Mauritius Telecom

MULTI-ORDER CONTRACT

2024-2025

FOR

ODN & CUSTOMER WORKS IN MAURITIUS

TENDER MT 1039/08/2024

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MULTI-ORDER CONTRACT

FOR

ODN & CUSTOMER WORKS IN MAURITIUS

Chapter1 Introduction

This is a multi-order contract, which consists of the construction and maintenance of the FTTH ODN and Customer Network and the present tender seeks quotations from potential bidders and involves the execution of the following parts:

1. Construction of the FTTH ODN & Customer Network.
2. Construction of micro ducts systems.
3. Maintenance of the FTTH ODN & Customer fibre & copper Network.
4. Emergency Repair Works of the FTTH ODN Network
5. Pole Works.
6. Manhole Works.
7. Civil Works (duct, manhole & bridge crossings).

Bidders may provide offers for the full scope of the tender or for part of the Bill of Quantities as follows. For any of the options decided by the Bidder, the corresponding number of teams shall be specified by the Bidder. (Section 1.10)

I. Only Subscriber Connection Works (Individual, Large Building, Underground, Miscellaneous) as per BOQ sheets Annex CC1Connections(New and Misc.) Subscriber Network Maintenance Works Annex CS4 and Rehabilitation Works Annex INF9.

II. Only Micro duct construction works Annex INF1, ODN cable works Annex INF2, Emergency ODN Works Annex INF3, Manhole Works Annex INF6, Copper Netwotk INF7 and Bridge Crossing works Annex INF8.

III. Only ODN cable works Annex INF2 & Emergency ODN works Annex INF3 and Civil, Manhole works, Copper Network and Bridge Crossing works, Annexes INF4, INF6, INF7 EVAand INF8.

IV. Only Pole Works Annex INF5

A brief description of the different tasks is provided below.

1.1 Construction of the FTTH ODN & Customer Network.

This Project involves construction and testing works in the Outside Plant Network from equipment in Telecom Exchanges and/or Telecom Cabinets to the Optical Distribution frames, Optical DPs, fibre cabinets, and equipment in the Customer's buildings / Equipment in the mobile sites / equipment in MT exchanges as per the requirements of Mauritius Telecom. The works comprise the following main tasks:

1.1.1 ODN Works

- Some minor extents civil works comprising amongst others of duct tests, duct repairs, raising of manholes, soldering/de-soldering of manhole frame & covers, cleaning of manholes, demolition & reconstruction of manholes, poles planting and poles consolidation for running the fibre cables.
- Pulling, Splicing and Termination of the optical fibre cables as per Bill of Quantities.
- Preparation and submission of As-Built Duct plans and Fibre Optic cables plans and Fibre core line diagrams in digitized format, (AutoCAD) for each works order.
- Testing and submission of test results for civil and optical fibre cable works as per the standard requested by MT.

1.1.2 Customer Connection Works

The works related to the customer connection shall comprise of the following main tasks:

- Survey of waiters, whether in individual houses or large buildings, overhead or underground connections and allocation of the appropriate position on the Fibre Distribution Point (FDP).
- Installation of the optical fibre network, configuration of ONT & STB and testing of all devices at customer premises.
- The works related to LAN Cabling shall comprise of the following main tasks: Pulling and termination of CAT 5/6 cables inside customer premises. Testing and submission of test results as per standard requested by MT.
- Upon connection of customers and successful testing of fibre connection and services, the contractor will have to change the CMOT and upload all required photos in GCI.
- Whenever there are surges in demands for new connections, the contractor shall be able to increase its daily production capacity, by up to as much as 25% (overtime works), as and when required.

1.2 Construction of micro ducts systems.

This task consists of the construction of multi-tubular micro duct systems as per the trench specifications is provided in Annex 10 and includes the trenching, underground duct laying, backfilling, manholes construction, reinstatement and other associated works.

HDPE pipes of diameter 33 mm and/or PVC pipes of diameter 45 mm shall be provided by Mauritius Telecom for the construction of the microduct systems.

1.3 Maintenance of the FTTH ODN & Customer Network.

The scope of works for maintenance of the FTTH Network shall consist of the following:

1.3.1 Days of work

The bidder shall carry out fault repair works on customers' FTTX lines and services including cables (underground & overhead cables) including ODN and maintenance/ repair works on the infrastructure (pole, manholes, tree lopping etc..) and CPEs every day, including Saturdays, Sundays, Public holidays and Post Cyclone / Other Calamities days.

The Bill of quantities makes provision for special rates for works performed on Sundays, Public holidays, and post cyclone repair works.

1.3.2 Service Level Agreement (SLA)

The bidder shall arrange for the repair of the faults in such a way that every fault is attended/ repaired within the same day.

1.3.3 Evidence on fault repair

The bidder shall make sure that photographs are taken before and after work is done as and when required by MT. These photographs will stand as proof that such work has effectively been carried out. MT reserves the right to carry pre and post inspection verification.

1.3.4 Maintenance works on network infrastructure.

Work orders will be issued for maintenance / repair works on network infrastructure.

1.3.5 Important requirements when attending faults:

Contractors' Technicians attending faults shall be well groomed and shall abide to the following requirements:

- Wear clean and pressed uniforms provided by the Contractor.
- Tidy appearance to create a positive impression and conveys professionalism and trustworthiness to clients by maintaining good personal hygiene and keeping your hair neat.
- Shall not wear slippers. Shall wear safety shoes at all times.

All contractors' representatives shall always show the ID cards provided by Mauritius Telecom.

All contractors' representatives shall be polite and conversant in French or English or creole.

Technicians shall exercise extreme care when carrying out works.

Vehicles should be properly kept and clean and have the required logo.

Immediately after the fault repair, technicians are required to upload their pictures (timestamped) together with the fault repair pictures to demonstrate compliance with the requirements described in this paragraph.

1.3.6 Staff details

At the time of contract execution, the contractor shall provide the following details for the operations manager, the team leader and the team(s):

1 Name & surname

2 Mobile telephone number

3 Office telephone number

4 E-mail address

5 NIC

6 Qualifications

7 Experience

8 Character certificate

9 Photo

10 Company ID

1.3.7 Training

The contractor shall have trainers who will continuously provide training to its technicians. If required MT can provide training to the contractors' trainers subject to MT conditions.

1.3.8 Tools and equipment

All technicians shall use appropriate tools and equipment for faults repair. A comprehensive list of tools and equipment is provided in the tender document Section 3.1.3.

1.3.9 ID card

ID cards shall be provided by MT. The ID card will contain the following:

- Full name of staff
- Photograph
- Validity period
- Contractor's Name

1.3.10 Fault Locations & Repair Process

It is mandatory that the contractor shall equip all its teams with rugged tablets for receiving faults work orders and closing completed work orders once fault is cleared on site.

Fault shall have to be repaired at any of the following locations:

- in FDP
- on cable and fibre (overhead & underground)
- cable joints and dome closures (overhead & underground)
- on fibre drops
- Splitter
- Subscriber premises etc
- Wi-Fi sites
- FTTX sites
- OFL links

- Network infrastructures.

The technicians shall verify and test the line after carrying out fault troubleshooting with the required tools.

Technicians shall carry out the necessary repair of the faulty segment to restore services. They shall carry out test(s) to confirm that all the parameters have been made good for the proper functioning of the services.

The process for effective troubleshooting and faults repairs is provided in Annex 1.

Annex 1 Process Effective troubleshooting

1.3.11 Main tasks

The works shall comprise of the following main tasks:

- Clearance of faults ODN, distribution and internal installations.
- Maintenance and repair of multi-tubular duct systems; including trenching, underground duct laying, backfilling, reinstatement and other associated works.
- Renewal and replacement of Access network elements.
- Pole planting and recovery works
- Rehabilitation works
- Manhole repair works
- Manhole welding and unwelding
- FTTX connections / Migrations
- FTTX faults repair
- OFL repair works

1.4 Emergency Repair Works of the FTTH ODN Network

Emergency Repair Works consists of the restoring of services on fibre optic cables after damages/ theft/ vandalism/relocation as quickly as possible in order to minimise outages on services provided by Mauritius Telecom. The works comprise of the following main tasks for the FTTX network:

1. Attending the site of the damage which may be located anywhere in Mauritius within 2 hours after notification by Mauritius telecom representative with all materials and labour required to perform the task.
2. The service outage is required to be restored within 2 hours after attending the site.
3. Notification for repairs will be requested at any time of the day or night as the case may arise.
4. The contractor should provide the service 24 hours/day, 365 days per year including public holidays and Sunday.
5. The contractor will be required to attend the damage sites under adverse climatic conditions unless prohibited by local laws.
6. Pulling, Splicing, termination and testing of fibre optic cable network for damaged/relocation/theft as per Bill of Quantities.
7. Preparation and submission of optical line diagram of completed links with test results.
8. Weld/unweld the manhole covers.

In addition to the above tasks the Contractor shall be responsible for the repair of cable in the fronthaul for International Transmission Network (Item Code FA09-10). The fronthaul is defined from the cable landing station to the beach manhole (BMH) located on the beach. There are two cable landing stations in Mauritius namely at Baie Jacotet and Terre Rouge.

In the fronthaul typically there are three types of cable running depending on the configuration of the system:

a. Optical fibre cable
b. Power cable
c. Ground cable

In the event of a fault leading to partial or total traffic loss, it is essential to implement appropriate procedures and collaboration for a swift restoration of service, aiming to minimize outages:

a. Mobilization of adequate resources onsite within one hour after formal request from MT.
b. The Contractor is required to collect the spare cable from store and transport the cable drum(s) onsite. Baie Jacotet team will provide guidance for the specific cable type and drum to be transported on site. Also, the team from Bay Jacotet will facilitate access to MT store to collect the cable required.

c. Baie Jacotet team will provide go ahead prior to intervention on the system as some cable may have high power and may not be safe for handling.

d. The contractor needs to provide contact details of the personnel to be contacted on 24/7-hour basis in case the service is required.

e. The works involve running of cable in duct up to a maximum span of 600 m. The existing cable should be removed from the damaged duct to free duct for future use or re-use in case free ducts are not available.

f. The cable pulling operations need to be completed within 3 hours excluding duct testing and other survey prior to mobilization.

g. Some supplementary works may involve duct and manhole repair, including unwelding and welding of the manhole covers.

h. The complete repair time should be less than 6 hours from the start of intervention excluding hauling of cables, fault location and exposure of faults.

i. Jointing of the cables will be performed by Mauritius Telecom's technicians but the contractor may be requested to provide some assistance in cable jointing operations. All jointing materials will be provided by Bay Jacotet team.

j. Contractor may be requested to provide a temporary repair in case the works involve major civil works to minimize outages.

k. Depending on the circumstances and extent of damage, the deployment of excavators, external labour, transport of cable drums, and security may be required, to recover the damaged cable, repair the duct route and install a replacement length from the spare cable.

l. All requisite equipment, tools, lighting, tents, workbench, and security amenities should be present prior to the repair.

m. All unused materials need to be returned to Mauritius Telecom stores.

1.5 Pole Works.

The scope of work for pole works includes the following main tasks:

a. Planting of poles

b. Recovery of poles

c. Straightening of poles

d. Pole Testing & numbering

1.6 Rehabilitation Works

The main rehabilitation works are DP cleaning, tree lopping and retensioning and recovery of dead drop cables.

1.6.1 Tree Lopping

The tenderer shall have to cut branches/foliage so as to ensure a minimum clearance of one metre (1 m) from Mauritius Telecom telephone network (including dropwires, aerial cables, poles, etc.).

The branches/foliage should be cut to such an extent that no further cutting will be required for at least one (1) year.

The activities under this contract are to be carried out throughout the island. Work Orders will be issued to the Contractors based on Mauritius Telecom needs and requirements, in terms of quantities and locations.

Works orders will not be issued for bulk works on a monthly basis. Works Specifications for Works shall be as per:

Annex 2 Works Specifications Tree Lopping

After the cutting of branches/foliage, the Contractor shall remove all debris and clean the site on the same day to the satisfaction of Mauritius Telecom. Carting away of branches and foliage shall be effected on the same day following the cutting work. All debris and branches shall be dumped in authorised dumping grounds.

1.6.2 DP Cleaning

The tasks to be implemented under this Contract consists of the execution of overhead copper network cleaning on existing customers' lines as per the requirements of Mauritius Telecom.

The existing copper DP together with all the associated dropwires are to be recovered and returned to MT Store. Work Orders will be provided by Mauritius Telecom with the DP regrouped in Cabinet Areas.

1.6.3 Drop Cables Works

This task consists of retensioning of drop cables and recovery of dead drop cables.

1.7 Bridge Crossings Works.

The scope of works for the maintenance of bridge crossings include provision , transportation and fixing of G.I pipes, supply and fixing of galvanised metal strips, supply and fixing of

galvanised angle bearers to support the G.I pipes, installation of new PVC ducts in the G.I pipe if necessary, supply and construction of concrete pile at the extremities of the G.I pipes if necessary, and supply and fixing of Galvanised bolts and nuts and soldering them

1.8 Seasonal Works

1.8.1 Additional Resources- Mobilization from December to March

The bidder shall have enough resources for seasonal works from December to March, such as surge in repair works (post cyclone or bad weather) and surge in customer connections works. The bidder will have to recruit 63 additional 2- man teams (over and above the number of teams provided for execution of the contract in section 1.10).

Repair works shall include both restoration of services at customer premises and the ODN.

Training will be provided to the additional teams and the Bidder should ensure that each additional team clears at least 8 faults or complete 5 new connections or miscellaneous works per day. For any other works such as preventive maintenance, both parties shall agree on the quantity of works to be executed per team on a daily basis.

By mid-November of the current year, the Bidder shall provide, for each of the additional teams:

- Name
- ID
- Morality Certificates
- Vehicle and tools

1.8.2 Seasonal Payment

The bidder is requested to quote for the mobilization of 63 additional teams (126 technicians) from December to March as per the relevant item in the Bill of Quantities.

1.8.3 Contractor Default.

The Contractor shall be responsible or liable for failure in the fulfilment of the Contract requirement in section 1.1 Seasonal works due to any cause or circumstances within his control, including but not limited to:

(a) Failure to provide 63 additional teams during the period December to March will entail liquidated damages of Rs 5,000.00 per team per day.

(b) Failure to clear at least 8 faults or complete 5 new connections or miscellaneous works per day by each additional team, in which case liquidated damages shall be applicable as per Article 31- Penalties

1.8.4 Terms of payment for seasonal works.

Payment for seasonal works will be effected on the following terms:

a) 30% Advance Payment against submission of the Resource Plan in section 1.8.1

b) 60% on the basis of Provisional Acceptance Certificate issued at the end of every month from December to March. The PAC shall include any penalty as per Article 31 and liquidated damages as per section 1.1.3.

c) 10% at the time of final acceptance, defined in 2.14 (Article 14).

1.9 Supplier Code of Conduct

The Contractor shall comply with the Supplier Code of Conduct as well as with the Anti-Bribery and Corruption policy which can found under our website:

https://www.telecom.mu/our-company/corporate-governance.html

MT reserves the right to carry out an audit to ensure contractor's compliance with the code. Contractors are required to cooperate and provide documentary evidence requested promptly.

A copy of the Supplier Code of Conduct is available in Annex 3.

Annex 3 Supplier Code of Conduct

1.10 Resource Requirements

The bidder shall provide the number of teams assigned to this Contract as per table below.

The successful bidder shall have the obligation to submit its full organization structure on a fortnightly basis for as long as appointed works are being carried out. The organization structure shall include the identities of personnel effecting all relevant works.

Description Works	**No of Teams**	**No of Staff**
Customer Connection (Overhead, Large building & underground)		
Maintenance (Overhead Faults)		
Microduct Construction		
ODN Works (Maintenance & New)		
ODN Emergency Works (Maintenance)		
Civil Works (Maintenance & New)		
Pole Works (Maintenance & New)		
Manhole Works (Maintenance & New)		
Maintenance (Copper Network)		
Maintenance (Bridge Crossings)		
Maintenance (Rehabilitation)		
Seasonal Mobilization December to March (63 Teams required)		

Total		

Table Resource Requirements

Chapter2 Financial and Administrative Clauses

2.1 ARTICLE 1 Scope Of Works

The scope of this tender consists of ODN construction and maintenance works and Customer Network construction, rehabilitation and maintenance works during normal operations as well as post cyclone repair works.

2.2 ARTICLE 2 General Condition Of Execution

2.1 The contractor shall with due care and diligence execute and complete the works and remedy any defects therein in accordance with the provisions of the contract. The contractor shall provide all the labour, consumables, equipment and all other things whether of a temporary or permanent nature, required in and for such execution, completion and remedying of any defects.

2.2 The Contractor shall comply with and adhere strictly to the instructions from Mauritius Telecom concerning the works.

2.3 The Contractor shall comply with all laws in force in Mauritius in relation all matters including but not limited to employment of labour or connected thereto and including safety/security measures. In particular the contractor shall ensure compliance with the safety/security measures provided in Attachment 4.

2.4 Gradually, as the works progress, the Contractor shall successively clear and remove from the site all constructional plants, surplus material, rubbish and temporary works of every kind and leave the site clean and in a condition that satisfies Mauritius Telecom, the Authorities and the public at large.

2.5 The Contractor will be accompanied by an MT officer at all times when there is any intervention in an Exchange, Base Station Controller, Radio Network Controller, a Mobile BTS site, customer buildings and during interventions on existing fibre optic cables.

2.3 ARTICLE 3 Validity Of Offers

The offer submitted by the Tenderer shall be valid for a period of one hundred and twenty (120) days from the last date for submission of tender. Such prices shall remain effective and irrevocable during this period.

2.4 ARTICLE 4 Queries Of Tenderers

Any query as to the tender document shall be addressed in writing to:

Head Sourcing and Supply Chain

Mauritius Telecom Limited

Level 13, Telecom Tower

Edith Cavell Street

Port Louis

On mail: neeta.digumbar@telecom.mu

at least five (5) days before the last date of submission of tender.

Should the tenderer conclude from the Tender Document that there exists any inconsistency, discrepancy or conflict within the content thereof or any figures and wording indistinct, or any doubt as to the true meaning of any part of the Tender Document, he must notify Mauritius Telecom in writing.

Mauritius Telecom shall not be held responsible for possible errors and omissions existing in the Tender Document if the tenderers have not asked for explanations in time.

Notification of any uncertainty or omission seen in the Tender Document shall immediately be communicated in writing to Mauritius Telecom. All explanations or clarification will be given by Mauritius Telecom in writing up to the 5th day preceding the last date of submission of offers and will be deemed to be addendum to the Tender Document. Any addendum issued to all participating bidders shall become part of the Tender Documents.

2.5 ARTICLE 5 Submission Of Tender

Tenders will be accepted only if they comply with the following conditions:

Tenders must be submitted and have been received by the time mentioned in the Invitation to Tender.

Your offers should be submitted in two parts, one for the technical aspects marked as **"Technical Proposal for MT 1039/08/2024-Tender for Multi Order Contract for ODN Works and Customer Works around Mauritius"** and the other for the financial aspects

separately marked as **"Financial Proposal for MT1039/08/2024-Tender for Multi Order Contract for ODN Works and Customer Works around Mauritius""** addressed to the following email address: procurement@telecom.mu by closing date and time.

Offers not submitted on above email address will not be taken into consideration.

The tenderers are requested to fill the compliance table stating whether they are compliant or agree to each article of the terms and conditions and also specifications in this document. Deviations if any should be clearly pointed out.

A copy of the Compliance Statement is provided in Annex 4.

Annex 4 Compliance Statement

2.6 ARTICLE 6 Letter Of Award

The letter of award together with the Tender Document and the offer from the tenderer shall constitute a binding Contract between Mauritius Telecom and the said tenderer.

