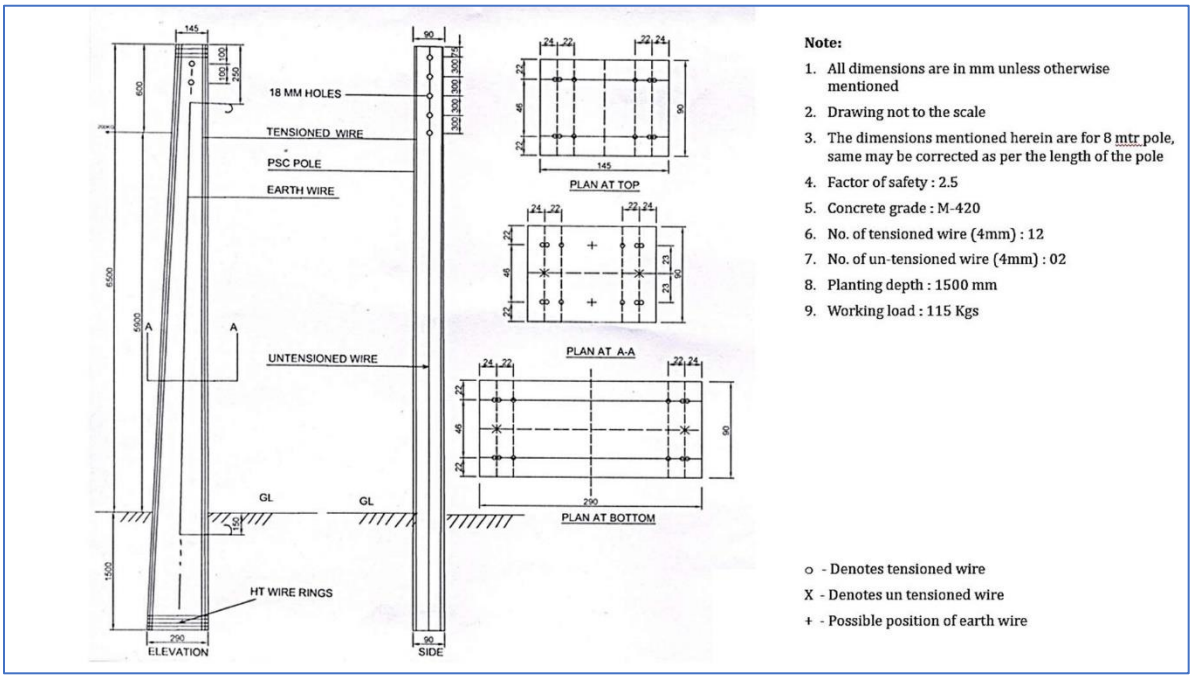
The poles shall be clearly and indelibly marked with the following particulars, during

manufacture but before testing at a position so as to be easily seen after erection in position.

a. Month and year of manufacture
b. Maker’s Sl. No. and marking
c. Purchase order No. and date
d. A line to indicate the depth of planting
e. BHARATNET engraved (letters – OWNER)

Provisions for holes for fixing the cross arms and other fixtures shall confirm to drawing and/or the industry construction practice. The universal pole clamp and ADSS accessories are to be used for slinging of ADSS OFC as per E.I

Drawing:



XII. **Technical Specification for Armoured Ribbon Optical Fibre Cable for Underground Duct Application**

1. Introduction:

1.1 This document describes the Standard for generic requirements of Armoured Ribbon Optical Fibre Cable for underground installation in ducts. A ribbon shall have six fibres. Semi-Dry Core Cable type has been mentioned in these specifications. The optical fibre

cables shall be suitably protected for the ingress of moisture by suitable water blocking material. The raw material used in the cable shall meet the requirements of the GR for raw materials (Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any).

1.2 The TEC GR/ Standard for the product (Armoured Ribbon Optical Fibre Cable for Underground Duct Application) is under preparation. Till finalization of the TEC GR/ Standard, Technical Specifications as mentioned in this section shall be applicable. After, finalization of the TEC GR/ Standard, any additional requirement shall be made applicable with mutual consent.

2. Functional Requirements:

2.1 The design and construction of Optical fibre cable shall be inherently robust and rigid under all conditions of installation, operation, adjustment, replacement, storage and transport.

2.2 The Optical fibre cable shall be able to work in a saline atmosphere in coastal areas and should be protected against corrosion.

2.3 Life of cable shall be at least 25 years. Necessary statistical calculations shall be submitted by the manufacturer. The cable shall meet the cable aging test requirement.

2.4 The Optical fibre cable shall be manufactured so as to protect the cable from rodent and termite.

2.5 It shall be possible to operate and handle the Optical fibre cable with tools as per Standard No. TEC 89060:2006 (latest release) and subsequent amendments, if any. If any special tool is required for operating and handling this optical fibre cable, the same shall be provided, in sufficient numbers as per requirement, along with the cable.

2.6 The Optical fibre cable supplied shall be suitable and compatible to match with the dimensions, fixing, terminating & splicing arrangement of the Splice closure.

2.7 The manufacturer shall submit an undertaking that the optical and mechanical fibre characteristics shall not change during the lifetime of the cable against the manufacturing defects.

2.8 It is mandatory that the Optical fibre cable supplied in a particular route is manufactured from a single source of optical fibres.

3. Technical Requirements:

Single Mode Optical Fibre used in manufacturing optical fibre cables shall be as per ITU-T Rec. G 652 D or G.657 A1. The specifications of optical fibre are mentioned below:

3.1 Type of fibre (Wavelength band optimized nominal 1310 nm):

Single mode as per Section-I of the Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any

3.2 Geometrical Characteristics of fibre:

As per Section-I of the Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any. All the parametric values shall be as per the

Standard for GR for raw materials (Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any)

3.3 Transmission Characteristics of fibre:

As per Section-I of the Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any. All the parametric values shall be as per the Standard for GR for raw materials (Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any)

3.4 Mechanical Characteristics of fibre:

As per Section-I of the Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any. All the parametric values shall be as per the Standard for GR for raw materials (Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any)

3.5 Material Properties of fibre:

As per Section-I of the Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any. All the parametric values shall be as per the Standard for GR for raw materials (Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any)

3.6 Environmental Characteristics of Fibre:

As per Section-I of the Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any. All the parametric values shall be as per the Standard for GR for raw materials (Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any)

3.7 Colour Qualification and Primary coating Test:

As per Section-I of the Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any. All the parametric values shall be as per the Standard for GR for raw materials (Standard No. TEC 89010:2021(or latest release) and subsequent amendments, if any)

3.8 Ribbon Structure:

3.8.1 Six primary coated fibres shall be arranged in ribbon structure. The fibres in the structure shall be parallel and shall not cross over each other along the entire length of the ribbon. The dimensions of 6 fibres ribbon shall be as per the sectional specification of IEC 60794- 3 / Bell Core document no. GR-20Core issue 4, 2013 (latest version) and as given below:

3.8.2 Ribbon Dimensions: The maximum dimensions of fibre ribbon shall be as follows and the cross section geometry of the fibre ribbon shall be as shown in the following figure:

Number of Fibres	Ribbon Width (W)	Ribbon Height (H)	Extreme Fibres (B)	Planarity (P)
6	1648 µm	360 µm	1310 µm	50 µm

3.8.3 Ribbon Material: The ribbon shall be manufactured using single mode optical fibres coloured with UV cured resin and the ribbon shall be encapsulated with a further layer of UV cured acrylate. The fibres and the ribbons shall confirm to the colour requirement as per clause no. 5.4 of this GR.

3.8.4 Ribbon Mechanical Properties:

3.8.4.1 Ribbon Macro-bend:

Change in attenuation when wrapped on a 60 mm: < 0.05 dB diameter mandrel for 100 turns at 1310 & 1550 nm.

3.8.4.2 Ribbon Compression Resistance:

Change in attenuation when subjected to a compressive: < 0.05 dB load of 500 N at 1310 nm & at 1550 nm

3.8.4.3 Ribbon Torsion Resistance

Change in attenuation (At 1310 nm & 1550 nm) : < 0.05 dB

3.9 Ribbon Optical fibre Cable Construction Specifications for Semi Dry Core :

The cable shall be designed to the parameters mentioned in Annexure – I. The manufacturer shall submit designed calculations and the same shall be studied and checked.

TYPICAL STRUCTURAL DRAWING FOR 48 FIBRE OF SEMI DRY CORE CABLE

3.9.1 Secondary Protection: The primary coated Ribbon fibres may be protected by loose packaging within tube, which shall be filled with thixotropic jelly. The dimensions of tube shall be as per Annexure – I.

3.9.2 Number of fibres in cable: 48, 96, 144, 216, 288

(Type Approval for a cable shall be issued depending upon the no. of fibres in the cable).

a. Number of fibres per ribbon: Six (6) Fibres

b. The number of ribbons per loose tube in ribbon optical fibre cable shall be as follows:

S. No	No. of Fibres	Ribbon Per Tube	Multi loose tube type
a.	48 oibres	2 ribbon per tube	4 tubes and 1 Filler
b.	96 oibres	4 ribbon per tube	4 tubes and 1 Filler
c.	144 oibres	6 ribbon per tube	4 tubes and 1 Filler
d.	216 oibres	6 ribbon per tube	6 tubes
e.	288 oibres	6 ribbon per tube	8 tubes

3.9.3 Strength Member: Solid FRP non - metallic strength member shall be used in the center of the cable core. The strength member in the cable shall be for strength and flexibility of the cable and shall have anti buckling properties. The FRP shall keep the fibre strain within permissible values. The FRP central strength member shall be as per the Standard No. TEC 89010:2021(or latest release) and the subsequent amendments, if any. The size of FRP shall be as per Annexure – I.

3.9.4 Moisture barrier (protection) over FRP: The water swellable yarn shall be binded over FRP. The specification of WS yarn shall be as per section XIX of Standard No. TEC 89010:2021(or latest release) and the subsequent amendments issued, if any.

3.9.5 Cable Core Assembly: Primary coated fibres in ribbon structure shall be protected inside loose tubes which are stranded together around a central strength member using helical or reverse lay techniques and form the cable core. The dimensions of FRP and stranding pitch shall be as per Annexure – I. The nylon/polyester binder thread shall be used to hold the cable core, if required.

3.9.6 Core Wrapping: The main cable core shall be wrapped by a layer/layers of water swellable tape. The water swellable(blocking) tape shall be as per Section-XIV of Standard No. TEC 89010:2021(or latest release) and the subsequent amendments, if any. The nylon/polyester binder thread shall be used to hold the tape, if required. The nylon/polyester binder thread shall be as per Section-IX of Standard No. TEC 89010:2021(or latest release) and the subsequent amendments, if any. The core wrapping shall not adhere to the secondary fibre coating and shall not leave any kink marks over the loose tube.

3.9.7 Filling compound: The filling compound used in the loose tube shall be compatible to fibre and secondary protection of fibre of the cable. The drip point shall not be lower than
+70°C. The fibre movement shall not be constrained by stickiness and shall be easily removable for splicing. Reference test method to measure drop point shall be as per ASTM D 566. The thixotropic filling compound (jelly) shall be as per the Standard No. TEC 89010:2021(or latest release) and subsequent amendments issued, if any.

3.9.8 Glass Reinforcement: Impregnated Glass Fibre Reinforcement are used to achieve the required tensile strength of the optic fibre cables over the cable

core wrapping to provide peripheral reinforcement along with Solid Rigid FRP Rod in the centre at cable core. The use of Solid Rigid FRP Rod(s) is mandatory in Optical Fibre cable design. Impregnated Glass Fibre Reinforcement used shall be equally distributed over the periphery of the cable core wrapping. The quantity of the Impregnated Glass fibre Reinforcement used per km length of the cable along with its dimensions shall be as per Annexure-I. The specification of the glass roving shall be as per Section XII of Standard No. TEC 89010:2021(or latest release) and subsequent amendments issued, if any and as per other details given in the Annexure–I.

3.9.9 Armouring: Armouring shall be provided by corrugated ECCS Tape (Electrolytically Chrome Coated Steel) to make the cable protected from rodent and termite. The armour shall also provide the sufficient radial as well as compressive strength and the armour shall be electrically continuous and bonded to the outer sheath. The force of adhesion shall be minimum 14 Newton and shall be tested as per ASTM D- 4565 test method.

3.9.9.1 The ECCS Tape armouring corrugated transversely for lateral strength and bending flexibility shall be applied longitudinally with an overlap of 10% (MIN) over the main cable core. The corrugation over the entire length of the tape shall be uniform. The overlap portion of the cable armour shall be suitably protected for the ingress of the moisture (below the armour) by water swellable tape.

3.9.9.2 The height of corrugation shall be 0.6 mm (min) & the pitch of corrugated tape shall be
2.5 mm (max). Height and pitch of corrugation shall be measured between crest and trough base line.

3.9.9.3 The corrugated armouring of ECCS Tape shall offer excellent corrosive resistance The specifications of ECCS tape shall be as per Section-XV of the Standard No. TEC

89010:2021(or latest release) and subsequent amendments, if any .

3.9.10 Continuity of Metallic members: All metallic elements used in the cable (i.e. longitudinally applied tape) shall be electrically continuous.

3.9.11 Outer Sheath: A non-metallic moisture barrier sheath (black in colour) shall be applied over the armour, which shall consist of tough weather resistant made High Density Polyethylene compound (HDPE), UV stabilized. The colour shall confirm to Munsell colour standards. The thickness of the outer sheath shall not be less than 1.8 mm and the strength members embedded with in the sheath. The outer sheath shall be uniform, circular, smooth, free from pin holes, joints mended pieces and other defects. The reference test method to measure thickness shall be as per IEC 60811-202.

Note1: HDPE material from finished product shall be subjected to following tests (on sample basis) and shall confirm to the requirement of the material as per

Section III of Standard No. TEC 89010:2021(or latest release) and the subsequent amendments, if any:

i) Density
ii) Melt flow index
iii) Oxidative Induction time
iv) Carbon black content
v) Carbon black dispersion
vi) ESCR
vii) Moisture content
viii) Tensile strength and elongation at break
ix) Absorption Coefficient
x) Brittleness Temperature

Note 2: The outer jacket of HDPE shall be as to protect the sheath from attack by termites. Manufacturer shall ensure that doping material/additives used if any, are non-toxic and non-hazardous. The surface of the sheath shall be smooth and free of defects such as cracks, blisters, etc.

3.9.12 Cable diameter: The finished cable diameter shall be as per Annexure-I.

3.9.13 Cable Weight: The nominal cable weight shall be as per Annexure – I.

3.9.14 RIP Cord:

a) The minimum two suitable ripcords, diametrically opposite to each other, shall be provided in the cable, which shall be used to open the HDPE sheath and armour of the cable. It shall be capable of consistently slitting the sheath without breaking for a length of 1 meter at the installation temperature. The ripcords (3ply & twisted) shall be nonwicking type and shall not work as a water carrier.

b) The ripcords used in the cable shall be readily distinguishable from any other components utilized in the cable construction.

4 Mechanical Characteristics and Tests on Optical Fibre Cable:

(Note: All observations are to be taken at 1310nm and 1550nm wavelengths)

4.1 Tensile strength Test:

Objective: This measuring method applies to optical fibre cables which are tested at a particular tensile strength in order to examine the behaviour of the attenuation as a function of the load on a cable which may occur during installation.

Method: IEC 60794-1-21-E1

Test Specs.: The cable shall have sufficient strength to withstand a load of value T(N) = 3000N. The load shall be sustained for 10 minutes and the strain of the fibre monitored.

Requirement: The load shall not produce a strain exceeding 0.25% in the fibre and shall not cause any permanent physical and optical damage to any component of the cable. The attenuation shall be noted before and after the release of load. The change in attenuation of each fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength.

4.2 Abrasion Test:

Objective: To test the abrasion resistance of the sheath and the marking printed on the surface of the cable.

Method: IEC-60794-1-21-E2

Test Specs.: The cable surface shall be abraded with needle (wt. 150 gm) having diameter of 1 mm with 500 grams weight (Total weight more than equal 650 gms.)
No. of cycles : 100

Duration : One minute (Nominal)

Requirement: There shall be no perforation & loss of legibility of the marking on the sheath.

4.3 Crush Test (Compressive Test):

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand crushing.

Method: IEC 60794-1-21-E3

Test Specs.: The fibres and component parts of the cable shall not suffer permanent damage when subjected to a compressive load of 2000 Newton applied between the plates of dimension 100 mm x 100 mm. The load shall be applied for 10 minutes. The attenuation shall be noted before and after the completion of the test.

Requirement: The change in attenuation of the fibre after the test shall be ≤0.05 dB both for 1310 nm and 1550 nm wavelength.

4.4 Impact Test:

Objective: The purpose of this test is to determine the ability of an optical fibre cable to

withstand impact.

Method: IEC 60794-1-21-E4

Test Specs: The cable shall have sufficient strength to withstand an impact caused by a mass weight of 50 Newton, when falls freely from a height of 0.5 meters. The radius R of the surface causing impact shall be 300 mm. 10 such impacts shall be applied on the cable at different locations typically spaced not less than 500mm apart.. The attenuation shall be noted before and after the completion of the test.

Requirement: The change in attenuation of the fibre after the test shall be ≤ 0.05dB both for 1310 nm and 1550 nm wavelength.

4.5 Repeated Bending Test:

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand repeated bending.

Method: IEC 60794-1-21-E6

Test Specs.: The cable sample shall be of sufficient length (5 m minimum) to permit radiant power measurements as required by this test. Longer lengths may be used if required.

Parameters:

Length of Cable sample : 5m (minimum)
Load : as per FOTP-104
Minimum distance from Pulley :216mm centre to holding device
Minimum distance from Wt. to : 457mm Pulley centre

Pulley Diameter :
(D - cable diameter)

20 D

Angle of Turning : 90o
No. of cycles : 30
Time Required for 30 cycles : 1 min

Requirement: During the test no fibre shall break and the attenuation shall be noted before and after the completion of the test. The change in attenuation of the fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength.

4.6 Torsion Test:

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand torsion.

Method: IEC 60794-1-21-E7

Test Specs.: The length of the specimen under rest shall be 2 meters and the load shall be

100 N. The sample shall be mounted in the test apparatus with cable clamped in the fixed clamp sufficiently tight to prevent the movement of cable sheath during the test. One end of the cable shall be fixed to the rotating clamp which shall be rotated in a clock wise direction for one turn. The sample shall then be returned to the starting position and then rotated in an anti-clock wise direction for one turn and returned to the starting position. This complete movement constitutes one cycle. The cable shall withstand 10 such complete cycles. The attenuation shall be noted before and after the completion of the test.

Requirement: The cable shall be examined physically for any cracks tearing on the outer sheath and for the damage to other component ports of the cable. The twist mark shall not be taken as damage. The change in attenuation of the fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength.

4.7 Kink Test:

Objective: The purpose of this test is to verify whether kinking of an optical fibre cable results in breakage of any fibre, when a loop is formed of dimension small enough to induce a kink on the sheath.

Method: IEC 60794-1-21-E10

Test Specs.: The sample length shall be 10 times the minimum bending radius of the cable The sample is held in both hands, a loop is made of a bigger diameter and by stretching both the ends of the cable in opposite direction, the loop is made to the minimum bend radius so that no kink shall form. After the cable comes in normal condition, the attenuation reading is taken.

Requirement: The kink should disappear after the cable comes in normal condition. The change in attenuation of the fibre after test shall be ≤ 0.05 dB both for 1310 nm & 1550 nm wavelength.

4.8 Cable Bend Test:

Objective: The purpose of this test is to determine the ability of an optical fibre cable to withstand repeated flexing. The procedure is designed to measure optical transmittance changes and requires an assessment of any damage occurring to other cable components.

Method: IEC 60794-1-21-E11 (Procedure-I).

Test Specs.: The fibre and the component parts of the cable shall not suffer permanent damage when the cable is repeatedly wrapped and unwrapped 4 complete turns of 10 complete cycles around a mandrel of 20 D, where D is the diameter of the cable. The attenuation shall be noted before and after the completion of the test.

Requirement: The change in attenuation of the fibre after the test shall be ≤ 0.05 dB both for 1310 nm and 1550 nm wavelength. Sheath shall not show any cracks visible to the naked eye when examined whilst still wrapped on the mandrel

4.9 Test of Figure of 8 (Eight) on the cable (Type Test):

Objective: Check of easiness in formation of figure of 8 of the cable during installation in the field.

Test Method: 1000 meter (approximate) of the cable shall be uncoiled from the cable reel and shall be arranged in figure of 8 (eight). The diameter of each loop of the figure of 8 shall be maximum 2 meters.

Requirement: It shall be possible to make figure of 8 of minimum 1000meter length of the cable uncoiled from the cable reel, without any difficulty. No visible damage shall occur.

4.10 Temperature Cycling (Type Test):

Objective: To determine the stability behaviour of the attenuation of a cable subjected to temperature changes which may occur during storage, transportation and usage.

Method: IEC 60794-1-22-F1 (To be tested on Standard cable length & drum i.e 2Km. ± 5%)

Test Specs.: The permissible temperature range for storage and operation will be from -20°C to +70°C. The rate of change of temperature during the test shall be 1°C per minute approx. The cable shall be subjected to temperature cycling for 12 Hrs. at each temperature as given below:

TA2 temp. : -20°C

TA1 temp. : - 10°C.

TB1 temp. : + 60°C.

TB2 temp. : + 70°C.

The test shall be conducted for 2 cycles at the above temperatures.

Requirement: The change in attenuation of the fibre under test shall be ≤ 0.05 dB for 1310 nm and 1550 nm wave length respectively for the entire range of temperature.

4.11 Cable aging Test (Type Test):

Objective: To check the cable material change dimensionally as the cable ages.
Method: IEC 60794-1-22-F9

Test Specs.: At the completion of temperature cycle test, the test cable shall be exposed to 85
± 2 degree C for 168 hours. The attenuation measurement at 1310 & 1550 nm wave length to be made after stabilization of the test cable at ambient temperature for 24 hours.

Requirement: The increase in attenuation shall be ≤0.05 dB at 1310 and 1550 nm.

Note: The attenuation changes are to be calculated with respect to the base line attenuation values measured at room temperature before temperature cycling.

4.12 Water Penetration Test (Type Test):

Objective: The aim of this test is to ensure that installed Optical Fibre cable will not allow water passage along its length.

Method: IEC 60794-1-22-F5

Test Specs.: A circumferential portion of the cable end shall face the water head. The water tight sleeve shall be applied over the cable. The cable shall be supported horizontally and two-meter head of water, containing a sufficient quantity of water-soluble fluorescent dye for the detection of seepage, shall be applied on the HDPE sheath for a period of 7 days at ambient temperature. No other-coloured dye is permitted.

Requirement: No dye shall be detected when the end of the 3m length of the cable is examined with ultraviolet light detector.

4.13 Flexural Rigidity Test on the optical fibre cable (Type Test):

Objective: To check the Flexural Rigidity of the metal free optical fibre cable.

Method: To be tested as per ASTM D –790

Test Specs: The fibre and the component parts of the cable shall not suffer permanent damage in the cable subjected to Flexural Rigidity Test as per the above method. The attenuation shall be noted after and before the completion of the test.

Requirement: The change in attenuation of the fibre after the test shall be < 0.05 dB at 1310, 1550 nm and 1625nm wavelengths. The sheath shall not show any cracks visible to the naked eye.

4.14 Static Bend test (Type Test):

Objective: To check the cable under Static bend.

Method: As per the clause no 4.8 of the GR alternatively as per ASTM D790.

Test Specs: The cable shall be subjected to static bend test. The optical fibre cable shall be bend on a mandrel having a Diameter of 10 D (D is diameter of the cable).

Requirement: The change in attenuation of the fibre after the test shall be <0.05 dB for 1310, 1550 nm and 1625nm wavelengths. Sheath shall not show any cracks visible to the naked eye when examined whilst still wrapped on the mandrel.

4.15 Cable Jacket Yield Strength And Ultimate Elongation:

Objective: To determine the yield strength and elongation of the polyethylene (HDPE) cable sheath (jacket).

Test Method: FOTP-89 or ASTM 1248 Type III class

Test Condition: 1. Sample shall be taken from a completed cable. The aged sample shall be conditioned at 100 ± 2°C for 120 hours before testing. 2. The cross-head speed

shall be 50 mm per minute.

Requirement:

Jacket Material	Minimum Yield Strength		Minimum Elongation (%)
	(MPa)	(psi)	
HDPE un-aged	16.5	2400	400
HDPE aged	12.4	1800	375

4.16 Ribbon Dimension Measurements test: (Type Test)

Objective: To Check the fibres in ribbon structure, fibre cross over and fibre identity to ensure the transmission performance and the mechanical service life of the fibre in the ribbon structure.

Test Method: As per extant method of BSNL QA.

Requirement: It shall meet the dimensional requirements given in clause no. 3.8.2 of this GR. The fibres in the entire length of the ribbon shall not cross over at any point.

4.17 Ribbon Resistance to Twist (Robustness) test: (Type Test)

Objective: To check the robustness of the fibre ribbons to withstand the twist in installed conditions and to check the structural integrity of the ribbon over the deployed length for mid-span entry, maintenance purposes, consideration in rearrangements and housekeeping.

Test Method: As per extant method of BSNL QA.

Requirement: The un-aged and aged (at 85 + 2 degree C with uncontrolled humidity for a period of 30 days) completed ribbon shall not show any separation of individual fibres from the ribbon structure after completion of the twist test when observed under 5X magnification.

4.18 Ribbon Residual Twist (Flatness) Test: (Type Test)

Objective: To check the dimensional integrity of the ribbon without twisting to allow rearrangements and to limit the potential attenuation increases due to a macro-bending caused by twisting of the fibre ribbon.

Test Method: As per extant method of BSNL QA.

Requirement: The aged (at 85º + 2º C with uncontrolled humidity for a period of 30 days) ribbon residual twist (if any) shall have a pitch: > 400 mm.

4.19 Ribbon Separation Test:

Objective: (a) To check the separation of individual fibres, separation of sub-unit of fibres and mid span separation from a fibre ribbon.

(b) To check the retention of sufficient colorant for identification for any 2.5 cm length of fibre after separation for individual and sub-unit of fibres.

Test Method: As per extant method of BSNL QA. Test to be conducted for:

(a) Separation of any single fibre or a multi-fibre subgroup by a tool or by hand from a ribbon for a length of 1 meter. Mid span separation from a 2 meter sample, separated close to middle for at least 0.5 meter (both single fibre and the six fibre sub – units) for un-aged ribbon.

Requirement: The un-aged ribbon of minimum length of a 0.3 meter (1.0 foot) of an individual fibre and a sub group of six fibres shall be separated from the ribbon without breaking the fibres or damaging the fibre coating. The force required to perform separation shall not exceed 4.4 N. The area at the separation shall not show any damage to the fibre coating when examined under 5X magnification.

(b) Retention of the Colour and Fibre Identification after separation.

Requirement: Individual fibre colour identification shall be maintained after the separation test. It shall retain sufficient colorant that any 2.5 cm length is readily identifiable.

(c) Removal of Ribbon matrix material to access individual fibres. Requirement: No damage shall occur either to fibre coating or the fibres. The coating shall not sustain any swelling self-stripping, cracking or splitting when examined under 5X magnification.

Note: The manufacturer shall recommend the procedure for the removal of ribbon matrix.

4.20 Ribbon Strippability Test:

Objective: Check of removal of the matrix material and the fibres protective coating mechanically with commercial stripping tools from unaged and aged ribbons.

Test Method: As per extant method of BSNL QA. Pre-Conditioning:
a. Aged samples: The humidity of aged ribbons shall be soaked at 85 + 2 degree C and a non-condensing humidity of 85 + 5% for a period of 30 days.

b. Water aged samples: The water aged ribbons shall be soaked in de- ionized or distilled water at a temperature of 23 + 5 degree for a period of 14 days.

The fibre ribbon strip-ability testing shall be conducted at standard atmospheric conditions. The un-aged, humidity – aged, and water aged ribbons shall be tested within eight hours after aging.

Requirement: There shall be no fibre breakage, and any coating residue shall be removable with a single isopropyl alcohol wipe when at least 25 mm of the matrix material and the fibre Protective coating is mechanically removed with commercial stripling tools from un-aged and aged ribbons.

4.21 Ribbon Macro-Bend Performance

Objective: To check the macro-bend performance of a ribbon. Test Method: As per extant method of BSNL QA.
Method: One hundred turns of ribbon are wound around a 60 mm diameter ribbon and the loss increase at 1310 nm & 1550 nm shall be measured.

Requirement: The change in attenuation of the fibre shall be < 0.05 dB, for 1310 nm and 1550 nm wave lengths.

4.22 Torsion Resistance of the ribbon (Type test): Objective: To check the torsion resistance of the ribbon. Test Method: As per extant method of BSNL QA.
Method: One-meter length of ribbon is twisted to through five revolutions of 360°and measurement is taken.

Requirement: The change in attenuation of the fibre shall be < 0.05 dB, for 1310 nm and 1550 nm wave lengths.

4.23 Crush Resistance of Ribbon (Type Test): Objective: To check the crush resistance of the ribbon.
Method: A 50 mm2 sample is subjected to a load of 500 N and the attenuation measurement taken for both 1310 nm & 1550 nm wave lengths.

Requirement: The change in attenuation of the fibre shall be < 0.05 dB, for 1310 nm and 1550 nm wave lengths.