A formal Contract Agreement shall be signed by MT and the tenderer and shall determine the start of the Contract period.

2.7 ARTICLE 7 Closing Date

The tenderer shall submit his offer by:

12.00 hrs on 19/08/2024.

2.8 ARTICLE 8 Evaluation And Comparison Of Tenders

Evaluation queries addressed to the tenderers shall be raised by the Head of Procurement or other duly authorised persons.

For comparison purposes, MT will give marks to each Tenderer. MT will estimate the tenderers not only on the basis of prices but also on the following factors in the manner and to the extent indicated below:

(a) References and Certificates of proof.

(b) Quality of works

(c) Price

References and Certificates of Proof

The Tenderer's experience and capacity with regard to installation and putting into service of similar works will be judged on the basis of references and Certificates of proof provided.

The qualifications and experience of the key personnel will also be taken into account.

Quality of Works

The criteria used to give marks to the quality of works will include: organisation, project management, works schedule, works procedures, human and equipment means employed. The past performance of the contractors in terms of fault repetition, complaints on bad workmanship and bad behaviours of their technicians will be used as the main parameters for the assessment.

The bidder shall submit the necessary documents to support the above mentioned evaluation criteria.

PRICE

The Financial Evaluation will be carried out on those offers which comply with our tender technical and commercial requirements.

MARKING SYSTEM

	Criteria	Applicable Weight
1	Price estimation of works	50
2	Quality of works	40
3	References and certificates of proof	10

Price estimation marks will be calculated as follows: The Tenderer having the most competitive prices for services will get the maximum marks.

In the case of other Tenders, the marks given will be at pro rata, computed by the following formula:

$N = Nmax \times P(M)/P(X)$

where:

Nmax = maximum marks that could be given

P(M) = price of most advantageous Tender

P(X) = price of Tender "X"

N = number of points given to Tender "X"

Mauritius Telecom reserves the right to adjust arithmetical or other errors in the Tender. Any adjustments made by Mauritius Telecom to a Tender will be stated to the Tenderer prior to the acceptance of the Tender.

2.9 ARTICLE 9 Other Conditions

(i) TENDER BOND

- The Tenderer shall deposit a Tender bond bearing stamps of appropriate value in the form of a guarantee from a Commercial bank operating in Mauritius, to the amount of MRs 500,000 (One hundred thousand MRU) valid for a period of one hundred and twenty (120) days from the date of submission of offer on or before the closing date of the tender. The amount shall be forfeited to Mauritius Telecom in the event the bidder withdraws his bid or part thereof, before expiry of its validity period including any extension agreed upon with the Tenderer and/or fails to enter into the contract, including the submission of a performance bond within ten (10) days after an award is made to him by Mauritius Telecom.
- The security provided by unsuccessful Tenderers will not be repaid or discharged until the expiration of hundred and twenty (120) days from the day on which Tenders are to be received or until such earlier time as a Tender shall have been accepted and a performance bond shall have been duly provided by the Tenderer whose tender is accepted.
- The security, provided by the tenderer whose tender is accepted, shall be repaid or discharged when the Performance Bond has been duly entered into and executed. A format of the Tender Bond is given in Chapter 10 Format Tender Bond.

(ii) SPLITTING AND REJECTION OF TENDER

- Mauritius Telecom shall not be bound to accept any offer even the lowest and shall not assign any reason for the rejection of an offer.
- Mauritius Telecom also reserves the right to split the Tender between different Tenderers.
- Tender not conforming with the foregoing instructions may not be considered:

- Any Tenderer who himself or by his agent endeavours to contact officers of the Company, including any member of the Tender evaluation committee with the view to favour this tender, will have his Tender rejected.
- The Tender will also be rejected if the Tenderer tries to influence his Tender through any third-party intervention or representations.

- The Tenderer may note that it is the duty of any officer of the Company to disclose any interest in relation to a Tenderer and to reveal the name of any Tenderer who had tried to exercise an influence.

2.10 ARTICLE 10 Performance Bond

The Contractor shall within twenty (20) days of the notification of acceptance of the tender by the Company deposit a Performance Bond issued by a commercial bank operating in Mauritius to a value equal to ten (10) percent of the Contract Price. The format is provided in Chapter 10 Format Performance Bond.

The Performance Bond shall be valid for a period of two months beyond the Contract period which includes one (1) year maintenance period from date of PAC for the Contract.

2.11 ARTICLE 11 Prices

The unit rates exclusive of VAT of 15 % applicable in Mauritius shall be fixed and firm for the duration of the Contract of one year and shall include all the necessary costs and provisions for risks to complete the works. No fluctuations whatsoever shall be permitted.

The Tenderer should provide their VAT Registration Number with their offer.

For items of works where quantity is not mentioned the Tenderer should quote for unit prices. Mauritius Telecom may assign quantities to such items for evaluation purposes and subsequently issue of works.

A summary of the prices shall be filled by the tenderers in Oracle Fusion.

A copy of the Summary of Prices is provided as Annex 5.

Annex 5 Summary of Prices

2.12 ARTICLE 12 Terms Of Payment

Payment for works will be effected on the following terms:

- 90% on the basis of Provisional Acceptance Certificate issued for completed batches of works. Invoices for reinstatement works shall be processed only after receipt of Provisional Acceptance Certificate from RDA, Municipalities or Local authorities.
- 10% at the time of final acceptance. Final Acceptance Certificate shall be issued one year after receipts of all PAC under this contract, completion of the one-year guarantee period and completion of material reconciliation for the full contract.

2.13 ARTICLE 13 Period Of Payment

Payment for works shall be effected within forty-five (45) days from the submission of the invoice (free from error) to Mauritius Telecom as per Article 12.

2.14 ARTICLE 14 Procedures For Acceptance

The tests for acceptance shall be those as defined in the accompanying documents including such visual and physical checks as deemed necessary by Mauritius Telecom.

The tests for acceptances will be done after the receipt of a request from the Contractor after the completion of the related parts of works.

The Contractor shall provide the tools needed for the tests.

PROVISIONAL ACCEPTANCE

Mauritius Telecom shall take charge provisionally of the completed works order wise provided the following conditions are satisfied:

- Completed works as per “works order” installed are tested and results are according to standard specified and materials utilised are according to standard specifications.
- As-built drawings must be received and approved by Implementation Team and Drawing Office.
- Unutilised materials supplied to the Contractor by Mauritius Telecom are either returned to Mauritius Telecom Store by the Contractor or reconciled with next batch of work orders.
- Provisional acceptance certificate for the Contract will be issued to the Contractor after reception of PAC for all Works Orders.

FINAL ACCEPTANCE

The final acceptance of works shall take place one (1) year after the provisional acceptance. All defects noticed during the guarantee period or during tests carried out prior to the issue of Final Acceptance Certificate, must be rectified to the satisfaction of Mauritius Telecom, by the Contractor.

Final Acceptance Certificate shall be issued one year after receipts of all PAC under this contract, completion of the one year guarantee period and completion of material reconciliation for the full contract.

2.15 ARTICLE 15 Recovery of Sum Due

Whenever under the contract any sum of money shall be recoverable from or payable by the Contractor, the same may be deducted from any sum then due or which at any time thereafter may become due to the Contractor, under this or another contract with Mauritius Telecom.

2.16 ARTICLE 16 Variation

The Company shall make any variation of the form, quality or quantity of the works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion be desirable, he shall have power to order the Contractor to do and the Contractor shall do any of the following:

- increase or decrease the quantity of any work included in the Contract.
- omit any such work.
- change the character or quality or kind of any such work.

and no such variation shall in any way validate or invalidate the Contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

No such variation shall be made by the Contractor, without an order in writing of the Company. Provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an order given under this Clause but is the result of the as-built quantities exceeding or being less than those stated in the BoQ.

- All extra or additional work done, or work omitted by the order of the Company shall be valued at the rates and prices set out in the contract if, in the opinion of the Company, the same shall be applicable. If the contract does not contain any rates or prices applicable to the extra or additional work, then suitable market rates or prices shall be agreed upon between the contractor and the Company.
- The contractor accepts to execute works without adjustment of the prices for variations of increase or decrease within a frame of twenty (20) percent of the

Contract Amount, provided that such variations are notified to the Contractor three (3) months before the Contractual Completion Date.

- On case-to-case basis, when the Company is convinced that the implementation period should also be varied, the same shall be mutually agreed.

2.17 ARTICLE 17 No Review Of Prices

The prices quoted in the offers shall be firm and non-revisable during the 2 year-contract period.

2.18 ARTICLE 18 Guarantee Period

The guarantee period is one (1) year and shall take effect from the date of Provisional Acceptance of works.

During this period, the Contractor shall, at his own expense, make good or repair or replace any defective item of works, caused by poor workmanship, subsidence, neglect, omission or failure on his part and found out after the Provisional Acceptance.

In default of such making good by the Contractor, Mauritius Telecom shall cause the defect to be remedied by its own personnel or by another contractor and deduct an equivalent sum with overheads from the final invoice, Article 12.3.

2.19 ARTICLE 19 Delay In Performance

An unexcused delay by the Contractor in the performance of its delivery obligations shall render the Contractor liable to any or all of the following sanctions: forfeiture of its performance security, imposition of liquidated damages, and/or termination of the Contract for Default.

If the execution of the work shall, without any default of negligence on the part of the Contractor, be delayed as a result of any of the following causes:

- By reason of any act or default on the part of Mauritius Telecom or any road authorities.
- Strikes, lockout, of workmen employed on the work or in the preparation or manufacture of materials intended for the works.
- By bad weather conditions such as heavy rains and cyclones.
- By any cause for which the Contractor is not responsible.

The contractor shall so inform Mauritius Telecom in writing and the Contractor shall be allowed an extension of time for the completion as will be certified to him in writing.

In case of delays in completion for reasons other than stated above, in this Article, Mauritius Telecom shall apply a penalty and the resulting sum shall be deducted from the project amount.

2.20 ARTICLE 20 Liquidated Damages

For such delays, which are beyond the control of the Contractor, the Company shall grant suitable extensions or postponement of the dates of the Acceptance test originally specified in the Implementation Plan. If due to any other circumstances successful Acceptance Test for any work order cannot be achieved on the original, extended or postponed dates mentioned above, as the case may be, then the Company shall have the right to claim liquidated damages as follows.

- Penalty fees as per Article 31.
- The total liquidated damages shall be limited to 10% of the contract Value.

The Company may without prejudice to any other method of recovery and without having to resort to any judicial or extra-judicial process deduct the amount of such damages from any monies in his hands or which may become due to the Contractor, all sums due by way of damages as aforesaid upon claim for damage having been established.

The payment or deduction of such liquidated damages shall not relieve the Contractor from the obligation to deliver and install the network or part thereof or from any other obligation and liabilities under the contract.

The Contractor shall not be entitled to increase the unit rates as a result of a delay caused by him.

In case of a delay caused by the Company, the Contractor shall be entitled to an extension of the time for completion of the works without compensation. However, if such delays amount totally to a period exceeding two months or more then MT shall cancel and withdraw the delayed Work Orders.

2.21 ARTICLE 21 Works Programme

Such activities as fibre optic cable pulling; splicing, termination and testing shall be carried out under constant follow-up of Mauritius Telecom. The Contractor shall be required to carry out these activities during normal Mauritius Telecom working hours, that is, from 7.30 am to 4.30 p.m. Only in emergency situation shall Mauritius Telecom or his representative allow work to proceed after the normal working hours, on Saturday, Sunday, and public holiday in which case the Contractor shall be charged for the cost of supervision and inspection at the applicable overtime rate to be deducted from the works claim.

After receipt of each order, the Contractor shall submit within one week a time schedule; indicating clearly the starting and completion dates for the implementation of the works. The

combined time schedule for all work orders issued shall constitute the Implementation Plan. The scheduling of the works shall satisfy the following:

- In terms of completed works, the minimum requirement for a distribution duct route is an average of 400 metres and for a main duct route an average of 200 metres of backfilled trench per week, inclusive of interim restoration, pole erection and manhole construction (excluding temporary reinstatement). Final reinstatement work, whether on pavement or roadway shall be carried out as per specifications.
- The minimum cable length to be laid per day is 1000m.
- In case the contract is not split, the contractor must deliver a minimum number of projects per month as agreed with MT.
- For urgent and important works, the implementation schedule shall be agreed with Mauritius Telecom.
- Non-submission of a time schedule shall be considered, as a serious breach of contract and Mauritius Telecom shall be entitled to terminate the contract.
- The last order will be submitted at latest one month before the end of the contract.
- The works programme shall conform to the contract specifications. The first orders will be handed over to the successful Tenderer within one week from the contract effective date.
- Works on site shall start at most two weeks after the award of the contract. Mauritius Telecom shall forward all orders together with the project details and related basic drawings to the Contractor's registered address or collected by the contractor at Mauritius Telecom Tower, Edith Cavell Street Port Louis.

2.22 ARTICLE 22 Subcontracting Of Works

Subcontracting is permissible subject to the following:

- The Contractor shall state at the time of agreement with Mauritius Telecom whether it will undertake the work itself or allocate portion or the whole work to subcontractors.
- The name, address and references of the subcontractors have to be submitted.
- Subcontractors should comply with our Supplier Code of Conduct and Anti-Bribery and Corruption policy.

2.23 ARTICLE 23 Local Consent/Wayleave

The Company shall initiate the way leave application from the local authorities or any other body or person for the works. However, consents from Authorities are not within the control of the Company, who should therefore not be made responsible for delay to provide such consents.

The following will be under the responsibility of the Contractor:

- Follow up on the wayleave applications from the authorities and obtain authorisation prior to execution of works.
- Obtaining authorisation from the Police for the execution of the works including closing of roads or traffic diversions required.
- Obtaining approval of sign boards and safety measures required from the traffic Management Unit of the Ministry of Public Infrastructure.
- Obtaining authorisation from the Transport Authority for the temporary displacement of bus stops and traffic diversion required.

2.24 ARTICLE 24 Insurance

The Contractor shall indemnify and keep Mauritius Telecom indemnified against all losses and claims for injuries or damage to any person or property whatsoever caused by the party and which may arise out of or in consequence of the implementation of the works and against all claims, demands, proceedings, damages, costs, charges, and expenses whatsoever in respect of or in relation thereto.

The Contractor shall subscribe to the necessary policies, Public Liability policy for not less than Rs 10m for each and every occurrence and an Employer's Liability to cover its employees from reputable insurance companies as recommended by Mauritius Telecom to cover those risks.

A copy of the said policies shall be submitted for approval to Mauritius Telecom before the start of works on site.

2.25 ARTICLE 25 Planning & Co-Ordination

The Contractor shall to a reasonable extent co-ordinate with Mauritius Telecom for the total project management and shall give all reasonable information required by Mauritius Telecom. This shall include submission of weekly programme of works, weekly progress report & regular coordination meeting.

2.26 ARTICLE 26 Force Majeure

26.1 The Contractor shall not be responsible or liable for any delay or failure in the fulfilment of the Contract due to any unpredictable cause or circumstances beyond his control, including but not limited to: Acts of God; fire, flood, cyclones, general strike, embargo,

requisition or war hostilities (whether declared or not), invasion, catastrophe, acts of public enemies, rebellion, epidemics, all such events considered as "Force Majeure".

26.2 Where a party feels that a condition of Force Majeure has arisen, it shall promptly notify the other party furnishing all relevant information thereto.

26.3 In case of Force Majeure, both parties upon mutual agreement shall be entitled to suspend the execution of the Contract for the period of such Force Majeure plus any additional period as shall be reasonable in the circumstances and agreed upon. In the case of extended Force Majeure, should the Contract have been suspended for a period of 6 months or more beyond the expiry date of the Contract, the parties shall agree whether to suspend the Contract further, in which case prices and deliveries shall be reviewed and agreed by both parties immediately as the Force Majeure ceases to prevail or, alternatively, to terminate the Contract.

26.4 In the event of failure of both parties to agree on termination as last mentioned or on revised rates and deliveries or on the Contract value to be paid on suspension or termination, the dispute shall be referred to Arbitration in accordance with Article 27 (ARBITRATION)

26.5 If any damage, injury or loss shall have been caused to the works, materials, personnel or site by Force Majeure (with the exception of industrial disputes involving the Contractor's employees) for which neither of the parties is responsible, the Contractor shall notify the Company of the event within ten (10) days and should make good such damage or loss if required but at the Company's expense if the Force Majeure occurs in Mauritius so far as not covered by the Contractor's proper all Risks Insurance and provided that the Contractor shall have taken all necessary steps to prevent and mitigate such damages. The cost of making good such damage or loss shall be mutually agreed between the Company and the Contractor.

26.6 In the event of this Contract being terminated by mutual agreement under this Article, the Contract price payable by the Company to the Contractor shall (after taking into account amounts previously paid under the Contract) be the contract value of works provided and executed under the Contract up to the time of the termination.

2.27 ARTICLE 27 Arbitration

Three arbitrators shall finally settle all disputes, differences or questions between the parties to the contract with respect to any matter arising out of or relating to the contract in Mauritius and the proceedings shall be conducted in English. The parties shall appoint one arbitrator each and the third shall be appointed jointly.

2.28 ARTICLE 28 Termination For Default

28.1 Mauritius Telecom may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Contractor, terminate the contract in whole or partly.

(a) If the Contractor fails to deliver part or all of the works within the time period(s) specified in the contract or any extension thereof granted by Mauritius Telecom pursuant to Article 19 or by the time when the Company becomes entitled to apply liquidated damages amounting to 5% of the value of work in any work order calculated as per Article 20.

(b) If the Contractor fails to perform any of the obligation(s) under the Contract including but not limited to the submission of time schedule within the specified period.

28.2 In the event Mauritius Telecom terminates the Contract in whole or in part, pursuant to Article 28.1(a), Mauritius Telecom may procure, upon such terms and in such manner as it deems appropriate, works similar to those undelivered and the Contractors shall be liable to Mauritius Telecom for any excess costs for such similar works. However, the Contractor shall continue performance of the contract to the extent not terminated.

28.3 The Company may at any time by notice in writing immediately terminate the Contract without compensation to the Contractor if the contractor shall pass a resolution, or any court shall make an order, that the Contractor shall be wound up or if a trustee in bankruptcy, liquidator, receiver, or manager on behalf of a creditor shall be appointed or if circumstances shall arise which would entitle the court or a creditor to make a winding up order.

28.4 Termination of the Contract, from whatever cause arising, shall be without prejudice of the rights of the parties, which have occurred under the Contract up to the time of termination.

2.29 ARTICLE 29 Other Charges

The other charges that the contractor may be liable are:

- Overtime charges if the Contractor carries out works which requires presence of Mauritius Telecom's representative outside normal working hours.
- Any fees payable to the Police or representative of the other authorities whose assistance will be required by the Contractor for the implementation of the works.
- Any fees payable to local authorities for obstruction of roads or use of land, etc.

2.30 ARTICLE 30 Governing Laws

The contract shall be governed by and construed in accordance with the laws of Mauritius.

2.31 ARTICLE 31 Penalties

Mauritius Telecom shall apply a penalty, with the resulting amount deducted from the project total, in the following cases listed below. The penalty serves as a deterrent to prevent the delivery of poor-quality services to our customers. If the total penalties exceed Rs 1 million, Mauritius Telecom may consider this a breach of contract and may terminate the contract for default as per Article 28.

1. Missed appointment – Rs 5,000 per missed appointment.
2. Customer complaints following interventions (repeated faults/bad workmanship) - Rs 5,000 per case.
3. Complaints from customers for technicians not abiding with Supplier Code of Conduct - Rs 5,000. per case.
4. A Penalty of Rs 5,000 shall be applied to every fault cleared with the wrong or inappropriate fault clearance code on MT's system following MT's internal quality check.
5. Failure to provide on-site work security measures to specified standard – Rs 10,000 per case.
6. Falsified QS data Rs 10,000 per case.
7. Disconnection in FDP of an existing and working subscriber – Rs 10,000
8. Branch Lopping: Dumping of debris and branches in non-authorised dumping grounds - Rs 100,000
9. Branch lopping: Execution of works without authorisation/ in absence of MT staff - Rs 10,000
10. FDP's are left open or inappropriately closed by contractor's staff – Rs 10,000
11. Attempt to sell or selling any MT devices – 3 times the cost of devices or Rs 25,000, whichever is higher.
12. Manhole rehabs or other civil works – Rs 25,000 if more than two interventions within warranty period of one year.

13. Soliciting money for intervention at customer, and any incident which will affect the image of MT – Rs 50,000 + matter refer to Police for criminal prosecution.
14. Established cases of harassment or misconduct towards any customer Rs 25,000.
15. Late submission of QS –Rs 25,000 per QS
16. Failure to provide the required number of teams (as per agreed mobilization cost) to clear faults post cyclone works – Rs 50,000 per day.
17. Failure to secure passwords resulting in fraudulous connections- Contractor shall bear the cost of unpaid bills added to materials cost (Customer FTTH materials & Equipment) and cost of investigation which is not less than Rs 25,000 for each and every occurrence.
18. Failure to submit pictures of fault clearing, installation or miscellaneous work, Rs 10,000 for each and every occurrence.
19. Failure to log GPS coordinates from intervention sites – Rs 5,000.
20. Smart ID card: a penalty of Rs 25,000 for each non-timely notification and surrender of the Smart ID issued to their technicians.

Chapter3 General Conditions And Specifications

3.1 Profile Of the Right Firm

The tenderer shall have the financial and management capability to undertake the work. It shall have the personnel with a good and sufficient knowledge of the work, a high degree of skill to plan, organise, coordinate, and control the various operations, maintain a well organised site of work, perform a good standard of work, and be able to execute this contract successfully within the agreed time schedule.

To show that it possesses these qualities, the tenderer will be required to submit at the time of Tendering documents certifying that it has: -

- At least 5 years' experience in Telecommunications optical fibre cabling, splicing and termination works.
- At least 2 years' experience in civil engineering construction works especially in underground utility construction.
- Details of plant and machinery immediately available with the tenderer for the use on the works.
- Details of technical and supervisory personnel already employed by the tenderer which he proposes to utilise for this work and such other personnel which he proposes to employ further for this work.
- Full information on the capacity, financial resources, and experience about him backed by certificates of proof and references.
- Certificate from the Ministry of Public Infrastructure stipulating that the tenderer or his sub-contractor is a contractor registered with the Ministry and that the Ministry will have no objection if the said tenderer or his sub-contractor carries out excavation and re-instatement works on public roads.
- To register as a prospective tenderer with MT in Oracle Fusion.

Should the tenderer fail to submit the above details, his tender shall be rejected as non-responsive.

3.1.1 Management, Technical & Supervisory Personnel On Site Of Work

The complexity and specificity of the works demand that the contractor has the right personnel full-time on site of work for the construction management of the project, the organisation of the site of work, the control of workers and supervision of standard of work.

Contractors with existing works contracts with Mauritius Telecom should clearly demonstrate that they have the required capacity and personnel to undertake the works under this tender without jeopardising on-going projects.

For tenderers bidding for the full scope of the Contract as defined in Section 1.1 (Scope of works), the management, technical and supervisory personnel which the contractor shall have for this project includes: -

(a) A Contractor's works representative who shall be a qualified Engineer with relevant experience in Fibre Optics network construction.

(b) A Contractor's works representative who shall be a qualified Engineer with relevant experience in external line plant civil engineering works. The civil engineer will ensure that the contractor's civil works, including manhole construction, meet specified standards in the tender documents (Chapter 6) by assessing workmanship, materials, and safety compliance, thus ensuring a high-quality infrastructure.

(c) Technicians with relevant experience in FTTH engineering works.

(d) A Contractor's works representative who shall be a credential holder Project Manager, preferably from a recognised Project Management Institute with relevant experience in Fibre Optic Cable network construction.

Requirement (b) does not apply for tenderers bidding only for Subscriber Works (Part I section 1.1). Only requirement (c) is valid for tenderers bidding only for pole works (Part IV section 1.1).

3.1.2 Replacement Of The Firm's Personnel

Mauritius Telecom or his representative shall have the right to require the contractor to replace any of the contractor's employees whose continued employment is found undesirable for this project.

3.1.3 Equipment Necessary For Execution Of The Project

For the efficient performance of the work, the contractor shall have sufficient appropriate equipment in permanence on site.

Mauritius Telecom shall not accept any delays or poor standard of works resulting from insufficient equipment or tools on site of works. Penalty as per Article 20 will be applied in case of such delays.

An indication of the equipment required is provided in the Table below and detailed in relevant Chapters (FTTH Construction works, Civil Engineering Works & Maintenance of FTTH Network).

Mauritius Telecom will proceed for an inspection of the above equipment prior to the award of the Letter of Intent. In case any discrepancy found, the contractor will be required to take immediate remedial action so that the contract could be awarded.

Tools & equipment	**Construction of ODN & Maintenance & Civil Works**	**Construction of ODN & Maintenance & Microduct Works**	**Customer Connection & Overhead Faults Repairs**	**Pole Works**
Ladders	✓	✓	✓	✓
Tespa Tool	✓	✓	✓	✓
Traffic Warning signs, cones, etc	✓	✓	✓	✓
Power meter & Light source	✓	✓	✓	
Cleavers, Strippers and other specialised accessories	✓	✓	✓	
Fusion Splicing machine	✓	✓	✓	
Inspection probes	✓	✓	✓	
Fiber Tool kit (Cutters, Pliers, Strippers, Goggles, Alcohol)	✓	✓	✓	
Visual optical indicator	✓	✓	✓	
Crimping tool	✓	✓	✓	
Drilling Machine	✓	✓	✓	
Step ladder 3.5 m	✓	✓	✓	
Crane lorry	✓	✓		✓
Water pump	✓	✓		
Drum trailers	✓	✓		
Concrete mixer	✓	✓		
Concrete Vibrator	✓	✓		
Tar sprayer	✓	✓		
Roller	✓	✓		
Duct test equipment like ‘Furet & gun’ and pneumatic blower	✓	✓		

Cable grips	✓	✓		
Swivel	✓	✓		
Metal detector, cable locator	✓	✓		
Water tank and spraying equipment	✓	✓		
Tank for removal of water, liquids in manhole	✓	✓		
Welding machine	✓	✓		
Metal cutter	✓	✓		
Duct Rods	✓	✓		
PON OTDR	✓	✓		
OTDR	✓	✓		
Pneumatic excavation equipment, comprising of various pneumatic tools, such as wide asphalt cutter, narrow asphalt cutter, chisel, plug and feather, hammer, together with air compressors, etc.	✓	✓		
Vibrating plate compactor (mechanical rammer) and compactor	✓	✓		
Working Mat	✓	✓		
Power Generator	✓	✓		
Micro trenching machine		✓		
Screw Driver Sets (7 types)			✓	✓
Side Cutter – Plier			✓	✓
Plier Long Nose			✓	
Adjustable Spanner - Spanner Set			✓	
Concrete Drill Twist Set (4, 5.5, 6, 8, 10 mm)			✓	
Wood Drill Twist Set			✓	
Hammer 1/2 pound			✓	
Plier Wire Stripper			✓	
Spirit Level			✓	
Electric Plier			✓	
Extension Lead			✓	
Hammer (heavy)				✓
crow bar (barramine)				✓

spoon				✓
Basket, Hoe, Pick-axe, Machete				✓

Recommended Tools

Tools of good quality are a pre-requisite to avoid bad workmanship and repetitive faults. Below is a list of tools recommended by Mauritius Telecom.

Tools & equipment	**Recommendation**	
PON OTDR	EXFO: FTBV1-FTBx-730C PON	
OTDR	EXFO	ANRITSU MT9082B8 & YOKOGAWA 735032
Fusion Splicing machine	Fujikura 38S Core Sense Splicer &Fujikura 41S Single Fiber Fusion Splicer Active V-groove alignment	SUMITOMO MODEL-Z2C
Power meter & Light source	UNION FIBER MUNFTTH007 and EXFO PPM-350C	FIBER SOLUTIONS OLS
Visual optical indicator	UNION FIBER VFL 10MW	COMPTYCO AUA-30
Cleavers, Strippers and other specialised accessories	FUJIKURA PRECISION CLEAVER CT 30 AND CT 08	Insintech Cleaver /FIBEROPTIC STRIPPER CFS-3
Metal detector	3M™ Dynatel™ Locators 2250M/2273M Series	GOLD DRILL GS-6000

3.2 Subcontracting Of Works

Subcontracting is permissible subject to the following conditions: -

- The contractor shall state at the time of tendering whether it will undertake the work itself or allocate portion or whole of the work to subcontractors.
- The name, address and references of the subcontractors have to be submitted. Subcontractors shall register with MT in Oracle Fusion (Supplier Portal)

3.3 Civil Engineering Works

All related activities for implementing the Civil Engineering works shall be paid as per corresponding items in the Bill of Quantities.

The Contractor shall implement the following works without surplus cost:

- Execution of earth work whatever the soil conditions are, whatever the required depth of the trenches is, whatever the difficulties of working near or under existing facilities,
- Required works due to waterlogged soil,
- Form-works and shuttering necessary for the concreting of ducts and manholes construction,
- Backfilling with original excavated site materials or with imported materials or crusher-run after the prior approval of Mauritius Telecom,
- PVC bends shall be laid at the extremities of ducts leading to poles or walls,
- On Mauritius Telecom request, concrete cubes for testing shall be prepared, stored and tested at the Contractor's expenses.

All reinstatement on roads under the jurisdiction of the Road Development Authority (RDA) shall have to be carried out by Grade 'A' Contractors registered with RDA and supervised by a consulting engineer appointed by the Contractor and registered as a professional engineer.

3.4 Fibre Optic Cable Works

The length of underground cable to be considered as installed for the payments will be the actual length of cables installed as per the cable markings between the 2 manholes including the 15m of coil in each manhole with joint closure.

The length of overhead cable to be considered for payments will be the length between the connection points increased by 3m for each overhead joint.

At the time of acceptance of cable works, the Contractor shall submit a balance sheet of cables delivered by Mauritius telecom installed, and in hand.

Balance of cables shall be as follows:

- Lengths installed as defined previously.
- Cut loss shall not exceed:
    - 6% for underground cable installed.
    - 4% for aerial cable installed.

Cables returned to Mauritius Telecom stores will have to be labelled as good for use (in drums) or good for scrap and the corresponding lengths etc...

The cost for the pruning activity to be done by the Contractor for the installation of aerial cables shall be included in the related construction items.

3.5 Recovery Of Materials

The Contractor shall recover only cables, rack, sub rack, optical distribution frame and splice closure earmarked to be recovered, on the execution drawings.

Removal shall be done according to following rules:

- All cables removed shall be rolled on drums or in bundles. The extremities shall be closed with shrinkable caps.
- All drums and bundles shall be labelled
- The label shall show the capacity, diameter, length and origin of the cable with tests carried out to determine the status of the cables like, good for use, good for scrap etc... (Test results to be submitted to MT).

3.6 Supply of Stores by Mauritius Telecom

The following store items shall be supplied by Mauritius Telecom:

Customer Materials	**ODN Materials**	**Accessories from Repair Centre**
Splice protector dia 2.2mm Lg 45mm	12,24,48,96,144,288 CORE- SM 10/125 Underground Fibre cable	STBHE2704 (Refurbished)
Wall clamp/hook (DWS 8: Pitons d`ancrage)	Anchoring Clamp PA 3000 (8-12 mm) for aerial cable 24-48 core	ONT Refurbished
(STM BOX) Transition box with storage (wall mounted)	CT 8 Cross arm for multiple suspension clamp and a	REMOTE CONTROL STB
20 mts - Indoor Cable FR LSZH 1 core SM G.657A pre	Dome Closure (MJS-CP/2.00) with 16 splitters and 4	POWER ADAPTORS
8 mts - Indoor Cable FR LSZH 1 core	FDP covers only	LAN CABLES

Customer Materials	ODN Materials	Accessories from Repair Centre
Access termination box (ATB)- 1, 2, 4 CORE with pigtails	Galv. Pipe 0.5-1.0 In	HDMI CABLES
Anchoring Clamp (6-8 mm) for drop cables & aerial cables 4-12 core	Manhole Frame & Covers & Accessories	RCA CABLES
Armoured patchcord 3.0mts-Dia 3.0mm with SC/APC Connector	Optical Aerial cable 4, 12, 24 & 48 cores	STBHP4411 4K PRO (Refurbished)
Basic Phone Atlinks T26	Optical DP to include one unit of 1:8 splitter	
Data Cable Utp Cat 6 (metre)	Pole Cap	
Drop Cable 50 to 500 m pre-connectorised one end or double connectorised	PVC Bend 45 Mm X 90 Deg	
Dual band ONT HG8145V5 / X6	PVC Bend 60Mm X 90 Deg	
Handset Cord Rj 11 (Black, Standard Length)	PVC Bend 80 Mm X 90 Deg	
Huawei Access Point WA8021V5	PVC Duct Plug 45Mm	
Huawei MiFi 5576	PVC Pipes 42/45 Mm X 6 M	
HUAWEI MIFI E5330	PVC Pipes 56/60 Mm X 6 M	
HUAWEI WIFI 6 ROUTER HG8145X6	PVC Pipes 33 Mm X 6M	
Internal Cable 2 Pair	PVC Pipes 75/80 Mm X 6M	
Line Cord Rj 11 Type	PVC Reducer 45X25	
ONUs-MA5675M: 4 GE + 8 POTS + Wi-Fi	PVC Socket - 110 Mm	
Optical Adapter, SC/APC-SC/APC, Green	PVC Socket - 45 Mm	
Optical filter (Reflector) SC/APC male & SC/APC	PVC Socket - 60 Mm	
Plug 8mm for wall hook	PVC Socket - 80 Mm	
Plug Rj 11	Rack Mounted ODF 12,48,96 PORT SC/PC	
Plug Rj 45	Rack Mounted ODF/Patch panel 48,96	

Customer Materials	ODN Materials	Accessories from Repair Centre
	ports FC/PC	
RJ 45 Sockets	Ref:09170 Suspension clamps for pole (DS 6: Dispositif	
Skyworth Technology-STBHE2704	splice closure with 4,6,8 entries	
Starter Pack Everlasting-Business Boost	Splice protector dia 2.2mm Lg 45mm (pack	
STBHP4411 4K PRO	splitter 1:8 for Optical DP	
Telephone socket RJ11 Jelly type	T0, T1 Splice closure 10 entries	
Transition Box For Splicing of 1 core (TB)	Tespa Band 19/20Mm	
Universal Pole Bracket	Tespa Buckle 19/20Mm	
	Wall Mounted ODF/Patch panel	
	Wooden Pole 8M	

All consumables like glue, nylon wire, warning tapes, copper screws, raw plugs, raw bolts, nails, cable clips, cable tie, transportation tube, etc shall be provided by the Contractor.

The Contractor shall provide transportation means and collect the materials.

3.7 Delivery Of Materials

All materials to be supplied by Mauritius Telecom shall be delivered at its main store or any other place appointed by Mauritius Telecom. The contractor shall take delivery of all items for each works order. The Contractor shall have to set up a site store for stocking of sufficient materials. Materials shall not be dumped, nor shall surplus be stocked haphazardly. The PVC pipes should be stored in a secured shelter and not exposed to sunlight.

Delivery of the materials shall be made to the contractor against goods receipt note that shall be provided by the contractor. Delivery of materials will be made only to persons/ staff as approved in the organisation structure of the contractor.

The contractor will submit the balance of materials on a monthly basis to Mauritius Telecom

All materials supplied shall be under the responsibility of the Contractor.

3.8 Inventory Of Materials

The selected bidder shall keep an inventory of the MT materials supplied, installed, installation in progress and the balance left. This will allow to anticipate on materials shortage in advance & appropriate re-ordering.

MT reserves the right to carry out an inventory check at bidder's premises at short notice.

3.9 Works Record Sheets And Site Diaries

The Contractor's works representative shall record any completed work. This record to be used for the preparation of progress invoices shall be certified by both the Contractor's representative and Mauritius Telecom's representative.

The Contractor shall also provide site diaries, with standard header and contract details, with pages in duplicate on each site, for the following purpose:

- recording of any remarks and instructions given during site visits by Mauritius Telecom' officers.
- and the Contractor shall take immediate action on instruction entered in the diaries, recording of the action will be taken.

Above instructions will be limited to minor variations of the works order, where the contractor shall abide. However, approval will have to be sought at Engineer's level if major variation in cost is foreseen before implementation.

3.10 Duration Of Contract

The duration of the contract is one year.

3.11 Work Orders

The first batch of works orders will be handed over within one (1) week from the date of award of the contract and the submission of the copy of insurance policies as stated in Article 24 chapter **2**, financial and administrative clauses.

3.12 Working Documents For The Execution Of The Project

The Works Order to be submitted to the contractor shall consist of:

- Works Order with a Works order number, Address and Details of the Customer.
- Requirements for Services: End of completion date and any additional detail
- The design drawing showing the fibre optic cable network as and when required.
- All information useful for the proper execution of the works

It is mandatory that the contractor shall equip all its teams with rugged tablets for receiving faults work orders and closing completed work orders once fault is cleared on site.

All technicians shall make use of tablets to receive their daily appointments/works orders to carry out customer installations. The tablets shall be also used to take photos of the installed network. These photographs shall be uploaded onto a centralised system as provided by Mauritius Telecom.

3.13 As-Built Drawings

The As-Built drawings of all works undertaken shall be delivered to Mauritius Telecom in digitized format, compatible (version 2018 to 2024) with MT AutoCAD version 2024. The drawings shall comprise both existing and newly constructed network and the format should be validated by MT.

The cost for the preparation of the As-built drawings shall be included in the unit prices to be quoted by the Contractor for the item of works included in the Bill of Quantities.

The contractor shall submit to Mauritius Telecom the approved As-Built Drawings within a period of four weeks after completion of optical fibre cable works for each order. One print of each drawing shall be sent to Mauritius Telecom before every inspection of Provisional Acceptance.

Every part of the network (duct, manhole, and fibre optic cable, etc…) in service after the completion of the network shall be shown in the drawings.

Chapter4 Specification FTTH Construction Works

4.1 Fibre to the Enterprise

The FTTE network is a point-to-point optical fibre or point to multi point network based on G652D ITU standard cable from Mauritius Telecom exchange up to the Building. The single mode fibre network can be single cable or distributed network. The installation should be according to ITU standards for pulling of cables, installation of ODF and splicing of single mode optical fibre.

The Diagram below illustrates the installation of FTTE network together with the major components.