4.24 Check of the quality of the loose tube (containing optical fibre ribbon) (Type Test):

a. Embrittlement Test of Loose Tube

This test method is based on bending by compression and reflects embrittlement much better than the other tensile tests. This test is independent of wall thickness of the loose tube.

Sample: The minimum length of the test sample depends on the outside diameter of the loose tube and should be 85 mm for tubes up to 2.5 mm outside dia. The length of the bigger tubes should be calculated by using the following equation:

Lo > , Where

Lo = Length of tube under test. D = Outside dia of loose tube.
d = Inside dia of loose tube.

Procedure: Both the ends of a buffer tube test sample may be mounted in a tool, which is clamped in jaws of a tensile machine which exerts a constant rate of movement. The movable jaw may move at a rate of 50 mm per minute toward the fixed jaw. Under load, the tube will bend so that it is subjected to tensile and compressive stresses. The fixture for holding the tube should be designed in a manner that the tube might bend in all directions without further loading.

Requirement: The tube should not get embrittled. No kink should appear on the tube up to the safe bend diameter of tube (15 D), where D is the outside diameter of the loose tube. There should also not be any physical damage or mark on the tube surface.

b. Kink Resistance Test on the Loose Tube

Objective: To safeguard the delicate optical fibres, the quality of the loose tube material should be such that no kink or damage to the tube occur while it is being handled during installation and in splicing operations.

Method: IEC 60794-1-23-G7

Procedure: To check the kink resistance of the loose tube, a longer length of the loose tube is taken (with fibre and gel), a loop is made and loop is reduced to the minimum bend radius of loose tube i.e. 15 D (where D is the outside diameter of the loose tube). This test is to be repeated 4 times on the same sample length of the loose tube.

Requirement: No damage or kink should appear on the surface of the tube.

4.25 Drainage Test for Loose Tube and Drip test on the cable (Type Test):

a. Drainage Test for loose tube Method:
Sample Size: 30 cm tube length. Test procedure:
1. Cut the tube length to 40 cm.

2. Fill the tube with the tube filling gel ensuring that there are no air bubbles and the tube is completely full.

3. Place the filled tube in a horizontal position on a clean worktop and cut 5 cm from either end so that the finished length of the sample is 30 cm.

4. Leave the filled tube in a horizontal position at an ambient temperature for 24 hrs. (This is necessary because the gel has been sheared and the viscosity has been reduced during the filling process).

5. The sample tube is then suspended vertically in an environment heat oven over a weighed beaker. It is left in the oven at a temperature of 70° C for a period of 24 Hrs.

6. At the end of the 24 hrs period the beaker is checked and weighed to see if there is any gel in the beaker.

Requirement:

1. If there is no gel or oil in the beaker, then tube has PASSED the drainage test.

2. If there is gel or oil in the beaker, then tube has FAILED the drainage test.

b. Drip test on the cable

Objective: The purpose of this test is to determine the ability of jelly in the O.F. cable to withstand a temperature of 70-degree C.

Method: IEC 60794-1-22-F16

Test Specs.: Take a sample of 30 cm. length of the cable with one end sealed by end cap.

Remove outer black sheath, binder tapes for 5 cm from open end of the sample. Clean the jelly. Then the sample is kept vertically with open end downwards in the oven for 24 hours at 70o C with a paper under the sample.

Requirement: Examine the paper placed below the cable inside the oven for dripping of the jelly after 24 hours. There should be no jelly drip or oily impression on the paper.

4.26 Check of easy removal of sheath:

Objective: Check of the easy removal of sheath of the optical fibre cable by using normal sheath removal tool.

Procedure: To check easy removal, about 300 mm length of the sheath should be removed by use of rip cords. It should be observed during sheath removal process that the cable core should not be damaged during the operation. One should be able to remove the sheath easily.

4.27 Check of the effect of aggressive media on the cable (Acidic and Alkaline Behaviour) (Type Test):

Procedure: To check the effect of aggressive media, solution of PH4 and PH10 shall be made.
The two test samples of the finished cable, each of 600 mm in length, are taken and the ends of the samples are sealed. These test samples are put in the PH4 and PH10 solutions separately. After 30 days these samples are taken out from the solutions and examined for any corrosion etc on the sheath and other markings of

the cables. (Test method no. ISO175).

Requirement: The sample should not show any effect of these solution on the sheath and other marking of the cable.

4.28 Sheath to ground dielectric strength test:

Objective: To confirm that the cable sheath is continuous and free from pin holes. Test Specs.: The dielectric strength shall be 8KV RMS or 12 KV DC when spark tested.
Method: IEC 62230
Requirement: The cable shall pass the test.

4.29 Electrical Continuity Test :

Objective: The aim of this test is to ensure that all the metallic elements used in the cable are electrically continuous throughout the cable.

Method: IEC 60794-1-403

Procedure: Strip and open both the ends of the cable (for a short distance sufficient enough to access the inner metallic elements) and connect the test apparatus to the metallic members to complete the test circuit.

Requirements: All the metallic elements used in the cable shall be electrically continuous.

5 Engineering Requirements:

5.1 Cable Marking:

5.1.1 A long lasting suitable marking shall be applied in order to identify this cable from other cables. The cable marking shall be imprinted (indented). The marking on the cable shall be indelible of durable quality and at regular intervals of one meter length. The accuracy of the sequential marking must be within -0.25% to +0.5% of the actual measured length. The sequential length markings must not rub off during normal installation and in life time of optical fibre cable. The total length of the cable supplied shall not be in negative tolerance.

5.1.2 The marking shall be in contrast colour over the black HDPE Sheath (jacket) and shall be one by hot foil indentation method. The colour used must withstand the environmental influences experienced in the field. The marking on the cable shall be permanent, insoluble in water and shall be legible for duration of cable life.

5.1.3 The type of legend marking on O.F. cable shall be as follows:

a) Company Legend

b) Legend containing telephone mark & international acceptable Laser symbol

c) Type of Fibre – G.652 D / G.657 A1

d) Number of Fibres

e) Type of cable

f) Year of manufacture

g) Sequential length marking

h) User's Identification

i) Cable ID

5.2 Cable Ends:

5.2.1 Both cable ends (the beginning end and end of the cable reel) shall be sealed and readily accessible. Minimum 5 meter of the cable of the beginning end of the reel shall accessible for testing. Both ends of the cable shall be kept inside the drums and shall be located so as to be easily accessible for the test. The drum (confirming to GR No. G/CBD- 01/02 NOV 94 (latest release) and subsequent amendments, if any) should be marked to identify the direction of rotation of the drum. Both ends of cable shall be provided with cable pulling (grip) stocking and the anti twist device (free head hook). The wooden drums shall be properly treated against termites and other insects during transportation and storage. The manufacturer shall submit the methodology used for the same

5.2.2 An anti-twist device (Free head hook) shall be provided, attached to the both the ends of the cable pulling arrangement. The arrangement of the pulling eye and its coupling system along with the anti-twist system shall withstand the prescribed tensile load applicable to the cable.

5.3 The nominal drum length:

5.3.1 Length of OF Cable in each drum shall be 2 Km / 4Km / 8Km / 10Km shall be supplied as per the order. The variation in length of optical fibre cable in each drum shall be ± 5% to ± 10%, as decided by the purchaser. Purchaser may at their discretion procure shorter length cable drum as per their requirement.

5.3.2 The fibres in cable length shall not have any joint.

5.3.3 The drum shall be marked with arrows to indicate the direction of rotation.

5.3.4 Packing list supplied with each drum shall have at least the following information:

a) Drum No.

b) Type of cables

c) Physical Cable length

d) No. of fibres

e) Length of each fibre as measured by OTDR

f) The Cable factor - ratio of fibre/cable length

g) Attenuation per Km. of each fibre at 1310 & 1550 nm

h) Users / Consignee's Name

i) Manufacturers Name, Month, Year and Batch No.

j) Group refractive index of fibre.

k) Purchase Order No.

l) Cable ID

5.4 Colour coding and Ribbon identification in O.F. Cables:

5.4.1 The colorant applied to individual fibres shall be readily identifiable throughout the life time of the cable and shall match and conform to the MUNSELL color standards (EIA- 598D) and also IEC Publication 304(4).

5.4.2 Colour Coding Scheme:

When the loose tubes are placed in circular format, the marking to indicate the loose tube no. "1" shall be in blue colour followed by loose tube no.2 of orange and so on for other tubes as per the colour scheme given below at Table-1 and complete the circular format by placing the dummy /fillers at the end.

Table -1: Colour Coding scheme of Loose tube

Loose tube No./Sequence	Loose tube identi6ication
1	Blue
2	Orange
3	Green
4	Brown
5	Slate
6	White
7	Red
8	Black
9	Yellow
10	Violet
11	Rose/Pink
12	Aqua

Depending upon the number of fibres in a Ribbon (which depends on the cable capacity), the fibres within each Ribbon are serially chosen starting from blue colour as per the colour scheme given below at Table-2.

Table-2: Colour Coding scheme of the Optical Fibre within Ribbon

Fiber No./Sequence within Ribbon	Fibre Identi6ication
1	Blue
2	Orange
3	Green
4	Brown
5	Slate
6	White
7	Red
8	Black
9	Yellow
10	Violet
11	Rose/Pink
12	Aqua

5.2.1 Identification of Ribbon:

No. of 6ibre in a Cable	No. of Tube s	No. of Ribbon per Tube	Fibe r Per	Marking on Ribbon
48 Fibres	4 Tubes 1 Filler	2	6	Individual Ribbon shall be printed with respective number
96 Fibres	4 Tubes 1 Filler	4	6	Individual Ribbon shall be printed with respective number
144 Fibres	4 Tubes 1 Filler	6	6	Individual Ribbon shall be printed with respective number as 1, 2, 3, 4, 5, 6.
216 Fibres	6 Tubes	6	6	Individual Ribbon shall be printed with respective number as 1, 2, 3, 4, 5, 6.
288 Fibres	8 Tubes	6	6	Individual Ribbon shall be printed with respective number as 1, 2, 3, 4, 5, 6.

Note: The individual number marking shall be at regular interval of every 300 mm or lesser on natural color ribbon and shall be legible. The printing on the ribbon shall also be of durable quality and shall be compatible with coating of the ribbon and Thixotropic Jelly (filled in the loose tube of the cable).

6 Quality Requirements:

6.1 The cable shall be manufactured in accordance with the international quality standards ISO 9001-2015 or latest issue for which the manufacturer should be duly accredited. The Quality Manual shall be submitted by the manufacturer.

6.2 Raw Material:

6.2.1 The cable shall use the raw materials approved against the Standard No. TEC 89010:2021(or latest release) and the subsequent amendments issued, if any. The list and details of the Raw Materials used, the make and grade of the raw material and valid certificate of source approval issued by CACT or any Conformity Assessment Body(CAB) recognized by TEC, shall be submitted by the manufacturer.

6.2.2 Any other material used shall be clearly indicated by the manufacturer. The detailed technical specifications of such raw materials used shall be furnished by the manufacturer at the time of evaluation/testing.

6.2.3 The raw materials used from multiple sources is permitted and the source / sources of raw materials (Type and grade) from where these have been procured shall be submitted by the manufacturer.

6.2.4 The manufacturer can change the raw material from one approved source to other approved source with the approval of QA wing of purchaser. The change of source/grade of SM optical Fibre and/or design of cable shall call for fresh approval/certification. The clauses 10.2 and 10.3 of this Standard for GR shall facilitate the clause 6.2.4 of this Standard for GR, in order to simplify the certification process and to avoid repetitive testing.

6.2.5 The raw material used (HDPE black in colour) for outer sheath shall protect the cable from attack by termite. The manufacturer shall specify anti-termite additives used if any, and submit the detail characteristics of the material and additives used to make it termite proof. The cable shall be tested for the presence of Anti- termites additives by recognised laboratory or institute. The additives/dopants used if any, shall be non-toxic and nonhazardous. The non-toxicity, thermal stability, half-life, efficacy etc. of additives/dopants shall be tested by recognized laboratory or institute. The

cable shall be tested for its termite proof-ness by recognised laboratory or institute.

6.2.6 The HDPE black in colour used for sheath shall be UV stabilised.

Note:

A test certificate from CACT or from any Conformity Assessment Body(CAB) recognized by TEC may be acceptable for the UV stability of the HDPE sheath material. Source

Approval Certificate (SAC) issued by CACT against Standard No. TEC 89010:2021(or latest release) for the HDPE raw material used, indicating UV stabilized grade, may also be acceptable in this respect.

6.2.7 The material used in optical fibre cable must not evolve hydrogen that will affect the characteristics of optical fibres.

Note: A test certificate from a recognised laboratory or institute may be acceptable.

6.3 Cable Material Compatibility:

Optical fibre, buffers/core tubes, and other core components shall meet the requirements of the compatibility with buffer/core tube filling material(s) and/or water-blocking materials that are in direct contact with identified components within the cable structure (This shall be tested as per clause no. 6.3.3 of Telecordia document GR-20-CORE issue 4, July 2013 or as per IEC 60794-1-219).

Note: The tests may be conducted in house (if facility exist) or may be conducted at CACT or at any Conformity Assessment Body(CAB) recognized by TEC. The test certificate may be accepted and the tests may not be repeated subsequently, in next type approvals, if the raw material used is of same make and grade.

7 Safety Requirements:

7.1 The material used in the manufacturing of the Optical fibre cables shall be non-toxic and dermatologically safe in its life time and shall not be hazardous to health. The manufacturer shall submit MSDS (Material safety Data Sheet) for all the material used in manufacturing of OF Cable to substantiate the statement.

ABBREVIATIONS

ASTM - American Society for Testing and Materials
BIS - Bureau of Indian Standards
CACT - Component Approval Centre For Telecommunications
dB - decibel
EIA - Electronic Industries Association
ESCR - Environmental Stress Crack Resistance
FRP - Fibre Rinforced Plastic
FOTP - Fibre Optic Test Procedure
HDPE - High Density Polyethylene
IEC - International Electro -Technical Commission
ISO - International Organization for standardization
ITU-T - International Telecommunication UnionTelecommunication Standardization Sector

MFD - Mode Field Diameter
MSDS - Material Safety Data Sheet
QA - Quality Assurance
SM - Single Mode
TEC - Telecommunication Engineering Centre
UV - Ultra Violet
µm - Micrometer
oC - Degree Celsius

Annexure - I

(Semi Dry Core Design)

The following parameters of the component of the cable are to be taken in to account while designing and manufacturing the optical fibre cables of the required fibre count. These parameters shall be checked during evaluation of the OF cables.

SN	Parameter	Unit	48F Ribbon Fibre	96F Ribbon Fibre	144F Ribbon Fibre Cable	216F Ribbon Fibre Cable	288F Ribbon Fibre Cable
1	FRP Rod EAA Coated	mm					
2	FRP Up-coating	mm					
3	Tube ID (min)	mm					
4	Tube OD	mm					
5	No of oibre / ribbon	No	6	6	6	6	6
6	No of Ribbon in a	No	2	4	6	6	6
7	Color of oibre per Ribbon		BL,OR, GR, BR,SL, W H	BL,OR, GR, BR SL WH	BL,OR, GR, BR SL WH	BL,OR, GR, BR SL WH	BL,OR, GR, BR SL WH
8	No of loose tubes	No	4 with 2 Ribbons	4 with 4 Ribbons	4 with 6 Ribbons	6 with 6 Ribbons	8 with 6 Ribbons
9	Colour of loose tubes		BL,O R, GR	BL,OR, GR, BR	BL,OR, GR, BR	BL,OR, GR, BR	BL,OR,GR ,BR,SL,W H, RD,
10	No of dummy cord	No	1	1	1	0	0

11	Tube stranding lay over length	mm					
12	Qty. of Impregnated	Kg					
13	Outer Sheath Thickness(min)	mm					
14	Cable diameter	mm					
15	Cable weight	Kg/km					
16	Cable to be designed to Fibre strain value of.	%					
17	Cable to be tested at deoined load for oibre strain value of	%					

Note: The manufacturer shall submit the design calculations which shall be cross checked.

Annexure C: ENGINEERING INSTRUCTIONS FOR UNDER GROUND OPTICAL FIBRE CABLE LAYING WORKS

a) Scope

The Engineering Instructions spelt out in this document deal with the methods to be adopted for underground Optical Fiber Cable laying in PLB HDPE ducts and termination of OF Cables at Gram Panchayats (GPs) for BharatNet Projects. The methods of underground OFC laying included in this EI are

1.Open trenching method

2.Horizontal drilling method (HDD)

Under this RFP unified rates have been taken irrespective of the method used for OFC laying, therefore PIA has to take appropriate decision to adopt any of the above method depending upon the feasibility, time frame, meeting SLA over the contract period and O&M. The PIA has to follow the guidelines for open trenching method or HDD method adopted by him as under.

b) Optical Fibre Cable Laying Approach

On the basis of the survey reports done by CONTRACTOR and further approved by GFGNL, routes for OF cable laying shall be finalized. Road Cutting Permission shall be obtained from road and rail authorities for laying the Optical Fiber Cable along the finalized roads and at rail / road crossing along the route. Generally, O.F. Cable may preferably be laid straight as far as possible along the road near the boundaries, away from the burrow pits. When the O.F. Cable is laid along the National Highways, Cable should run along the road land boundary or at a minimum distance of 15 meters from the center line of the road where the road land is wider as the OFC carries high capacity traffic and is planned for about 25 to 30 years of life. It is essential that the cable is laid after obtaining due permission from all the concerned authorities to avoid any damage (which may result in disruption of services / revenue loss) and shifting in near future due to their planned road widening works. For obtaining RoW GFGNL will facilitate the CONTRACTOR.

In special cases where it may be necessary to avoid burrow pits or low lying areas, the Cable may be laid underneath the shoulders at a distance of 0.6 meter from the outer edge of the road embankment provided the same is located at least 4.5 meters away from center line of road.

While laying new cables/ rectifying asset, the PIA must coordinate with the relevant authorities, such as those responsible for roads, gas lines, bridges, or railways, etc. The tenderer will not cover any additional costs associated with this coordination, installation and maintenance. The PIA also assumes all future risks associated with the new cable laying.

c) General

Soil Classification

Soil shall be classified under two broad categories Rocky and Non-Rocky, The soil is categorized as rocky if the cable trench cannot be dug without blasting and / or chiseling. All other types of soils shall be categorized as Non-Rocky including Murrum & soil mixed with stone or soft rock.

Rocky soil

The terrain which consists of hard rocks or boulders where blasting/ chiseling is required for trenching such as quartzite, granite, basalt in hilly areas and RCC (reinforcement to be cut through but not separated) and the like.

Non-Rocky soil

This will include all types of soil- soft soil/hard soil/Murrum i.e. any strata, such as sand, gravel, loam, clay, mud, black cotton murrum, shingle, river or nullah bed boulders, soling of roads, paths etc. (All such soils shall be sub-classified as kachcha soil) and hard core, macadam surface of any description (water bound, grouted tarmac etc.), CC roads and pavements, bituminous roads, bridges, culverts (All such soils shall be classified as Pucca soils)

d) The Optical Fibre Cable shall be laid through PLB HDPE Ducts buried at a nominal depth of 165cm. The steps involved in OF Cable laying are as under

Excavation of trench up to a nominal depth of 165 cm in non-Rocky soil, according to construction specifications along National/State Highways/other roads and in built up /rural areas. Under exceptional conditions/ genuine circumstances due to site constraints/ soil conditions, relaxation can be granted by the competent authority for excavation of trench to a depth lesser than 165cm. Such relaxation shall be given as per the laid down norms/ procedures being set by State/SIA and with the approval of the competent authority. The payment in such cases shall be made on pro-rata basis as per the laid down norms adopted by the concerned State/SIA.

Laying of PLB HDPE Ducts/coils coupled by sockets in excavated trenches, on bridges and culverts, as per construction specification and sealing of PLB HDPE Ducts pipe ends at every manhole by end-plugs of appropriate size.

Providing additional protection by R.C.C. Pipes/GI pipes and/or concreting/chambering, wherever required according to construction specification.

Fixing of GI pipes/troughs with clamps on culverts/bridges and/or chambering or concreting of G.I. Pipes/troughs, wherever necessary.

Laying Protection Pipes on Bridges and Culverts. In case trenching and pipe laying is not possible on the culverts, the pipes shall be laid on the surface of the culverts/bridges after due permission from the competent authority within the concerned State/SIA as per construction specification.

Back filling and Dressing of the Trench according to construction specifications.

Manhole of size (1.0 m length x 1.0 m width x 1.65 m Depth) to be installed as loop chamber at following locations (but not limited to) as per industry best practice,

1. Every Km
2. At both sides of road crossings, culvert and bridge crossings.

At Every cable pulling location for housing the OF Cable loop & Pulling Optical Fiber Cable using proper tools and accessories. Sealing of both ends of the PLB HDPE pipe in manhole/joint chamber by hard rubber bush of suitable size to avoid entry of rodents into the PLB HDPE Ducts, putting split PLB HDPE Ducts and split RCC pipes with proper fixtures over cable in the manhole to protect the bare cable.

A loop of minimum 25 meter of OFC will be left in every manhole. Sealing of both ends of the PLB HDPE pipe in manhole by hard rubber bush of suitable size to avoid entry of rodents into the PLB HDPE Ducts.

Digging of pit of size 2-meter x 2 meter x 1.8 meter (depth) for fixing of Jointing chambered-cast RCC cover or stone of suitable size on jointing chamber to protect the Joint and backfilling of jointing chamber with excavated soil.

Digging of pits 50 cm to 100 cm towards jungle side at every manhole and jointing chamber along the route to a depth of 75cm fixing of route Indicator/joint indicator, concreting and backfilling of pits. Painting of route indicators with Blue colour and joint Indicator by Grey colour and sign writing denoting route/joint indicator number and marked as “GFGNL”, as per construction specification.

Dimension Of MH/HH Chambers:

#	Description	Proposed Chamber Specifications	Remarks
1	INNER DIAMETER	75 CM	
2	THICKNESS	7.5 CM	
3	HEIGHT IN JOINT CHAMBER (1+1 COLLAR EACH COLLAR 50CM HEIGHT)	80 CM	ONLY 1 COLLAR OF 80CM HEIGHT IS USED
4	HORIZONTAL IRON ROD RING USED	6 MM	
5	HORIZONTAL IRON ROD RING USED	4 NOS.	
6	VERTICAL BARS IRON	10 MM	

#	Description	Proposed Chamber Specifications	Remarks
7	VERTICAL BARS IRON USED	10 NOS.	
8	TOP COVER THICK	100 MM	
9	BOTTOM COVER THICK	50 MM	
10	CONCRETING	MIX: 01:02:03	

e) Specifications of Materials to be used

PLB HDPE Duct

Optical Fiber Cables should be pulled though Permanently Lubricated HDPE Duct of 40mm/33 mm size conforming to the specifications as per. TEC/GR 72030:2019 with latest Amendments. The Ducts shall be blue in colour and single color per each island and have the identification markings as per TEC GR wherein “Gujarat Fibre Grid (GFGNL)” logo shall be marked as GFGNL’s name

Push fit Coupler

Push Fit couplers shall be used for coupling PLB HDPE ducts/coils. The specifications of the couplers shall be as per GR no TEC/GR 72030:2019 with latest amendments.

PP Rope

Should confirm to GR No. TEC/GR 72030:2019 with latest Amendments. However, this is optional and CPSUs may use the same on need basis. The PP rope can be ordered along with the PLB duct as required. In this case PP ropes drawn through the HDPE/PLB pipes/coils and safely tied to the end caps at either ends with hooks to facilitate pulling of the OF cables at a later stage. The rope used is 3 strands Polypropylene Para Pro rope having yellow colour and size of 4 mm diameter. It should have a minimum breaking strength of 550 kgs. The length of each coil of rope should be 5 meter more than the standard length of duct (or as ordered) and it should conform to (i) BS 4928 Part-II of 1974 (ii) IS 5175 of 1982. It should be of special grade and should have ISI certificate mark. It should be manufactured out of industrial quality Polypropylene.

End Cap

End Cap shall be used for sealing the ends of the empty ducts, prior to installation of the OF Cable and shall be fitted immediately after laying the duct to prevent the entry of any dirt, water, moisture, insects/rodents etc. It should confirm to TEC GR No. TEC/GR 72030:2019 with latest amendments. The ends of the PLB HDPE ducts/coils laid in the manholes should be closed with End Caps. The End Caps used should be suitable for closing40mm/33mm PLB HDPE ducts/coils. A suitable arrangement should be provided in the End Cap to tie PP Rope. (See figure-1 for details)

Cable sealing Plug

This shall be used to seal the end of the ducts perfectly, after the OF cable is pulled in the duct. For pulling the cable through the ducts, it is necessary to provide manholes at that location and also at bends and corners wherever required. The ends of the PLB HDPE ducts/coils are closed with Cable sealing Plugs. The End Plugs used should be suitable for closing 40mm/33mm PLB HDPE ducts/coils. The Cable sealing plug shall confirm to TEC GR No. TEC/GR 72030:2019 with latest amendments. (Wherever blowing technique is used for laying OF Cable, at the discretion of the CPSUs concerned, the hand holes/manholes required for accessing the cable during cable laying can be at longer distances depending upon requirement.)

RCC Full Round Pipes: Reinforced cement concrete pipes (spun type) coupled with RCC collars sealed with cement mortar used to provide additional protection to PLB HDPE Ducts/coils at lessor depths should be of full round, NP-2 class and size 100 mm (internal diameter), conforming to IS standard 458-1988 with latest amendments. The pipes should have a nominal length of 2 meters.

The RCC collars should be properly sealed using cement mortar 1:3 (1:53 grade cement of reputed brand, 3: fine sand without Impurities). If case of long spans, every third joint will be embedded in a concrete block of size 60 cm (L) x 40cm (W) x 25 cm (H) of 1:2:4 cement concrete mix (1: cement, 2: coarse sand, 4: stone aggregate of 20 mm nominal size) so that the alignment of RCC pipes remain firm and intact. Also, both ends of RCC pipes spans will be sealed by providing concrete block of size 40 cm (L) x 40 cm (W) x 25 cm (H) of 1:2:4 cement concrete mix to avoid entry of rodents.

RCC Split Pipes: The split Reinforced cement concrete pipes (spun type) with in-built collars are used to provide additional protection to PLB HDPE Ducts/coils should be of 100mm internal

dia.(Spotted), Class--NP-3, Thickness: 25mm, Length: 2 Meters with inbuilt collaret one end, Conforming to ISI Specification IS: 458, 1988 with latest amendment

G.I. Pipes: G.I. pipes should be of medium duty class having inner diameter of 50mm andshould conform to specifications as per IS 554/1985 (revised up to date) IS 1989 (Part- I), 1900 Sockets (revised up to date) & IS 1239 (Part-II) 1992 (revised up to date).

DWC Pipes: Use of normal duty DWC (Double walled corrugated) HDPE pipe confirming to TEC GR no.GR/ with latest amendments shall be preferably utilized as first choice for protection of Optical Fiber Cable instead of GI pipes. The DWC pipes used shall be of size 75/61mm as per table 2 of the said TEC GR.

M.S. Weld Mesh: The PLB HDPE Ducts can also be protected by embedding it in concrete of size of 25 cm x25 cm reinforced with MS weld mesh. The MS weld mesh used should be of 50 mm x 100mm size, 12 SWG, 120 cm in width in rolls of 50m each. One meter of MS weldMesh caters to approx. 3 meters of concreting (See figure '2' for details). The strength of RCC/CC is dependent on proper curing, therefore, it is imperative that water content of CC/RCC mix does not drain out into the surrounding soil. In order to ensure this, the RCC/CC work should be carried out by covering all the sides by yellow PVC sheets of weight not less than 1 kg per 8 sqm to avoid seepage of water into the soil.

Joint Chamber: The Joint chamber shall be provided at every joint location to keep the OF cable joint well protected and also to house extra length of cable which may be required in the event of faults at a later date. The Joint chamber shall be of pre-cast RCC type as per construction specification. Brick chamber can also be made with prior permission of GFGNL.

Rubber Bush: To prevent entry of rodents into PLB HDPE DUCTS, the ends of PLB HDPE DUCTS are sealed at every manhole and joint using rodent resistant hard rubber bush (cap) after optical Fiber cable is pulled. The rubber bush should be manufactured from hard rubber with grooves and holes to fit into 40 mm PLB HDPE DUCTS pipe, so that it should be able to prevent the entry of insects, rodents, mud, and rainwater into the PLB HDPE DUCTS pipe. It should conform to TEC GR with latest amendments. (See Figure-3)

Route/Joint Indicator: The Route/Joint indicators are co-located with each manhole/joint chamber. In addition Route indicators are also to be placed where route changes direction like road crossings etc. Either RCC/Pre-cast or Stone based route indicators can be used. The detailed specification and design of the same shall be as per construction specification. Generally, Stone Route indicators shall be used for the BharatNet Project. Alternatively electronic markers shall be used for joint indicators by fixing/tying them to joint closure.

f) Exacavation Of Trenches

Trenching

Location and Alignment of the Trench: In built up areas, the trench will normally follow the foot-path of the road except where it may have to come to the edge of the carriage way cutting across road with specific permissions from the concerned authorities maintaining the road (such permissions shall be obtained by the department as per MOU signed with respective State Govt.). Outside the built up limits the trench will normally follow the boundary of the roadside land. However, where the road side land is full of burrow pits or afforestation or when the cable has to cross culverts/ bridges or streams, the trench may come closer to the road edge or in some cases, over the embankment or shoulder of the Road (permissions for such deviations for cutting the embankment as well as shoulder of the road shall be obtained). The alignment of the trench will be decided by a responsible official of the GFGNL

Once the alignment is marked, no deviation from the alignment is permissible except with the approval of GFGNL. While marking the alignment only the center line will be marked and the CONTRACTOR shall set out all other work to ensure that, the excavated trench is as straight as possible. The CONTRACTOR shall provide all necessary assistance and labor, at his own cost for marking the alignment. CONTRACTOR shall remove all bushes, undergrowth, stumps, rocks and other obstacles to facilitate marking the centre line without any extra charges. It is to be

ensured that minimum amount of bushes and shrubs shall be removed to clear the way and the CONTRACTOR shall give all, consideration to the preservation of the trees.