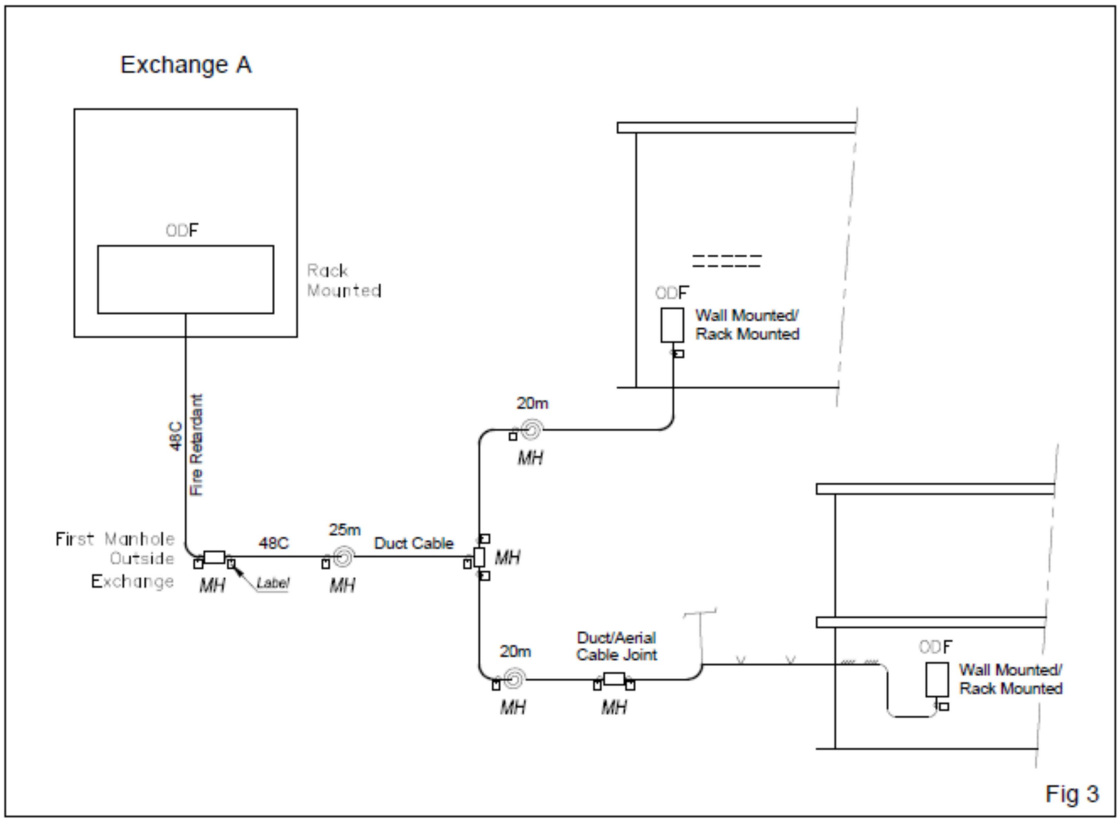

Figure 1 Diagram FTTE

4.1.1 ODN Network for FTTE Projects

This part of the tender concerns the implementation and testing of the ODN for the FTTx, more precisely from the Optical Distribution Frames (ODFs) inside Mauritius Telecom Exchange to

the Optical Distribution Frames at customer's premises. The optical network construction consists of the following major works:

- Pulling of optical fibre cable in duct, fibre on wall and aerial installation. Where no free pipe is available for pulling the contractor is requested to advise in writing to Mauritius Telecom for needful. Similarly for manhole under tar the contractor is requested to advise in writing well in advance.

- Installation of Optical distribution frame and associated works in Exchange and at building client sites, including riser and false ceiling cable installation.

- Splicing of route joints as per diagram submitted by Mauritius Telecom.

Potential bidders should take note that:

- Either a GPON network is being implemented from the OLT port to the last split or a point-to-point network is being implemented from the ODF inside MT exchange to the ODF at customer's premises.
- The ODN network being implemented will support class B+ GPON technology or Point to Point wherever required.
- The installation should be according to ITU standards for pulling of cables, installation of ODF and splicing of single mode optical fibre.
- The following ITU standards must adhered to:

    - ITU-T 984.1
    - ITU-T 984.2
    - ITU-T 984.3
    - ITU-T 984.4
    - ITU-T 984.5
    - ITU-T 984.6
    - ITU-T L.35

4.1.2 Vertical and Horizontal Optical Fibre pulling

- Either a GPON network or a point-to-point network is being implemented from the ODF inside the basement of the building at customer's premises to the technical room/server room/ data cabinet on the different floors of the building.
- The network being implemented will support class B+ GPON technology or Point to Point wherever required.
- The installation should be according to ITU standards for pulling of cables, installation of ODF and splicing of single mode optical fibre.

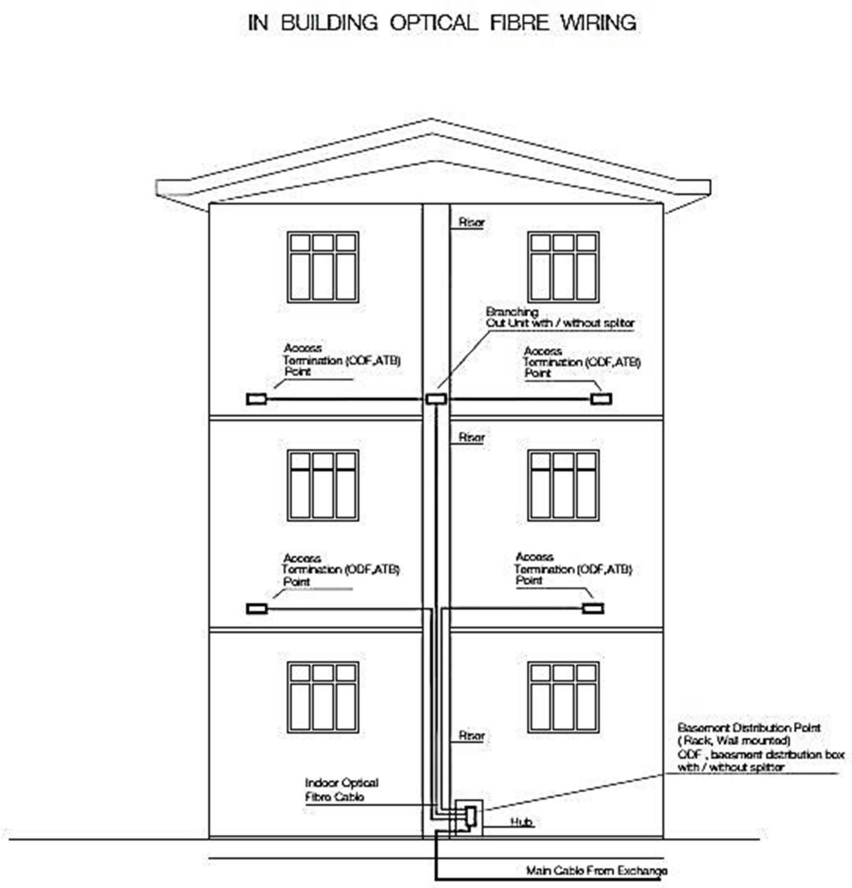

Figure 2 Diagram Vertical & Horizontal Wiring

A typical building scenario is presented above. Optical fibre has to be pulled from joint closures/or FDP inside riser till the server room of the customer and terminated either on a rack mounted or wall mounted ODF or ATB.

4.1.3 General Description

Mauritius Telecom will ensure that sufficient works are given to the Contractor on a monthly basis so as to meet the total amount for works as per the Bill of Quantities. The quantities for works, in the Bill of Quantities, are indicative of the extent of works expected.

4.1.4 Scope of works

The works related shall comprise of the following main tasks:

i. Survey of customer's premises, under MT supervision in individual locations or large buildings.
ii. The existing customer's lists will be provided to the Contractor by Mauritius Telecom.
iii. Arrange for appointments with customers.
iv. Liaison with Building syndic and seek all necessary way leave from syndic.
v. Installation of the optical fibre network, from MT exchange to the basement of the building.
vi. Pulling of fibre from basement to each floor or the space as per customer's requirement.
vii. Termination of the optical fibre. Either in the server room of the respective floor or in a Joint Closure or on a 12 Core wall mounted Optical Distribution Frame/Rack mounted ODF or ATB.
viii. Indoor fibre shall be run in trunking, duct, conduit or surface mounted fixed with the appropriate glue along its whole length, from Joint Closure or FDP up to 12 Core wall mounted Optical Distribution Frame/Rack mounted ODF or ATB.
ix. Upon connection of customers and successful testing of fibre connection and services, the contractor will have to submit a release sheet on a daily basis giving information on the customers released, their optical line constitutions, power readings on the Optical Distribution Frame and materials usage.
x. Allocations and creations on the appropriate exchange equipment will be carried out by Mauritius Telecom.
xi. After completion of all connection works in an area, the contractor will have to provide all customer constitutions data in soft copy / by email.
xii. After carrying out the above works, the Contractor shall provide all customers' optical network data for the new connections and the relevant tests results.
xiii. Whenever there are surges in demands for new connections, the contractor shall be able to increase its daily production capacity, by up to as much as two times, as and when required.

4.2 Optical Fibre Network For Mobile Sites (FTTM)

The FTTM network is a point-to-point optical fibre network based on G652D ITU standard cable from Mauritius Telecom exchange up to the cell site. The single mode fibre network can be single cable or distributed cable network. The installation should be according to ITU standards for pulling of cables, installation of ODF and splicing of single mode optical fibre.

The Diagram below illustrates the installation of FTTM network together with the major components.

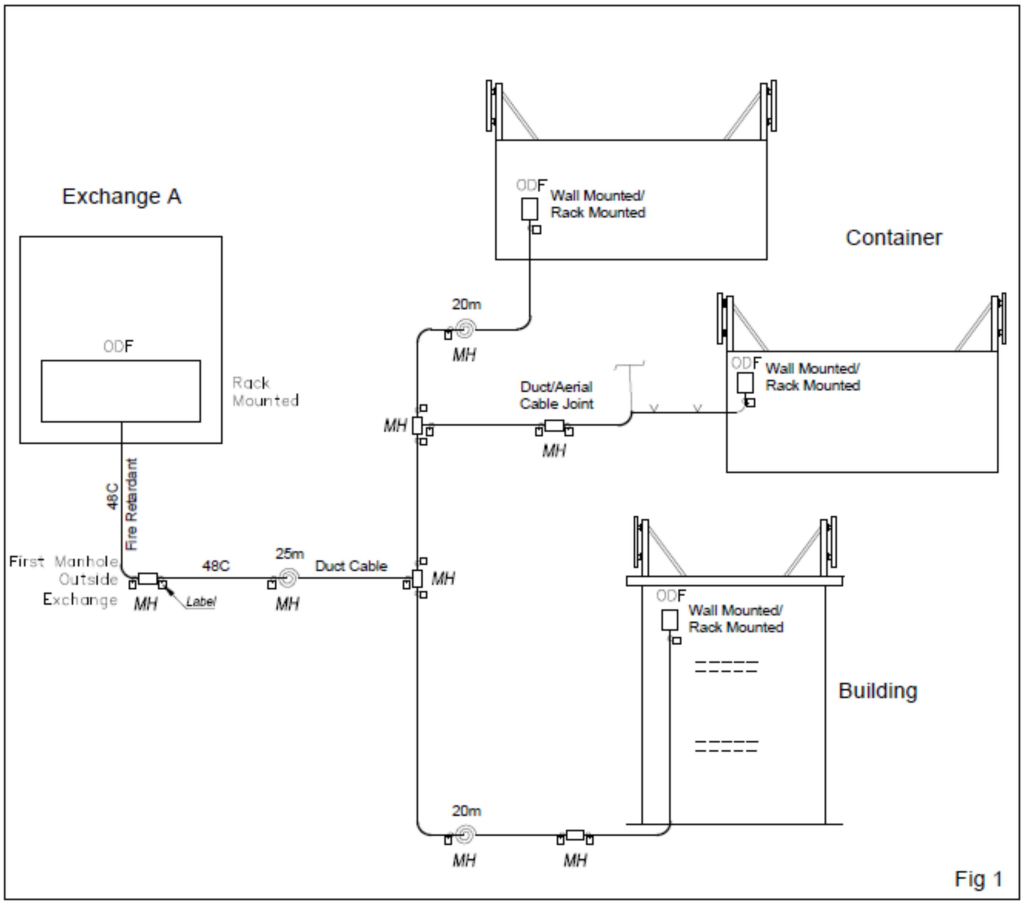

Figure 3 Diagram Vertical & Horizontal Wiring-FTTM

4.2.1 General Description

Mauritius Telecom will ensure that sufficient works are given to the Contractor on a monthly basis so as to meet the total amount for works as per the Bill of Quantities. The quantities for works, in the Bill of Quantities, are indicative of the extent of works expected.

4.2.2 Scope of works

The optical network construction consists of the following major works:

- Pulling of optical fibre cable in duct, fibre on wall and aerial installation. Where no free pipe is available for pulling the contractor is requested to advice in writing to Mauritius Telecom for needful. Similarly for manhole under tar the contractor is requested to advice in writing well in advance.

- Installation of Optical distribution frame and associated works in Exchange and at mobile Cell sites (Termination of fibre can be either on wall mounted ODFs or Rack mounted)

- Splicing of route joints.

4.3 Optical Fibre Network For Fibre Between Exchanges (OFL)

The OFL network is a point-to-point optical fibre network based on G652D ITU standard cable between exchanges. The single mode optical fibre network is a single cable network. The installation should be according to ITU standards for pulling of cables, installation of ODF and splicing of single mode optical fibre.

The Diagram below illustrates the installation of OFL network together with the major components.

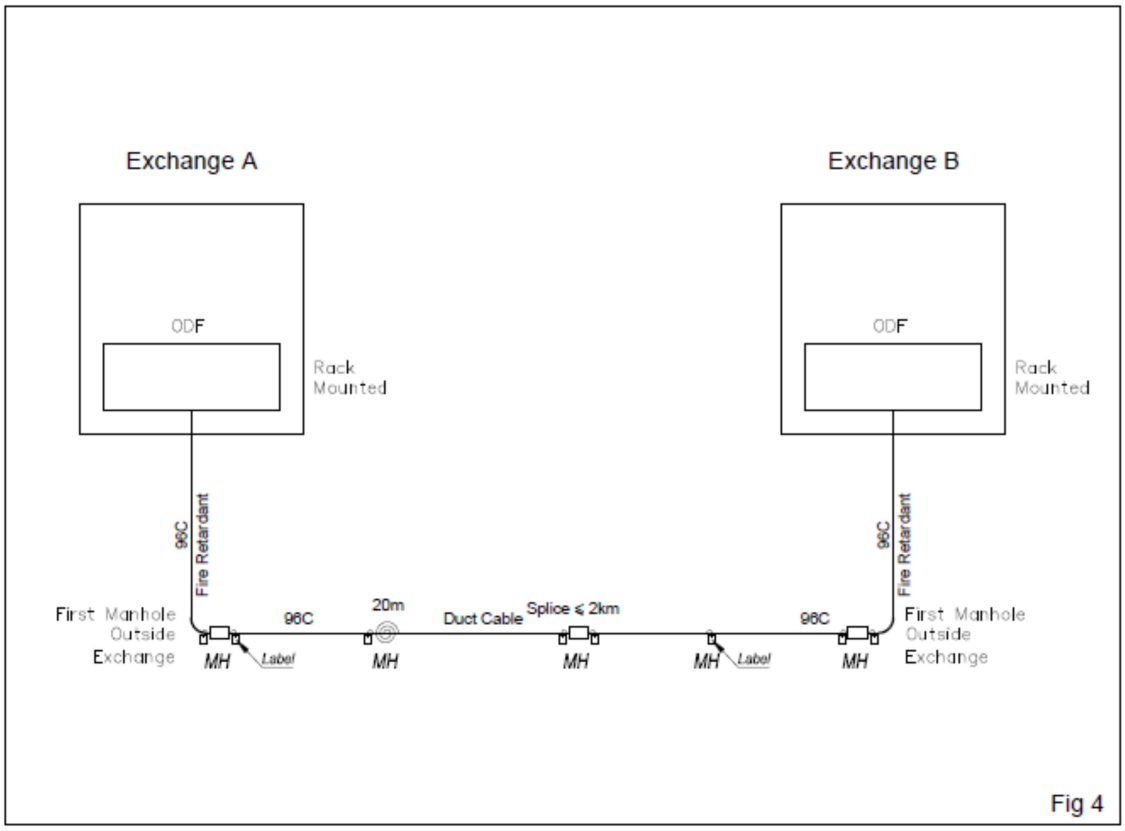

Figure 4 Diagram OFL

4.3.1 Scope of work

The optical network construction consists of the following major works:

Pulling of optical fibre cable in duct. Where no free pipe is available for pulling the contractor is requested to advice in writing to Mauritius Telecom for needful. Similarly for manhole under tar the contractor is requested to advice in writing well in advance.

Installation of Optical distribution frame and associated works in Exchanges.

Splicing of route joints as per diagram submitted by Mauritius Telecom.

4.4 New FTTE Connections

4.4.1 Procedure for new FTTE connections

The contractor shall carry out the survey of customers / waiters to be connected. All new connection works will be carried out on appointments. The contractor shall arrange appointments with customers / waiters. The contractor shall put up all the controls and follow up so as to strictly adhere to them. A penalty as per Article 31 shall be applied for appointments not attended and/or unreasonable lateness by the Contractor.

For cases where drop fibres have to cross private properties, the contractor has to seek official permission/prior authorisation (signed wayleave) from the relevant proprietor/owner.

For cases requiring new poles, the Contractor shall arrange to erect these poles and complete the installations as required. For other cases requiring lopping of trees and/or branches the contractor shall carry out the tree lopping and complete the installation.

The contractor shall submit a commissioning form duly filled and signed by the customer.

Subsequent complaints from customers about quality of works performed shall carry a penalty as per Article 31 for bad workmanship per complaint.

Customers' complaints about wrong behaviour, impoliteness etc., of contractors representatives, shall carry a penalty per complaint as per Article 31.

Cases where customers / waiters could not be located, a penalty per case shall be applied as per Article 31 if they are traced back by the Employer.

No customer connection shall be left out except for cases where customers are not ready. The contractor shall reiterate contacts with these customers so that they are eventually connected.

4.4.2 Ethics

The contractor shall ensure that its technicians comply with the Supplier Code of Conduct Anti-Bribery and Corruption policy and exercise a code of behaviour and ethics that protect the public image of the Employer. Any attempt to extort money from customers shall entail a penalty as per Article 31.

4.4.3 Lan Cabling

4.4.3.1 Scope of work

i. Pulling of CAT 6 cables from the ATB to different termination points/equipment as per customer's requirement.
ii. Extension of the network by using UTP CAT6 Cables from the ATB to the customer's devices and equipment. A coil of 1m to 3m of CAT6 should be left near the ATB.
iii. Crimping of the UTP CAT6 cable with RJ 45 Connectors on both ends of the cable, testing and commissioning of the UTP link.
iv. The indoor CAT 6 Cable should be run in trunking, duct, conduit, or surface mounted fixed with the appropriate glue along its whole length.

4.4.3.2 Cat 6 Pulling

Potential bidders should take note of:

How to wire Ethernet Patch Cables:

1. Strip off about 2 inches of the ethernet cable sheath.
2. Untwist the pairs - don't untwist them beyond what you have exposed, the more untwisted cable you have the worse the problems you can run into.
3. Align the coloured wires according to the wiring diagrams.
4. Trim all the wires to the same length, about 1/2" to 3/4" left exposed from the sheath.
5. Insert the wires into the RJ45 plug - make sure each wire is fully inserted to the front of the RJ45 plug and in the correct order. The sheath of the ethernet cable should extend into the plug by about 1/2" and will be held in place by the crimp.
6. Crimp the RJ45 plug with the crimper tool.
7. Verify the wires ended up the right order and that the wires extend to the front of the RJ45 plug and make good contact with the metal contacts in the RJ45 plug.
8. Cut the ethernet cable to length - make sure it is more than long enough for your needs.
9. Repeat the above steps for the second RJ45 plug.

How to wire fixed Ethernet Cables:

1. Run the full length of ethernet cable in place, from endpoint to endpoint, making sure to leave excess.
2. At one end, cut the wire to length leaving enough length to work, but not too much excess.
3. Strip off about 2 inches of the ethernet cable sheath.
4. Align each of the coloured wires according to the layout of the jack.