The line-up of the trench must be such that PLB pipe(s) shall be laid in a straight line, both laterally as well as vertically except at locations where it has to necessarily take a bend because of change in the alignment or gradient of the trench, subject to the restrictions mentioned elsewhere.

Line-Up: The line-up of the trench must be such that PLB HDPE Ducts shall be laid in a straight line except at locations where it has to necessarily take a bend because of change in the alignment or gradient of the trench, subject to the restrictions mentioned elsewhere.

Method of Excavation

In built up areas, the PIA shall resort to use of manual labour / HDD only to ensure no damage is caused to any underground or surface installations belonging to other public utility services

and/or private parties.

However, along the Highways and cross country there shall be no objection to the PIA resorting to mechanical means of excavation, provided that no underground installations existing the path of excavation, if any, are damaged.

There shall be no objection to resort to horizontal boring to bore a hole of required size and to push through G.I. Pipe (50 mm ID) through horizontal bore at road crossing or rail crossing or small hillocks etc.

All excavation operations shall include excavation and ‘getting out’. ‘Getting out’ shall include throwing the excavated materials at a distance of at least one meter or half the depth of excavation, whichever is more, clear off the edge of excavation. In all other cases ‘getting out’ shall include depositing the excavated materials as specified.

In Rocky strata excavation shall be carried out by use of electro mechanical means like breakers/ jack hammers or by blasting wherever permissible with express permission from the competent authority. If blasting operations are prohibited or not practicable, excavation in hard rock shall be done by chiseling / jack hammers.

Trenching shall as far as possible be kept ahead of the laying of pipes. PIA shall exercise due care that the soil from trenching intended to be loose for back filling is not mixed with loose debris. While trenching, the PIA should not cause damage to any underground installations belonging to other agencies and any damage caused should be made good at his own cost and expense.

Necessary barricades, night lamps, warning board and required watchman shall be provided by the PIA to prevent any accident to pedestrians or vehicles. While carrying out the blasting operations, the PIA shall ensure adequate safety by cautioning the vehicular and other traffic. The PIA shall employ sufficient man-power for this with caution boards, flags, sign writings etc.

The PIA should provide sufficient width at the trench at all such places, where it is likely to cave in due to soil conditions without any extra payment. A minimum free clearance of 15 cm should be maintained above or below any existing underground installation. No extra payment will be made towards this. In order to prevent damage to PLB HDPE DUCTS over a period of time, due to the growth of trees, roots, bushes, etc., the PIA shall cut them when encountered in the path of alignment of trench without any additional charges.

In large burrow pits, excavation may be required to be carried out for more than 165 cm in-depth to keep gradient of bed less than 15 degrees with horizontal. If not possible as stated above, alignment of trench shall be changed to avoid burrow pit completely.

Depth and Size of the Trench

The depth of the trench from top of the surface shall not be less than 165 cm unless otherwise relaxation is granted by State/SIA under genuine circumstances.
In rocky terrain, less depth shall be allowed only in exceptional circumstances with additional protection where it is not possible to achieve the normal depth due to harsh terrain/ adverse site conditions encountered. This shall be done only with the approval of the State/SIA. This shall be

properly documented. In all cases, the slope of the trench shall not be less than 15 degrees with the horizontal surface. The width of the trench shall normally be 45 cm at the top & 30 cm at the bottom.

In case, additional pipes (HDPE/GI/RCC Pipes) are to be laid in some stretches, the same shall be accommodated in this normal size trench.

When trenches are excavated in slopes, uneven ground and inclined portion, the lower edge shall be treated as top surface of land and depth of trench will be measured accordingly. In certain locations, such as uneven ground, hilly areas and all other Places, due to any reason whatsoever it can be ordered to excavate beyond standard depth of 165 cm to keep the bed of the trench as smooth as possible. Near the culverts, both ends of the culverts shall be excavated more than 165 cm to keep the gradient less than 15 degree with horizontal. For additional depth in excess of 165 cm, no additional payment shall be applicable.

If excavation is not possible to the minimum depth of 165 cm, as detailed above, full facts shall be brought to the notice of the State/SIA in writing giving details of location and reason for not being able to excavate that particular portion to the minimum depth.

Approval shall be granted by the State/SIA in writing under genuine circumstances. The decision of the State/SIA shall be final and binding on the PIA. All the relaxations granted as specified above shall be dealt with as per the laid down norms and procedure of State/SIA.

Dewatering: The PIA shall be responsible for all necessary arrangements to remove or pump out water from trench. The PIA should survey the soil conditions encountered in the section and make his own assessment about dewatering arrangement that may be necessary. No extra payment shall be admissible for this.

Wetting: Wherever the soil is hard due to dry weather conditions, if watering is to be done for wetting the soil to make it loose, the same shall be done by the PIA. No extra payment shall be admissible for this.

Blasting: For excavation in hard rock, where blasting operations are considered necessary, the PIA shall obtain approval of the State/SIA in writing for resorting to blasting operation. The PIA shall obtain license from the State/SIA for undertaking blasting work as well as for obtaining and storing the explosive as per the Explosive Act, 1884 as amended up to date and the explosive Rules, 1983. The PIA shall purchase the explosives fuses, detonators, etc. only from a licensed

dealer. Transportation and storage of explosive at site shall conform to the aforesaid Explosive Act and Explosive Rules. The PIA shall be responsible for the safe custody and proper accounting of the explosive materials. Fuses and detonators shall be stored separately and away from the explosives. The State/SIA or his authorized representative shall have the right to check the PIA's store and account of explosives. The PIA shall provide necessary facilities for this. The PIA shall be responsible for any damage arising out of accident to workmen, public or property due to storage, transportation and use of explosive during blasting operation. Blasting operations shall be carried out under the supervision of a responsible authorized agent of the PIA (referred subsequently as agent only), during specified hours as approved in writing by the State/SIA. The agent shall be conversant with the rules of blasting. All procedures and safety precautions for the use of explosives drilling and loading of explosives before and after shot firing and disposal of explosives shall be taken by the PIA as detailed in IS: 4081 safety code for blasting and related drilling operation.

Trenching Near Culverts/ Bridges: The PLB HDPE Ducts shall be laid in the bed of culvert at the depth not less than 165 cm protected by RCC pipes as decided by State/SIA. Both ends of culverts shall be excavated more than 165 cm in depth to keep the gradient of not less than 15 degree with horizontal. The bed of trench should be as smooth as possible.

While carrying out the work on bridges and culverts, adequate arrangement for cautioning the traffic by way of caution boards during day time and danger lights at night shall be provided .In case of small bridges and culverts, where there is a likelihood of their subsequent expansion and remodelling, the cable should be laid with some curve on both sides of the culvert or the bridge to make some extra length available for readjustment of the cable at the time of reconstruction of culvert or the bridge.

g) Laying OF PLB HDPE Ducts

After the trench is excavated to the specified depth, the bottom of the trench has to be cleared of all stones or pieces of rock and levelled up properly. A layer of soft soil/or sand (in case the excavated material contains sharp pieces of rock/stones) of not less than 5 cm is required for levelling the trench to ensure that the cable when laid will follow a straight alignment. Adequate care shall be exercised while laying so that the OF cables are not put to undue tension/pressure

after being laid as this may adversely affect the optical characteristics of cables with passage of time.

The PIA shall ensure that trenching and pipe laying activities are continuous, without leaving patches or portions incomplete in between. In case intermediate patches are left, measurement of the completed portions will be taken only after work in such left over patches are also completed in all respects.

Preparatory to aligning the pipe for jointing, each length of the PLB HDPE Ducts shall be thoroughly cleaned to remove all sand, dust or any other debris that may clog, disturb or damage the optical Fibre cable when it is pulled at a later stage. The ends of each pipe and inside of each Socket shall be thoroughly cleaned of any dirt or other foreign materials.

After the trench is cleaned the PLB HDPE Ducts/Coil shall be laid in the cleaned trench, jointed with Sockets. Drawing up of PP rope is optional as per TEC GR. In case of use of PP Rope, at every manhole approximately at every 200m or at bends or turns the PP rope will be tied to the HDPE end caps used for sealing the PLB HDPE Ducts, to avoid entry of rodents/mud etc.

At the end of each day work, the open ends of the pipes sections shall be tightly closed with endcaps to prevent the entry of dirt/mud, water or any foreign matter into PLB HDPE Ducts until the work is resumed. In built up area falling within Municipal/Corporation limits, the PLB HDPE Ducts shall be laid with protection using RCC Pipes/ Concreting reinforced with weld mesh (only in exceptional cases).

For lesser depths requiring additional protection in built up areas, towns and cities falling within t the municipal limits, suitable protection shall be provided to PLB HDPE pipes/coils using RCC/DWC full round/split pipes or GI pipes or cement concreting reinforced with MS weld mesh or a combination of any of these as per the site requirement. This shall be done only with the prior instructions/approval of the State/SIA. The specifications for providing each of these protections are given later in this document.

Moreover, in cross country routes, if depth is less than 1.2 meters, protection by using RCC/DWC Pipe shall be provided. State/SIA shall decide about such stretches and type of protection to be provided in view of the site requirements. Normally 63/100 mm RCC /DWC Pipes shall be used for protecting PLB HDPE Ducts but if more than one PLB pipe is to be laid and protected, RCC/DWC Pipe of suitable size to accommodate the required number of PLB Pipes shall be used.

The PLB HDPE Ducts shall be laid in RCC Full Round spun Pipes/GI Pipes as required at Road crossings. The RCC pipes/GI pipes shall extend at least 3 meters on either side of the road at Road crossings. At Road crossings, extra GI/PLB HDPE Ducts may be laid as per the direction of

the State/SIA. On Rail bridges and crossings, the PLB HDPE Ducts shall be encased in suitable cast iron as prescribed by the Railway Authorities.

Wherever RCC pipes are used for protection, the gaps between the RCC collars and the RCC pipes shall be sealed using cement mortar 1:3 (1:53 grade cement of reputed brand, 3: fine sand without impurities) to bar entry of rodents. Every third collar of RCC pipes (normally of 2 meters length) and also both ends of RCC Pipes will be embedded in a concrete block of size 40 cm (L)x 40 cm(W) x 25 cm (H) of 1:2:4 cement concrete mix (1:53 grade cement of reputed brand, 2: coarse sand, 3: stone aggregate of nominal size of 20 mm) so that the alignment of RCC pipes remain firm and intact and to avoid entry of rodents.

Wherever GI pipes are used, special care should be taken to ensure that G.I. Pipes are coupled properly with the sockets so as to avoid damage to PLB pipe and eventually the OF Cable in the event of pressure coming on the joint and G.I. Pipe joint giving its way. Rubber bushes shall be used at either ends of the GI pipes to protect PLB pipe. Both the ends of G.I. Pipe will be embedded in a concrete block of size 40 cm (L) x 40 cm ((W) x 25 cm (H) of 1:2:4 cement concrete mix (1:53 grade cement of reputed brand, 2: coarse sand, 3: stone aggregate of nominal size of 20 mm) so that the alignment of G.I. Pipes remain firm and intact and to avoid entry of rodents.

In case of protection by concreting at site, the nominal dimension of concreting shall be 250 mm x250 mm section. Cement Concrete Mixture used shall be of 1:2:4 composition i.e. 1:53 grade Cement of a reputed company, 2: Coarse Sand, 4: Graded Coarse Stone aggregate of 20 mm nominal size, reinforced with MS weld mesh. As the RCC is cast at site, it is imperative to ensure that special care is taken to see that proper curing arrangements are made with adequate supply of water. The PIA shall invariably use mechanical mixer at site for providing RCC protection, to ensure consistency of the mix.

For carrying out concreting work in trenches, yellow PVC sheets of width not less than 1.0 M and of weight not less than 1 kg. Per 8 sq. meters shall be spread and nailed on sides of the trench to form trapezoidal section for concreting in the cleaned trench, to avoid seepage of water into the soil.

A bed of cement concrete mixture of appropriate width and 75 mm thickness shall be laid on the PVC sheet, before laying PLB HDPE ducts. The PLB HDPE Ducts shall then be laid above this bed of concrete. After laying the PLB HDPE Ducts, MS weld mesh is wrapped around and tied and concrete mix is poured to form the cross sectional dimensions as instructed by the State/SIA.

The strength of RCC is dependent on proper curing therefore, it is imperative that water content of RCC mix does not drain out into the surrounding soil. Portions where cement concreting has been carried out shall be cured with sufficient amount of water for reasonable time to harden the surface. After curing, refilling of the balance depth of the trench has to be carried out with excavated soil.

The PLB HDPE Ducts/RCC/GI Pipes shall be laid only in trenches accepted by State/SIA or his representative. The PIA shall exercise due care to ensure that the PLB HDPE Ducts are not subjected to any damage or strain.

Water present in the trench at the time of laying the PLB HDPE Ducts shall be pumped out by the PIA before laying the pipes in the trench to ensure that no mud or water gets into the pipes, thus choking it.

In case of nallahs, which are dry for nine months in a year, the PLB HDPE Ducts shall be laid inside the RCC Pipes laid at a minimum depth of 165 cm, as instructed by the State/SIA. The mechanical protection shall extend at least 5 meters beyond the bed of nallah on either side.

Notwithstanding anything contained in clauses referred above, the State/SIA may order, based on special site requirements, that the PLB HDPE Ducts may be encased in reinforced cement concrete, as detailed, ibid. While laying the pipes, a gap of 2 M is kept at convenient locations approx. 200 m apart and at the bends and turns, which will be used as manholes during OF cable pulling. Ends of the PLB HDPE Ducts at the manholes shall be sealed using end caps after tying the PP rope to the end caps to avoid choking of the pipes. In a similar manner, manholes shall be kept while approaching bridges, road crossings etc., as instructed by the State/SIA. The location of the manholes will be decided by the State/SIA

Warning Tap :

Warning tap to be laid in trench as per industry standard.

Laying Protection Pipes on Bridges and Culverts:

In case trenching and pipe laying is not possible on the culverts, the pipes shall be laid on the surface of the culverts/bridges after due permission from the State/SIA. Of late the bridge construction authorities are providing channel ducts on the footpaths on the bridges for various services. The RCC/DWC/ G.I. Pipes can be laid in these ducts for pulling cables. However, for

laying cables on existing bridges, where duct arrangement does not exist, one of the following methods may be adopted.

In case of the Bridges/Culverts, where there are no ducts and where the cushion on the top of the Arch is 50 cm to 100 cm or more, G.I. Pipe (Carrying PLB HDPE pipe and cable) may be buried on the top of the Arch adjoining the parapet wall, by digging close to the wheel guards. Every precaution shall be taken to see that no damage occurs to the arch of the culvert. After burying the GI pipe, the excavated surface on the arch shall be restored.

Where the thickness of the Arch is less than 50 cm, the pipe must be buried under the wheel guard masonry and the wheel guard rebuilt.

If neither of the two methods is possible, the G.I. Pipes/GI Troughs must be clamped on the parapet wall with the clamps. If necessary, the pipes may be taken through the parapet wall at the ends where the wall diverges away from the road.

Methods cited in above clauses should be carried out under close supervision of Road authorities. The surface to be concreted should be thoroughly cleaned and levelled before concreting. At both ends of the Bridges/Culverts, where the GI Pipes /GI Troughs slope down and get buried, the concreting should be extended sufficiently to ensure that no portion of the GI Pipes/GI Troughs is exposed as approved by the State/SIA to protect the pipe/trough from any possible externally caused damage.

Where white wash/colour wash is existing on the Bridges/ Culverts, the same should also be carried out on the concreted portion to ensure uniformity.

h) Back Filling and Dressing of the Trench

Provided that the PLB HDPE pipes have been properly laid in the trench at the specified depth, the back filling operation shall follow as early as practicable. The earth used for filling shall be free from all roots, Grass, shrubs, vegetation, trees, saplings and any other kind of garbage or pebbles. The back filling operation shall be performed in such a manner so as to provide firm support under and above the pipes and to avoid bend or deformation of the PLB HDPE pipes when the pipes get loaded with the back filled earth.

At locations where the back filled materials contains stones/sharp objects which may cause injury to the PLB HDPE pipes and where the excavated or rock fragments are intended to refill the trench

in whole or in part, the trench should be initially filled, with a layer of ordinary soil or loose earth (free from any stones/pebbles) not less than 10 cm thick over the pipes.

Back filling on public, roads, railway crossings, footpaths in city areas shall be performed immediately after laying the HDPE pipes. Back filling at such locations shall be thoroughly rammed, so as to ensure original condition so that it is safe for the road traffic. All excess soil/ material left on road/ footpath/railway crossing shall be removed by PIA. However, along the highways and in country side, the excess dug up material left over after refilling should be kept in a heap above over the trench.

In city limits, at any given time not more than 50 Meters length of trench should be kept open and in all places where excavation has been done, no part of the trench should be kept open over night to avoid occurrence of any mishap or accident in darkness.

i) Restoration of Road Surface

Road restoration work to be made with bituminous macadam for semi grouting 50 mm thick and premix carpet surfacing 25 mm thick over the grouted surface (total up to 75 mm thick) including supply of asphalt etc. to evenly match the road, including consolidation and rolling as per standard specification of DSR 1997. This is responsibility of PIA for all restoration work.

Road restoration work with cement concrete 1:4:8 mix for thickness varying from 150 mm to 225 mm, including supply of concrete to be made to evenly match the road.

j) Cable Pulling And Joining/Splicing

CABLE PULLING

Manholes marked during PLB HDPE Ducts pipe laying of approx. size of 2.0 m length x 1.0 m width x 1.65 m depth shall be excavated for pulling the cables. There may be situations where addition manholes are required to be excavated, for some reasons, to facilitate smooth pulling of cable. Excavation of addition manholes will be carried out, without any extra cost. De-watering of the manhole, if required, will be carried out without any extra costs. Dewatering/ De-gasification of the Ducts, if required, will be carried out without any extra costs.

The Optical Fibre cable drums in lengths of approx. 2 km shall be used. The cables shall be blown / manually pulled (in exceptional cases) through already laid PLB HDPE DUCTS. This work is to be carried out under the strict supervision of site in-charge. It shall be ensured that during the blowing / pulling of Cable the tension is minimum and there is no damage to the Cable/Optical Fibres. The PIA will ensure that manufacturer's guidelines for minimum bend radius and tension

are followed while installing the OFC. The PIA will handle the Optical Fibre Cable drums as per instructions given by the manufacturer.

After pulling of the drum is completed, both ends of the PLB HDPE DUCTS pipe in each Manhole should be sealed by hard rodent resistant rubber bush, to avoid entry of rodents/mud into PLBHDPE Ducts.

The Manholes are prepared by providing 40 mm split PLB HDPE DUCTS pipe of 2.5 to 3m length and closing the split PLB HDPE Ducts by providing necessary clamps/ adhesive tape as per the directions of State/SIA. Afterwards, the split/cut PLB HDPE DUCTS pipe are covered with 100 mm split RCC pipe of 2m length and sealing the ends of RCC pipe with lean cement solution for protecting bare cable in the manhole. After fixing of RCC Split Pipes necessary back filling/reinstatement and dressing of manholes should be carried out as referred under trenching. The location of the pulling manhole should be recorded for preparation of documentation.

Jointing/ Splicing

Optical Fibre Cable Joints between 96F feeder cable and 48F distribution cable will be at varying distances depending upon the road intersection point from where distribution fibre to be laid for connecting Panchayats. The 12 fibres are to be spliced at every Joint between feeder and distribution cables to provide each GP with minimum 12F connectivity & at both ends (Terminations) in the equipment room as directed by the State/SIA. The infrastructure required for cable splicing i.e.Splicing machine,OTDR,LSPM,Optical talk set,Tool kit etc.

Will be arranged by the PIA and also any additional accessories. e. g. Engine etc. required at site for splicing will also be arranged by the PIA.

The Optical Fibre Cable thus jointed end-to-end will be tested by the State/SIA/TPA officer of Acceptance Testing unit of the concerned State/SIA for splice losses and transmission parameters as specified by BBNL and prevalent at that time. The through Optical Fibre should meet all the technical parameters, specified and no relaxation will be granted.

The PIA will seal and install the Fibre Splice Joint closure assembly as per TEC norms

The PIA will carry one hour of leakage/ water penetration test on Fibre Splice Joint closures after installation.

The PIA will attach Cable tags to all OFC which are entering the Fibre Splice Joint Closure and OFC readings shall be recorded for updating in the As-build and GIS drawings.

The PIA will maintain an As-build route diagram and details for splicing of OFC for each GP through GIS tool having accuracy of 50 cm. The diagram shall indicate the cores from all OFC with their color coding and numbering. PIA will provide As-build route diagram every quarter during implementation phase and on 1st Jan of every year during O&M phase, then only next payment will be processed. These diagrams will be in high resolution pdf plus A2 sized print out covering one block per A2 sheet.

The As-build should incorporate Geo Coordinates (Lat-Long) of all the Point and Line assets as under:

Sr. No.	Layer	Features	Detailed information to be Captured
1	Optical Fiber Cable	Position of OFC Route @ every 10 Meter from the offset, Centre of Road	Lat Long of entire OFC route/ path up to 6 decimal / meter level accuracy, Position of Router, OLT, ONT, FPOI, Splitter, OFC Joints, Couplers, Manholes, Milestones, Culverts, Bridges/nallah, water bodies, crossroads, railway crossings, fly overs and public places like temples/mosque, bus stop, PHC, Post office, School, College, shops & other important landmarks etc
		OFC Cable Specifications and Deployment Details	Depth of OFC **(Recorded at the time of deployment)**, count of terminated and spare fibers, loop, make and size of cable deployed, Logical diagram, OTDR readings, Light Source Power Meter readings, Optical test results for each fibre.
		Route marker details	Cement Route Marker (Lat-Long), details & Route Marker Identification.
		OFC Alignment Details:	Overhead or Underground alignment, type of execution (HDD, OT, Aerial etc.), OFC protection used. ABDs shall be prepared in two parts, Part I: showing the overall cable laying routes for a block or tree from OLT to the ONT/FTB which shall identify the various cable laying sections and assets. Part II: shall contain detailed drawings of the various cable sections as depicted in Part I mentioned above. i.e. OFC route to be bifurcated in number of Grids of 200 to 250 meters and each Grid to be prepared in separate sheet (A4) with complete details. Each sheet to be assigned.

			a unique number
		RoW	Railway authority, NH, Forest authority and any other authority limits shall be recorded along with OFC path. Information should be shown in drawing as text (aligned to road centreline) at start/end of every 400 meters drawing or at authority change within 400 meters
		Road features	Length, width and type (RCC, Kuchha, pakka etc.). Variation in width of road may be recorded in meters taking offset from the centre of the road.
		Other Operators/Utility:	Presence of underground OFC of other operators, utility pipes, transmission cable etc. to be captured in map
2	OLT	OLT	Name, Code, Block, District, State, Make, PON ports, Power, Earthing, FDMS, HLD/LLD, Line Diagram
3	ONT	ONT	Name, Code, Block, District, State, Parent OLT, Make, Ports, FTB, Power etc.
4	Fibre splicing	Fibre splicing	Location, Fiber details
5	Splitters	Splitters	Make, Type, Fiber details
6	Joints and Couplers	Joints and Couplers	Location, number, depth, Type, Loop, loss detail
7	Codification	Codification	Codification of all BharatNet assets as per BBNL/NIC coding instructions.
8	Router	Router	Name, Code, Block, District, State, Make, PON ports, Power, Earthing, FDMS, HLD,LLD, Line Diagram

Note:

1. As Built Drawings (ABDs) shall be uploaded in the GIS platform in GIS format (Shape File, .shp).
2. Readings should invariably be recorded at every bend on the road, road/railway crossings, culverts, diversion etc. at every 5 meters.
3. For point feature like poles, trees, sewerage manholes, other utility chambers, transformers, bore well etc. which are approximately less than 1m diameter/length, shall be captured as a point and if the feature is more than 1m diameter/length, need to take the boundary. Every feature within survey corridor should be shown in drawing.
4. Separate sheets shall be used for recording details of cable sections where cable are laid by open trench, in duct and by HDD method. Separate diagrams (in blown-up details) may be prepared for major road/rail intersections for better clarity of details.
5. For all the linear features, geo coordinates shall be recorded at every turning point.
6. For all the utilities above ground viz. Poles, Manholes and telephone exchanges etc, details shall be recorded in a corridor of 50m (25m on either side of the road centerline or ROW of road whichever is more).
7. To and/or from direction to village, town, city etc. shall be recorded for all roads.
8. All the road KM stones shall be recorded and shown in drawing using symbol provided.
9. All the property boundaries with in the corridor shall be recorded and shown in drawing.
10. All features in the drawings shall be plotted with respect to drawing origin as 0,0,0 using UTM coordinates.
11. Three point's references need to be shown for every joint chamber/Pull through

Chamber/Manholes.

12. The details of various assets to be tabulated.
13. Collection of data (Custodianship of GPON equipment, location of school, college, hotels, post office, other Govt. offices, key contacts in GP etc.) in each Gram Panchayat and other important locations. Contact numbers of all the above Offices to be indicated.
14. The GIS mapped lengths shall be calibrated with OTDR measurements.
15. All the diagrams shall bear the signatures of the contractor and the project manager as a proof of accuracy of the details. The diagrams shall be bound in A-4 size book with cover. The cover sheets shall be laminated and should have the following details.
    a. Name of the Project Organization.
    b. Name of the OFC Link with ID.
    c. Name of the Contractor.
    d. Name of Survey Agency Rep as part of Acceptance Test.
    e. Name of BBNL Rep as part of Acceptance Test.
    f. Date of commencement of work.
    g. Date of completion of work.

The PIA will use Mid-Span Access Buffer Tube Slitter during mid-span splicing to ensure that buffer jackets of fibre tubes are cut longitudinally to access all ribbons / fibres inside tube and then only required ribbon / fibre cores will be cut for splicing.

During maintenance of the network, PIA will ensure that all fibre cores are spliced at the cut location (and not only live fibre cores) during rectification process. State/SIA/any third party as appointed may audit the health / continuity of all fibre cores at any time and PIA will have to facilitate this exercise by performing LSPM and OTDR testing in presence of this team.

k) Construction of Jointing Chamber :

The joint chambers are provided at every joint to keep the O.F.C. joint well protected and also to keep extra length of cable, which may be, required to attend the faults at a later date. Jointing chambers are to be prepared at the Fibre Point of Interconnect (FPIO) or normally at distance of every 2 km. Actual location of jointing chamber depends on length of cable drum and appropriateness of location for carrying out jointing work, tapping point for 96/48/24 connection.

The jointing chambers are constructed by way of fixing pre-cast RCC chambers/Brick Chambers and covers as per the instructions from State/SIA.

Precast RCC chamber

For fixing precast RCC chamber, first a pit of size 2 m x 2 m x 1.8 m depth shall be required to be dug. Precast RCC chamber shall consist of three parts (i) round base plate of 140 cm diameter and 5 cm thickness in two halves (ii) full round RCC joint chamber with diameter of 120 cm and

height of 100 cm and thickness of 5 cm (iii) round top cover will be in two halves with diameter of 140 cm and thickness of 5 cm having one handle for each half in centre and word ‘GFGNL OFC’ engraved on it. (See figure ‘4’). After, fixing the pre cast RCC joint chamber, the joint chamber is filled with clean sand before closing. Back filling of joint chamber pit with excavated soil shall be carried out in the end.

Brick Chamber

For constructing brick chamber, first a pit of size 2m x2 mx1.8 m depth is shall be required to be dug, then, base of the chamber shall be made using concrete mix of 1:5:10 (1 cement, 5 coarse sand, 10 graded stone aggregate of 40mm nominal size) of size of 1.7m x 1.7 m and 0.15 m thickness. Wall of brick chamber should be constructed on this base having wall thickness of 9” using cement mortar mix of 1:5 (1: cement, 5: fine sand). The chamber should have internal dimensions of 1.2 m x 1.2 m and 1 m height. The bricks to be used for this purpose should be of size 9” x 4.5” x 3”, best quality available and should have smooth rectangular shape with sharp corners and shall be uniform in colour and emit clear ringing sound when struck.

The joint chamber should be so constructed that PLB pipe ends remain protruding minimum 5 cm inside the chamber on completion of plastering. The PLB pipes should be embedded in wall in such a way that, the bottom brick should support the pipe and upper brick should be provided in a manner that PLB HDPE pipe remains free from the weight of the construction. The joint chamber should be plastered on all internal surfaces and top edges with cement mortar of 1:3 (1: cement, 3: coarse sand), 12 mm thick finished with a floating coat of complete cement as per standard. Pre-cast RCC slab with two handles to facilitate easy lifting, of size 0.7 m x 1.4 m and of thickness of 5 cm having one handle for each half in centre and word ''OFC' engraved on it are to be used to cover the joint chamber. Two numbers of such slabs are required for one joint chamber. This pre-cast slab should be made of cement concrete mix of 1:2:4 (1: cement, 2: coarse sand, 4: stone aggregate 6 mm nominal size) reinforced with steel wire fabric 75 x 25 mm mesh of weight not less than 7.75 Kg per sq. Meter. The joint chamber is filled with clean sand before closing. Back filling of joint chamber pit with excavated soil shall be carried out in the end

Fixing of Route Indicators / Joint Indicators

Pits shall be dug 50 cm to 100 cm towards jungle side at every Manhole and Jointing chamber for fixing of Route/Joint Indicator. In addition, Route Indicators are also required to be placed where O.F. Cable changes directions like road crossing etc.

The pits for fixing the indicator shall be dug for a size of 60 cm x 60 cm and 75 cm (depth).

The indicator shall be secured in upright position by ramming with stone and murrum up to a depth of 60 cm and concreting in the ratio of 1:2:4 (1: cement, 2: coarse sand, 4 stone aggregate 20 mm nominal size) for the remaining portion of 15 cm. Necessary curing shall be carried out for the concreted structure with sufficient amount of water for reasonable time to harden the structure.
RCC/Pre cast Route Indicators

The route /joint indicator made of pre-cast RCC should have the following dimensions
Base - 250 mm x 150 mm Top - 200 mm x 75 mm Height - 1250 mm (See Figure '5')
~~Stone based Route Indicators~~
~~The route /joint indicators made of Sand/lime Stone Should have the following dimension.~~ The word 'GFGNL OFC' should be engraved on the Route/Joint indicators.

~~Stone to be used (Sand/lime Stone)~~
Indicator Top surface to be rounded
Base 155 mm × 100 mm
Upper 500 mm length to be Tapered width wise as shown in the drawing and homogeneously finished.
Height 650mm (Straight) + 400 mm (Tapered)
The route indicators should be engraved with word 'OFC' of size 80mm length & 50mm, width.
Length 3.5 Ft., top 4"x4" dressed 1Ft. from top & tapered.

(See figure '6' for details of Stone Route Indicators)
The route indicators are to be placed at every 200 mts. and at every place where the cable changes direction. The Route indicators shall painted Blue and placed at 50 to 100 cm away from the centre of the trench towards jungle side. The Joint indicators are placed at OFC joints and placed at 50 to 100 cm away from wall of the joint chamber facing jungle side and are painted Grey. The engraved word "GFGNL OFC" should be painted in white, on route as well as joint indicators. Numbering of route indicators/joint indicators should also be done in white paint. The numbering scheme for route indicators will be Joint No./Route Indicator No. for that joint. For example, 2/6 marking on a route indicator means 6th route indicator after 2nd joint. Additional joints on account of faults at a later date should be given number of preceding joint with suffix A,

B, C, and D. For example sign writing 2A on a joint indicator means, additional joint between joint No. 2 and 3. The numbering of existing route/joint indicator should not be disturbed on account of additional joints. Enamel paints of reputed brand should be used for painting and sign writing of route as well joint indicators.

The route and joint indicator shall be painted with primer before painting with oil paint. The material used should bear ISI mark. The size of each written letter should be at least 3.5 cm. The colours of painting and sign writing is as under:

For Joint Indicator: Grey colour

For Route Indicator: Blue colour

For GFGNL OFC & Nos: White colour.

Documentation

The documentation, consisting of the following shall be prepared for each Block and the Panchayats connected to the Block. 4 sets of documentation shall be provided both in Electronic format on CD as well as Hard binded copy.

Route Index Diagrams – General: This diagram shall consist of Cable Route Details on Geographical Map drawn to scale with prominent land marks and alignment of cable with reference to road. This shall be prepared on A-3 sheets of 80 GSM.

Route Index Diagrams –Profile

These diagrams will contain

Make and size of the cable.

Offset of cable from centre of the road at every 10 meters

Depth profile of Cable at every 10 meter;

Details of protection with type of protection depicted on it;

Location of culvert and bridges with their lengths and scheme of laying of PLB HDPE Ducts pipe thereon.

Important landmarks to facilitated locating the cable in future; Location of Joints and pulling manholes.

These diagrams shall be prepared on A-4 sheets of 80 GSM. On one sheet profile of maximum 400 meters shall be given to ensure clarity.
Joint Location Diagram

This diagram will show
Geographical location of all the joints.
Depth of Joint Chamber covers from ground level
Type of chamber (Brick/Pre-cast)
Length of O.F. Cable kept inside the joint chamber from either direction. This shall be prepared on A-4 sheets of 80 GSM.

All the diagrams (1), (2) & (3) shall bear the signatures of the PIA, the State/SIA as a proof of accuracy of the details. The diagrams shall be bound in A-4 size book with cover.
The cover sheets shall be of 110 GSM and laminated. The front cover shall have the following details.
Name of the State/District/Block
Name of the Panchayats connected
Name of the GFGNL with logo
Name of the PIA
Date of commencement of work
Date of completion of work
For each Block 1 sets of above mentioned document shall be submitted to GFGNL.
SAFETY PRECAUTIONS

Safety Precautions when excavating or working in excavations close to electric cables

The Officer in charge (State/SIA) of the work should get full information from Electricity undertaking regarding any electric cables, which are known or suspected to exist near the proposed excavation and unless this is done, excavation should not be carried out in the section concerned. The

electricity undertaking should be asked to send a representative and work should be preceded with close consultation with them.

Only wooden handled hand tools should be used until the electric cables have been completely exposed. Power Cables, not laid in conduits, are usually protected from above by a cover slab of concrete, brick or stone. They may or may not be protected on the sides. It is safer, therefore, always to drive the point of the pick axe downwards then uncovering a cable, so that there is less chance of missing such warning slabs. No workman should be permitted to work alone where there are electric cables involved. At least one more man should be working nearby so that help can be given quickly in case of an accident. If disconnection of power could be arranged in that section it will be better. No electric cables shall be moved or altered without the consent of the Electric Authority and they should be contacted to do the needful. If an electric cable is damaged even slightly, it should be reported to the Electric Authority and any warning bricks disturbed during excavation should be replaced while back filling the trench. Before driving a spike into the ground, the presence of other underground properties should be checked. Information on plans regarding the location of power cables need not to be assumed as wholly accurate. Full precautions should be taken in the vicinity until the power cable is uncovered. All electric cables should be regarded as being live and consequently dangerous. Any power is generally dangerous, even low voltage proving fatal in several cases.

Electric shock-Action and treatment :

Free the victim from the contact as quickly as possible. He should be jerked away from the live conductors by dry timber, dry rope or dry clothing. Care should be taken not to touch with bare hands as his body may be energized while in contact. Artificial respiration should begin immediately to restore breathing even if life appears to be extinct. Every moment of delay is serious, so, in the meanwhile, a doctor should be called for.

Safety Precautions while working in public street and along railway lines :

Where a road or footpath is to be opened up in the course of work, special care should be taken to see that proper protection is provided to prevent any accidents from occurring. Excavation work should be done in such a manner that it will not unduly cause inconvenience to pedestrians or occupants of buildings or obstruct road traffic. Suitable bridges over open trenches should be so planned that these are required for the minimum possible time. Where bridges are constructed to

accommodate vehicular traffic and is done near or on railway property, it should be with the full consent and knowledge of the competent railway authorities.

Danger from falling material

Care should be taken to see that apparatus, tools or other excavating implements or excavated materials are not left in a dangerous or insecure position so as to fall or be knocked into the trench thereby injuring any workman who may be working inside the trench.

Care when working in Excavations

Jumping into a trench is dangerous. If it is deep, workmen should be encouraged to lower themselves. Workers should work at safe distance so as to avoid striking each other accidentally with tools. If the walls of the trench contain glass bits, corroded wire or sharp objects they should be removed carefully. If an obstruction is encountered, it should be carefully uncovered and protected if necessary. If an obstruction is encountered, it should be carefully uncovered and protected if necessary. Care must be taken to see that excavated material is not left in such a position that it is likely to cause any accident or obstruction to a roadway or waterway. If possible the excavated material should be put between the workmen and the traffic without encroaching too much on the road.

Danger of cave in

When working in deep trenches in loose soil, timbering up/shoring the sides will prevent soil subsidence. The excavated material should be kept at sufficient distance from the edge of the trencher pit. Vehicles or heavy equipment must not be permitted to approach too close to the excavation.

When making tunnelled opening, it should be ensured that the soil is compact enough to prevent cave in even under adverse conditions of traffic. Extra care should be taken while excavating near the foundations of buildings or retaining walls. In such cases, excavation should be done gradually and as far as possible in the presence of the owners of the property.

Protection of Excavations

Excavations in populated areas, which are not likely to be filled up on the same day should be protected by barriers or other effective means of preventing accidents and the location of all such openings must in any event be indicated by red flags or other suitable warning signs. During the

hours from dusk to dawn, adequate number of red warning lamps should be displayed. Supervisory officers should ensure that all excavations are adequately protected in this manner as serious risk and responsibility is involved. Notwithstanding adoption of the above mentioned precautions, works involving excavations should be so arranged as to keep the extent of opened ground and the time to open it to a minimum.

Precautions while working on roads

The period between half an hour after sun-set and half an hour before sunrise, and any period of fog or abnormal darkness may also be considered as night for the purpose of these instructions, for the purpose of providing the warning signs.

Excavation liable to cause danger to vehicles or the public must at all times be protected with fencing of rope tied to strong uprights or bamboo poles at suitable height or by some other effective means. Any such temporary erection which is likely to cause obstructions and which is not readily visible should be marked by posts carrying red flags or boards with a red background by day and by continuously lighted lamps at night.

The flags and the lamps should be placed in conspicuous positions so as to indicate the pedestrians and drivers of vehicles the full expanse i.e. both width and length of the obstruction. The distance between lamps or between floors should not generally exceed 1.25 m along the width and 6m along length of the obstruction in non-congested areas, but 4 meters along the length in congested areas.

If the excavation is extensive, sufficient notice to give adequate warning of the danger, should be displayed consciously not less than 1.25 m above the ground and close to the excavation. Where any excavation is not clearly visible for a distance of 25m to traffic approaching from any direction or any part of the carriage way of the road in which the excavation exists, a warning notice should be placed on the kerb or edge of all such roads from which the excavation or as near the distance as is practicable but not less than 10 m from the junction of an entering or intersecting road in which the excavation exists. All warnings, in these should have a red background and should be clearly visible and legible. All warning lamps should exhibit a red light, but white lights may be used in addition to facilitate working at night. Wherever required a passage for pedestrians with footbridge should be provided. At excavations, cable drums, tools and all materials likely to offer obstructions should be properly folded round and protected. This applies to jointer’s tents as well. Leads, hoses etc. stretched and across the carriageway should be guarded adequately for their own protection and also that of the public.

Traffic Control

The police authorities are normally responsible for the control of traffic and may require the setting up of traffic controls to reduce the inconvenience occasioned by establishment of a single line of traffic due to restriction in road width or any other form of obstruction caused by the work. As far as possible, such arrangements should be settled in advance. If there are any specific regulations imposed by the local authorities, these should be followed.

Work along Railway Lines

Normally all works at Railway crossing is to be done under supervision of the railway authorities concerned, but it is to be borne in mind that use of white, red or green flags by the Departmental staff is positively forbidden to be used when working along a railway line as this practice may cause an accident through engine drivers mistaking them for railway signals. When working along double line of railway, the men should be warned to keep a sharp look on both the “UP” and’ DOWN” lines to avoid the possibility of any accident when trains pass or happen to cross one another near the work spot.

Procedure and Safety Precautions for use of explosives during blasting for trenching

In areas where the cable trench cannot be done manually on account of boulders and rocks, it is necessary to blast the rocks by using suitable explosives. The quality of explosive to be used depends on the nature of the rocks and the kind of boulders. A few types of explosive fuses and detonators normally used for making trenches for cable works are detailed below:

Gun powder
Nitrate Mixture
Gelatine
Safety fuse
Electric Detonator
Ordinary Detonator

Procedure

A detailed survey of the route is to be done to assess the length of the section where trenching is to be done with the help of blasting. A route diagram of the rocky section may be prepared indicating the length of the route where the explosives are to be used. For the purpose of obtaining license, a longer length of route should be given in the application as in many cases, after digging, rocks appear which was not initially anticipated.

Next a license will have to be obtained for use and storing of explosive in that section. If the area falls under a police commissioner, the authority for granting such license is the police commissioner of the concerned area. When the route does not fall in the jurisdiction of a police commissioner, the authority for issuing license is the District Magistrate.

The concerned State/SIA authority should be applied in prescribed form with a route map. The concerned authority will make an enquiry and issue license for using/storing explosives for cables trenching work. Such license will be valid for 15 days only. The license should be got renewed if the blasting operation needs to be extended. Once the license is granted, it is the responsibility of the holders of the license for the proper use of explosives, its transportation and storing.

Method of using

The safest explosive is the Gelatin and electric detonator. Gelatin is in the form of a stick. Electric detonator is a type of fuse used for firing the explosive electrically. Holes are made at suitable intervals on rocky terrain or boulders either by air compressor or by manual chipping. The depth of the holes should be 2 to 3 ft. Fill up the holes with small quantity of sand for about 6”. First the electric detonator is to be inserted into the Gelatin and the Gelatin is to be inserted into the holes keeping the + ve and - ve wirings of electric detonators outside the holes. Again refill the holes with sand. These +ve and-ve insulated wires of detonator are than extended and finally connected to an EXPLODER kept at a distance of not less than 100 m.

Now the explosive is ready for blasting. But, before connecting wires to exploder for blasting, all necessary precautions for stopping the traffic, use of red flags, exchange of caution signals, etc. should be completed and only then Exploder should be connected and operated.

Operation of exploder (IDL schaffler type 350 type exploder)

The type 350 blasting machine consists of a bearing block with blasting machine system and the explosion proof light- alloy injection moulded housing. The exploder is held with the left hand. The twist handle is applied to the drive pin, clapped with the right hand turned in the clock wise direction in continuous measurements at the highest speed from the initial position until it reached to a stop.

At this stage an indication lamp will glow. When the indication lamp glows, “press button switch” should be pressed. This will extend the electric current to detonator and Gelatin will be detonated. The rock will be blasted out of the trench. Number of holes can be blasted in a single stroke by connecting all such detonators in series connection and finally to the exploder. After blasting, again mazdoors are engaged on the work to clear the debris. It the result of the first blasting is not satisfactory, it should be repeated again on the same place.

Warning

There may be two reasons for unsatisfactory results of the blasting

Misfire of Gelatin due to leakage of current from detonator.

Over loading because of overburdens.

Never pull the broken wire pieces form the holes in such cases. Attempt should not be made to reblast the misfired Gelatin. The safest way is to make a fresh hole by its side and put fresh Gelatin in that hole and blast it.

Precautions

The abstract of Explosives Rules 1983 which are relevant to our work is given below:

Restriction of delivery and dispatch of explosives

No person shall deliver or dispatch any explosives to anyone other than a person who is the holder of a license to possess the explosives or the agent of a holder of such a license duly authorized by him in writing on his behalf? OR

Is entitled under these rules to possess the explosives without a license.

The explosives so delivered or dispatched shall in no case exceed the quantity, which the person to whom they are delivered or dispatched is authorized to possess with or without a license under these rules.

No person shall receive explosives form any person other than the holder of a license granted under these rules. No person shall receive from or transfer explosives to any person for a temporary storage or safe custody in a licensed premise unless prior approval is obtained from the Chief Controller.

A person holding license for possession of explosives granted under these rules shall store the explosives only in premised specified in the license.

Protection from Lightening During Storing

Every magazine shall have attached there to one or more efficient lightening conductors designed and erected in accordance with the specification laid down in Indian Standard Specifications No.2309 as amended from time to time. The connections to various parts of earth resistance of the lightening conductor terminal on the building to the earth shall be tested at least once in every year by a qualified electrical engineer or any other competent person holding a certificate of competency in this behalf from the State Electricity Department. A certificate showing the results of such tests and the date of the last test shall be hung up in conspicuous place in the building.

Precautions during thunder-storm

When a thunder- storm appears to be imminent in the vicinity of a magazine or store house every person engaged in or around such magazine and store house shall be withdrawn to a safe distance from such magazine or store house and the magazine and store house shall be kept closed and locked until the thunder storm has ceased or the threat of it has passed.

Maintenance of records

Every person holding a license granted under these rules for possession, sale or use of explosives shall maintain records in the prescribed form and shall produce such record on demand to an Inspection Officer.

Explosives not to be kept in damaged boxes

The licensee of every magazine or store house shall ensure that, the explosives are always kept in their original outer package. In case, the outer package gets damaged so that the explosive contained therein cannot be stored or transported, such explosives shall be repacked only after the same are examined by controller of explosives.

Storage of explosives in excess of the licensed quantity

The quantity of any kind of explosives kept in any licensed magazine or store house shall not exceed the quantity entered in the license against such kind of explosives. No explosives in excessof the licensed quantity shall be stored in the magazine or store house unless a permit in this behalf is obtained from the licensing authority by a letter or telegram.

Precautions to be observed at Site

The electric power at the blasting site shall be discontinued as far as practicable before charging the explosives. No work other than that associated with the charging operations shall be carried out within 10 meters of the holes unless otherwise specified to the contrary by the licensing authority.

When charging is completed, any surplus explosive detonators and fuses shall be removed from the vicinity of the hole and stored at a distance which should prevent accidental detonation in the event of a charge detonating prematurely in any hole. The holes which have been charged with explosive shall not be left unattended till the blasting is completed. Care shall be taken to ensure that fuse or wires connected to the detonation are not damaged during the placing of stemming materials and tamping.

Suitable warning procedure to be maintained

The licensee or a person appointed by the licensee to be in charge of the use of explosives at the site shall lay down a clear warning procedure consisting of warning signs and suitable signals and all persons employed in the area shall be made fully conversant with such signs and signals.

Precautions to be observed while firing

The end of the safety fuse (if used in place of a detonator should be freshly cut before being lighted. The exploders shall be regularly tested and maintained in a fit condition for use in firing. An exploder shall not be used for firing a circuit above its rated capacity. The electric circuits shall be tested for continuity before firing. All persons other than the shot-firer and his assistant, if any, shall be withdrawn from the site before testing the continuity.

For the purpose of jointing, the ends of all wires and cables should have the insulation removed fora maximum length of 5 cm. and should, then be made clear and bright for a minimum length of 2.5 cm. and the ends to be joined should be twisted together so as to have a positive metal contact. Then these should be taped with insulation to avoid leakage when in contact with earth. In case of blasting with dynamite or any other high explosive, the position of all the bore holes to be drilled shall be marked in circles with white paint. These shall be inspected by the PIA's agent. Bore holes shall be of a size that the cartridge can easily pass down. After the drilling operation, the agent shall inspect the holes to ensure that drilling has been done only at the marked locations and no extra hole has been drilled. The agent shall then prepare the necessary charge separately for each bore hole. The bore holes shall be thoroughly cleaned before a cartridge is inserted. Only cylindrical wooden tamping rods shall be used for tamping. Metal rods or rods having pointed end shall never be used for tamping. One cartridge shall be placed in the bore hole and gently pressed but not rammed down. Other cartridges shall then be added as may be required to make up the necessary charge for the bore hole. The top most cartridge shall be connected to the detonator which shall in turn be connected to the safety fuses of required length. All fuses shall be cut to the length required before being inserted into the holes. Joints in fuses shall be avoided.

Where joints are unavoidable, a semi-circular niche shall be cut in one piece inserted into the niche. The two pieces shall then be wrapped together with string. All joints exposed to dampness shall be wrapped with rubber tape.

The maximum of eight bore holes shall be loaded and fired at one occasion. The charges shall be fired successively and not simultaneously. Immediately before firing, warning shall be given and the agent shall see that all persons have retired to a place of safety. The fuses of the charged holes shall be ignited in the presence of the agent, who shall see that all the fuses are properly ignited.

Careful count shall be kept by the agent and other of each blast as it explodes. In case all the charged bore holes have exploded, the agent shall inspect the site soon after the blast but in case of misfire the agent shall inspect the site after half an hour and mark red crosses (X) over the holes which have not exploded. During this interval of half an hour, nobody shall approach the misfired holes. No driller shall work near such bore until either of the following operations has been done by the agent for the misfired boreholes.

The PIA's agent shall very carefully (when the tamping is a damp clay) extract the tamping with a wooden scraper and withdraw the primer and detonator.

The holes shall be cleaned for 30 cm of tamping and its direction ascertained by placing a stick in the hole. Another hole shall then be drilled 15 cm away and parallel to it. This hole shall be charged and fired. The misfired holes shall also explode along with the new one.

Before leaving the site of work, the agent of one shift shall inform the agent relieving him for the next shift, of any case of misfire and each such location shall be jointly inspected and the action to be taken in the matter shall be explained to the relieving agent. The State/SIA shall also be informed by the agent of all cases of misfire, their cause and steps taken in that connection.

General Precautions

For the safety of persons red flags shall be prominently displayed around the area where blasting operations are to be carried out. All the workers at site, except those who actually ignite the fuse, shall withdraw to a safe distance of at least 200 metre from the blasting site. Audio warning by blowing whistle shall be given before igniting the fuse.
Blasting work shall be done under careful supervision and trained personnel shall be employed. Blasting shall not be done within 200 meters of an existing structure, unless specifically permitted by the State/SIA in writing.

Precautions against misfire

The safety fuse shall be cut in an oblique direction with a knife. All saw dust shall be cleared form inside of the detonator. This can be done by blowing down the detonator and tapping the open end. No tools shall be inserted into the detonator for this purpose. If there is water present or if the borehole is damp, the junction of the fuse and detonator shall be made water tight by means of tough grease or any other suitable material. The detonator shall be inserted into the cartridge so that about one-third of the copper tube is left exposed outside the explosive. The safety fuse just above the detonator shall be securely tied in position in the cartridge. Waster proof fuse only shall be used in the damp borehole or when water is present in the borehole. If a misfire has been found to be due to defective fuse, detonator or dynamite, the entire consignment from which the fuse, detonator or dynamite was taken shall be got inspected by the State/SIA or his authorized representative before resuming the blasting or returning the consignment.

Precaution against stray currents

Where electrically operated equipment is used in locations having conductive ground or continuous metal objects, tests shall be made for stray current to ensure that electrical firing can proceed safely.

Horizontal Directional Drilling (HDD)

HDD Overview :Horizontal directional drilling is an excellent alternative to traditional utility installation methods. Unlike manual labor, trenching or excavation, the HDD process is highly suitable in urban areas or places where aboveground obstructions exist that are expensive, inconvenient or impossible to disturb for product installation. HDD machines install utilities under obstacles such as roads, rivers, creeks, buildings and highways — with little or no impact to the aboveground surface.

Drill Rig : Horizontal directional drilling machines are available in many sizes. Regardless of a machine's size, it has three main functions — rotation, forward thrust/pullback and fluid flow.

HDD Process :Horizontal directional drilling machines will bore under or around obstacles. Once the drill path is planned, an underground pilot bore is performed utilizing a series of drill rods connected to a drill head. After the pilot bore is completed, a back reamer is attached to the drill string that enlarges the drill path to accommodate the product that will subsequently be pulled into place. Vermeer NAVIGATOR horizontal directional drilling machines can install product under roads, buildings, railroad tracks, streets, rivers, creeks and in congested underground areas.

Steering :Steering refers to control of the direction of a drill path. The shape of a drill bit on the drill head allows an operator to change the drill path direction during a bore. When an operator points the drill bit downward to the 6 o'clock position and pushes the drill head forward, the drill head goes deeper. When the drill faces the 12 o'clock position, the drill head will rise. Pushed to the 9 o'clock position, the head goes left. Pushed to the 3 o'clock position, the head goes right. If no change in drill path is needed, the drill head and rod are rotated while thrusting.

Locating :Prior to starting a bore, the drill head is equipped with a transmitter that sends signals to an aboveground receiver during the bore. The drill head's location must be tracked during a bore in order to provide steering position information to the HDD operator.

ALLIED ACTIVITIES

Storing/Warehousing of Materials: PIA will be responsible for storing and warehousing of all the material and accessories, but not limited to, supplied by him at his own cost. No storing/warehouse shall be provided by State/SIA.

Transportation of Materials: The PIA shall be responsible for transporting the materials, to be supplied by the GFGNL or otherwise to execute the work under the contract, to site at his/ their own cost. The costs of transportation are subsumed in the standard quoted Rates and therefore no separate charges are payable on this account.

Disposal of Empty Cable Drums: The PIA shall be responsible to dispose of the empty cable drums after laying of the cables. The cost of various sizes of empty cable drums recoverable from the PIA will be fixed taking into account the prevailing market rates.

It shall be obligatory on part of the PIA to dispose of the empty cable drums at his/their level and the amount fixed for various empty cable drums shall be recovered from the bill for the work for which the drum (s) was/were issued or from any other amount due to the PIA or the Security Deposit.

The PIA shall not be allowed to dump the empty cable drums in Govt. /Public place which may cause inconvenience to the GFGNL / public. If the PIA does not dispose of the empty cable drums within 3 days of becoming it empty, the GFGNL shall be at liberty to dispose off the drums in any manner deemed fit and also recover the amount fixed in this contract from the bill/security deposit/ any other amount due to the PIA.

Supply of Materials: There are some materials (Accessories) other than as mention in BoQ required to be supplied by the PIA for execution of work under this contract like Bricks, Cement, Wire Mesh and Steel for protection, etc., besides using other consumables which do/don't become

the part of the asset. The PIA shall ensure that the materials supplied are of best quality and workmanship and shall be strictly in an accordance with the specifications.

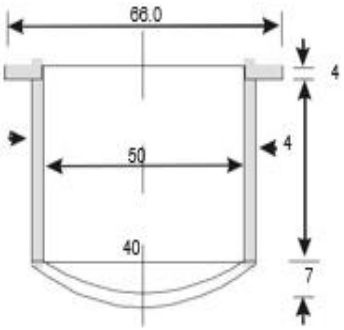
Social auditing: While carrying out the execution work of cable/Eqpt. ,videography may be carried out on sample basis for duration of 15 to 30 minutes per Gram Panchayat which may also involve the local people of the Gram Panchayats and villages including the Gram Panchayat Pradhan (If possible) and same may be submitted in a form of CD along with the documentation sets for information.

Detail information with completion route may publish in public domain for public/GramPacnhayat feedback, Selected PIA is solely responsible to answer those queries and improve the field and backoffice infrastructure (applicable under this RFP scope) and take acknowledgement from concern authority in written. GFGNL is authorized to do scrutiny on sample basis wherever feasible and if any deviation found,the suitable actions with penalty will be applied to PIA.

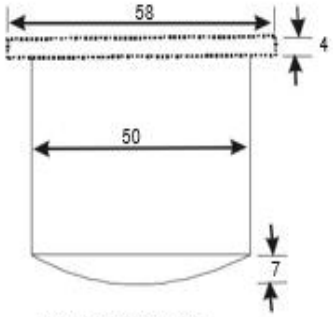
Note: All the materials as above have to be TSEC/Type approved by BSNL QA/TEC against mentioned TEC GR or as per the approval procedure of executing State/SIA for which TEC GR not there.