5. Use the punch down tool to insert each wire into the jack.
6. Repeat the above steps for the second RJ45 jack.

Test: Continuity test should be carried out using Fluke meter/cable test management software.

4.4.4 Important requirements

4.4.4.1 Staff details

At the time of contract execution, the contractor shall provide the following details for all the staff involved in customer connections, the manager(s), the team leader(s) and the team(s):

- Exact name
- Mobile telephone number
- Office telephone number
- E-mail address.
- NIC
- Qualifications
- Experience
- Photo
- Morality certificate

4.4.4.2 Attending customer premises:

Technicians attending customer's premises shall be well groomed and shall abide to the following requirements:

- Wear uniforms apparel with Contractor logo.
- Shall not wear slippers. Shall wear shoes at all times.
- Technicians shall always show the ID cards provided by Mauritius Telecom clearly to customers.
- Technicians should be polite and conversant in French, English, Creole and Bhojpuri.
- Technicians shall exercise extreme care when carrying out works.
- Technicians shall protect customers' assets like furniture, carpets, paint, building etc.
- Technicians shall never use customers' assets like ladders and/or phone to make calls etc.

- Vehicles should be clean and in a reasonable condition. The Employer may request the contractor to remove any vehicle(s) should it consider that such the vehicle(s) is (are) not appropriate.
- The contractor's vehicles shall be branded with appropriate logos, tag lines and any other hoarding/advertising.
- Complaints from customers on any of the above will carry out a penalty per case as per Article 31.

4.4.4.3 Use of tablets

All technicians shall make use of tablets to receive their daily appointments/works orders to carry out installations. The tablets shall be also used to take photos of the installed network. These photographs shall be uploaded onto a centralised system as provided by Mauritius Telecom. They will be used for acceptance and commissioning of the installed network.

4.4.4.4 Tools

All technicians shall use appropriate tools as described under section 3.1.3.

4.4.4.5 Smart ID card

Smart ID card shall be provided by the MT. The ID card will contain the following:

- Full name of staff
- Photograph
- Validity period
- Logo of the contractor's company
- QR code

All details pertaining to the contractors' staffs as described above shall be provided to MT upon request.

The Contractor is responsible for the Smart ID card issued by MT and should return the Smart ID card whenever their Technicians have ceased working with them. In case of non-compliance, the Contractor shall be responsible for all financial liabilities arising from mis-use of the Smart ID card plus a penalty of Rs 25,000 for each non-timely notification and surrender of the Smart ID issued to their technicians

Customers will identify the technician attending their premises by scanning and counter verifying the code. The name, photograph, location(s) of work etc of the technician will be

sent from a central database to the customers' terminals. In the event the QR code does not positively identify the technician, no intervention will be allowed. Further details on the ID card shall be mutually agreed by Mauritius Telecom and the contractor before start of works.

4.4.4.6 Training

The contractor shall ensure that training is provided to its personnel for continuous improvement in their performance while carrying out works for this contract.

4.5 Works Implementation

4.5.1 Clearances

Overhead fibre run for the construction of lines shall be surrounded, all along their lengths as applicable, by a clear cylinder and should be at least 1 metre free from any branches, twigs, leaves, buildings and houses.

The contractor shall carry out the cutting/lopping of trees, branches, twigs or leaves etc. whenever required.

The overhead customer's line shall be installed in such a way so as to provide a clearance of at least 6.0 metres from road level when crossing roads or entrances. In all other cases the minimum clearance shall be 5.5 metres. Crossing of highways or motorways is not allowed.

4.5.2 Mechanical Contact

All optical cable shall be protected from moving mechanical or physical contacts, such as foot or vehicular traffic.

4.5.3 Connections

Optical patch cords of 3m shall be used for connection from the ATB to Customer Premises Equipment (CPE). It shall be readily identifiable at the Access Terminal Box for ease of connection, disconnection, testing and reconnection.

Connections should be carried out to ensure fault free performance.

4.5.4 Tension

All fibre shall be free from tension at both ends, as well as over the length of each run.

Fibre run on wall surfaces should be neatly laid and securely fixed along the run to prevent sag or accidental displacement. The cables shall be fixed using appropriate glue along the whole length of the fibre.

4.5.5 Cable Bends

The radius of every bend shall be such that the fibre shall not suffer damage. Fibre bends, or radii, shall not be less than twenty (20) times the fibre external diameter.

4.5.6 Harsh, Hazardous, Or Corrosive Environments

Communications fibres shall not be installed where vapours, fumes, corrosives, dusts, or other industrial byproducts are present without appropriate precautions to protect the cables. Mauritius Telecom shall be consulted in all such cases.

4.5.7 Damage To Mauritius Telecom Materials

Greatest care has to be taken while handling, placing or installing the materials belonging to the MAURITIUS TELECOM under the custody of the contractor for the purpose of the work.

The contractor shall be responsible for any damage or losses resulting from carelessness, negligence, mishandling or any act of default of its own or its workers.

The contractor shall be required to make immediate replacement of damaged materials or pay the amount against the concerned item.

4.5.8 Required Dedicated Field Resources

Based on the Bill of Quantities, the contractor shall ensure that it has enough dedicated field resources required for the execution of the contract.

4.5.9 Supply, Stocking & Transportation Of Materials

The cost of all complementary materials and fittings shall be included in the cost of works items in the Bill of Quantities and shall not be claimed separately.

At the time of bidding, the tenderer shall submit a detailed description of all materials and fittings he proposes to use under this contract, for approval by Mauritius Telecom.

The Contractor shall make, at its own expense, arrangements for stocking and transportation of materials.

4.5.10 Tools Requirements

The contractor shall ensure that, at all times during the execution of the contract, all their field technicians have the appropriate tools to carry out all the different type of works related to FTTx works. Mauritius Telecom shall reject any work if contractor’s technician is found to be using inappropriate tools during execution of works.

Chapter5 Acceptance FTTH Construction Works

5.1 Scope

The optical fibre network constructed as per order received must be tested according to ITU standards and to ensure delivery to MT of the completed network without defects.

Any defects found during testing must be corrected by the contractor at no additional cost to Mauritius Telecom.

All fibre cores/cables installed and terminated must be tested and test results provided to MT in the format requested by MT.

5.1.1 Acceptance Documents To Be Submitted By The Contractor

The following are required for Acceptance of the completed network in one complete set per order in soft and paper within 2 weeks after completion of the order. PAC will then be issued after verification and approval of same.

5.1.2 Signed Acceptance Sheet For Optical Network Constructed

The acceptance sheet is a summary of all activities done in the order received. This includes from pulling of cable up to the testing of core fibres.

This also includes the acceptance of the completed work on site for tidiness.

All complaints & solutions concerning the order should be highlighted so that corrective actions could be taken to prevent such occurrings.

5.1.3 Bill Of Quantities

The BOQ will capture all works in the different orders implemented.

The approved works completed (PAC) will then be used for the invoice.

5.1.4 Physical Layout

The physical layout should provide details of location of:

- Rack
- ODF

- joint closures
- splitters
- Optical DPs and
- connector type layout for reference.

5.1.5 Network Tests

The completed optical network loss should be compared to calculated loss budget (with reference to manufacturer data sheets) including cables loss, splice loss, connector loss and splitter loss.

The optical power attenuation tests shall be performed by both the OTDR and the Power Meter/Light source methods, the latter method is used to ensure that split splicing has not been done (Core No=x connected to Core No= not x in another cable section).

Both 1310nm and 1550nm wavelength should be tested in both directions together with the OTDR trace.

Return loss also should be taken into consideration.

Results should be provided for each and very core fibre installed and terminated.

5.1.6 Acceptance

The following tests shall be carried out by the contractor:

(Test for Point-to-point links)

5.1.6.1 Power loss measurement (OLTS) and PON OTDR tests:

- From GPON port/ODF to 1st splitter
- From GPON port/ODF to 2nd splitter
- From GPON port/ODF to TB
- From GPON port/ODF to ATB

All OTDR waveforms must be saved and provided to uploaded on MT network inventory and GIS (document application)

5.1.6.2 Acceptance test ranges for Point to Multipoint network

1. **End-to-end optical power loss range: 15 - 25 dB**

- If lower - attenuator must be used

- If higher – loss of signal may occur.

2. **Component loss**

- Splice loss range: 0.05- 0.2 dB
- Connector loss: 0.1- 0.3 dB
- Fibre loss/Km: 2.0 - 3.5 dB

3. **Splitter loss**

- For 1:2 splitters: < 4.0 dB
- For 1:4 splitters: < 7.5 dB
- For 1:8 splitters: < 10.3 dB
- For 1:16 splitters: < 13.5 dB

5.1.7 Works/services

Proposed ODN installation shall comply with the following standards:

(Related to residential optical fibre installations and guidelines for fibre and fibre accessories)

TIA 455,526, 568,569, 590, 598, 607, 640 and 758

ITU-T L50 and 52

5.1.8 Splicing/Network Diagram

The splicing / network diagram should provide the end to end from exchange to the end point for the distribution of fibre cores via the different splitters and joint closures. They should also indicate the manholes concerned, the DP poles concerned, the fibre cores used and free at each intervention point.

5.1.9 Splice Loss Table

The table should provide the loss at each splice for every core spliced with a maximum loss of 0.05dB per splice. The core colours should also be provided.

5.1.10 Plate Organisation In Closures And ODF

The fibre core organization inside closures and optical distribution frames should provide details of each and every cable installed, division of tubes and splitters installed in the network.

5.1.11 OTDR Trace / Light Source & Power Meter Readings

The captured OTDR trace, else, light source & power meter readings for ALL Optical DP ports at output of last splitter should be provided with details of cable length, attenuation, reflection, location of splitters and events over the completed networks. The OTDR traces or light source & power meter readings should be done at 1310nm, 1550nm and 1625nm.

5.1.12 As Built Drawings

The contractor should provide ABD for the completed network in Auto cad format for both cable and fibre core installed in the constructed network.

5.1.13 UTP Cable tests

The contractor should provide test results for the completed internal network in pdf format for UTP cables.

Chapter6 Civil Engineering Works Specifications

6.1 Definition, Execution and Checking of Civil Engineering Works

6.1.1 Duct Nest Construction

6.1.1.1 Staking

The contractor shall carry out staking of the works in plan in conformity with the project. He shall set out a number of points along the duct route which when joined by means of a line will give the axis of excavations, each point being either a metal or timber pole or simply marked clearly with paint.

The setting out shall be sufficiently accurate, visible and can be made use of at the time of works execution.

The contractor shall take appropriate precautions to maintain the setting out, to re-establish their position or to replace them if need be either at their original location or at other points if required by the process of works.

If setting out is not carried out in the presence of the client the contractor shall have the staking works checked by the latter before start of excavation works.

6.1.1.2 Trial Excavation/Pilot hole

The Contractor shall carry out Pilot/Trial Hole at every 50 mts or less for the localization of exact position of underground services/obstruction, and for test purposes.

6.1.2 Position Of Trench

- Trenches have to be excavated along roadway, footway or off-road as required by the site constraints.
- The contractor shall mark up the position and size of the trench with paint or any alternative means provided by himself.
- Any work done contrary to MAURITIUS TELECOM specification will be at the contractor's own charge.
- The contractor shall ensure that the trench is located at a minimum horizontal clearance of 50cm from any existing water pipe or electric cables.

6.1.3 Use Of Mechanical Excavators

Mechanical excavators can be utilized provided that the trench is not wider than it should be and that any track excavators used are properly padded.

6.1.4 Shape, Quality And Size Of The Trench

- The trench shall be straight [except where otherwise specified or required, e.g. bends] and shall not be in V shape. The walls shall be perpendicular to the stone-free and levelled trench bottom.
- The trench dimension will vary depending on the location of the works, the size of the duct nest, etc. As and when directed by MAURITIUS Telecom's representative, the contractor shall provide trenches of different dimensions, e.g. when working in the vicinity of other services, where minimum clearances are required.
- The backfill over the top most PVC pipe in the duct nest is 800 mm.
- The width of the trench shall not be greater than necessary for the execution of the works.

6.1.5 Backfilling

- The portion of the trench over the works (duct nest) is filled up with selected material through a sieve 5 mm square and conforming to the specifications for fill material as described in Annex 6 as required by the road authorities.

Annex 6 RDA Specifications Road Works

- The fill material shall be placed in layers not exceeding 150 mm and thoroughly compacted using a suitable trench compactor or vibrating roller. The Contractor should ensure that no damage is caused to the ducts during compaction.
- The backfill shall be humidified, if necessary, prior to compaction, to obtain the compaction value required by the authorities concerned.
- Relevant tests should be carried out at intervals of 50m or as per conditions stipulated by authorities. The contractor shall bear the cost.

6.1.6 Construction Of The Duct Nest

The duct is either embedded in sand free from stones, encased in concrete or a combination of both, as the case may be.

6.1.7 Embedding Of PVC Duct In Sand

- PVC ducts are glued, jointed and laid over a 50 mm sand bedding provided on the trench bottom.
- 100 mm sand cover is provided over the topmost duct and minimum 70 mm sand cover is provided on the sides.
- The contractor shall make use of appropriate steel or wooden stakes to maintain the stability of the duct module and the appropriate wooden benches to join the pipes throughout the installation stage.
- Sand used shall be granulated, size varying between 0.15 mm and 5 mm**.**
- **Concrete anchor blocks shall be constructed by the contractor at distance along the duct route that shall not be less than one every 50 metres.**

A hole shall be excavated in advance at places where anchor blocks are to be constructed so as not to damage the pipe during construction.

6.1.8 Encasement Of PVC Ducts In Concrete

The two basic methods for concrete embedment currently employed are: -

(i) The standard encasement method or Type A.

(ii) The layer-by-layer method or Type C.

TYPE A
A 50 mm concrete bedding is laid on the trench bottom. The PVC pipes are glued, jointed and installed over the concrete. A cover of 100 mm concrete over the topmost duct, and a 70 mm concrete of the sides is provided.

TYPE C
The same construction method, with the difference that a 30 mm gap provided by separators, is allowed between the pipes. The gap is filled up with easy flow concrete or cement mortar. Duct entries in manholes are constructed in type C over the last 1.5 metres to 3.0 metres.

6.1.9 Laying Of Pipes Above Concrete Embedment Block

When PVC pipes are to be laid above the concrete embedment block, they shall be surrounded in a fine sand bedding over the whole width of excavation such that there is a minimum of 5 cm layer below the lower generatrix of the pipe and 10 cm above the upper generatrix.

6.1.10 Glueing Compound

(a) Mauritius Telecom shall approve the glueing compound provided by the contractor

(b) Glueing and coupling of ducts shall be done with care over specially constructed wooden benches.

6.1.11 Concrete Mix

The concrete mix is 350Kg cement for $0.4m^3$ sand and $0.8m^3$ coarse aggregate. Granulated washed sand, size varying between 0.08 to 5 mm, and coarse aggregate of size ranging from 6 mm to 12 mm should be used.

6.1.12 Presence Of Other Services In The Ground

During the construction of a new duct route the Contractor shall

(1) Take extreme care not to damage existing services of Mauritius Telecom and services pertaining to other authorities
(2) Provide adequate protection to any services monuments and structures.
(3) Maintain the stability of any services and structures.

The services that are encountered during excavation of trenches are usually telephone cables and pipes, water pipes, power cable and sewerage plant.

Lateral clearances of 500 mm and vertical clearances of 300 mm are maintained between the edge of the topmost telephone PVC duct and power cable or water pipe, except where otherwise specified. Installation of the duct directly on top of existing water pipes power cables is not permitted except for crossings.

PVC ducts shall be laid at a minimum depth of 150 mm below the base of water drain or gutter, where the case arises.

The drain or gutter shall then be repaired.

6.1.13 Warning Tapes

Warning tapes (green colour) in the form of grids or plastic tapes shall be laid across and along the whole width and length of the excavations with sufficient overlapping between each element. This is generally laid over the first layer of backfill. Under no circumstances shall it be laid less

than 0.20 m above the embedded works and less than 0.10 m below the surface. Warning tapes shall be supplied by the contractor himself and approved by MAURITIUS TELECOM.

The width of the warning tape should be chosen, so that it overlaps the duct nest width by at least 50 mm.

6.1.14 Manhole Construction

The manholes to be constructed shall conform to the standard drawings given in Annex 7.

Annex 7 Specifications Manhole Construction

6.1.15 Standard Jointing Boxes And Manholes

The jointing boxes and manholes to be constructed shall conform to the standard drawings given in Annex 7.

The standard jointing boxes to be constructed on roadway are K1C, K2C, K3C L1C, L2C, L3C, L4C, P1C, P2C

The standard jointing boxes on foot way are L1T, L2T, L3T, L4T, L5T, L6T.

6.1.16 Construction Operations

The construction of the joint box and manhole comprises the following operation: -

(a) The digging of pilot holes to determine the proper location of the works.

(b) The excavation of the required trench.

(c) The construction of the joint box or manhole as per the standard drawing.

(e) The leading in of the ducts in the manhole with the duct nest terminating in Type C formation.

(f) The backfilling with selected fill material, including ramming at every 150mm on the manhole sides and ceiling.

This operation, however, is carried out after the curing period, and at the time of permanent reinstatement.

6.1.17 Shuttering

(a) Subject to compliance with the drawings as regards dimensions, the contractor shall be free to adopt any arrangement he may think fit for the make-up of the shuttering.

(b) The shuttering shall be of such dimensions, and so constructed so as to remain unyielding to weight and vibration during the concrete casting.

6.1.18 Removal Of Shuttering And Curing Period

The minimum period before the removal of shuttering for manholes is 5 days.

The curing period is 21 days during which the joint box and manhole should be fenced and isolated from the traffic.

6.1.19 Fittings

(a) Anchor Irons have to be fitted and secured to the steel reinforcement and cast in concrete during the placing of concrete itself.

(b) Bearers and Supports, and steps or ladder can be fixed after the striking off of shuttering.

(c) Weakly sealed fittings have to be removed and refitted so as to be up to standard.

(d) Sump cover has to be installed as specified.

6.1.20 Reinforcement For Manholes

a) The manhole should be reinforced as per the specified structural design in Annex 7.

b) Any alternative design by a Professional Structural Engineer should be approved by the Ministry of Public Infrastructure/ Road Development Authority and MAURITIUS TELECOM.

c) The steel reinforcement to be embedded in concrete shall be free from mud, oil, rust, grease, paint, etc.

6.1.21 Cabinet Installation

Base for cabinet and duct entry in manhole shall be in conformity to relevant working drawing. Refer to specifications installation of cabinet.

Provision shall be made in the formwork when such work is required.

Curing time for cabinet support is 7 days.

Mauritius Telecom's representative shall indicate the exact siting of the cabinet.

6.1.22 Raising Of Manholes

The Contractor shall follow the procedures as per Annex 8.

6.1.23 Repairs/Replacement Of Manhole Frames And Covers

The Contractor shall follow the procedures as per Annex 8.

Annex 8 Specifications Manhole Raising & Repair

6.1.24 Brickwork

(a) The concrete used during construction with bricks is 350 Kg cement per m^3 of concrete for 0.400m^3 sand, and 0.800m^3 coarse aggregate.

(b) The concrete on the floor shall be allowed to set at least 12 hours before starting the laying of bricks.

(c) The cement mortar used for joints, and for cement rendering is 400 Kg cement per m^3 of sand, size varying between 0.08 mm to 2 mm.