Figure 1

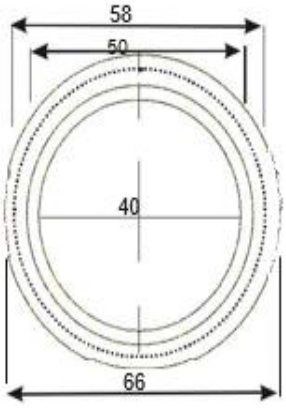
HDPE END CAPS

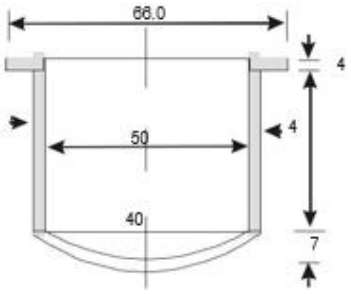


SECTION ON A.B



FRONT ELEVATION





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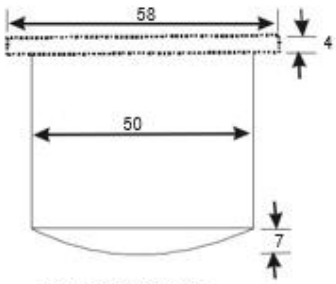
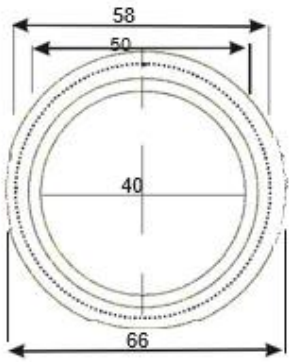
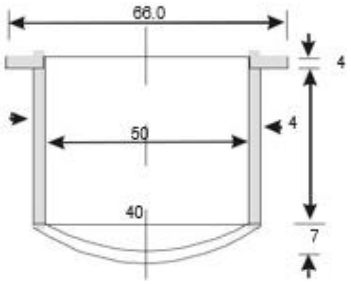


FRONT ELEVATION





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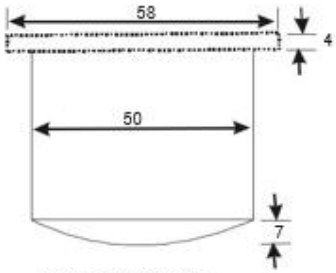


FRONT ELEVATION

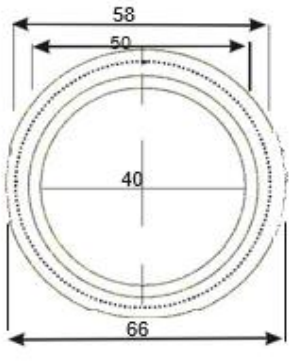
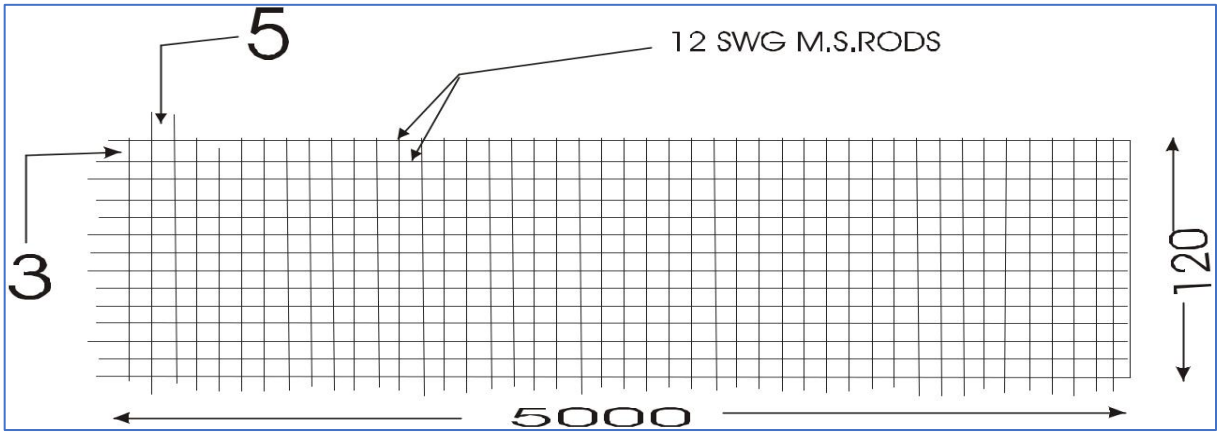


Figure2

M.S. WELDMESH

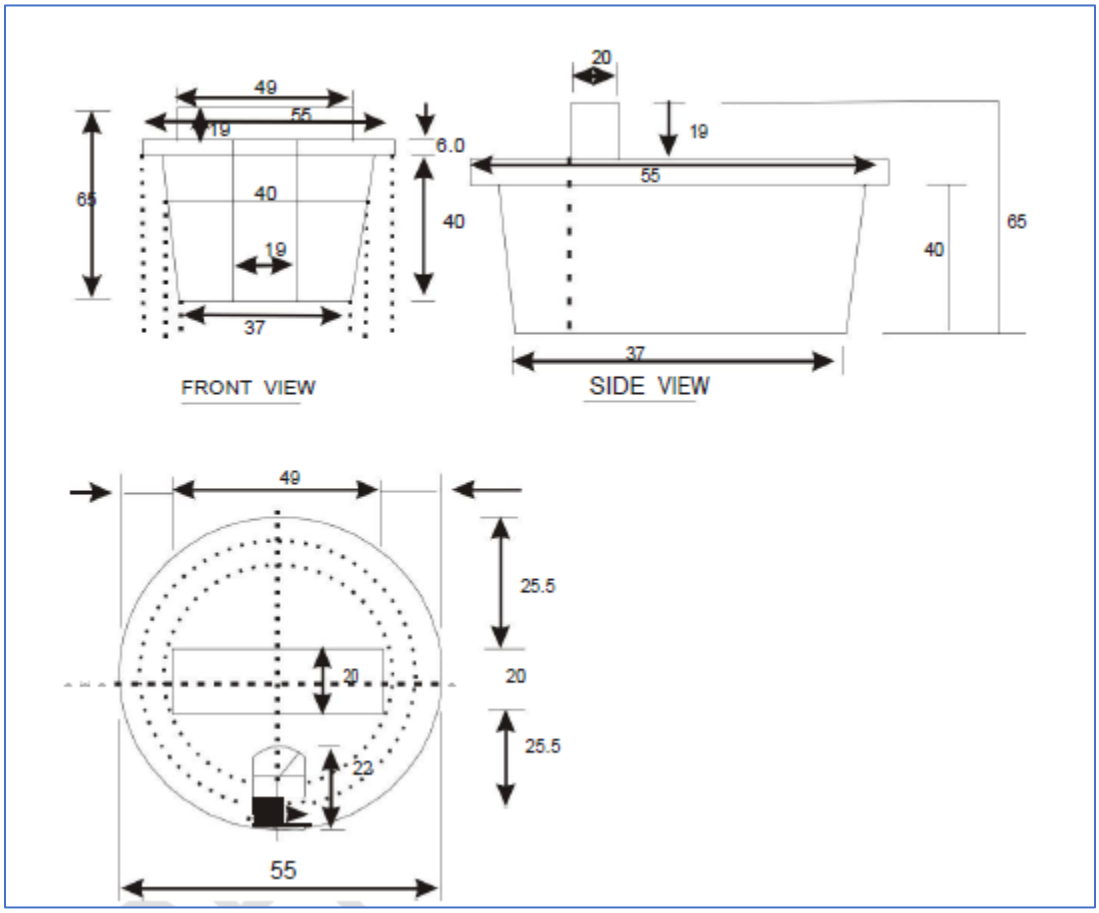
DETAILS OF 100 MM X 50 MM, 12 SWG MILD STEEL WELD MESH HAVING WIDTH OF 120 CM.



Note: All measurements are in centimeters.

Figure 3

Rubber Cork

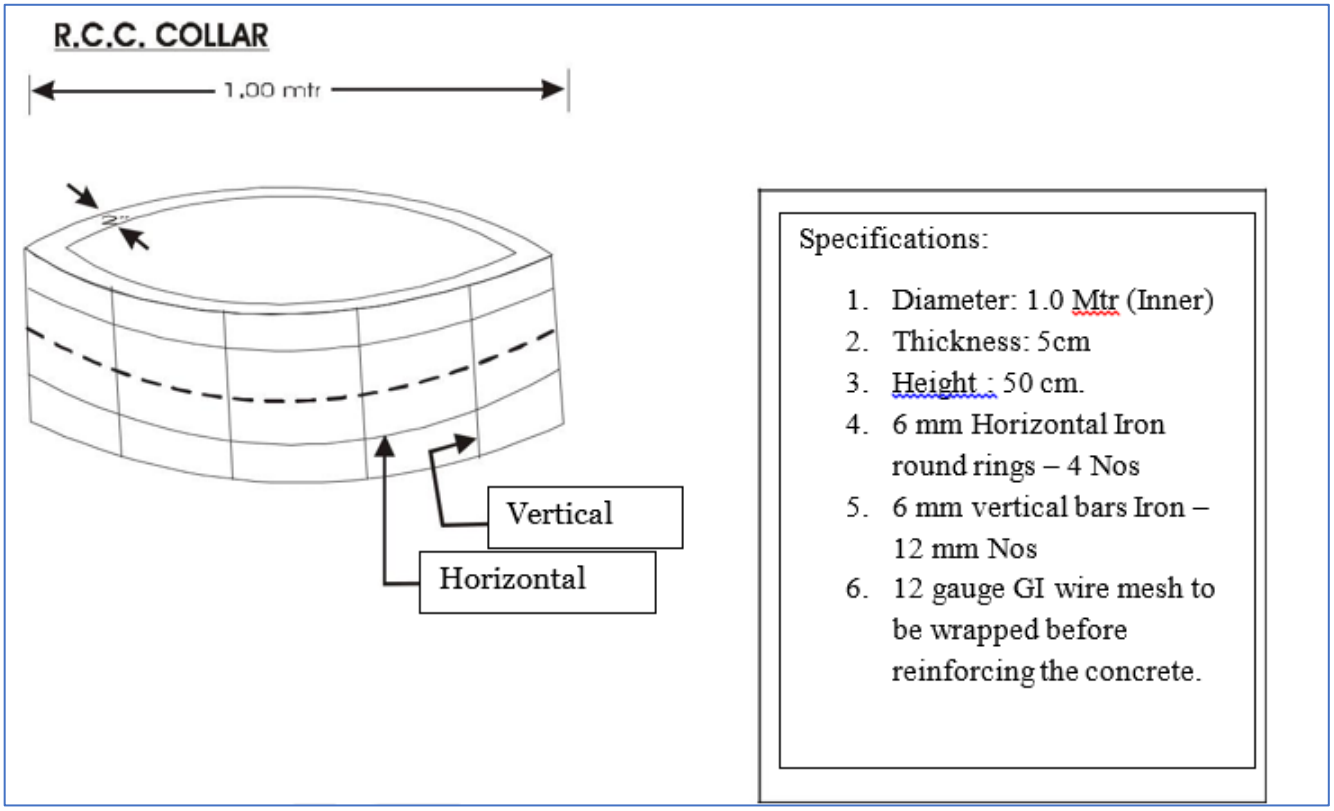


Note:

1. All Dimensions are in MM
2. Dimensions are only for guidance. Tapper Should be such that it should tightly fix, into Type A & Type B Hope 50mm OO Pipes.

Figure 4

SPECIFICATION AND REINFORCEMENT DETAILS OFR.C.C. JOINT PROTECTION CHAMBERS



Note:

a) Concrete 'Mix. 1: 2:3 (1 Cement : 2 Sand : 3 graded Stone aggregate 20 mm nominal size.

b) Finishing : Smooth

Figure 5

RCC Route Indicator

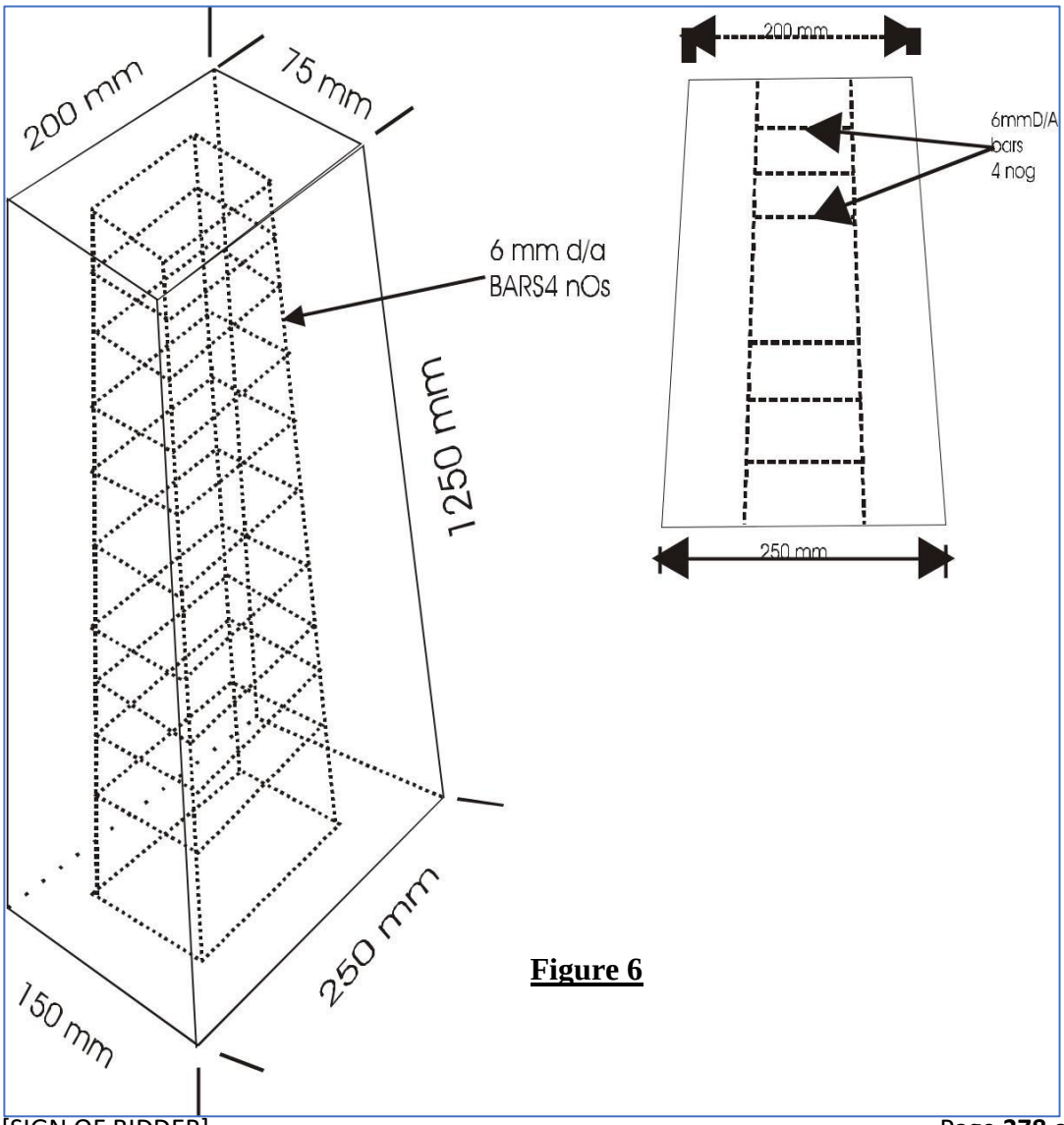
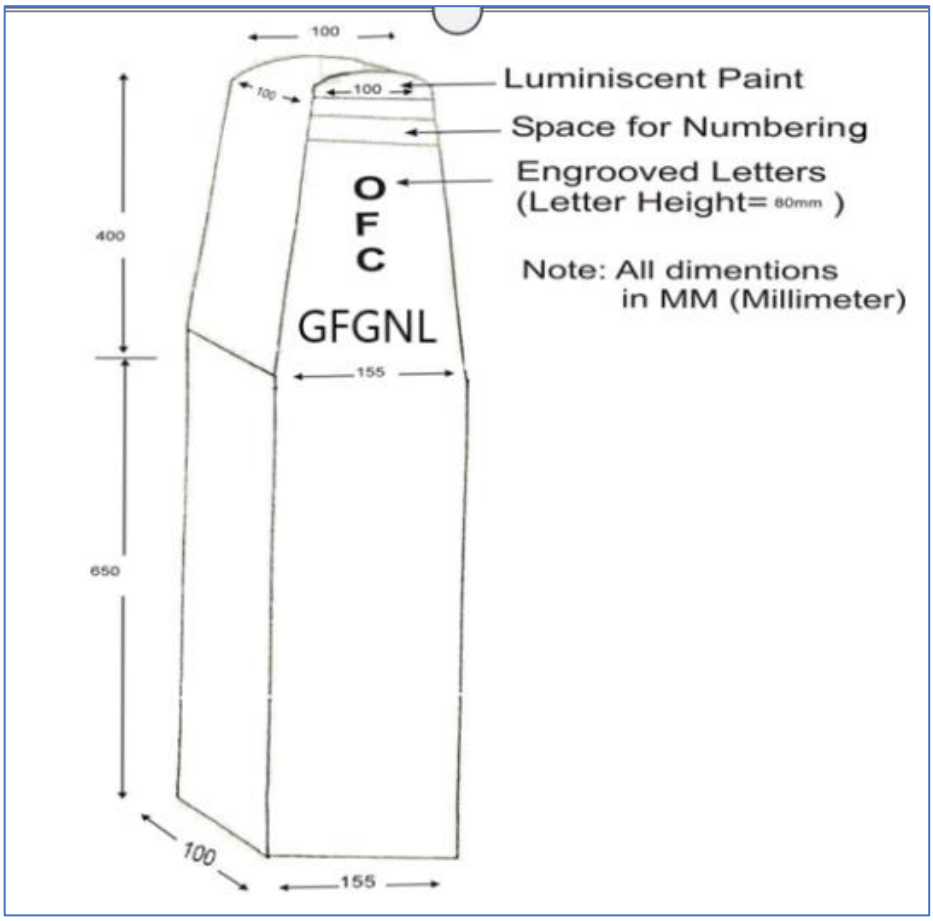


Figure 6

Stone OFC Route Indicator



Abbreviations

Penalty for Deviation from Standard Engineering Instructions Underground Laying

Normally depth of the trench should be 1.65 m in normal & mix soil and 1.2m in hard soil.

Deviations due to field conditions will be required to have necessary protections in case of less depth. The cases and solutions are as following;

Minimum depth of burial in general shall be 1.65m.In rocky/ hilly area (including Murrum& soil mixed with stone or soft rock) depth of burial shall be 1.2m at the minimum.

In case of utility where depth is 100 to 120 cm then DWC protection is to be used in normal/mix soil case.

In some areas where the depth is 60cm, in those cases reinforced concrete casing of 4"(Four inch) round or GI pipe should be provided.

For hard strata/rock soil layer for 50 to 80 cm cases DWC with wire mess and PCC or GI pipe is to be used. However, for depth relaxation photograph (with GPS) proof and justification is required.

Above ground installation of ducts shall be limited to culvert and bridge crossings only. At such locations, ducts shall be installed inside GI pipe or HDPE DWC pipes with metal sheet protection (GI sheet wrapping) of appropriate size (4” to 6”) suitable for number of ducts to be installed.

Trenching depth under no circumstances shall be less than 30cms. Trenching work in soft/hard rock patches are to be achieved using rock breakers or any other method deemed fit.

The relaxation by the competent authority prescribed below shall be obtained giving reasons for not achieving standard depth;

Note:

In case of rocky/hilly soil, full payment is to be made for depth equal to or more than 1.2 m. The details of payment to be made in less depth cases are mentioned at clause 5 of section IV B of tender document.

Duct: Extra 2% of trench length to account for actual PLB length in trenches. The payment shall be made with above factor included.

In compliance to para 11, joint chambers are to be provided at every joint to keep the O.F.C. joint well protected and also to keep extra length of cable, which may be, required to attend the faults at a later date. Separate payment shall be made for construction of Joint Chambers. Extra OFC length shall normally be kept @ 20 meter per joint. However, to avoid wastage of OFC, extra length beyond 20 meters and upto 100 meters may be allowed.

The payment of OFC shall be made as per the end to end OTDR length.

Annexure :D INSTALLATION PRACTICE OF SELF SUPPORTING METAL FREE AERIAL OPTICAL FIBRE CABLE

1. Introduction

This engineering Instruction (EI) deals with the guidelines and the installation practice for installing of self-supporting metal free aerial optical fibre cable.

2. General guidelines

2.1 General Instruction for Installation of ADSS :

(a) The methods described in this Engineering Instruction for installation of All Dielectric Self-Supporting (ADSS) fiber optic cable are intended to be used as guidelines by design engineers and outside plant construction personnel. This guide is generic enough, and yet contains sufficient specific information, to be applicable for most installations of ADSS cable, however, local conditions, existing engineering and customer procedures and requirements must be considered.

(b) ADSS Cables should meet National Electric Safety Code (NESC) loading requirements for heavy, medium, and light loading conditions in their sag/tension tables. Special tables can be

generated based on specific customer installation requirements, which may include minimum separation and clearance, sag requirements, and loading conditions.

(c) It is assumed that the personnel using the information presented in this document have prior experience in the planning, engineering or placement of ADSS fiber Optic Cable.

(d) The ADSS Cable should meet the P1222 IEEE Standard for All- Dielectric Self- Supporting Fiber Optic Cable (ADSS).

2.2 Precautions during Installation of ADSS :

(a) The following are some suggested precautions which should be observed when working with fiber optic cables. Before starting any aerial fiber optic cable installation, all personnel must be thoroughly familiar with Occupational Safety and Health Act (OSHA) regulations. Each individual company's safety precautions for ADSS fiber optic cable installations should be reviewed before work begins and practiced during the entire installation process.

(b) Before cable installation begins, the cable reels should be carefully inspected for any imperfections such as nails and broken flanges which might cause damage to the cable as it is payed out. Precautions should be taken to protect stored reels from possible damage by vandals or other sources when left unattended.

(c) Fiber optic cable is a high capacity transmission medium which can have its transmission characteristics degraded when subjected to excessive pulling force, sharp bends, and crushing forces. These losses may not be immediately revealed after installation. For these reasons extra care must be taken during the entire installation process.

(d) Whenever cable from the reel is placed on pavement or other surfaces, it should be protected with barricades or cones to prevent possible vehicular or pedestrian traffic damage.

(e) Fiber optic cables are susceptible to performance degradation due to tight bending. The minimum bend radius of each cable is specified relative to the cable's diameter. During installation a cable not be exposed to a bend radius smaller than 20 times the cable diameter and that after installation a cable should not be exposed to a bend radius smaller than 10 times the cable diameter.

(f) Whenever cable from the reel is placed on pavement or other surfaces, it should be protected with barricades or cones to prevent possible vehicular or pedestrian traffic damage. A "figure-eight" configuration should be used when the cable is removed from the reel and piled on the ground. This prevents kinking and twisting of the cable which could cause damage. Fiber optic cable should not be coiled in a continuous direction except for lengths of 30 meters (100 ft) or less. The preferred sized for the "figure-eight" is about 4.5 meters (15 ft) in length with each loop 1.5 meters (5 ft) to 2.4 meters (8 ft) in diameter.

Note: An alternative to the manual figure-eight is the "figure-eight" machine. This equipment will "figure-eight" cable much faster than manual methods saving time and manpower. Using a "figureeight" machine the remaining cable on the reel is wound on the machine's drum. Once the inside cable end is accessible, the machine is reversed and the cable is pulled from the machine through the duct. The machine's drum and rollers are designed to keep the cable at a bend radius that exceeds the minimum bend radius of the cable.

(g) Never, during the pull-in process, should the fiber optic cable experience sags, bends or twists that produce in the cable a bend whose radius is smaller than that specified as the minimum bend radius for the cable being installed.

(h) Do not cut the Cable under any circumstances without prior approval of the engineer responsible for the project. Splice locations are determined in the initial system design by the project engineer. Introducing new splices can potentially degrade the transmission characteristics of the system.

(i) Temporary or permanent guys should be installed at any location where the self-supporting cable is tensioned to avoid placing an unbalanced load on the support poles. Wire mesh grips are intended for pulling the cable into place and are not intended for tensioning the cable in place. Do not use split wire mesh grips to tension or to hold cable under tension.

2.3 Accessories and tools for Installation of ADSS :

(a) The type and construction of the reel support determines the method and tools for handling. Reel construction requires that they be mounted on an axle or be supported by the reel flange. The equipment used must be rated for the maximum load and be able to lift the reel. When the reel stand is not self-loading, a crane, forklift or some other method of lifting must be available to lift the reel onto its stand.

(b) The reel support design employed must incorporate an adjustable brake to supply the necessary hold-back tension needed to properly tension the cable. The cable may be pulled directly from the reel support when employing slack stringing methods that apply minimal tension to the reel of cable.

(c) Capstan and reel type pulling machines with approved adjustable tensioners may be used to install the ADSS fiber optic cable.

(d) The pulling and braking system employed should operate smoothly to prevent any jerking or bouncing of the cable during placement. The system should be controllable and able to maintain a constant and even tension on the cable during the installation process. Pullers and tensioner should be equipped with tension indicator and limiting devices. Tensioner wheels should be controlled so that a constant hold-back tension is maintained at all pulling speeds. A braking system to maintain cable tension when pulling is stopped is required.

(e) Sheave diameters larger than those specified in Paragraph 2.5 are suggested, especially at the payoff reel position and the take-up or winch location. A larger diameter than the minimum diameter required offers the advantage of reducing the load applied to the cable.

(f) The depth and flare of grooves in wheels used during the placing process are not critical, but there are some recommended guidelines that should be followed. The sheave grooves should have depth of 25% greater than the cable diameter with a flare angle of 15 to 20 degrees from vertical. This will facilitate the passage of grips, swivels, etc. and contain the cable within the groove. The material and finish of the grooves should be such that it does not mar the surface of the cable.

(g) Traveler, sheave, or quadrant blocks used should be in good working order and properly lubricated. The cable release should work smoothly with minimal pressure. These should be lined so that they do not cause any abrasion of the cable jacket. A plastic lining of neoprene or urethane are acceptable.

(h) Tangent supports made of metal with a protective pad can be used as a replacement for stringing blocks. These supports are mounted directly on the pole and open from the top. The protective pads can be removed and the top closed and secured for stringing.

(i) At places where uplift may occur, it is recommended that uplift rollers or hold down blocks be used.

(j) Wire mesh grips or pulling eyes can be used to pull the cable into place through the travelers, sheaves, or quadrant blocks. The mesh grip or pulling eye must be used in conjunction with a swivel link which will minimize cable twisting that can be introduced by the pull rope. The load rating of the swivel link shall not exceed the maximum pulling tension rating of the cable.

2.4 ADSS Installation Methods:

There are two primary method used for placing ADSS cable. Both these methods are very similar to those methods used to place most aerial cables. The first method is called the stationary reel, or the “Pull-back Method,” and the second is called the moving reel, or the “Drive-out Method.”

The Pull-back Method: The Pull-back Method is illustrated in Figure A below.

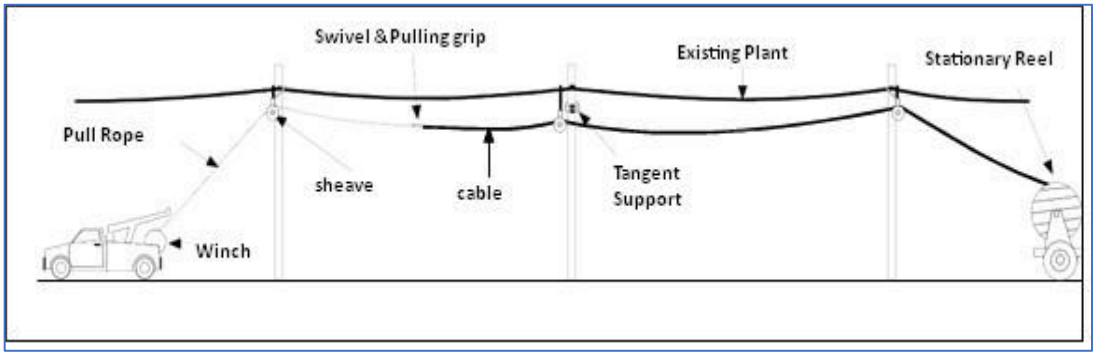


Figure A: The Pull-back Method of Installation of ADSS

(a) Holes are drilled in all poles along the cable run and line pole hardware is attached to the poles at the engineered height. At dead-end and tangent locations, down guys are placed at the correct position according to local engineering practices.

(b) Travelers, sheaves, or quadrant block are placed just above or just below the location of the installed pole line hardware at each pole location. The diameter of these supports must meet the minimum bend radius specs for the cable in any location where the cable will be bent more than 20 degrees. The cable warranty is void if these limits are not observed.

(c) Please note that if tension is let off the cable during a pull, the natural sag of the cable will usually produce angles larger than 20 degrees at each support point. Thus, extreme caution must be used if pulling through small diameter supports.

(d) The pulling line is then pulled through each traveler, sheave, or quadrant block. After the pulling line is in place, it is attached to the ADSS cable with a break-away swivel and a factory installed pulling eye. A wire mesh grip may be used when a pulling eye has not been installed.

(e) The ADSS cable is then pulled in through the entire section using the puller and the tensioner. Care must be taken to avoid over tensioning the cable and to avoid sagging of the cable that may introduce bends that are smaller than the minimum bending

radius of the cable. Several pulling stages may be required to place the cable through the entire system.

(f) When the entire cable has been pulled into place, starting at an end location, each dead-end to dead-end cable length can be sagged and tensioned and support hardware applied according to the installation requirements.

The Drive-back Method : The Pull-back Method is illustrated in Figure B below.

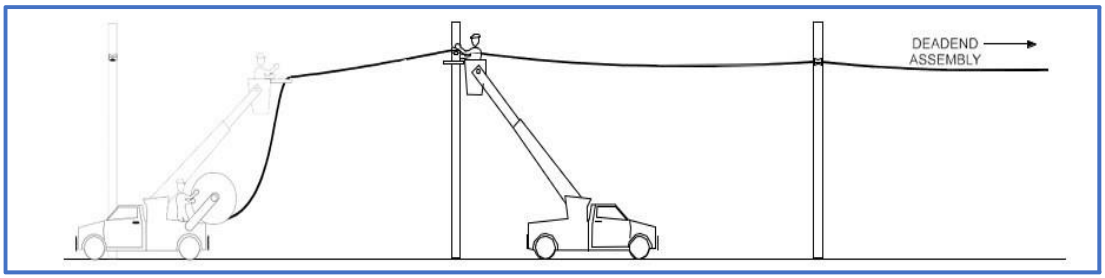


Figure B: The Pull-back Method of Installation of ADSS

(a) The Drive-out method of cable placement is primarily used during the construction of new lines where there is a clear right-of-way and with no obstructions to vehicles.

(b) The reel of cable is placed on a reel trailer or a truck equipped with a reel carrier. The cable should play off the top of the reel for reel trailers and the bottom of the reel for trucks equipped with

a reel carrier. The reel trailer or reel equipped truck should have a braking device, set on minimum. The brake is used to prevent overrun of the reel when stopping at the support poles.