6.1.25 Digging Of Holes And Erection Of Poles

TYPE, DIMENSION OF POLE AND DIMENSION OF HOLES

The standard wooden poles are 7 m and 8 m. The holes to be dug are of the following dimensions:

POLE	7m	8m
DIAMETER	0.50 m	0.50 m
DEPTH	1.40	1.50 m

6.1.26 Pole Erection

- The pole has to be erected in the hole so dug with appropriate tools, crowbar (barramine) and spoon. There is no objection to the use of a Vehicular Pole Erection Unit.
- The pole is held upright and rigidly stable by means of sharp-edged stones (Blue Basalt) around the leg of the pole for about a third of the depth of the hole and rammed in tightly by means of hand rammers. The same operation is repeated on the upper third of the pole. Round stones and earth being used in the middle layer, and tightly rammed.
- For underground network distribution, PVC 45 mm diameter 90° bend should be terminated on the pole.

6.1.27 Siting And Inspection Of Hole

- The contractor will site the pole and will provide the land work, in the presence of Mauritius Telecom's representative.
- The contractor will in no circumstances modify the sitting without the prior approval of MAURITIUS Telecom's representative.
- MAURITIUS Telecom's representative will inspect the hole before the pole is erected.

6.1.28 Cutting Of Pole

The contractor shall in no circumstances cut the pole.

6.1.29 Protection Of The Hole

The hole shall be completely isolated from the public by means of rods and tapes, until the pole is erected properly.

6.1.30 Reinstatement Of Road Surface (Asphalt)

(a) The Contractor shall provide a temporary reinstatement immediately after backfilling. Such works shall be carried out within utmost care so as not to cause inconvenience to vehicles and pedestrian traffic until the final reinstatement.
(b) The road surface should be reinstated according to the specifications in force in the area or on the road where excavation works are done.
(c) The conditions and specifications for excavations, backfilling and reinstatement of road surface are as per Annex 6.

6.1.31 Scheduling, Quality And Guarantee Of Reinstatement Works

(a) Interim restoration or reinstatement works, whether on pavement or roadway will have to be carried out immediately following backfilling and ramming operation and should satisfy the specifications of the authorities concerned.

(b) Final reinstatement of any asphalt, concrete or masonry stone surface shall be carried out within fifteen (15) days following backfilling and interim restoration. Backfilled trenches not permanently asphalted or tarred shall not exceed a maximum length of 1 (one) km. In circumstances requiring **URGENT** asphalting or tarring, the Contractor shall execute works **IMMEDIATELY** upon request from MAURITIUS TELECOM.

(c) Repair or reinstatement of bridge, drain, culvert, concrete or a stone structure shall be carried out a maximum of twelve (12) hours following backfilling of trenches.

(d) The time lag and the maximum length of un-tarred trenches at (b) and (c) may be reduced or increased to satisfy the requirements of the authority concerned.

(e) The project on any site of work shall be considered as having been completed only after permanent reinstatement has been effected to the satisfaction of the authority concerned.

(f) Any subsidence following the initial reinstatement work, and before the final acceptance by roads authorities shall be rectified and made good by the contractor.

6.1.32 Interim Restoration

Prior to the final reinstatement, asphalt, concrete or masonry stone surfaces, footways and roadways shall be restored to suitable condition to enable normal motorist or pedestrian flow.

The interim restoration shall be executed immediately following backfilling and in the manner specified so that affected portion is neither a source of inconvenience nor danger to the motorist or pedestrian.

The interim restoration of roadways should be carried out in the manner specified by the Ministry of Public Infrastructure/RDA.

6.1.33 Reinstatement Of Pavement In Masonry Stone

(a) The trench is well compacted by a Mechanical rammer as defined in backfilling of trenches.

(b) Concrete mix, 350 kg cement per m3 concrete, for 0.4 m^3 of washed granular sand, and 0.8 m^3 coarse aggregate is laid on trench surface up to 100 mm.

(c) The masonry stones are laid in the concrete in such a way that they are level with the existing surface.

(d) The joints are filled up with concrete mortar 400Kg cement per m^3 of sand and finished flush with the masonry stone pavement.

6.1.34 Reinstatement Of Gutter Or Drain In Masonry Stone

(a) The same operations as the reinstatement of pavement are carried out.

(b) The thickness of the concrete laid on the trench bottom is however, 150 mm.

(c) The reinstatement stone works must match the existing gutter regarding shape and gradient.

6.1.35 Reinstatement Of Pavement In Concrete

(a) The trench is well compacted by means of a Mechanical Rammer.

(b) Hardcore filling is to be handpicked to an average thickness of 70 mm on the trench top.

(c) The hardcore filling is blinded with 32 mm (1¼") blue basalt aggregate.

(d) 100 m thick concrete 350 kg m^3 concrete for 0.400 m^3 of washed granular sand, and 0.8 m^3 coarse aggregate is laid on the prepared base and made anti-acid with a float.

(e) When required, the surface should be rendered anti-acid with required pattern to restore it to its original condition.

6.1.36 Reinstatement Of Gutter Or Drain In Concrete

(a) The same operations as the reinstatement of concrete are carried out.

(b) The thickness of the concrete is, however, 150 mm.

(c) The bottom is rendered with cement mortar 400 Kg cement for 1 m^3 of sand and should match existing shape or slope.

6.1.37 Safety And Hygiene On Site

The contractor shall carry out the works in conformity with the existing legislation in force.

6.1.38 Site Office

At the request of the client for his personal use, the contractor shall provide a site office.

6.1.39 Duct Test

The Contractor shall inform the client of the date he proposes to perform duct tests. He shall carry out the tests with the help of appropriate mandrel or rings which must travel freely in the laid pipes. He shall prepare test sheets in two copies, one of which handed over to the Mauritius Telecom.

All the tests should be carried out in the presence of Mauritius Telecom.

6.1.40 Works In The Vicinity Of Services, Structures Or Monuments

Extreme care has to be taken by the contractor while working in the vicinity of services, such as telephone plant, power cables, water pipes, sewage, concrete structures, monuments etc.

During the construction of new duct route any existing plant or structure has to be adequately protected and arrangements made to maintain its stability.

During non-working hours and at night, permanent watch is to be provided to avoid damage to any plant or structure resulting from accident, vandalism or otherwise.

The contractor shall be responsible for any damage to telephone plant, water pipes, power cables, sewage plants, concrete structures and all existing underground installations caused by the contractor, or resulting from vandalism, accident, or otherwise.

The contractor shall submit an adequate insurance policy to cover those risks.

6.1.41 Water Intrench Affecting The Work Progress

During the execution of works, the contractor may encounter water leaks or water flow in the ducts or manhole pits. The contractor shall make the following immediate arrangement so as to avoid impeding the progress of work.

(a) He shall construct special sumps with concrete or otherwise to divert the water.

(b) He shall contact the service concerned for the necessary repairs.

(c) He shall carry out the repair of the drain or gutter demolished for the necessary repairs.

(d) He shall carry out the repair of the drain or gutter demolished for the purpose of the ductwork.

6.1.42 Damage To Mauritius Telecom Materials

Greatest care has to be taken while handling, placing or installing the materials belonging to Mauritius Telecom under the custody of the contractor for the purpose of the work.

The contractor shall be responsible for any damage or losses resulting from carelessness, negligence, mishandling or any act of default of its own or its workers.

The contractor shall be required to make immediate replacement of damaged materials.

6.1.43 Modification Of Plans And Variation

The contractor shall not carry out any modification of whatever nature of the working plans on its own initiative. Authorization for the modification of plans will come from Mauritius Telecom's representative at Inspector's or Engineer's level.

6.1.44 Inspection And Quality Control

The contractor shall ensure that the stores it supplies and the works performed meet the specified standard. The materials not otherwise defined are to be in accordance with specifications of the Mauritius Standard Bureau (MSB), the RDA and Mauritius Telecom.

Stores supplied and works are subject to inspection and quality tests during the works progress and at delivery.

The quality control tests, which are to be performed by the RDA, the MSB or any other approved laboratory, are at the expense of the contractor, which shall abide by the procedures and conditions of these organisations.

The contractor shall submit, to the Ministry of Public Infrastructure or other local authorities, test results on compaction, from an approved laboratory, taken before and after laying of crusher run when requesting acceptance certificates for reinstatement from the Ministry of Public Infrastructure or other local authorities.

The contractor shall also supply a copy of the test report to Mauritius Telecom.

6.1.45 Quality Of Stores

Officers of Mauritius Telecom may visit the factory to inspect the standard of the manufacturer or fabrication, as well as the quality of finished product as supplied by the contractor.

6.1.46 Concrete-Quality, Placing And Finish

(a) QUALITY OF MATERIAL

The concrete mix is 350 Kg of cement per m^3 of concrete for 0.400m^3 sand and 0.800m^3 coarse aggregate. Washed and granulated sand, and coarse aggregate of size 6 mm to 12 mm should be used.

(b) TEST CUBES

(i) Mauritius Telecom may request the contractor to take test cubes from any batch of site mixed or premixed concrete used on any concrete work. The equipment necessary for the making of test cubes shall be provided by the contractor. Testing of the cubes shall be arranged by the contractor. Works will not normally be delayed while awaiting for the test report which shall be forwarded to MAURITIUS TELECOM or its representative as soon as it is available.

(ii) The result shall satisfy the following table: -

COMPRESSION		**TENSION**	
7 days	28 days	7 days	28 days
185 bars	270 bars		

	18 bars 23 bars

(iii) Whether test cubes have been taken or not, MAURITIUS Telecom's Inspector or Engineer may carry out rebound hammer tests on any concrete work 7 days or 28 days following casting.

(c) PLACING

Concrete mixing may be done either by hand or by concrete mixers. Concrete mixing by hand for small joint boxes is acceptable and should have the approval of MAURITIUS TELECOM'S representative.

For any joint box and manhole construction, the concrete should be thoroughly vibrated at successive layers of 600 mm by means of a poker type vibrator until a dense solid mass without void is obtained.

(d) FINISH

When the shuttering is removed, the wall should present a smooth finish. Any slight cavities exposed should be made good with cement mortar. UNDER NO CIRCUMSTANCES SHALL THE WALLS BE COATED WITH A CEMENT OR CEMENT/SAND WASH. In case of poor quality of finish when the shuttering is removed the contractor shall render the wall with cement mortar at no extra cost.

6.1.47 Quality Of Duct Nest

(a) Each and every PVC duct in a duct nest shall be tested by means of a mandrel after permanent reinstatement.
(b) The test shall be done in the presence of the contractor's works representative and Mauritius Telecom's Inspector.
(c) The test equipment such as "Furet", "Treuil" and nylon wire rope, etc shall be provided by the contractor.
(d) Air compressor and other related accessories as well as operators and workmen required for the test shall be provided by the contractor.
(e) The test results shall be certified by both the contractor's representative and Mauritius Telecom's representative.
(f) The test results shall be attached to the contractor's claim.
(g) The results shall satisfy the following minimum values: -

PVC PIPE	MINIMUM ACCEPTABLE INTERNAL DIAMETER
104/110	96
75/80	70
56/60	50
42/45	38

(h) At the request of Mauritius Telecom, the contractor shall replace Minimum Bore Meter or complete the duct test with the help of an Alveometer.

(i) The contractor shall supply and provide nylon draw wires of a type approved by Mauritius Telecom in all ducts.

Note: The cost of duct test and provision of draw wires in all PVC pipes shall be borne entirely by the contractor.

6.1.48 Quality Of Reinstatement

(a) Officers of the road authority and local authority may carry out inspections during the progress of reinstatement works.

(b) The contractor's works representative will follow instruction given by officers of those authorities and perform work to their requirements as defined by standard specifications.

(c) Claim for payment for reinstatement works shall be made only after joint inspection by representatives from Mauritius Telecom, the contractor and the authority concerned.

(d) All reinstatement works on roads under the jurisdiction of the Ministry of Public Infrastructure shall be carried out by GRADE A contractors registered with the said Ministry.

6.1.49 Sub-Standard Store Or Works Item

(a) Mauritius Telecom shall not accept any store provided by the contractor or work item that has been found to be substandard through test-results or otherwise.

(b) The contractor shall replace any defective store supplied and reconstruct any item of work, such as duct nest, manhole, etc having been found to be substandard, within the period specified by Mauritius Telecom's representative.

6.1.50 Non-Compliance With Instructions And Specifications

If the contractor, having been informed by Mauritius Telecom to rectify, reconstruct, correct, or replace any defective part, or having been informed that the work is being performed in an

insufficient or improper manner with respect to quality, fails to take corrective measures within five (5) days following the issue of instruction to him, the inspector in charge shall at once stop the work and the contractor will be required to take immediate corrective actions.

Any delay caused by such stoppages shall be the sole responsibility of the Contractor and the Contractor will not be eligible for any extension in time or any other compensation whatsoever for such delays.

6.1.51 Organisation, Precautionary Measures And Safety On Site Of Work

Works of this nature, performed on public places, demand a well-organized and efficiently protected site of work, as they should in no circumstances be a source of inconvenience or danger to the general public or working personnel themselves.

6.1.52 Responsibility Of The Contractor

The contractor is responsible for: -

(a) The provision and placing of traffic signs, warning signs, barriers, rods, temporary bridges, lamps and other means or equipment in adequate quantity at the works area.

(b) The provision and placing on site of a board mentioning Mauritius Telecom as the name of the client, and its own name, as the contractor carrying out the excavation works. The size, colour of the board as well as the lettering should be approved by the RDA.

(c) The provision of sufficient persons to monitor the security organization aspect at all times during the day, and watchman at night.

(d) Any accident causing damage to vehicles, plants, materials, property of any person or organisation or injuries or death of any person.

The contractor shall comply with Road Traffic Ordinance and the requirement of RDA and local authorities and should obtain from them the approval for the proposed signalisation and safety measures prior to start of work on a site.

6.1.53 Insurance

To satisfy these conditions, the contractor shall subscribe to the Contractors All Risk Policy, a Public Liability Policy of Rs 10m for each and every claim and an Employer Liability policy for all its employees from a reputable Insurance Company as recommended by Mauritius Telecom.. A copy of the said Policy shall be submitted for approval to Mauritius Telecom before the start of works on site.

At the time of Tendering the Tenderer has to show proof that it shall subscribe to these insurance policies.

6.1.54 Open Trenches And Maximum Opening Length

Warning signs, fences and barriers etc shall be moved along as work progress so as to maintain safety and secure a smooth traffic flow.

The Contractor's works representative shall so organize the work that trenches, or other items of works are not left opened or uncompleted in any street or zone as new trenches are opened, thus causing Mauritius Telecom's representatives on site of work to stop further excavations.

A maximum excavation length of 150 metres on a single stretch is allowed open at a time per site of work, cabinet, or main duct. This length is subject to modification to suit the requirements of the Road or Local authorities, or Mauritius Telecom.

6.1.55 Open Holes, Pole Erection And Manhole Construction

Poles are to be erected, ahead of trenching and duct laying works.

Holes for pole or trenches for manhole construction shall not be abandoned due to difficulties of various nature or left open for a period longer than is required for the satisfactory performance of the work.

Barriers, rods, warning signs, lamps etc have to be maintained as long as works are still in progress.

6.1.56 Removal Of Earth, Stone And Unused Materials

Excavated soil and stone shall be dumped along the trenches during excavation in such a way that they neither restrict the use of entrances, passages, pavements or roads by pedestrians and vehicles, nor obstruct culvert or drain. Where such problem is observed, Mauritius Telecom's representative shall require the Contractor's works representative to cart away the excavated soil as excavation progresses.

Extra earth, stones and unused materials shall be carted away once backfilling or any other item of work is completed. The road pavements, drains, gutters and bridges shall then be cleared and cleaned.

6.1.57 Stacking Of Aggregate, Spall, Sand Etc On Site Of Work

Materials required for backfilling, manhole construction or road reconstruction, shall be stacked at one place, or at few convenient places in the vicinity of the location of work. Dumping of such materials on roads, and on pavements is inconvenient to the residents in the area, and a source of danger to pedestrians and vehicles and shall not be allowed by Mauritius Telecom's representative.

6.1.58 Temporary Access For Pedestrian And Vehicles, Etc

The Contractor shall maintain access to private and business premises, and normal traffic flow by means of wooden and steel bridges during excavation along or across roads. These bridges shall be of sufficient strength, and of adequate shape and size so as to be hazard-free for pedestrians, and other road users.

The dimensions of wooden bridge per unit:

Width	=	100 cm
Length	=	(Width of trench + 100) cm

The dimensions of steel plate per unit:

Width	=	300 cm
Length	=	(width of trench + 100) cm
Thickness	=	1.6 cm

6.1.59 Safety Measures To Be Observed By Contractor

(a) Rods linked with fluorescent warning tapes and barriers are provided for the fencing and isolation of uncompleted works and other related obstruction from portions not affected by the works for the safety of pedestrians, motorist and other road users.

(b) "Reduce speed 15 KM/H", "TELECOMMUNICATIONS WORKS AHEAD" and "SINGLE LANE TRAFFIC", signs with reflectorized red and white paints are placed at 50, 100 and 150 m respectively at both ends of the works on the side of the traffic flow to give clear warning to motorists:

(c) "STOP–GO", "DIVERSION", "NO ENTRY" signs are provided for the channelling of traffic.

(d) Beacon flashers at both ends of the works and at intermediate positions as required are provided at night and during hours of darkness to maintain visibility of the site of work.

(e) Watchmen are provided during non-working hours and at night to ensure that security is maintained at all times.

(f) The signs and fences of specified dimensions and designs are provided in the necessary quantity so as to be effective and are approved by the competent authorities.

Further details are provided in Annex 9 Traffic Control.

Annex 9 Traffic Control

6.1.60 In Absence Of Standard Precautionary Measures

Failure to provide the safety measures to the specifications of the Road Authority and Mauritius Telecom, during both day and night shall cause Mauritius Telecom to apply any of the following measures.

(a) The immediate stopping of further trench excavations, etc

(b) The closure of the site of work.

(c) The deduction of an amount equal to Rs 10,000/- (five hundred) per day from contractor's claim, in line with Article 31.

The contractor shall be held responsible for any delay in the completion of the project resulting from such measures.

6.1.61 Notice To Contractor For Sub Standard Precautionary Measures

(a) Attention of the Contractor's works Representative shall be drawn only once for each site of work by Mauritius Telecom's representative during the execution of the project in case the precautionary and safety measures provided are found insufficient, inappropriate or sub-standard.
(b) The contractor shall be required to take corrective action within twenty-four (24) hours.
(c) Failure to take necessary corrective action within the defined period shall cause Mauritius Telecom to apply any of the measures mentioned at Clause 3.16.

6.2 Construction of micro ducts systems.

This task consists of the construction of multi-tubular micro duct systems and includes the trenching, underground duct laying, backfilling, manholes construction, reinstatement and other associated works.

All specifications in section 6.1 shall apply for micro duct systems, the major difference being the trench specifications provided in Annex 10.

Annex 10 Specifications Micro Duct Trench

HDPE pipes of diameter 33 mm and/or PVC pipes of diameter 45 mm shall be provided by Mauritius Telecom for the construction of the microduct systems.

Chapter7 Maintenance of FTTX Network

Maintenance of FTTX Network is related to the execution of Curative maintenance (faults) on around 56,000 existing FTTX customers' lines and around 7,900 FTTX (ODN) interventions and associated works, across the island, per year.

Based on a daily average clearance of 10 faults per team, the successful bidder shall, at all times, mobilise a minimum of 19 teams for the execution of this particular work in this contract.

Mauritius Telecom will ensure that sufficient works are given to the Contractor/s on a monthly basis so as to meet the total amount for works as per the Bill of Quantities. The quantities for works, in the Bill of Quantities, are indicative of the extent of works expected.

Mauritius Telecom reserves the right to split the Tender between two or more contractors. In case the Tender is split, the quantity of works to be given to any contractor shall be divided accordingly.