(c) Holes will have to be drilled at the poles to mount the support hardware. At dead-end and tensioning locations, down-guys of the correct loading factor at to be placed according to local engineering practices.

(d) Travelers, sheaves, or quadrant blocks are placed above or below the pole mounting hardware at each pole location.

(e) With the cable dead ended at the starting location and minimum tension applied to the reel brake, the reel of cable is transported along the construction route while the cable is played out.

(f) As the reel passes a pole location, the trailer or truck must be stopped while the cable is placed into the traveler, sheave, or quadrant block attached to the pole.

(g) The reel then travels on to the next pole where the process is repeated over again. This continues until the cable is completely deployed or a deadend is reached.

(h) With the cable deployed, each span must be sagged and tensioned with supporting hardware installed. Each span is started at the deadend and slack worked back towards the opposite end. An alternative method is to sag and tension each span and install permanent hardware as the cable is being deployed.

2.5 Route Survey:

The route should be inspected before the actual installation of optical fibre cables. Survey of the aerial route should be carried out pole by pole.

2.6 Over Head Alignment:

The existing route alignment wherever available should be used. On new routes, alignment should be erected. The span length must not exceed above 90 metres.

2.7 Line Diagram:

(a) A line diagram should be prepared to mark the poles & the actual distance between the poles in a splice section (Normally 15 poles per km are recommended).

(b) Additional poles should be erected if required to keep the span length within the specified limits.

(c) Care should be taken that the alignment is easily accessible from the road. It is necessary to keep a clear head way (Ground clearance) of 12 to 15 feet in a section.

(d) A complete line diagram should be prepared i.e. from station A to station B.

(e) The number of road crossings, canals or nallahs, electric lines should be clearly marked in the route diagram.

2.8 Hilly Regions:

(a) Line erection rules must be strictly followed. Additional poles may be erected for better support to optical fibre cable & to avoid sharp curves & bends.

(b) Span lengths should be reduced to avoid sags in case of steep slopes.

3. Installation of ADSS on New poles

3.1 Tension Poles

Tension poles are dead end or termination poles. The tension poles shall have dead end fittings. The dead end fittings offer a continuous run of the aerial optical fibre cable. These fittings relieve the optical fibre cable of its compressive, bending & clamping stresses. The performed dead end fittings are suitably gritted for excellent tensile holding strength.

3.1.1 Selection of Tension Poles

Selection of tension poles depends upon the actual site location of the route. Every fifth pole should be a tension pole in straight alignment. Splicing location poles should

be tension poles or wherever alignment takes a sharp turn (more than 15 degrees) should also be a tension pole.

3.2 Suspension Poles

The suspension pole assembly is designed to offer cushion to aerial optical fibre cable against the dynamic stress of Aeolian vibration at the suspension point. They also reduce static stresses at the Support point.

3.3 Selection Poles

Selection of suspension poles also depends upon actual site location of route. All the intermediate poles between two tension poles will be suspension poles.

3.4 Selection of Splice location

The splice box of the aerial optical cable should be buried underground. Therefore it is necessary to fix & determine the splicing location as per the designated cable drum length.

3.5 Aerial optical Fibre Cable Specifications

1. Maximum span length : 90 metres (Amendment No. 12.7)
2. Maximum ice loading : 1 Kg per meter
3. Operational wind velocity : 75Kms per hour
4. Maximum sag allowed : 2% of span length

5. (without excess load) Maximum sag allowed :

3% of span length

6. (with excess load) Temperature range :
   - operation & storage : -30 to +70 degree C
   - installation : -15 to +50 degree C
7. Minimum bend radius : 2D (D-Dia of cable)
8. Tensile force

   During installation : Permanent with ice & wind load: 9.81 x 1.3 x w

9.81 x 3 x w

(where w is the mass of 1 km length of cable, in kg)

3.6 Type of Accessories and Fixtures

3.6.1 FORMED OFC DEAD END AND TERMINATION FITTINGS:

These fittings are used at tension/termination poles (dead end poles), or poles where splices are located and the poles where the overhead alignment takes a turn, (angle exceeding more than 15 degrees) as shown in fig. 1.

(a) J-SHAPED TENSION HOOK

J - Shaped tension hook is for the installation on cross arm channel C (C-Bracket) of the poles as shown in fig. 2.

(b) TURN BUCKLE

Galvanized forged steel turn - buckle is used at the dead end and at tension positions (for adjusting the sag & tension) as shown in fig. 3.

(c) EXTENSION LINK:

Galvanized steel extension link is used along with turn buckle as shown in fig. 4.

(d) CLEVIS THIMBLE:

Aluminium alloy die cast thimble is used to attach the extension link and for accommodating the loop of the helically formed terminating helix at the other and its smooth internal contour as shown in fig.5.

(e) PROTECTIVE HELIX (T):

Set of aluminium alloy helically formed protective helix having predetermined spiral shape is used & making them conveniently applied on the optical fibre cable without excessive clamping pressure at any point. See fig. 6.

(f) TERMINATING HELIX:

Helically formed terminating helix of Aluminized steel having a prefabricated loop shall be to fit into the grooved contour of the thimble and for fixing over protective helix over the optical fibre cable. See fig. 7.

(g) JUMPER CABLE CLAMP:

Galvanized steel jumper cable clamp is used to support the through length of optical fibre cable at the intermediate tension poles as shown in fig. 8.

(h) POLE MOUNTED STAY CLAMP (TUBULAR) OR POLE MOUNTED STAY CLAMP (RAIL)

Galvanized mild steel pole mounted stay clamp should be used at the pole for the fixing with a twisted eye & turn buckle; see figs. 9 & 10.
The selection of the type of stay clamp will depend upon the type of poles.

3.6.2 OFC SUSPENSION FITTINGS:

Helically formed suspension fittings along with the elastomeric pads inserts strapped by a galvanized steel eye-band is used to hang from the twisted eye-link connected to a pole mounted stay clamp or on the tension hook (J-shaped) installed on the C bracket at the intermediate poles as shown in fig. 11.

(a) TIWSTED EYE LINK:

The twisted eye link is used for installing suspension fitting on stay clamp or on tension hook as shown in fig. 12.

(b) PROTECTIVE HELIX (S)

Set of aluminium alloy helically formed protective helix having predetermined spiral shape is used & making them conveniently applied on the optical fibre cable without excessive clamping pressure at any point. See fig. 13.

(c) ARMOUR GRIP HELIX:

Set of aluminium alloy armour grip helix is used or fixing on the profile shaped elastomer pad for proper strut action, grip & bird caging as shown in fig, 14.

(d) SUSPENSION CLIPPER WITH ELASTOMER PAD:

Set of suspension clipper (made of aluminium alloy permanent mould die cast split type clamp) is used to support the elastomer pad inserts & is strapped by a galvanised steel eye-band in order to hang from a twisted eye-link connected to a pole mounted stay clamp or tension hook as shown in fig. 14.

(e) SPIRAL VIBRATION DAMPER (SVD)

Helically formed spiral vibration dampers are used on both sides of suspension fittings as shown in fig. 15.

3.6.3 DEMOUNTABLE PULLEY:

Demountable pulleys are used during the installation of aerial optical fibre cables see fig.16.

These are made from mild steel & the contour of the wheel is coated with rubber or any other suitable material for free movement of cable.

3.6.4 MATERIAL REQUIREMENT OF INSTALLATION ACCESSORIES AND FIXTURES:

(a) FOR DOUBLE TENSION POLES:

1. DESCRIPTION

J-shaped tension hook QUANTITY 2

2. (For C-bracket) Turn buckle

2

3. Extension link 2
4. Clevis thimble 2
5. Protective helix (T) 2 sets
6. Terminating helix 2 sets
7. Jumper cable clamp
8. a) Pole mounted stay clamp(Tubular) 1 (Pole having C-bracket)

   b) Pole mounted stay clamp (Tubular) bracket) 2(Pole without C-

OR

a) Pole mounted stay clamp (Rail) 1(Pole having C- bracket)

b) Pole mounted stay clamp (Rail) 2 (pole having C-bracket)

(b) FOR SUSPENSION (INTERMEDIATE POLES)

DESCRIPTION QUANTITY

a) Pole mounted stay clamp (Tubular)

b) Pole mounted stay clamp

(Tubular) 7

OR

a) Pole mounted stay clamp (Rail)

b) Pole mounted stay clamp (Rail)

Twisted eye link 1 set

Suspension clamp consisting of the following:

otective Helix (S) 1 set

mour grip helix

spension clipper with elastomer pad etc. 1 set iral vibration damper
haped tension hook 1 (Pole with C-bracket) mountable pulley One per pole in the splice section

Note: The ADSS accessories to be used shall be Helix type-I as per GR.no. 87060: 2017. The type of pole clamp to be used shall depend on type of poles and optical fiber cable used in the network; to ascertain the required SLA.

3.7 ENTRY OF THE O.F. CABLE IN THE BUILDING:

Normal methods for leading in and precautions recommended for leading-in of the optical fibre cable should be followed. A conduit pipe should be laid for leading-in the
O.F. cable inside the building; the cable may also be taken directly from the nearby
O/H pole to inside of the building for termination.

(a) Before the installation the O.F. cable should be tested.

(b) As per requirement install the additional new poles.

(c) Each pole should be checked for its strength. Provide extra stays if more strength is required.

(d) The Aerial O.F. Cable is recommended to be installed on the outermost hole of bracket towards road on the existing bracket/new bracket on the poles.

(e) Replace weak and other poles for clear ground clearance and strength as per the field conditions.

(f) Provide ground clearance of 12 feet in non-obstructing areas.

(g) Raise the height to minimum 16 feet at all the road crossings.

(h) Maintain the alignment as straight as possible.

(i) Construct splice chambers.

3.8 SPLICE LOCATIONS:

The field splices should be buried underground. The cable should be brought down through a 40mm dia GI pipe clamped on the pole. Proper bends (120-135 degree) are recommended for negotiating the bend. Wooden/hard rubber bushes shall be used at the entry and exit points of the GI pipe to avoid damage to the cable. A splice chamber as per the standard practice shall be made. The selection of the splice point shall depend upon the availability of space and the cable length. Wherever, burying of splice closure is not possible, the same be installed on the poles with proper clamping with the approval of GFGNL.

3.9 CALCULATION OF SECTION LENGTH:

Aerial O.F. cable is supplied as per TEC GR in a length of 2 Kms + 10%.
To arrive at the section length and allocating a particular reel of the cable to a particular section following consideration are required.

Strength Length:

- Actual section length measured.
- Allowance for sag 2% for each span length.
- Cable at each through tension pole (4 meters).
- Extra spare cable for coiling at the splice location (10 meters).

3.10 INSTALLATION MATERIAL REQUIRED DURING INSTALLATION

1. Demountable pulleys : 1 each for each pole in the installation section

2. Jack for cable drum : 1 set

3. Ladders : For each pole

4. Tools : Screw drivers C&T pliers Spanner set & hammer etc.

5. Manila rope 12 mm dia

6. Cable pulling winch machine

: 250 meters

with tension monitoring device : 1

7. Anti twist device : 1

8. Cable pole fork : 10

9. Flat twin open type cable grip : 2

3.11 INSTALLATION OF AERIAL OPTICAL FIBRE CABLE

The following steps are recommended:

(a) Install the accessories and fixtures as per the requirement of the individual poles it tension and suspension fittings.

(b) Install the demountable pulley on all the poles in the section before pulling the cable.

(c) Keep the cable drum over the jack near the 1st pole at the beginning of the section.

(d) Attach anti twist device and the shackle hook along with the rope to the front and of the cable on pulling eye or on the cable grip. Carry the attached rope over the demountable pulleys for pulling the cable.

(e) Depute one person at each pole to monitor and in case it is required to guide the cable over the demountable pulley during pulling operation.

(f) The cable should be pulled till the cable reaches the last pole of the section.

(g) Wherever in the pulling section; through pulling is difficult; half section or one fourth, action pulling method may be adopted by using figure of a techniques.

(h) The feeding and pulling of the cable should be synchronized by using communication link. Care is required to be taken so that the cable is not accumulated at any one point during pulling operation and sharp bends are avoided.

(i) Once the cable reaches the other end actual tensioning of the cable and fixing the installation of the accessories and fixtures shall be taken up with the help of cable pulling winch. The pulling tension must be monitored during tensioning.

(j) Install the tension fittings and accessories at the 1st pole.

(k) Fix a flat twin open type cable grip on the cable after tension pole for tensioning the cable in the preceding tension section.

(l) The cable shall be tensioned to a tension of 1-3 to 1-6 times of the cable weight. The sag shall be monitored and kept between 0.25 to 0.5% of the span length.

(m) The cable should be lifted between two poles by using cable pole fork during tensioning and fixing of the cable.

(n) During the fixing operation the cable shall remain under required tension for minimizing the sag in the splice section.

(o) Now install tension fitting and accessories at the all tensioned pole at the end of the tension section.

(p) Install the suspension fitting and accessories on the intermediate poles in the tensioned section.

(q) Similarly installation should be carried out in each tension pole in the entire section and the tension and suspension fittings are in stalled.

(r) At the Through tension poles the cable shall be kept loose and shall be supported by cable jumper clamp.

(s) At the end pole where the cable reel is kept; the cable to be taken through GI pipe (fixed to the pole) to the splice location.

(t) Extra care for the aerial O.F. cable may be taken at the bends and at entry and at the exit of the pipe. About 10 meters of cable shall be kept at the splice location for coiling (spare cable) and jointing requirement.

(u) Test the installed OF cable.

(v) Coil the OF cable and keep it safe in the splice location for splicing.

3.12 PECAUTIONS

(a) Provide display boards.

(b) Provide sufficient number of road sign and traffic cones.

(c) Avoid sharp bending of the OF cable during installation.

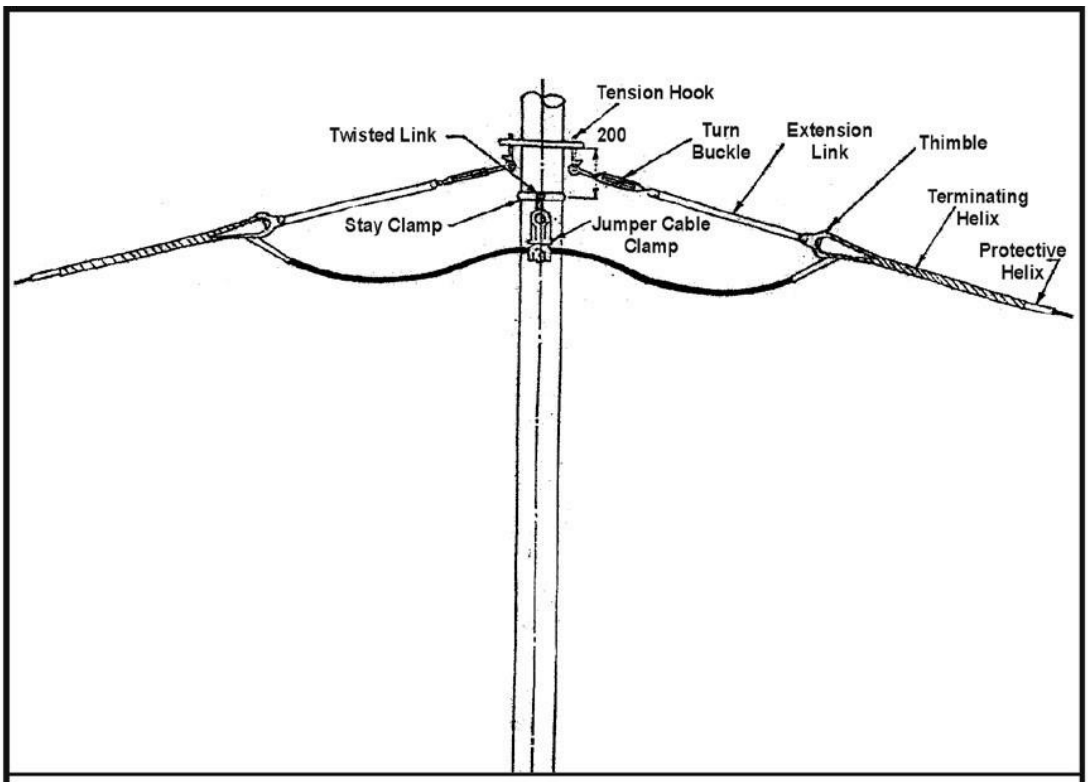
(d) The OF cable should not be given extra tension than the permissible tension limits.

(e) While crossing the overhead electric installations, safety measures should be taken. Also provide guard wire.

(f) To avoid man made damages, safety measures should be taken for each pole.

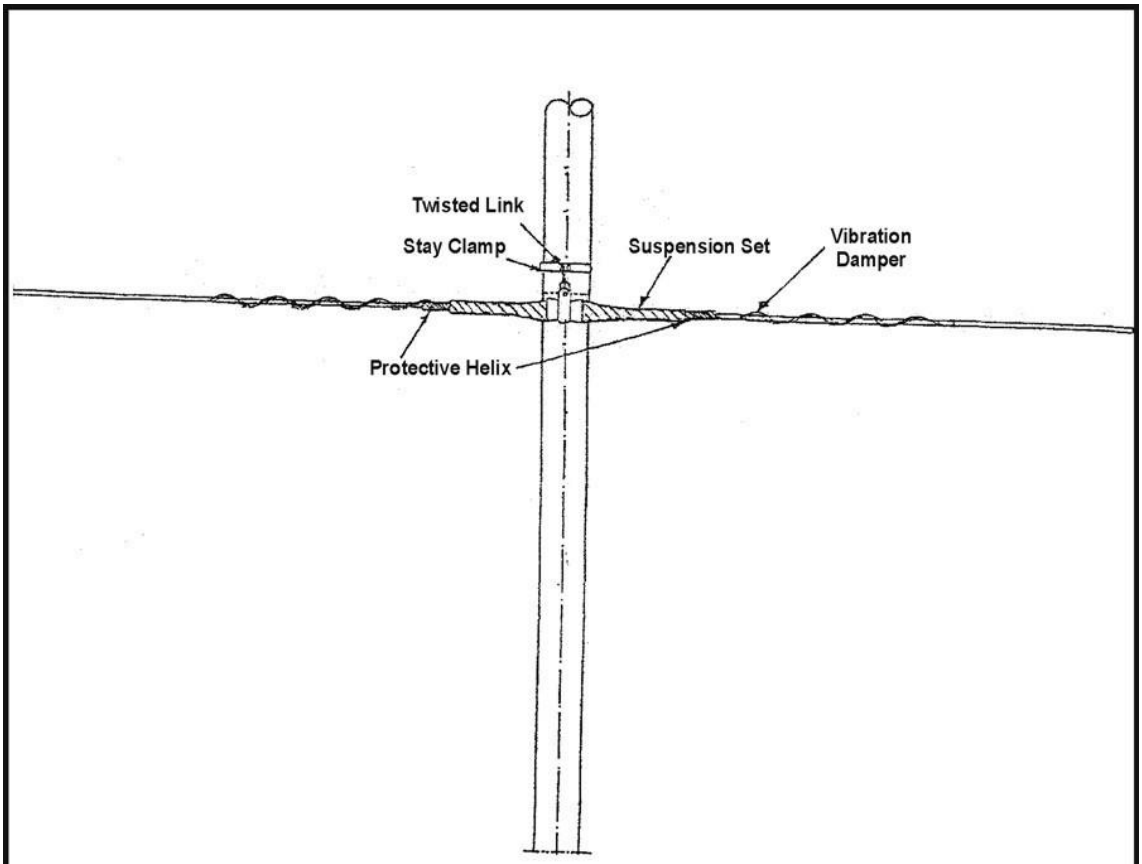
3.13 REFERENCE

TEC GR on Planning Guidelines and the Installation Practices for the installation of self supporting metal free aerial optical fiber cable.



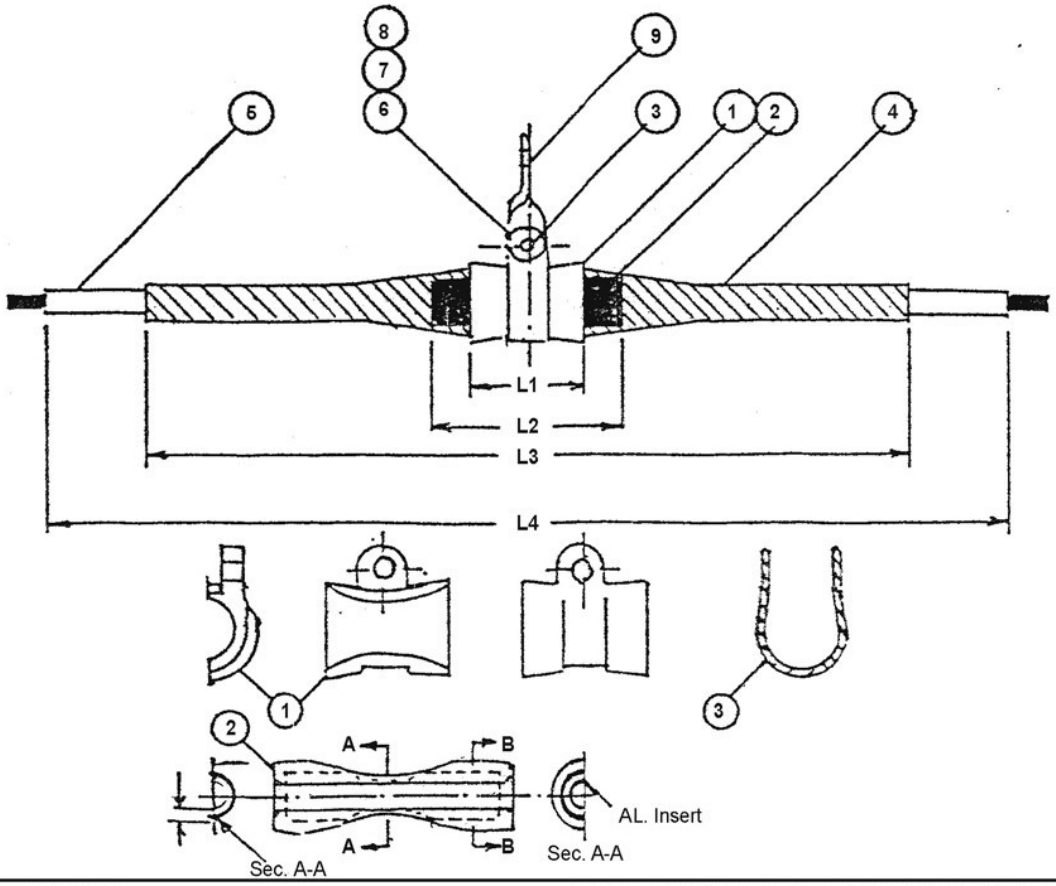
SUSPENSION POLE ASSEMBLY	
NOT TO SCALE	UNIT - MM

FIG -1



SUSPENSION POLE ASSEMBLY	
NOT TO SCALE	UNIT - MM

FIG - 2



(FOR EXAMPLE)
DIMENSIONS :- CABLE SIZE - 14.4 MM DIA.

CABLE DIA	L1	L2	L3	L4	COLOUR CODE	DIA AGS.ROD
14.4	115	200	800	1400	BROWN	4.25± 0.1

NOTE :- DIMENSIONS FOR DIFFERENT CABLE SIZES TO BE DECIDED AFTER TYPE TEST APPROVAL

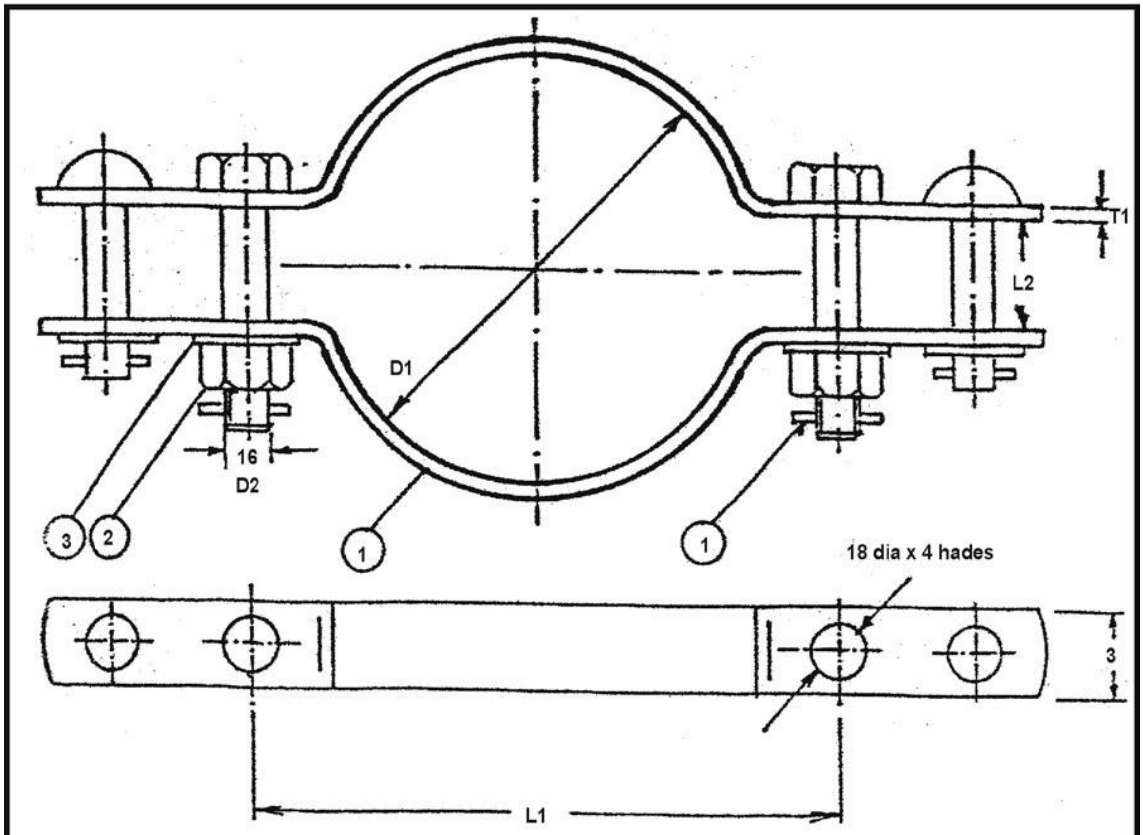
INSERT DIMENSIONS IN MM

INNER DIA.	AT - A - A 22	AT - B - B 22
OUTER DIA.	33	60

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	CLAMP)	ALUMINIUM ALLOY GDC	1S : 617	1 SET
2	INSERTS) SUSPEN. CLIPPER	POLYCHLOROPRENE COMPOUDED	1 PAIR	1 PAIR
3	STRAP)	ALUMINIUM ALLOY	IS : 617	1
4	AGS HELIX	ALUMINIUM ALLOY 6061		1 SET
5	PROTECTIVE HELIX	ALUMINIUM ALLOY 6061		1 SET
6	RIVET M 16	MILD STEEL GAVLVANISED	IS : 2062	1
7	FLAT WASHER	MILD STEEL GALVANISED	IS : 2016	1
8	SPLIT PIN	STAINLESS STEEL	IS : 2549	1
9	TWISTED EYE	MILE STEEL GALVANISED	IS : 2062	1

ARMOUF GRIP SUSPENSION SET	
NOT TO SCALE	UNIT - MM

FIG - 3



POLE MOUTED STAY CLAMP (RAIL)

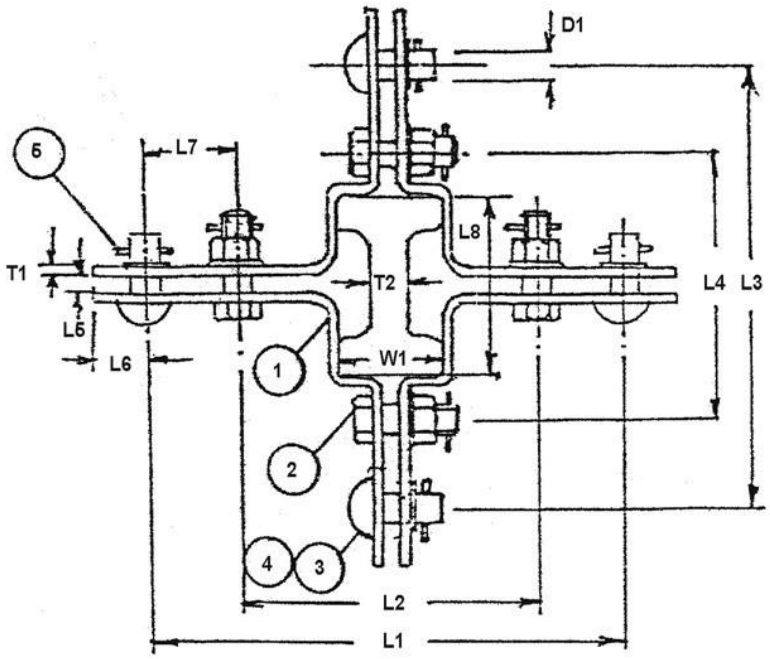
L1	L2	L3	L4	L5	L6	L7	L8	T1	T2	D1	W1
270	170	251	151	20	32	50	120	5	20	16	60

NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR UNLESS UNTILL SPECIFIED)
HOT dIP Galvainised as per is : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	CLAMP	MILD STEEL GALVANISED	IS : 2062	1 SET
2	BOLT & NUT M 16	MILD STEEL GALVANISED	IS : 1363	2
3	RIVET 16	MILD STEEL GALVANISED	IS : 2016	2
4	WASHER	MILD STEEL GALVANISED	IS : 2016	4
5	SPILT PIN	STAINLESS STEEL	IS : 549	4

POLE COLLAR CLAMP	
NOT TO SCALE	UNIT - MM

FIG - 4



DIMENSIONS IN MM :
POLE MOUTED STAY CLAMP TUBULAR

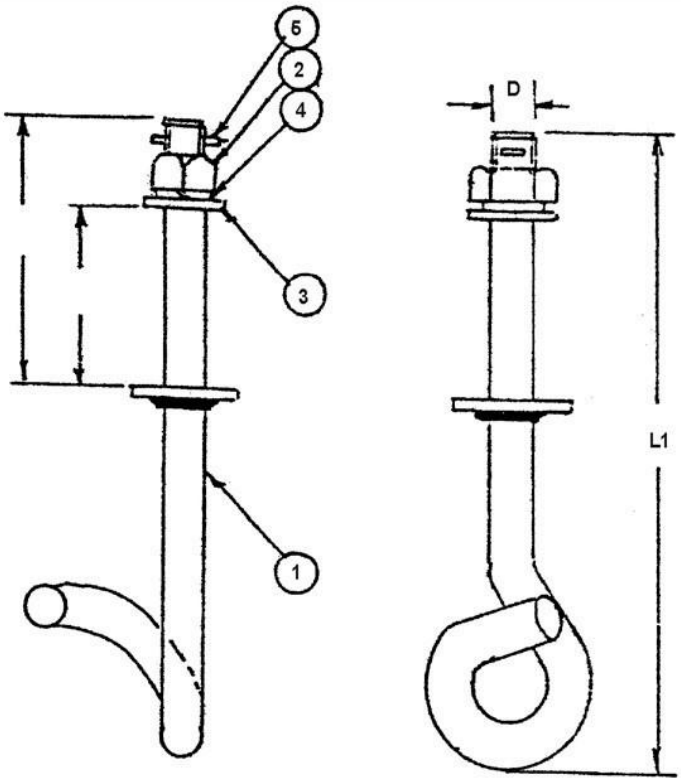
L1	L2	D1	D2	T1	W
210	20	150	16	5	30

NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR UNLESS UNTILL SPECIFIED)
HOT DIP GALVANISED AS PER IS : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	CLAMP	MILD STEEL GALVANISED	IS : 2062	1 SET
2	BOLT & NUT M 16	MILD STEEL GALVANISED	IS : 1363	4
3	RIVET 16	MILD STEEL GALVANISED	IS : 2016	4
4	WASHER	MILD STEEL GALVANISED	IS : 2016	8
5	SPILT PIN	STAINLESS STEEL	IS : 549	8 SET

POLE COLLAR CLAMP (R)	
NOT TO SCALE	UNIT - MM

FIG - 5



DIMENSIONS IN MM :

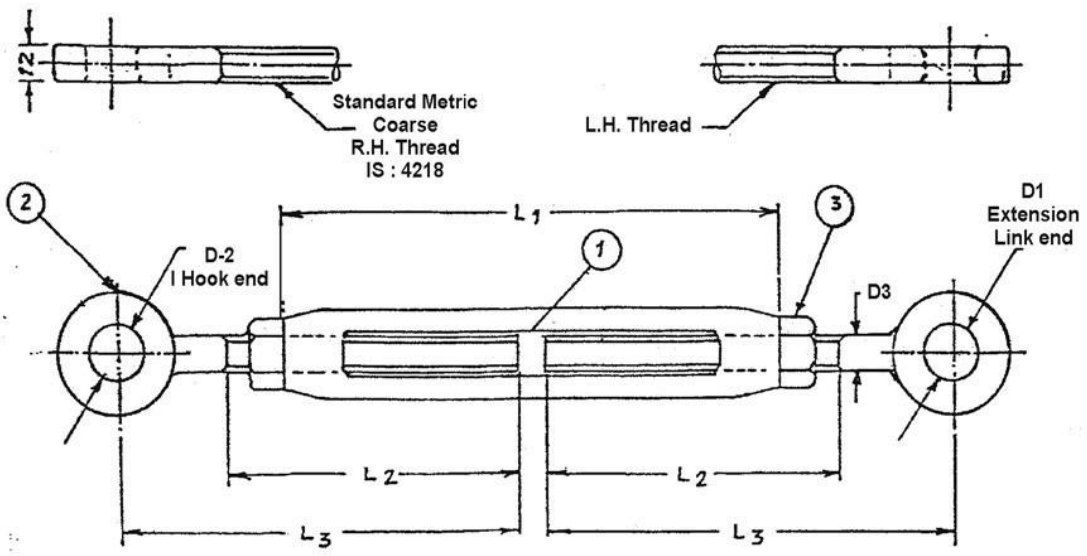
L1	L2	L3	D
177	75	50	12

NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)
TO BE USED HERE C-BRACKET IS AVAILABLE ON POLE FOR FITMENT OF TENSION HOCK
HOT DIP GAVANISED AS PER IS : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	BODY	ALLOY STEEL GALVANISED	IS : 2004	1
2	NUT	MILD STEEL GALVANISED	IS : 1363	1
3	PLAIN WASHER	MILD STEEL GALVANISED	IS : 2016	1
4	SPRING WASHER	SPRING STEEL GALVANISED	IS : 3063	1
5	SPILT PIN	STAINLESS STEEL	IS : 549	1

TENSION HOOK	
NOT TO SCALE	UNIT - MM

FIG - 6



DIMENSIONS IN MM :

L1	L2	L3	D1	D2	D3
170	100	140	18	18	12

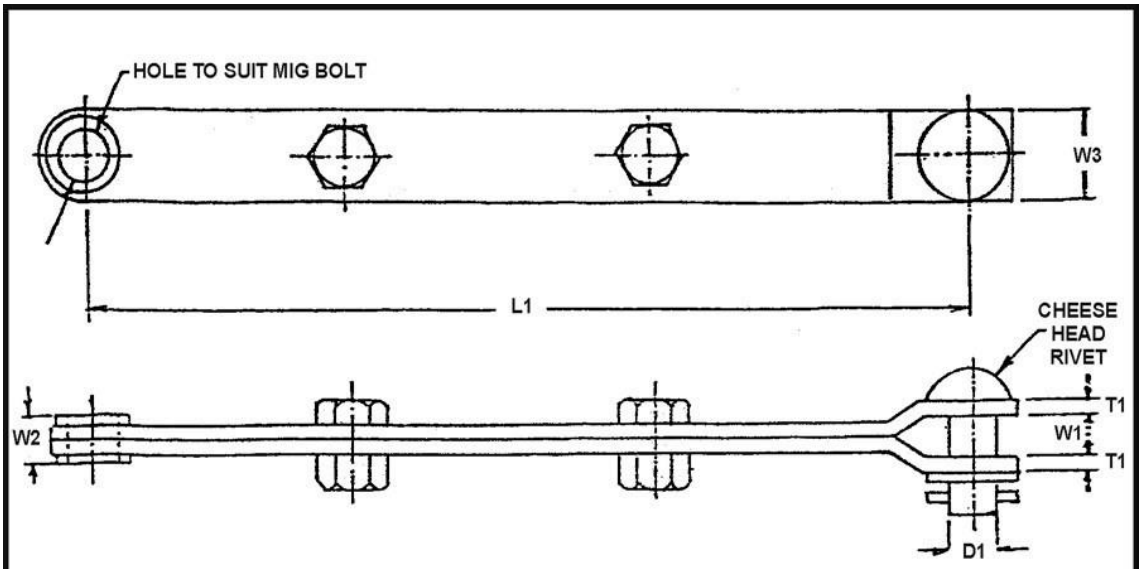
NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

MIN. LENGTH : 290 MM
MAX. LENGTH : 400 MM
RANGE OF ADi. : 110 MM
HOT DIP. GALVANISED AS PER IS : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	BODY	MILD STEEL FORGED GLAV.	IS : 2004	1
2	NUT BOLT	MILD STEEL FORGED GLAV.	IS : 2062	2
3	NUT	MILD STEEL	IS : 1363	2

TURN BUCKLE	
NOT TO SCALE	UNIT - MM

FIG - 7



DIMENSIONS IN MM :

L1	T1	W1	W2	W3	D1
465	5	14	16	30	16

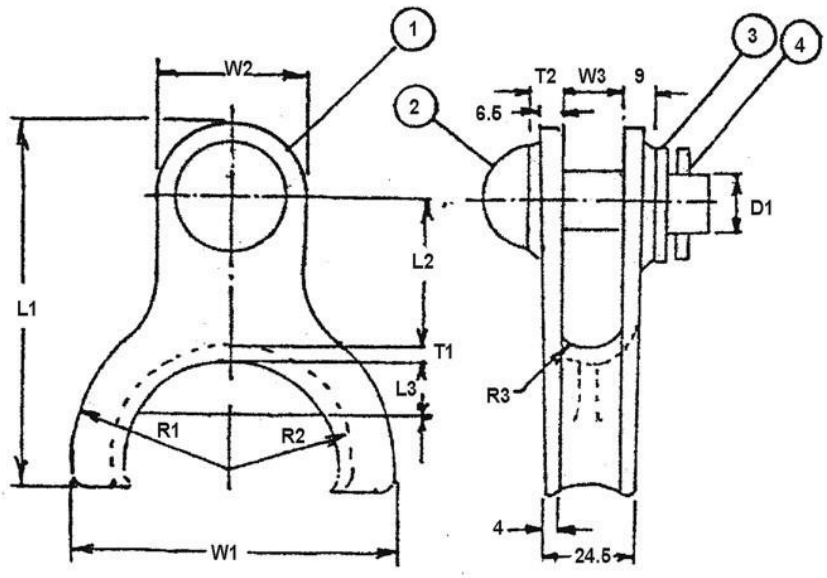
NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

HOT DIP. GALVANISED AS PER IS : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	STRAP	MILD STEEL GALVANISED.	IS : 2067	1
2	RIVET & WASHER	MILD STEEL GALVANISED	IS : 2016	1
3	SPLIT PIN	STAINLESS STEEL	IS : 549	1
4	BOLT & NUT M 16	MILD STEEL GALVANISED	IS : 1363	1

EXTENSION LINK	
NOT TO SCALE	UNIT - MM

FIG - 8



DIMENSIONS IN MM :

L1	L2	L3	T1	T2	R1	R2	R3	W1	W2	W3	D1
102	42	15	4	9	23	15	8	92	40	18	16

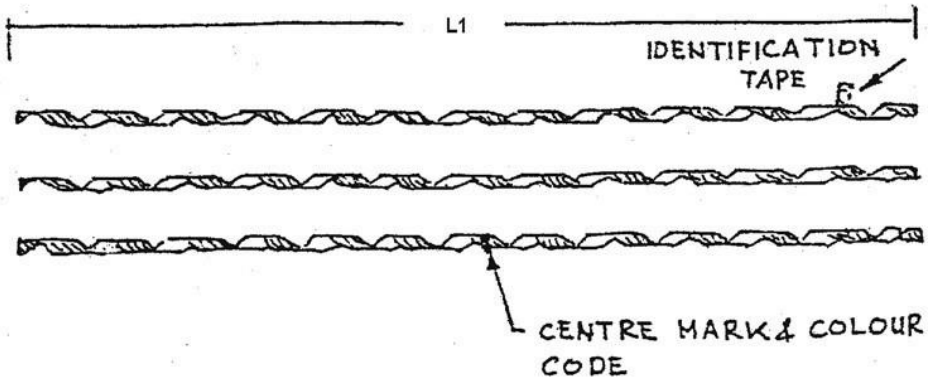
NOTE :- TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

FEROUS PARTS ARE HOR DIP GALVANISED
AS PER IS : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	CLAMP	ALUMINIUM ALLOY GDC.	IS : 617	1
2	RIVET M16 x 45	GALV. STEEL	IS : 2016	1
3	WASHER	GALV. STEEL	IS : 2016	1
4	SPLIT PIN	STAINLESS STEEL	IS : 549	1

CLEVIS THIMBLE	
NOT TO SCALE	UNIT - MM

FIG - 9



FOR EXAMLE
DIMENSIONS (FOR CABLE SIZE, D - 14.4 MM)

I. DIA OF EACH WIRE - 3.2 ± 0.1
II. NO. OF SETS - 3
III. NO. OF WIRE PER SET - 5
IV. LENGTH OF HELIX - 1400

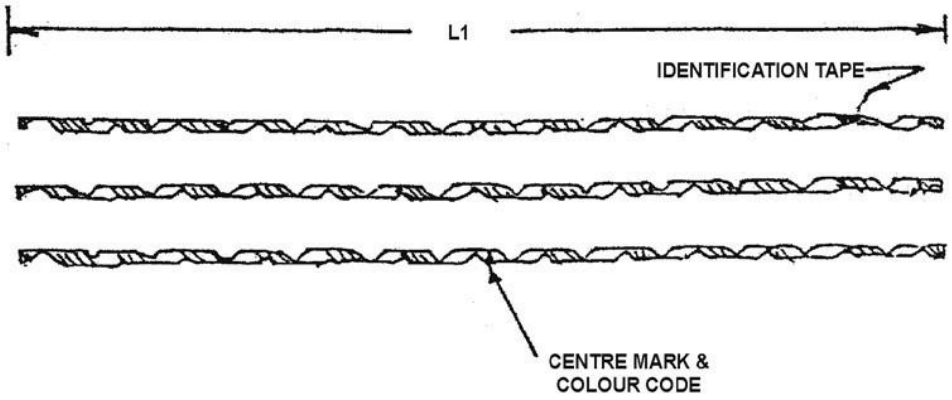
DIMENTION DETAILS FOR OTHER CABLE SIZE SHALL BE INDICATED BY THE MANUFACTURER INCLUDING THE PITCH OF HELIX

NOTE : ENDS OF RODS SHALL BE DEBURRED TOLERANCE SHALL BE AS PER IS : 2102 (DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	PROTECTIVE HELIX	ALUMINIUM ALLOY 6061		

PROTECTIVE HELIX (S)	
NOT TO SCALE	UNIT - MM

FIG - 10



FOR EXAMLE
DIMENSIONS (FOR CABLE SIZE, D - 14.4 MM)

I. DIA. OF EACH WIRE - 3.2 ± 0.1
II. NO. OF SETS - 3
III. NO. OF WIRE PER SET - 5
IV. LENGTH OF HELIX - 1000

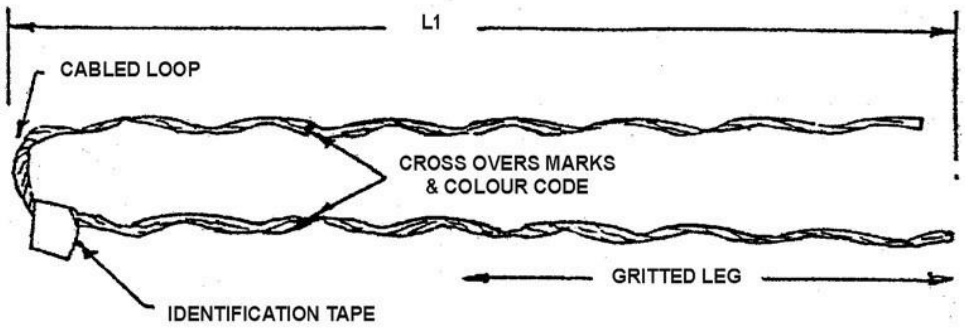
DIMENTION DETAILS FOR OTHER CABLE SIZE SHALL BE INDICATED BY THE MANUFACTURER INCLUDING THE PITCH OF HELIX

NOTE : ENDS OF RODS SHALL BE DEBURRED TOLERANCE SHALL BE AS PER IS : 2102 (DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	PROTECTIVE HELIX	ALUMINIUM ALLOY 6061		

PROTECTIVE HELIX (T)	
NOT TO SCALE	UNIT - MM

FIG - 11



DIMENSIONS
FOR EXAMPLE

L1	T1
1000	2.2±0.1

D IS DIA OF EACH WIRE ROD
NO. OF WIRES USED 5

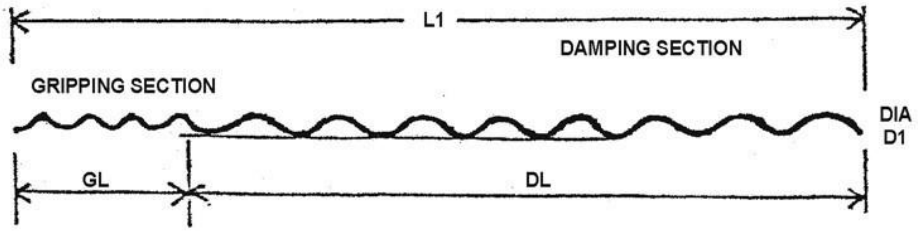
NOTE : TOLERANCE SHALL BE PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

DIMENSION DETAIL FOR DIFFERE CABLE SIZES TO BE DECIDED AP TYPE TEST APPROVAL
FOR EXAMPLE CABLE SIZE
ENDS OF RODS SHALL BE DEBUR LENGTH OF TERMINATING HELIX 1000 MM,
TER MINATING HELIX TO BE USED WITH THIMBLE C DIA - 14.4 MM

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	DEADEHD GRIP	ALUMINISED STEEL		

TERMINATING HELIX	
NOT TO SCALE	UNIT - MM

FIG - 12



DIMENSIONS IN MM

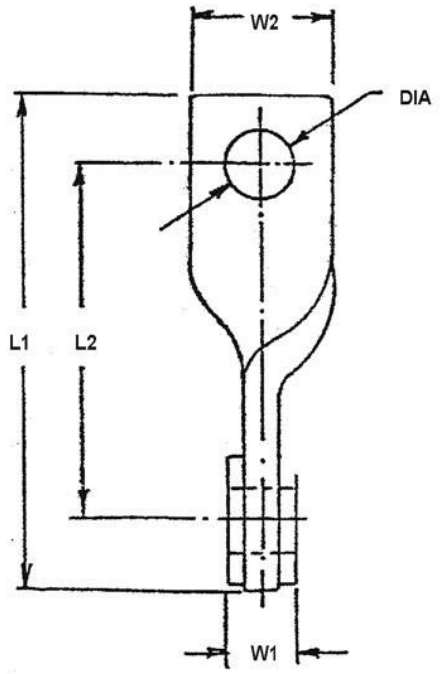
L1	GL	DL	D1
1346	446	900	12±1

NOTE : TOLERANCE SHALL BEAS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	SPIRAL VISRATION DAMPER	POLYVINYL COKPOUNDED		

SPIRAL VIBRATION DEMPER	
NOT TO SCALE	UNIT - MM

FIG - 13



DIMENSIONS IN MM

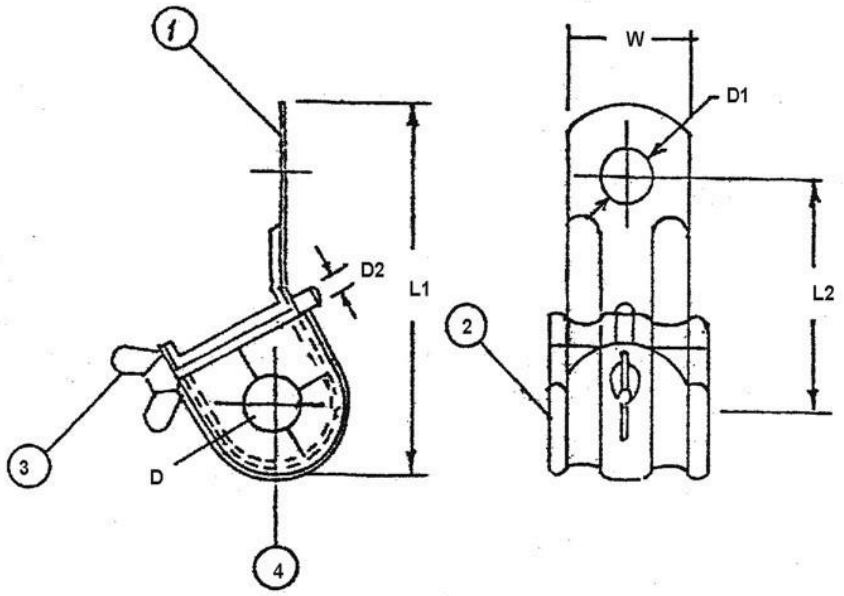
L1	L2	W1	W2	DIA
138	100	27	38	18

NOTE : TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)
HOT DIP GAVANISED AS PER IS : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	LINK	MILD STEEL	IS : 2062	1

TWISTED EYE LINK	
NOT TO SCALE	UNIT - MM

FIG - 14



DIMENSIONS IN MM

L1	L2	D1	D2	W
105	65	17.5	5-6	35

DIMENSIONS IN MM OF INSERT PAD

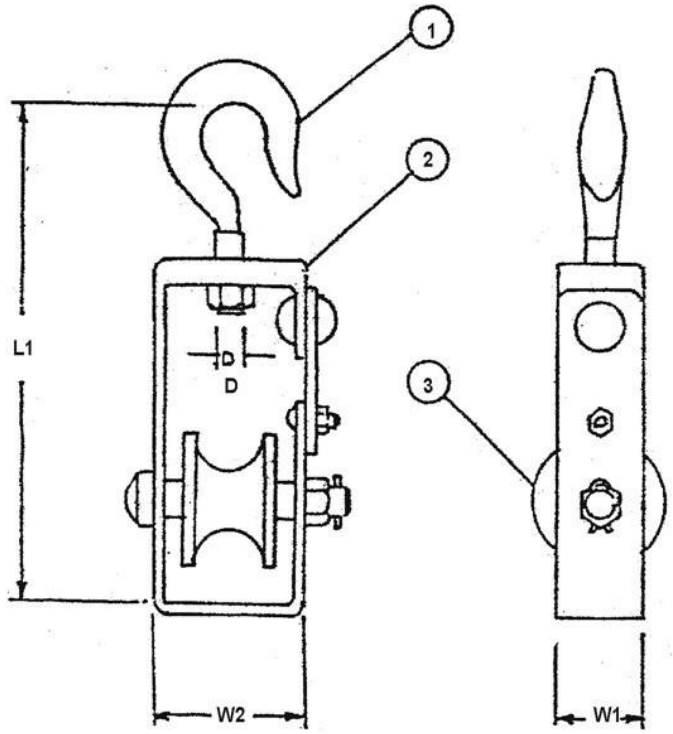
L	INNER DIA	OUTER DIA
40	15	30

NOTE : TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)
INSERT IN TOW HALVES D TO SUIT CABLE DIA FERROUS PARTS ARE HOT DIP GALVASIED AS PER IS : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	STRAP	MILD STEEL GALY	IS : 2062	1
2	INSERT	POLYCHLORADPRENE COMPOUNDED		1
3	WING BOLT	MILD STEEL GALY	IS 2062	1

JUMPER CABLE CLAMP	
NOT TO SCALE	UNIT - MM

FIG - 15



DIMENSIONS IN MM

L1	W1	W2	D
280	50	92	12

NOTE : TOLERANCE SHALL BE AS PER IS : 2102
(DETAIL AS PER GR, UNLESS UNTILL SPECIFIED)
FEFFOUS PARTS ARE HOT DIP GALVANISED AS PER IS : 2629

	DESCRIPTION	METERIAL	REF. Spec.	Qty.
1	HOOK	GALVANISED STEEL		
2	BODY	GALVANISED STEEL		1 SET
3	SPOOL	ALUMINIUM COATED NEOPRENE		

DEMOUNTABLE PULLEY	
NOT TO SCALE	UNIT - MM

FIG - 16

4. Post based, ADSS on LT/HT Electrical Poles

4.1 Overview

(a) The location of the tensioner and puller relative to the structure must be selected so that the pole is not overloaded. Where possible, a pulling slope of 75º to 80° is considered good practice. This ratio will minimize the load on the cable, traveler, sheave, or quadrant block, and pole. It may be necessary to place temporary guys to prevent overloading support poles. The reel must be placed in-line with the first two poles of the run to prevent twisting of the cable or any damage to the cable caused by rubbing the sides of the traveler, sheave, or quadrant block groove.

(b) Anchors and pole hardware must be rated above the expected environmental load of the cable, plus a safety factor. In installations where aeolian vibration could be an issue, the safety factor should be increased. At locations where the cable is tensioned to achieve proper sag, the pole may require a temporary down-guy and anchor to prevent overloading the pole.

(c) Travelers, sheaves, or quadrant blocks are normally attached directly to the support pole. The pole attachment, used to support the traveler, sheave, or quadrant block must be consistent with the working load and rating of the traveler, sheave, or quadrant block.

(d) The pulling grip shall be rated above the maximum pulling tension anticipated. Use the manufacturer's instructions for the proper application. When properly installed, no special preparation of the cable end, or aramid yarns, are required. A matching clevis type swivel should

be used to help prevent twisting of the cable during pull-in. The swivel should be of the type that has a break-away tension less than or equal to the cable's rated maximum pulling tension to prevent over tensioning the cable.

(e) Aeolian vibration is a resonant vibration caused by low velocity wind blowing across a cylindrical cable that is under tension. This vibration can cause severe degradation of the cable support hardware. Vibration dampers can be very effective in controlling aeolian vibrations when used on ADSS cable. Both resonant and interference type vibration control systems will work when properly applied.

(f) Splice locations require additional cable be provided to accommodate lowering the cable to the ground with enough slack to allow splicing inside a splicing van or trailer.

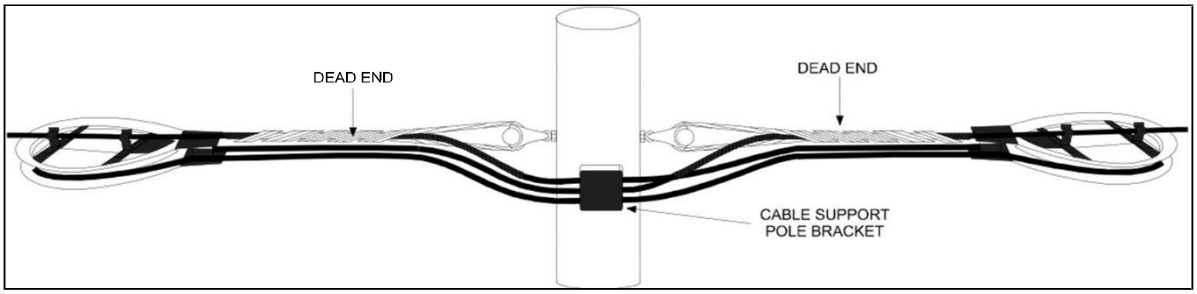


Figure: C – Cable Slack Storage

(g) All sl ack cable storage locations require the installation of slack cable storage

brackets. The strand cable storage bracket insures a proper bending radius for the stored fiber optic cable and provides for horizontal storage and tiering for storage of multiple cables and loops. Figure 3 below illustrates slack cable storage.

4.2 ADSS Cable Support Hardware:

There are two general types of ADSS cable support hardware: dead ends and tangent assemblies.

4.2.1 Dead-end assemblies:

(a) Deadend assemblies are used at the point of cable termination, or where the cable angle is greater than 20°. See Figure 4 below for illustration of a Deadend Assembly.

(b) The Structural Reinforcement Layer (SRL) is a subset of armor rod that is the first layer applied to the ADSS cable. They are spiraled in a precise twist lay to match the diameter and load of a specific cable. They are normally grouped together in a sub-set of four to five rods, with grit applied to the inside for slip resistance.

(c) The Deadend Grip itself is a set of armor rods that have been formed in a double spiral with a loop at one end. Its precise twist is designed to perfectly match the diameter of the SRL as it lay over the cable. The length of the deadend grip is dependent upon the maximum load. It too has grit applied to the inside for slip resistance.

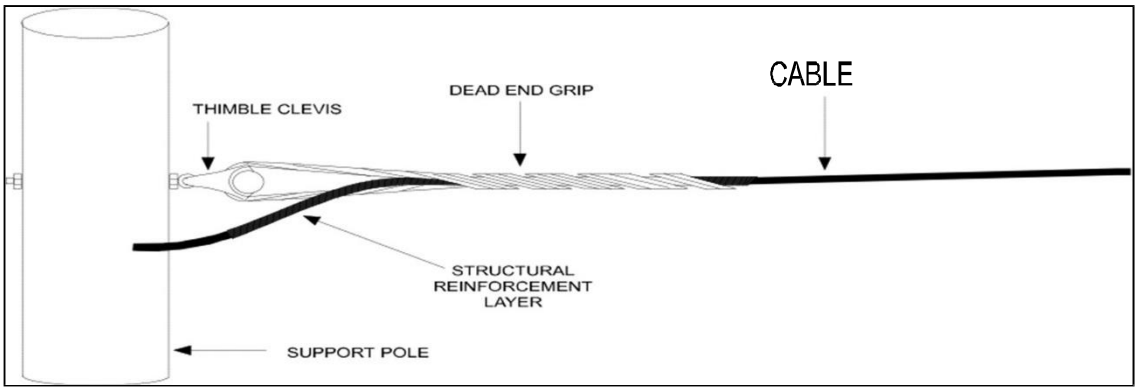


Figure: C – Cable Slack Storage

(d) The Thimble Clevis is made of cast aluminum or steel and is used to maintain the seat diameter of the deadend loop.