7.1 Overhead Curative Maintenance Works

7.1.1 Procedure for fault-clearing

The Contractor will be issued with lists of existing customers having reported their lines / services faulty, on a daily basis, from Monday to Sunday.

Additionally, lists of appointments taken with existing customers, having reported their lines / services faulty, will be issued on a daily basis, from Monday to Sunday. The contractor shall, at all times, meet these appointments.

The Contractor shall be required to perform the following works: -

- Testing of customers' lines & all services, including Cat5/6 cabling, MT extensions and CPE's.

- Localise fault(s) on customers' lines (whether overhead, underground, in conduit, in trunking etc.), internal fibre (whether in conduit, in trunking etc.), MT extensions / Cat5/6 cabling / CPE's.
- Clear faults by repairing, renewing or replacing faulty components / parts, splicing broken fibres, reconfiguring of CPE's whenever required, as per standard work practices and technical specifications and restoration of all services.
- Removal of unnecessary / unused accessories.
- Recovery of faulty components / parts.
- Repair, renew or replace FDP accessories and ensure proper termination of the fibres, wherever required.
- Inform all customers prior to the intervention on their lines and seek necessary authorisation for accessing their premises.

For validation of fault clearance, the Contractor shall perform the appropriate operations on Tablet after having tested the line / all services for any malfunction immediately following fault-clearance on site. The contractor shall also provide the following:

- Cause of fault.
- Location of fault.
- Results of tests performed.

The tests must be carried out as per below-mentioned procedures:

- The Contractor shall disconnect any terminal equipment on the repaired line and have the line tested using N2510 / PON OTDR / power meter.

- If line is found conforming to technical specifications when tested, then the Contractor shall reconnect the subscriber's terminal equipment and existing private extension, ensure that all services are functioning properly and provide all necessary details of works performed and materials used while closing work order on tablet.

- If any defects are found after testing, then the Contractor shall disconnect the line on the FDP and test the line using OTDR equipment and a power meter.

- If the defects have been located on the overhead section by the Contractor, then the Contractor should check all the works performed and make necessary repairs / replacements to clear out the defects. Then new testing shall be performed again as described above until no defect is detected on the line attended by the contractor.

- If no defect is found on the line, but services are still not functioning properly, the contractor shall liaise with the CMC/CSL for appropriate troubleshooting until all services are restored.

The line shall be deemed to have been repaired after these tests have been carried out successfully and corresponds to the standard parameters set by Mauritius Telecom, and all the services functioning properly.

Subsequent complaints from customers about quality of works performed or fault repetition shall carry a penalty per complaint as per Article 31 and shall be re-attended by the contractor free of charge.

The Contractor shall submit a form indicating: -

- The customer's name and address.
- The network records including Optical Cabinet, FDP and FDP Port Number.
- His Telephone Number.
- Nature of fault reported.
- The type and quantities of works carried out.
- The type and quantities of materials used.

7.1.2 Attending customer premises:

Technicians attending customer's premises shall be well groomed and shall abide to the following requirements:

- Wear uniforms apparel with Mauritius Telecom contractor logo
- Well shaved
- Shall not wear any earrings, piercings
- Shall not wear slippers. Shall wear shoes at all times.
- always show the ID cards provided by Mauritius Telecom clearly to customers.
- should be polite and conversant in French, English, Creole and Bhojpuri.
- shall exercise extreme care when carrying out works.
- shall protect customers' assets like furniture, carpets, paint, building.

- shall never use customers' assets like ladders and/or phone to make calls.

The contractor's vehicles shall be branded with appropriate logos, tag lines and any other hoarding/advertisings approved by Mauritius Telecom. Further details on the branding and advertising of the vehicles shall be mutually agreed by Mauritius Telecom and the contractor before execution of works. Vehicles should be clean and in a reasonable condition. The Employer may request the contractor to remove any vehicle(s) should it consider that such the vehicle(s) is (are) not appropriate.

7.1.3 FTTH Network Overview

7.1.3.1 ODN Network

Scenario 1

Each fiber from the exchange (GPON equipment) via an optical distribution frame (ODF) is split up to feed 16 customers using optical splitters. A first level split (1:2) in ODF, located in exchanges, is followed by the second splitter (1:8) installed in a pole mounted optical distribution point.

Scenario 2

A first level split (1:8) in dome closure, located in manhole, is followed by the second splitter (1:8) installed in a pole mounted optical distribution point, hence feeding 64 customers.

The feeder and distribution sections are underground (ducted) whereas the drop section is aerial. A maximum of 288-core cable will be installed in the feeder section whereas the distribution and optical DPs will be served by 96-12 core cables and 4 or 2-core distribution cables respectively.

A transition box connects the outdoor optical drop cable to the indoor optical wiring through a fusion splice. An access terminal block or optical socket connects, via a patch cord, the ONT to the in-house optical wiring. Aerial drop cable and indoor optical cable shall carry only a single optical fiber. SC/APC connectors are deployed throughout the optical distribution network.

Figure 4 provides an overall picture of the FTTH deployment scenario – the various optical components to be used. It is worth noting that the drop fibre cable of various lengths shall be pre-connectorised at only one end with an SC/APC connector. Likewise, indoor cable shall be terminated with access terminal block at one end. A transition box shall be used to store the fusion splice that shall be carried out between the drop cable and indoor cable.

Armoured patch cords of SC/APC type shall be used to connect the Access Terminal Block to the Optical Network Terminal.

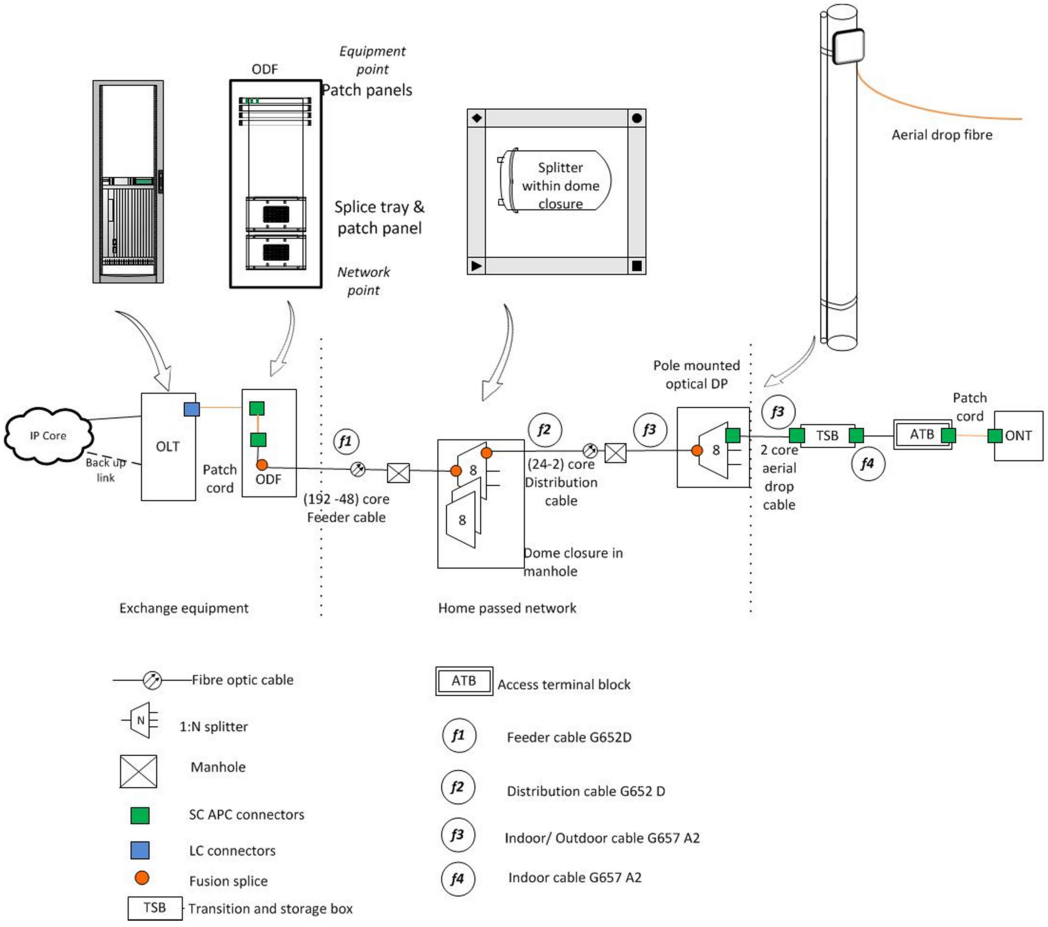

Figure 5 FTTH deployment ODN scenario

The Figure 4 above provides a big picture of the FTTH deployment scenario – the various optical components to be used. It is worth noting that pre-connectorized drop fiber cables with various lengths ranging from 20 to 200m will/may be used. Likewise, pre-connectorized indoor cable,

with access terminal block at one end and a SC/APC connector at the other end will be used. A transition box together with storage space to house extra fiber lengths from the indoor cable as well as from the drop fiber will/may be required. An SC/APC adapter, within the transition box will be used to connect the drop fiber with the indoor cable.

Patch cords (one for each port) from GPON equipment (OLT) will be connected to patch panels on ODF (equipment parking bay). Access feeder cable will connect the outdoor splitters to the ODF patch panels (network parking bay) via pigtails. GPON equipment ports will be connected to the access feeder cable via patchcords.

7.1.3.2 Customer Network

Figure 5 below provides an overview of the FTTH home deployment scenario and the various components to be installed. Connectorized single core drop cable with SC/APC connectors at both ends connects to a fiber distribution point (FDP) at one end and may have a Storage Transition Module (STM) at the other end. Drop cable length ranges from 20m to 200m.

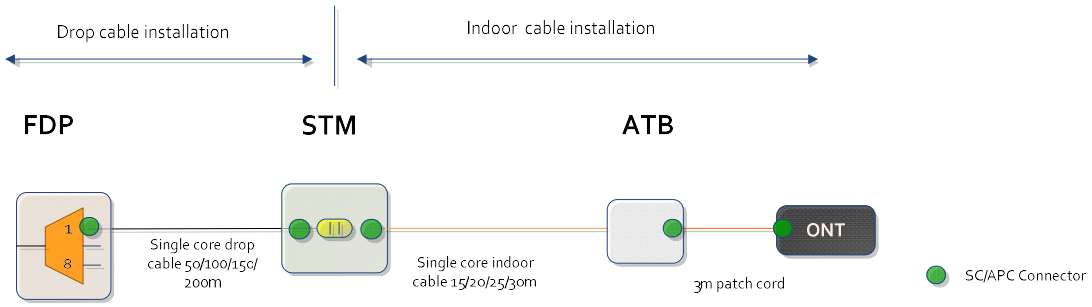

Figure 6 Diagram Customer Network Overview

Likewise, connectorized indoor single core cable, with a single port access terminal block (ATB) at one end and a SC/APC connector at the other end is used to connect to an optical network terminal (ONT) via a patch cord at one end and to the transition storage module at the other end respectively. Indoor cable length ranges from 5m to 30m in step of 5m. In some cases, the outdoor wall-mounted STM storage houses both extra drop cable and indoor cable lengths. It acts as a transition point between the outdoor and indoor cabling. An SC/APC adapter, within the STM, connects the drop cable to the indoor cable. One ONT FE port will be connected via UTP cable to the customer's laptop or computer for internet access; another FE port will be used for

connection to a set-top-box for IPTV and VoD service. POTs ports on ONT are used for voice service where applicable.

7.1.3.3 Customer Network Materials & Equipment

7.1.3.3.1 Storage & Transition Module (STM)

The Transition and storage box shall be used to store excess lengths of fiber from the pre-connectorized drop fiber as well as the pre-connectorized indoor fiber cable outside the building (external). It is the transition point between the drop fiber and the indoor fiber

The proposed transition box shall support the following features:

- be wall mounted (external)
- shall provide two cable entry ports for cables diameter of up to 15mm
- two SC/ APC adaptors to connect 2-core drop fiber cable to indoor 2-core fiber cable
- accommodate up to 50 m of fiber cables.
- be of light colour, preferably white, ivory or pale cream

Figure 6 below shows a 20 m storage capacity STM

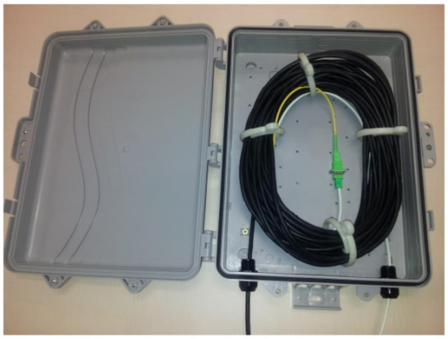

Figure 7 Picture STM

7.1.3.3.2 Transition Box (TB)

The Transition box shall be used to house the splice between drop fibre and indoor fibre outside buildings (external). It is the transition point between the drop fiber and the indoor fiber.

The proposed transition box shall support the following features:

A. Be wall mounted (external)
B. Shall provide two cable entry ports for cables diameter of up to 15mm
C. Be of light colour, preferably white, ivory or pale cream

Figure 8 Picture TB

7.1.3.3.3 Access Terminal Block (ATB)

The access terminal block shall support the following features:

A. Be of light colour, preferably white or ivory
B. Shall consist of two ports which can accommodate two standard SC/APC optical fiber adaptors for patch cord exit.
C. Shall allow fast and easy installation and a removable cover for easy access
D. Shall allow cables to enter from rear, bottom or top of the box.
E. Shall support connector laser protection for security purposes (flip mechanism)
F. Be of fire resistant rated material

G. Shall be supplied with all required fixing accessories

H. Be of maximum dimensions of 100mm x 100mm x 25mm

7.1.3.3.4 Poles Accessories & Indoor Materials

If MT provides this box, why we give the drawings here?

Figure 9 Pictures UPB, ACM & Suspension Clamp

Figure 10 Picture Drop cable, Wall hook, Indoor Cable

7.1.3.3.5 Active Equipment At Customer Premises

8.6.1 One unit of Optical Network Terminal and accessories

Figure 11 Picture ONT &STB

7.1.3.4 Installation Tools And Test Equipment To Be Used By Contractor

One unit of PON OTDR for two teams

One unit of PON power meter and light source per team

One unit of fiber cleaning kit per team and inspection microscope (where applicable)

One optical visual indicator per team

Figure 12 Pictures PON OTDR, Power Meter, Light Source

A set of optical cable adapters and reference test cables.

One vacuum cleaner per team (optional).

7.1.4 Installation

7.1.4.1 Drop Cable Installation (Individual Connection)

Drop optical cable run for the home connection shall be surrounded, all along their lengths by a clear cylinder of at least 1.0m free from any branches, twigs or leaves and wind effect needs to be considered.

The overhead customer's drop cable shall be installed in such a way so as to provide a clearance of at least 6.0m from road level when crossing roads or entrances. In all other cases the minimum clearance shall be 5.5m. Maximum allowable sag is 2% depending on span length. Crossing of highways or motorways is not allowed.

Drop cables shall not be installed where vapours, fumes, corrosives, dusts, or other industrial by-products are present without appropriate precautions to protect the cables and subject to approval by Mauritius Telecom.

Drop optical cable shall be run from FDP up to STM. Drop optical cable shall be fixed to all intermediate pole(s), and at customer premises, using anchoring clamps and accessories. The total lengths for typical installations shall not exceed 500m. From the hanging point at customer premises up to Transition and storage box, the drop fiber shall be fixed using fixing clips. The drop cable shall be terminated in the FDP at one end and in the STM (where applicable) or at the next splicing point at the other end through SC/APC connectors.

Selection of drop cable length:

- Survey drop cable installation to estimate maximum length required
- Confirm location of ATB
- Confirm location of STM/ splicing point
- Confirm location of anchoring clamp
- Select best cable path considering positioning of anchoring clamp/s and wall hook/s on customer premises to ensure that minimum extra drop cable (less than 15m) is stored into STM if applicable.
- Select drop cable length required based on estimated length – 20m to 200m

Note drop cable length selected and rough length of extra cable stored in STM in commissioning sheet where applicable

Drop cable connection into FDP

- Install anchoring clamp, UPB and accessories while referring to manufacturer's instruction
- One UPB shall accommodate up to 3 anchoring clamps
- Remove rubber grommet at relevant cable entry port of FDP
- Only remove drop cable connector cap at time when cable will be inserted into FDP
- Insert (with precaution) about 0.5m of drop cable (yellow part) into the FDP
- Insert drop cable (black part) in rubber grommet at the cable entry port of the FDP
- Clean the SC/APC connector where applicable with a suitable solvent and a lint free pad
- Arrange extra drop cable (yellow) in the tray
- Connect drop SC/APC connector to first (topmost adapter) or next consecutive free SC/APC adapter; note FDP port taken, associated FDP name and customer data
- Drop cables shall be properly labelled (1-8) based on their order on the adapter tag-block
- Use tie cables (with precaution) to organize without strain the drop cables (yellow part) inside the FDP
- Close FDP and ensure box is correctly closed to prevent entrance of water and dust particles
- Ensure that all FDP port entries do have their rubber grommet

7.1.4.2 Indoor Cable Installation

The subscriber cable shall run from the outdoor wall-mounted STM (where applicable) to the customer's Access Terminal Box through trunking / internal conduit or glued on the wall. Part of subscriber cable used outdoor must be installed in trunking.

Subscriber cable shall be routed and protected from moving mechanical or physical contacts, such as foot or vehicular traffic. Subscriber cable shall be free from tension at both ends. Cable run on wall surfaces shall be neatly laid and securely fixed along the run to prevent sag or accidental displacement due to vibration. The subscriber cables shall be fixed using clear glue with high bonding capacity for heat-sensitive material. Also, cable can be stapled against the wall

with fixing clips (C1, C2 etc.). Although subscriber cable is a bend optimised cable and can withstand bends with low radius, care shall be taken by Contractor to avoid multiple sharp bend (90º) at edges and corners to minimise cable power loss. It is recommended that 45º to 60º bend be used along subscriber cable installation routes where practical.

7.1.4.3 Access Terminal Block Installation

- Survey of indoor cable installation to estimate maximum length required.
- Select indoor cable length needed based on required length: 5m-30m
- Select location of ATB considering:
- That the shortest extra indoor cable is to be stored in STM (where applicable)
- That it should allow easy maintenance
- Select cable entry routing into ATB – rear, bottom/ top or sides of the box
- As specified by customer
- Providing most practical installation
- Follow manufacturer's manual for installation of ATB
- Ensure that connector flip mechanism (laser protection) is working for security purposes.

7.1.4.4 Storage Transition Module (STM)

- Install STM on a wall to ensure that shortest extra drop and subscriber cables cable are stored into the STM
- Install and organize extra drop and subscriber cables (less than 15m) into the STM
- Keep the largest diameter cable loops as practical in the STM to reduce optical power loss.
- Connect drop cable to subscriber cable using in-built adapter

7.1.5 Testing Procedures and methodology

7.1.5.1 Outdoor and Indoor cables Installation

Visual Inspection using visual fault locator:

- Connect one cable end to the light source
- On the other end of cable, check if the light is visible or not
- If light is not visible, check cable for bends and stresses; replace cable if necessary

7.1.5.2 Home Connection installation power measurement

During testing the following must be observed in order to get accurate results:

- Ensure that all measuring equipment are calibrated.

- Ensure that the connectors are cleaned each time they are used and the same reference cables are used. The reference cables used shall be of the highest quality (e.g. factory terminated). The quality of the reference cables shall be frequently tested. One end of the reference cable shall be terminated with the type of connector on the meter while the other end shall be SC/APC connectors.

- The mating adaptor used shall also be of highest quality and always stored in dust-free containers.
- The testing shall be carried out at 1310nm and either 1490nm or 1550nm. A dead-zone box is required for OTDR troubleshooting because of the short length of the home connection span.