(e) The deadend hardware is assembled in the following manner:

(i) The SRL rod is assembled on the cable first. The end with the color band is assembled towards the end of the span. Wind on one set of rods at a time. The rods should be placed close together so that there is enough room for them all.

(ii) The tips of the SRL rods should align at the end. Do not force the rods or use tools to install them. Forcing the rods or using tools may damage the cable jacket.

(iii) Align the color band on the deadend with the color band on the SRL and wind one leg of the deadend on approximately two feet.

(iv) Insert the thimble clevis into the loop.

(v) Align the color band on the second deadend leg with the color band on the first deadend. Wind the second deadend leg over the SRL for approximately two feet. Continue winding the deadend legs over the SRL until both legs are snapped in place.

(vi) Connect the thimble clevis to the hardware (or to the extension link and then the hardware) mounted on the pole

4.2.2 Tangent Assemblies:

Tangent hardware is normally installed after the span has been tensioned. Figure D below illustrates a front and side view of a Tangent Support. To install the cable, open the hinged top and insert the bottom pad. Then place the cable on the pad, place the top pad over the cable, close the top and tighten the bolt to hold the cable in place.

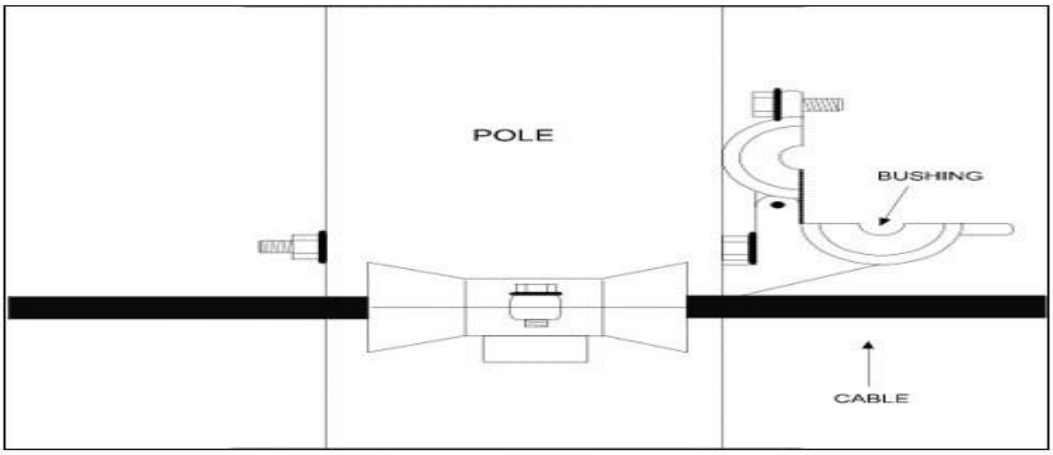


Figure: D

4.2.3 ADSS Sagging and Tensioning:

(a) Upon completion of placing the entire run of cable, sagging and tensioning can now be started. Sagging and tensioning the run is worked progressively from one end of the run towards the opposite end. Normally the slack is worked back in the direction of the reel in order to recover as much cable as possible. Sagging and tensioning should be conducted according to the cable manufacturer's recommendations for the cable just installed.

(b) The cable run is broken down into subsections for sagging and tensioning purposes. The last structure at each end of a section being sagged and tensioned is a deadend assembly. Remove all excess slack cable out of the section of the run being prepared for sagging and

tensioning. To remove the slack, reverse the tensioner and pull the cable back towards the reel, being careful not to exceed the minimum bending radius for the cable under tension.

(c) Once the slack is out of the cable, install a temporary deadend on the cable approximately 2 deadend assembly lengths away from the support pole. This deadend will be used as a tensioning grip to achieve proper span sag and tension, prior to installing the permanent deadend assembly.

(d) Attach the tensioning device: a chain hoist or power winch and a dynamometer between the pole and the temporary deadend. Begin to apply tension to the span.

(e) The cable is normally tensioned from deadend to deadend along the span back to the reel. Once the spans are properly sagged and deadends attached, the suspension or tangent hardware is installed and attached to the poles by working back to the deadend one span at a time.

(f) With a span's permanent deadend installed and the hardware attached to the poles, the pulling device can now have its tension released and the temporary deadends removed from the cable. When the next permanent deadend is installed on the adjacent span, make sure that the loop formed between the two deadends maintains the minimum bend radius for the cable. Repeat this operation until all spans are sagged and tensioned.

5. Conclusion

As All Dielectric Self-supporting Aerial Cable (ADSS) are made of brittle material, so it can't put too much strain and fiber diameter is very small, so he's tensile strength very weak .In choosing the cable hardware, the principle is not only to meet all the features and characteristics of the cable should be inclusive , but shall take into account the payment of grip strength with uniform , non-metallic sheath degradation , wear , vibration breeze , dancing , exceed the allowable bending stress and reverse parameters. Therefore, the general provisions are "Hardware's squeeze should not exceed with more than two cables design limits, hardware should not be designed for a range of diameters."

Abbreviations:

1. ADSS – All Dielectric Self Supporting optical fibre cable

2. MASS – Metal Free Aerial self supporting cable
3. OFC – Optical Fibre Cable
4. OPPC – Optical Phase Conductor
5. KV – Kilo Volt
6. LT – Low Tension
7. HT – High Tension
8. FTTH – Fibre To The Home
9. dB – decibel

10. Km – Kilometre
11. TEC GR – Telecommunication Engineering Centre (Department of Telecom, Govt of India) Generic Requirements.
12. IEEE – Institution of Electrical and Electronics Engineers
13. IEC – International Electro technical Commission

14 Aeolian vibration : Wind induced (Aeolian) vibrations of conductors and overhead shield wires (OHSW) on transmission and distribution lines can produce damage that will negatively impact the reliability or serviceability of these lines.

15 C- Bracket

16 D-Dia of cable

17 degree C : Degree Centigrade

18 EI : Engineering Instruction

19 OF cable : Optical Fibre Cable

20 SVD : SPIRAL VIBRATION DAMPER

21 TEC GR : Generic Requirements issued by the Telecommunication Engineering Centre New Delhi.

Annexure-E TECHNICAL SPECIFICATION FOR GIS MAPPING OF OFC ROUTES AND PROJECT MANAGEMENT TOOL

1. General requirements

1.1 State NOC (S-NOC) Integration with Central NOC (C-NOC)

- PIA shall ensure integration of S-NOC with C-NOC including NMS and all EMSs, such as IP-MPLS routers, RFMS, mini-OLT, alternate technology, etc.

- PIA shall ensure seamless integration of S-NOC applications such as Fault management, Performance management and Trouble ticket management etc. with C-NOC.

- PIA shall establish mechanisms for real-time data synchronization between S-NOC and C-NOC applications. The integration shall be based on open APIs and event-based data shall be pushed by S-NOC to C-NOC on near real time basis.

1.2 Geographical Information System (GIS)

- PIA shall perform GIS based desktop planning, preliminary design, detailed video graphic survey, GIS data collection during execution for creation of digital As Built Drawing (ABD) on GIS.

- PIA shall collect and maintain the inventory of both physical and logical resources of OSP (outside plant - fibre, chamber, splice-closure, coupler etc.), ISP (Inside Plant: room, rack equipment's and their connectivity) and power infra.

- PIA shall maintain and store all details of deployed network infrastructure till the readiness of C-NOC. After readiness of C-NOC, PIA shall upload all GIS data.

- PIA shall upload all required GIS details such as data files, videos, photos, etc. on C-NOC GIS application.

- PIA shall provide all required information related to network to C-NOC for fibre inventory management.

Note: The specific functional criteria listed in clause no. 2 below for the GIS mapping of OFC routes.

1.3 Asset management

• PIA shall maintain a detailed inventory of all BharatNet network assets, including but not limited to routers, switches, OFC, RFMS and other infrastructure components. This inventory will be validated by the Independent Engineer (IE) and then approved by the GFGNL.

• PIA shall manage the entire asset lifecycle of BharatNet infrastructure. PIA in consultation with GFGNL shall assign unique identifiers or tags to network assets and infrastructure elements in the field, such as routers, switches, fibre cables, splice points, junction boxes, and termination points etc.

1.4 Project Monitoring

• PIA shall provide necessary inputs regarding the progress and status of the project implementation in the Project Monitoring tool to be deployed by GFGNL. This input is crucial for creating and overseeing project schedules, milestones tracking, and monitoring of timelines within the project. The detailed requirements are given in clause no. 3 below.

1.5 Network Provisioning and Utilization

• The network shall enable retail, enterprise and wholesale services as per the requirement of GFGNL.

• PIA shall provide all necessary support and facilitation to GFGNL and designated service provisioning agencies for provisioning and monitoring of services from S-NOC.

• PIA shall be responsible for coordinating and assisting GFGNL in provisioning and configuring network resources for effective network operations, service provisioning, assurance and utilization through retail or wholesale enterprise services such as FTTH, leased circuits, dark fibre and bandwidth leasing etc.

2. Functional requirements for GIS Mapping of OFC Routes

• Accuracy: sub meter level accuracy (20cm).

• Format: .shp format with mapping on Geography Coordinate System (GCS) projection system with WGS 84 datum.

• Codification and layer structure will be provided by GFGNL. The PIA shall be responsible to create separate layers for all network elements as per the requirement. However, the indicative structure of the shape files for Block, GP, route markers and OFC layers are as given below:

Block Layer (indicative)

SN Field Type Description

1	Name	String	Block Name
2	Asset Type	String	Block
3	Blk_Name	String	Block Name
4	Blk_Code	String	Block Code
5	Dt_Name	String	District Name
6	Dt_Code	String	District Code
7	St_Name	String	State Name

Block Layer (indicative)

SN	Field	Type	Description
8	St_Code	String	State Code
9	Lat	Double	Latitude
10	Long	Double	Longitude
11	Cable_Len	Double	Cable Length
12	Remarks	String	if any
13	Obs	String	Observation
14	Status	String	Editing Status/It should be blank
15	Block_ip	String	IP address of BLOCK
16	geo_photo	String	Photo with geo- location
17	Vendor	String	Name of vendor
18	Phase	String	1/2/3
19	Model	String	DBOM
20	Technology	String	IP-MPLS

GP Layer (indicative)

SN	Field	Type	Description
1.	Name	String	GP Name
2.	Asset Type	String	GP
3.	Asset_Code	String	GP Code

4.	LGD_Code	String	LGD Code for Location
5.	Location	String	Location Name of GP
6.	Loc_Type	String	School, College, GP, PANCHAYAT BHAWAN etc.
7.	GP_Code	String	GP Code
8.	NMSBLOCK_CD	String	NMS BLOCK Code
9.	NMSGP_C D	String	NMS GP Code
10.	Blk_Name	String	Block Name
11.	Blk_Code	String	Block Code
12.	Dt_Name	String	District Name
13.	Dt_Code	String	District Code
14.	St_Name	String	State Name
15.	St_Code	String	State Code
16.	Lat	Double	Latitude
17.	Long	Double	Longitude
18.	Cable_Len	Double	Cable Length
19.	Remarks	String	Remarks from GFGNL
20.	Obs	String	Observations
21.	Status	String	Editing Status/It should be blank
22.	Block _ip	String	IP address of Block
23.	GP_mac_id	String	Mac Id of GP
24.	Otdr_len	Double	Length in meters
25.	Conn_str	String	PIC-PON- GP ID
26.	GP_sr_no	String	Device serial no.
27.	Backhaul	String	OFC or R F / Sat

GP Layer (indicative)

SN	Field	Type	Description
28.	geo_photo	String	Photo with geo-location
29.	Phase	String	1/2/3

30. Route_code String New/Old

OFC Layer (indicative)

SN	Field	Type	Description
1	Name	String	OFC Route name
2	Asset Type	String	Leased/Incremental
3	Asset_Code	String	Segment Code
4	Blk_Code	String	Block Code
5	Dt_Code	String	District Code
6	St_Code	String	State Code
7	CS	String	Cable Section
8	Seg_Length	Double	Route length
9	Start_Node	String	Starting Asset
10	S_Cable_Len	Double	Starting Cable Length
11	End_Node	String	Ending Asset
12	E_cable_Len	Double	Ending Cable Length
13	num_fibre	String	24/48
14	Status	String	Editing Status/ It should be blank
15	Remarks	String	Remarks from GFGNL
16	Obs	String	Observations
17	Traverse	String	FIBRE POSITION e.g. 'U' For Underground, 'O' for Overhead
18	fibre_pos	String	Left/ Right of the road
19	Direction	String	Towards GP or Block
20	Phase	String	1/2/3

21	Route_code	String	New/Old

Route marker (indicative)

S N	Field	Type	Description
1	Name	String	Route marker NAME
2	Type	String	Asset Type
4	Blk_Name	String	Block Name
5	Blk_Code	String	Block Code
6	Dt_Name	String	District Name
7	Dt_Code	String	District Code
8	St_Name	String	State Name
9	St_Code	String	State Code
10	Lat	Double	Latitude
11	Long	Double	Longitude
12	rd_Offset	Double	Offset from centre of the Road

Route marker (indicative)

S N	Field	Type	Description
13	CS	String	Cable Section
14	Remarks	String	Remarks from GFGNL
15	Obs	String	Observations
16	cable_len	String	if any
17	Status	String	Editing Status/ It should be blank
18	geo_photo	String	Photo with geo-location
19	fibre_pos	String	Left/ Right of the road
20	Direction	String	Towards GP or Block
21	Phase	String	1/2/3

22 Route_code String New/Old

Note: For other required layers similar structure may be envisaged.

2.1 GIS data collection

- PIA shall conduct survey of the Block and associated routes from Block to Gram Panchayats (GPs) to evaluate the existing and new fiber cable needs for network implementation.

- PIA shall collect coordinates of landmarks such as culverts, bridges / nallah, water bodies, crossroads, railway crossing, flyovers and public places like temples/mosques, bus-stop, PHC, post office, school/college, shops, police stations, banks, tourist spots, hospitals, etc. to be captured along with the route marker, cable joints, etc. along with the cable routes. One additional reading in the middle of the two manholes / RI should be recorded in the already laid network. Recordings are necessarily to be made at every fibre turn, bend along the route, road/railway crossing, culverts, diversion etc. Sufficient recordings at short intervals on the curvature of the route shall be captured to map it on GIS properly.

- PIA shall collect photos of various assets such as Blocks, GPs, manholes, joint chambers, FDMS, route markers etc. with geo tagged images.

- PIA shall collect information about terminated and spare fibres, loops, cable types/sizes and optical test results for each fibre, utilizing previously recorded data from GFGNL. This includes port-by-port fibre configurations, termination details, and OTDR readings for Blocks and Gram Panchayats (GPs) PIA shall collect cement/electronic route marker (lat- long) details for route marker identification.

- PIA shall collect information about road length, width and type (RCC etc.). variation in width of road in meters taking offset from the center of the road.

- PIA shall gather details about authorities such as railway, National Highways (NH) and forest departments within the limits of the OFC path required for RoW permissions.

- The point feature like poles, sewerage manholes, other utility chambers, transformers, bore well etc. shall be captured as a point.

- The record of Block, GP and any utility shall be maintained within a 50-meter corridor with an accuracy of 20 cm (25 meters on each side of the road's center line or within the road's right-of-way, whichever is greater)

- To and fro direction towards village, town, city etc. shall be recorded for all roads.

- The geo coordinates of all road KM stones shall be recorded and shown using symbol provided.

- Note: All the asset locations on ground are to be geo-tagged in five photographs (one close-up and four from different directions covering road part and also landmarks, if visible) and videography (zoom & wide angle) to be taken so as to identify the exact point later on. There will be a practical situation where the route markers will be found missing, in such situation a play card with the notional assets no. available RID/ABD to be placed on the identified point.

2.2 Mobile app for data collection from field

PIA shall use GFGNL mobile application & video recording solution for the BharatNet Project to accurately document project activities such as trenching, fibre laying, splicing and equipment deployment. The key requirements are given below.

- PIA shall record videos of depth, offset, chainage marking, etc. of overhead or underground alignment type of execution (HDD, OT, Aerial etc.)

- The video should support to record and identify depth, offset, ofc accessories details and landmarks of routes.

- PIA shall ensure that the accuracy of videos and GIS coordinates is within the range of 20 cm. (a sample check of the survey shall be performed on the ground by IE to check the submeter level accuracy (≤ 20 centimeters). GFGNL may use CORS system deployed by Survey of India for measuring the accuracy during sample check. The survey data shall be rejected if the accuracy of the sample data is not in accordance with the desired accuracy).

- The PIA should use suitable devices such as GNSS / DGPS (which can be pole- mounted or handheld as necessary), or any other appropriate technology and mobile applications for conducting surveys to capture GIS coordinates, videos, and photos of completed work.

- The BharatNet mobile app can be used as needed for capturing GIS coordinates, videos, and photos of executed work. The GNSS/ DGPS or any other device used by the PIA must be compatible with the BharatNet mobile app. If the PIA opts for its own application than PIA shall upload videos in mp4 format and GIS coordinates in shape file format on GFGNL provided GIS application. If the PIA uses the GFGNL mobile app, videos and GIS coordinates will be uploaded automatically.

- If PIA used own mobile app, in such case all videos and photos shall be geo tagged and geo location shall be mentioned in file name. The geographical information shall also be available in header file.

2.2.1 Video specifications:

- Format: MP4 format, minimum 720p & and above resolution, and 30 fps/60fps frame rate with HEVC codec for video compression.
- Content: Each video segment shall clearly capture start and end points of activities, depth readings for trenching/drilling, manhole/cable chamber installation, details of OFC blowing/pulling, splicing activities, route markers, and active equipment deployment procedures.
- Continuous recording: Videos shall be recorded continuously without cuts or edits, and file sizes should be optimized for efficient data exchange.
- Visual evidence: Use calibrated vertical measuring tools to display depth in the video frame at every 10 meters for Open Trenching.
- Verbal commentary: Provide running commentary describing activities, depth measurements, and location references.
- Date and time stamp: Automatically embed date and time stamps in recordings.

- File naming: File names should clearly indicate the type of work, block, and route.

- The following details (indicative) shall be captured in videos:
  - Chainage (CH) details
  - Methodology type
  - Depth and Offset details.
  - Lat long of each pit, RI, splice chamber landmarks etc.
  - Crossing of roads
  - 3 reference points of RI, Block and GP
  - Major crossing
  - Forest area, etc.

Note:

1. Requirements for mobile device/ handset for GIS mobile app

- The PIA shall have dedicated mobile for BharatNet program to capture implementation videos.
- Mobile device shall support minimum android version 13.0 & iOS version 15 for operating the GIS mobile application.
- Mobile device shall support minimum camera capacity of 48 MP or higher and have at least 256 GB storage with augmented cloud storage capabilities as well.
- The camera should provide stable footage with minimal shaking or distortion.

- The video recording needs to be captured in sufficient day light and significant speed of maximum 40mtr/minute and minimum of 20mtr/minute.
- The video recorded and uploaded by PIA to GFGNL shall also be stored by the PIA for future reference, extending for a duration of one year or until invoicing, whichever is higher.

- Mobile device shall support all the required features to fulfill the video recording requirements as given in clause 2.3.3.

2.3 GIS data upload and validation

• GFGNL shall provide online tool and measurement book format for uploading the captured data and information.

• PIA shall upload geotagged images and videos of designated locations in specified formats given in clause 2.4 below. The mobile app of BharatNet shall be used to upload photos and videos to be taken from the sites.

• To upload Block-wise data on GIS application (web and mobile), GFGNL will provide base maps to facilitate the upload and optimization of captured data and information, including fibre infrastructure and termination details etc.

• Validation of uploaded data shall be done in two stages:

o First stage: The PIA shall upload and verify the Block wise data/ videos/ photos in the GIS application (web/ mobile)
o Second stage: Second level validation shall be done by IE of respective Block.

• If the data correction is required at any stage, the same shall be sent to the PIA for necessary correction.

• PIA shall be responsible to modify/ correct the data and submit for revalidation by the IE/ GFGNL.

2.4 Digital As-Built Drawing (ABD):

• As-Built Drawing (ABD) shall be created digitally on GIS platform.
• PIA shall record details of other operators and utilities such as underground optical fiber cables, utility pipes, transmission cables, and other similar infrastructure, in the digital ABD wherever possible.
• The geo coordinates of all property boundaries within the fibre route corridor shall be recorded and shown in digital ABD.
• PIA shall capture physical OFC asset details and locations in respect of locations/ asset visited for capturing GIS data during scope of work as mentioned in this tender.
• Existing data as per documentations/ details made available to PIA w.r.t. to old OFC laid.
• ABD shall be prepared from Block to GPs during implementation. The ABD for each block shall be prepared separately. ABD may have the following details:

Particulars	parameters to be captured (indicative)
Cable details	▪ Make and Size of the cable

Particulars	parameters to be captured (indicative)
Joint chamber details	• Location of Joint Chamber (Lat/ Long details in decimal degree format up to six-digit precision) • Depth of Joint Chamber Cover from ground level • Details of cable stack at each joint chamber • 3 reference point of joint locations
Route marker	• Location of Route Marker Cement / Electronic (Lat/ Long details in decimal degree format up to six-digit precision) • Route Marker Identification details • 3 reference point of each route marker
OFC Alignment Details	• Offset of cable from centre of the road at every 10 meters (Details to be captured from HDD Graph / digital measurement book) • Details of crossings (road / rail / nala etc) should be provided. • Depth profile of cable at every 10 Meter (Details to be captured from HDD Graph / Measurement Book • Details of protection with type of protection (Details to be captured from BSNL provided input) • Locations of culvert and bridges with their lengths and scheme of laying of HDPE / PLB pipe thereon
Landmark Details	• Important landmarks to facilitate locating the cable position in future to include important buildings such hospital, religious places, petrol pumps, educational institutes, government offices, commercial complex, major residential complex / building etc
Road feature details	• Electric Pole / Transformer • Telephone Pole • Utility Manhole • KM Milestone • Street Pole / Lamp Post • Median • Divider • Large Tree

- Readings shall be recorded without any exception at interval of 10 meters including every bend on the road, road/railway crossings, culverts, diversion etc. Each section shall record maximum 200 to 250 meter of the route length.
- All the property boundaries within the corridor shall be recorded and shown in drawing. Three point's references need to be shown for every joint chamber/pull through chamber/manholes.

- Collection of data shall also include custodianship of equipment in each Gram Panchayat.

• All the diagrams shall be verified by the PIA (project manager level person) as a proof of accuracy of the details. The ABD may have the following details.

o Name of the Project Organization

o Name of the OFC Link with ID

o Name of the PIA

o Name of Survey PIA Rep as part of acceptance test o Name of GFGNL Rep (IE) as part of acceptance test o Date of commencement of work.

o Date of completion of work

• RoW: Railway authority, National highway, Forest authority and any other authority limit along with OFC path shall be captured in ABD (details will be provided in GFGNL ancillary input data).

• The PIA shall also be provided option to upload ABD in GIS format (.shp etc.) in the GIS platform through online tool to be provided by GFGNL. In such cases, PIA shall prepare ABD in GIS format (shape format) of OFC connectivity from Block location to respective Gram Panchayats (GPs), routes data shall be in soft copy.

3. Functional requirements for PM tool

The project monitoring tool shall enable real-time tracking of project progress, (timelines and milestones) including the status of network infrastructure deployment, equipment installation, and connectivity establishment across all packages of Amended BharatNet program.

• PIA shall provide the input for managing project documents, drawings, specifications, permits, contracts, and other relevant documentation etc.

• PIA shall provide all required information for the application dashboard in standard/ defined format such as measurement book, acceptance test proofs etc. The details shall be, but not restricted to, as under: -

o Block/GP wise Cable Length.

o Block /GP wise Duct length.

o Block /GP wise Trench Length.

o Total as build OSP network elements count/details of FDMS/ Handhole/ Manhole/ Site/ Splice Closure etc.

o Total Planned OSP network elements count/details of FDMS/ Handhole/ Manhole/ Router/ Site/Splice Closure etc.

o Total ISP network Elements count/details of Router/ Switch/OLT /Repeater /Equipment's etc.

• PIA shall be responsible to update the project progress in the project monitoring tool, enabling the system to automatically create milestone-based proforma invoices.

3.1 Digital measurement book

• Digital measurement book module of BharatNet C-NOC shall automatically calculate and update the work completed data including route length in RKM, depth etc. based on the videos uploaded during the execution of the work.

• PIA shall be responsible to provide/ update the measurement book information in the PM tool MB module via mobile application to record work details in the C-NOC MB module if required. The recorded, reading in the MB cannot be deleted. The MB data shall be validated by the (approved/ rejected) by the IE. PIA shall maintain and store all details of measurement book till the completion of C-NOC application. After completion of C-NOC, PIA shall upload all required data in PM tool GFGNL.

• PIA shall also get an option for manual entry of records in digital measurement book of PM tool in case of any issue faced in automated process.

3.2 Inspection and audit module

PIA shall have access of PM tool inspection and audit module, this module shall be utilized by IE to validate the high- and low-level network design, inspect the project and identify any lapses/defect

etc. The PIA shall provide comments on the observations and describe the necessary actions required, including specific timelines for completion.

Annexure-F for existing rates of OFC rectification work

Subject: Approved rates for OFC rectification work

GFGNL competent authority has approved below mentioned line item rates for OFC rectification work to be carried out anywhere in Package – A & B of BharatNet Phase – II Project.

For all eligible work as per RFP (RFP No: GFGNL/DST/BharatNet-PIA/2018/30 & 31) / WO / Contract, PIAs will be reimbursed as per below approved rates.

Sr. No.	Item Description	UOM	Final Rate for Rectification Work Package – A & B
A	**Supply - Passive Infrastructure (Underground Cable) (As per technical specifications given in Annexure-A TEC GR No.)**		
1	Optical fibre Cable 96 core (Ribbon)	Kms.	**1,55,682**
2	Optical fibre Cable 48 core (Ribbon)	Kms.	**81,457**
	Optical fibre Cable 24F Metal Free (Loose Tube)	Kms	**39,000**
3	Supply of Duct	Kms.	**47,700**
4	Supply of Jointing Chamber / Manhole	Nos.	**Price considered in D.1**
5	Supply of joint indicator	Nos.	**Price considered in D.1**
11	Full DWC Pipe (63 mm) of OFC Route Depth .6mts	Kms.	**Price considered in D.1**
12	GI Pipe (63 mm) Class-B Medium as per ISI MARK	Kms.	**Price considered in D.1**
13	Any other component -(Joint closure)	Lumpsum	**Price considered in D.1**
B	**Supply - Passive Infrastructure (Aerial Cable)**		
1	ADSS Optical fibre Cable 24 core ribbon	Kms.	**73,073**
2	24F FTB (Fully loaded including enclosure)	Nos.	**2,831**
3	RCC poles (8 meters) (for Aerial Fibre laying)	Nos.	**2,300**
4	Pole clamping Kit (Aerial Fibre laying)	Nos.	**1,686**
5	Tension Poles, with necessary accessories and foundation	Nos.	**3,279**

Sr. No.	Item Description	UOM	Final Rate for Rectification Work Package – A & B
D	**Services- Passive Infrastructure (As per technical specifications given in Annexure-A TEC GR No. and Engineering Instruction)**		
1	Excavation of trench for HDPE - PLB pipe laying, HDPE-PLB pipe laying, Backfilling, Reinstatement and Compaction after laying of HDPE-PLB pipe.	Kms.	**1,69,000**
2	laying / blowing of optical Fibre Cable inside laid HDPE-PLB pipe	Kms.	**Price considered in D.1**
2.a	96 core unarmoured optical fibre cable (Ribbon) blowing for connectivity planned as feeder cable from OLT / block location to road intersection location (where distribution cable from GP terminates with feeder cable). The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTBFDMS and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)	Kms.	**Price considered in D.1**
2.b	48 core unarmoured optical fibre cable (Ribbon) blowing for connectivity planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of joint chamber, manhole, splice closure, Fixing, painting and sign writing of Route /Joint Indicators, termination at FTBFDMS and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Underground laying) (As per the Engineering Instruction issued by BBNL)	Kms.	**Price considered in D.1**
2.c	24 Core ADSS Ribbon aerial fibre laying on existing / new poles planned as distribution cable from Road Intersection Location to Village Panchayat (GP) The cost shall include fixing of Poles, splice closure, termination at FTB and all the relevant accessories etc. and end to end testing of dark and lit fibre per GP (For Aerial laying) (As per the Engineering Instruction issued by BBNL)	Kms.	**Price considered in D.1**
3	Splicing and jointing of Optical Fibre Cable including Acceptance Testing, commissioning and makeover of the routes.	Nos.	**Price considered in D.1**
4	Road / bridge crossing, laying of HDPE- PLB inside DWC pipe, wherever required and obtaining Right-of-Way (RoW) permissions.	Kms.	**Price considered in D.1**

Notes:

1. Any consumable items other than mentioned in above existing rates table required for existing fiber route rectification the same will be reimbursed based on 80% of discovered rate in BSNL's (BharatNet- ABP Phase-III) tender of BSNL Madhya Pradesh(First Preference), BSNL Rajasthan (Second Preference) and other adjoining states.

Annexure: G List OF GP BharatNet Phase-I and Phase-II

Note: The indicative list is available on website/nProcure for reference, the bidder may refer the corrigendum for the updated list before submission of final bid.