- The test shall be started only after ensuring that the optical source output has stabilized after switching on the source. This time is to be taken from the manufacturer's equipment recommendations.

7.1.5.3 Tests

7.1.5.3.1 PON power measurement (bi-directional testing)

1. PON power measurement at wavelength 1310nm from ATB port to drop cable end connector
2. PON power measurement at wavelength 1490nm or 1550nm from drop cable end connector to ATB port.

Power loss measured in home connection installation shall be less than 2.5 dB

7.1.5.3.2 PON OTDR measurement

Span Signature and optical reflection loss measurement (bi-directional testing)

End to end OTDR test (manual or automatic) from the exchange (ODF) is to be carried out to obtain FTTH network span signature as well as the optical reflection loss (where applicable).
End to end OTDR test (manual or automatic) from the ATB is to be carried out to obtain FTTH network span signature as well as the optical reflection loss (where applicable).

Troubleshooting

If power loss is greater than 2.5 dB – OTDR measurements are carried out to identify loss due micro or macro-bending using higher wavelengths (e.g. 1625nm).

ONT received power level

Once ONT is registered, actual power received by ONT can be noted by:

1. Calling CMC to record observed received signal level on NMS
2. Looking at the received signal level in the ONT

Observed ONT received power shall be more than -28 dBm.

7.1.5.3.3 Tests Results

The OTDR waveform/s and power measurements results (soft version) shall be submitted to Mauritius Telecom (CMC) for each fault cleared.

Calibration certificates of measuring instruments shall be submitted to Mauritius Telecom at the outset of the project.

OTDR Installation Tests

Power loss measurement (OLTS) and PON OTDR tests:

- From GPON port/ODF to 1st splitter
- From GPON port/ODF to 2nd splitter
- From GPON port/ODF to FAT
- From GPON port/ODF to TB
- From GPON port/ODF to ATB

All OTDR waveforms must be saved and available on NICE network inventory and GIS (document application)

Acceptance test ranges

a. End-to-end optical power loss range: 15 - 25 Db

b. Component loss
    - Splice loss range: 0.1 - 0.3 dB
    - Connector loss: 0.1- 0.3 dB
    - Fiber loss/Km: 2.0 - 3.5 dB

c. Splitter loss
    - For 1:4 splitters: < 7.5 dB
    - For 1:8 splitters: < 10.3 dB
    - For 1:16 splitters: < 13.5 dB

7.1.6 ONT Configuration & Service Testing

Install and power on ONT as per ONT HG8245T manual and Huawei Installation Guide.

Check ONT status indicators as listed below and act accordingly:

- POWER led green light: electrical Power On
- If not good – replace ONT
- Blinking LOS led: Insufficient optical power
- Check installation and inform CMC
- LOS led OFF and PON led OFF: No connection with OLT
- Check installation and inform CMC
- LOS led off and PON led ON: ONT registered and connected
- OK
- ICMC to be contacted for submission of ONT ID for configuration of service profiles onto ONT based on customer's order
- CMC to be contacted for setting up of Internet access service - for login data -Username and password

ONT Ports Allocation For Services Delivery Are As Follows:

a. LAN1: Internet Access service
b. LAN 2: IPTV and VoD service
c. LAN3: free or SIP service
d. LAN4: free
e. POTS ports: PSTN Voice service

Connect relevant devices to ONT as per Huawei Installation Guide

a. Configure Internet Access on PC or laptop
b. Configure STB and check channels
c. Configure Wi-Fi service – new WEP key
d. Ensure that new WEP key is entered on all existing devices

Fill FTTH order completion form and have it signed by customer

7.1.7 Items To Return To Stores

The following items are to be returned to Mauritius Telecom Stores

- Drop cable connector caps (2)
- Indoor cable connector cap (1)
- Indoor cable box or plastic package
- STM box or plastic package
- STB and power cord (where applicable)
- Existing modem and power cord–livebox (where applicable)
- UTP cables (optional)
- ONT box
- Any other materials which remain after the installation

7.1.8 Glossary

ATB: Access Terminal Block

FDH: Fiber Distribution Hub

FDP: Fiber Distribution Point

PON: Passive Optical Network

ODF: Optical Distribution Frame

ODN: Optical Distribution Network

ONT: Optical Network terminal

OLT: Optical Line Terminal

STB: Set-Top-Box

STM: Storage Transition Module Installers equipment

TB: Transition Box

7.1.9 Overhead Materials Supplied by MT

This section contains the list of materials to be supplied by the Employer and their Technical Specifications.

- Drop Cable 1 core SM G.657A pre-connectorised with 1 SC/APC connector at one end.
- Indoor Cable FR LSZH 1 core SM G.657A pre-connectorised with one SC/APC connector on one end and ATB with a single port on the other end.
- Cat 6 cable
- RJ45
- Tespa Band and Accessories
- Ega Tube 45 mm Φ
- Anchoring clamps
- UPB with accessories
- Transition Box with Storage (STM)
- Access Terminal Box (ATB)

Specifications for Category 6 cable, UTP

Applications Standards

- - IEEE 802.3-IEEE802.5 - EN 50288-1
- - FDDI - EN 50173
- - ATM - ISO/IEC 11801
- - RNIS - TIA/EIA 568
- - IEC 61156-5

Characteristics

- Maximum pulling tension (N) 80
- Minimum bend radius during installation (mm): 40
- Minimum installed bend radius (mm) 20
- Nominal weight 30 kg/km
- Temperature rating (°C)
- Installation 0 to +50
- Operation -20 to +60
- Fire retardant IEC 60332-1

- Halogen free (LSOH versions) IEC 60754-1
- The grey sheath has length marking which is easy and convenient for the installer and gives a clear identification of cable and link lengths.
- A polyester tape between the sheath and twisted pairs allows easier stripping.
- Excellent electrical performance - tested to 250 MHz
- Length markings on the cable sheath
- Low smoke, zero halogen (LSOH)

Electrical characteristics at 20º C:

- Conductor resistance at 20° C (max.) 98.6 Ω /km
- Dielectric strength at 50 Hz 1 kV/1min
- Insulation resistance (min.) 5000 MΩ/km
- Velocity (nom.) 66%
- Characteristic impedance from 1 to 100 MHz 100 +/-15 Ω
- Mutual capacitance (nom) <55 pF/m
- Propagation delay skew 10 ns/100 m

7.1.10 Indicative List Of Tools & Equipment Required

One tool or one set is required per team as per list provided in section 3.1.3.

7.2 ODN Curative Maintenance Woks

This part of the tender concerns the repair and maintenance and testing of the FTTB/H/M, more precisely from the splicing Optical Distribution Frames (ODFs) to the Optical DPs and customer premises in some cases. Potential bidders should take note that:

The repair and maintenance works should be according to ITU standards Recommendation L.35 related to FTTB/H/M works.

FTTB/C/H/M repair and maintenance shall also comply with the following standards:

- TIA 455

- TIA 526
- TIA 568
- TIA 569
- TIA 590
- TIA 598
- TIA 607
- TIA 640
- TIA 758
- Telcordia GR 198
- Telcordia GR 365
- Telcordia GR 771
- Telcordia GR 1081
- Telcordia GR 3108
- ITU-T L50
- ITU-T L52

Mauritius Telecom shall not accept any delays or poor standard of works resulting from insufficient equipment or tools on site of works. Penalty as per Article 31 will be applied in case of such delays.
An indication of the basic equipment required is listed below in section 3.1.3.

-

Mauritius Telecom will proceed for an inspection of the above equipment prior to the award of the Letter of Intent. In case any discrepancy found, the contractor will be required to take immediate remedial action so that the contract could be awarded.

7.2.1 ODN Acceptance

The following documents are required from the contractor for Acceptance of the completed network in one complete set per order in soft and paper within 2 weeks after completion of the order. PAC will then be issued after verification and approval of same.

7.2.1.1 Signed Acceptance Sheet for Optical Network repaired

- The acceptance sheet is a summary of all activities done in the order received. This includes from pulling of cable up to the testing of core fibers.
- This also includes the acceptance of the completed work on site for tidiness.
- All complaints & solutions concerning the order should be highlighted so that corrective actions could be taken to prevent such occurring.

7.2.1.2 Network Tests Results

- The completed optical network loss should be compared to calculated loss budget including cables loss, splice loss, connector loss and splitter loss.
- The optical power attenuation tests shall be performed by both the OTDR and the Power Meter/Light source methods, the latter method is used to ensure that split splicing has not been done (Core No=x connected to Core No= not x in another cable section).
- As applicable tests shall be carried out using 1310 nm, 1490 nm, 1550 nm and 1625 nm wavelengths together with the OTDR trace.
- Return loss also should be tested.
- Results should be provided for each and very core fiber installed and terminated.

7.2.1.3 Splice Loss Table

The table should provide the loss at each splice for every core spliced with a maximum loss of 0.05dB per splice. The core colours should also be provided.

7.2.1.4 Plate Organization in Closures and ODF

The fiber core organization inside closures and optical distribution frames should provide details of each and every cable installed, division of tubes and splitters installed in the network.

OTDR trace/Light Source & Power Meter readings

The captured OTDR trace, else, light source & power meter readings for ALL Optical DP ports at output of last splitter should be provided with details of cable length, attenuation, reflection,

location of splitters and events over the completed networks. The OTDR traces or light source & power meter readings should be done at 1310nm, 1550nm and 1625nm.

7.2.1.5 Photographs Of Repaired Network

The contractor shall use tablets to take photos of affected network before and after the repair done. These photographs shall be uploaded onto a centralised system as provided by Mauritius Telecom. They will be used for acceptance and commissioning of the installed network.

7.2.2 ODN Materials

The materials listed below shall be supplied by Mauritius Telecom for ODN maintenance. Any other items required for ODN maintenance shall be supplied by the contractor.

Distribution & overhead cable 2 core
UG Duct 4 core
UG Duct 12 core
UG Duct 24 core
UG Duct 48 Core
Fire Retardant 48 Core
UG Duct 96 Core
UG Duct 144 Core
UG Duct 228 Core
Aerial 4 core
Aerial 12 core
Dome closure to include 1:8 splitters
Closure T0 10 entries
Closure T1 10 entries
Splice protectors

Optical DP to include one unit of 1:8 splitter

Optical DP to include two units of 1:8 splitter

Anchoring clamps for pole

Suspension clamps for pole (aerial cable)

Cross arm for multiple suspension clamp

UPB Pole clamps-accessories

Straight closure 4 entries (48C)

Straight closures with 6 entries (48C)

Straight closures with 8 entries (96C)

Straight closures with 8 entries (144C)

Straight closures with 8 entries (288C)

Galvanised Pipes 1" (unit of 3 m)

Galvanised Pipes 1/2"(unit of 3 m)

Tespa Bands 20mm (Roll 30m)

Tespa Buckles 20mm

Ega tube 45mm

PVC Bends 45mm

PVC sleeve/ socket 45mm

PVC Pipe Ø 45 mm

PVC Pipe Ø 60 mm

PVC Pipe Ø 80 mm

PVC Pipe Ø 110 mm

Patch cord SC /PC - SC/APC

Patch cord SC /APC - SC/APC

7.3 ODN Emergency Repair Works

Emergency Repair Works consists of the restoring of services on fibre optic cables after damages/ theft/ vandalism/relocation as quickly as possible in order to minimise outages on services provided by Mauritius Telecom. The works comprise of the following main tasks for the FTTX network:

7.3.1 Works Specifications

Works specifications in Section 7.2 ODN Curative Works shall also apply for ODN Emergency Repair Works.

7.3.2 Procedures and Time to Repair

The Procedure and Time to Repair are defined in Section 1.4 Emergency Repair Works of the FTTH ODN Network

The main requirements are summarized below:

1. Attending the site of the damage which may be located anywhere in Mauritius within 1 hour after notification by Mauritius telecom representative with all materials and labour required to perform the task.
2. The service outage is required to be restored within 2 hours after attending the site.
3. Notification for repairs will be requested at any time of the day or night as the case may arise.
4. The contractor should provide the service 24 hours/day, 365 days per year including public holidays and Sunday.
5. The contractor will be required to attend the damage sites under adverse climatic conditions unless prohibited by local laws.
6. In addition to the above tasks the Contractor shall be responsible for the repair of cable in the fronthaul for International Transmission Network. The fronthaul is defined from the cable landing station to the beach manhole (BMH) located on the beach. There are two cable landing stations in Mauritius namely at Baie Jacotet and Terre Rouge. Mobilization of adequate resources onsite within one hour after formal request from MT.

Chapter8 Pole Works

The scope of work for pole works - pole planting & recovery is as follows::

8.1 Pole Planting

- The Contractor shall have to collect the poles to be planted in stock yards that will be indicated by MT and bring the pole to the site to be planted by his own means of transport and equipment. Site and location plan for pole planting will be provided by Mauritius Telecom or supervisor will accompany contractor.

- The Contractor shall have to dig hole to the required depth and width as given in the specifications. For digging the hole, the Contractor shall have to use his own tools and equipment.

- The Contractor shall plant the pole and back-fill the hole as per the specifications provided by Mauritius Telecom and shall ensure that the works are done according to safety regulations.

- After planting of pole, the Contractor shall remove all debris and clean the site to the satisfaction of Mauritius Telecom.

8.2 Pole Recovery

- The Contractor shall recover unused poles as per site plans given by Mauritius Telecom and transport it back to the stockyard of Mauritius Telecom.

- After removal of pole, the Contractor shall ensure that all debris are removed and the site is clean to the satisfaction of Mauritius Telecom.

8.3 Straightening Of Pole

- The Contractor shall make upright a leaning pole.

- The Contractor shall have to remove the soil and rocks around the pole base and put the pole straight. The contractor shall block the pole with soil and blue rocks and compact the soil around the base till the pole is firmly blocked to the ground.

- The Contractor shall remove all debris and clean the site to the satisfaction of Mauritius Telecom.

8.3 Civil Works (Off & On Road – Asphalted And Non Asphalted)

The Contractor shall carryout excavation work to extend the existing PVC duct to a newly displaced wooden pole.

The Contractor shall dig a trench to the required length and depth, lay PVC pipe and fix PVC bend at the base of the pole. The contractor shall backfill the trench back to normal.

- The contractor shall execute the civil work according to the specifications and safety regulations provided by Mauritius Telecom.

- The Contractor shall remove all debris and clean the site to the satisfaction of Mauritius Telecom.

8.4 Fixing Back Of Existing Items On Pole With DP & FDP Box

Upon replacement of pole with DP/FDP, the Contractor shall fix back all the accessories e.g. the numbering plate with nails, the galvanised pipe, ega tube, tespa rings, pole bracket, DP and FDP box etc on the pole, as before and connect the existing drop wire and drop fiber and carry out the

8.5 Fixing Back Of Existing Items On Pole Without DP & FDP Box

For the replacement of a pole without DP/FDP, the Contractor shall fix back all the accessories e.g. the numbering plate with nails, the galvanised pipe, ega tube, pole bracket, tespa rings with tespa band on the pole as before and connect the existing drop wires, fibre drops & aerial cable (both copper and fibre) in a permanent way. splicing where applicable. Contractor shall be liable to all damages done to pole and accessories, including splicing.

8.6 Removal Of Advertising Sign Boards From MT Poles

For any pole work, the Contractor shall recover all unauthorised signposts fixed on MT poles as per the list of locations submitted by Mauritius Telecom supervisor and return all the recovered signposts to the scrap yard of Mauritius Telecom.

8.7 Fixing Of Numbering Plates On Pole.

The Contractor shall fix numbering plates (one per pole) on all new wooden poles on site belonging to Mauritius Telecom. The contractor shall fix the plates with 2 galvanised iron nails at a height of 3 m above ground level and shall be well visible to the public. The numbering plates will be supplied by MT.

8.8 Specifications Pole Works.

Please refer to Annex 11 Pole Works.

Annex 11 Specifications Pole Works

Chapter9 Manhole Works

9.1 Scope Of Works

The contractor has to repair, raise and change manhole frames and covers throughout Mauritius as per attached schedule of rates, and specifications and work orders issued.

Drawings having below references are attached:

- M/1807/95 (Annex 12- Appendix to Annex 8 -Specifications for Raising of manholes)
- Structural details of manhole types K1C, K2C, K3C, M1C, P1C, P2C, M5R, D2R, D3R,P2T , L1T, L2T, L3T, L4T, L5T and L6T for reference.

  (a) New sets of frames and covers will be provided by the Employer whenever required.

  (b) The required types of frames and covers will be delivered, at the Employer's store at Rose Belle or Plaine Lauzun, to the Contractor's designated officer by the Employer.

  (c) Transportation of the frames and covers from the Employer's designated store to the site of works shall be the sole responsibility of the Contractor.

  (d) Transportation of the replaced frames and covers from the site of works to the Employer's designated store, after changing have been effected, shall be the responsibility of the Contractor ; these are to be returned in the presence one of the supervisors of that region on Store Form 16 (SF16)

9.2 Instruction To Contractor

Mauritius Telecom shall issue works orders/advice notes to the Contractor for the necessary repair, raising and changes to be effected as per attached standard specifications and drawings. All information including the type and geographical location, of the manhole, to be attended shall be communicated to the Contractor.

9.3 Duration Of Works

The works shall be completed in the span of time mentioned in the works orders/ advice notes and will be calculated in regard to the number of manholes allocated for repair. However, whenever a manhole is advised for urgent repairs, the same should be effected within 24 hours of notice given by the Employer to the Contractor.

9.4 Warranty Of Civil Works

The Contractor is to guarantee good workmanship for a period of twenty four months from the date of completion of the works. Any defect arising due to bad workmanship within the said period of twenty-four months will within reasonable time have to be repaired by the Contractor at his own costs. More than two interventions within warranty period will entail a penalty of Rs 25,000 to the contractor.

9.5 Foreman-In-Charge

The Contractor shall constantly keep upon the site of works a competent foreman-in-charge and any instructions given to him by the Engineer / supervisor shall be deemed to have been issued to the Contractor. Such instructions will be recorded in the Site Diary.

9.6 Provision Of Watchman

The Contractor shall, from commencement to completion of the works both day and night, including Sunday and Public Holidays provide a watchman for the security of the work site.

9.7 Time To Perform Work

All works are to be carried out during working hours (08.00 – 16.00), except for cases of emergency or cases where relevant authorities have specified otherwise.

9.8 Local Consent/Wayleave

Mauritius Telecom Ltd. shall obtain any necessary consent/wayleave from the street authorities and police or any other body or person for the work and shall provide the Contractor with the conditions, if any, attached to such consent so far as the conditions bear to the execution of the

work. A copy of such consent/wayleave is to be available on site during the execution of the work

However, the following will be under the responsibility of the Contractor:

i. Obtaining approval for sign boards and safety measures required from the Traffic Management Unit of the Ministry of Works.

ii. Obtaining authorisation from the National Transport Authority for the temporary displacement of bus stops and traffic diversion required.

9.9 Liquidated Damages For Delay

If the Contractor fails to comply with the time for Completion, the Contractor shall be charged liquidated damages of Rs 10,000 per case till rectification is carried out.

9.10 Procedures Use Of Quick Setting Cement

The contractor shall use quick setting cement from (appropriate supplier) and follow the guide lines given below:

- The ratio of water to cement shall be strictly abide to and is compulsory – 1 bag of 25 kgs for 3 litres of water
- In heavy rain fall, the cement shall be properly protected against washing away / damage using appropriate means like firmly secured metal sheets, prelart / plastic sheets etc…
- Aggregates 6-10mm shall be used instead of the normal 12-18mm and is compulsory.
- Once water has been added to the mix cement and aggregates, the concrete shall be used within 10 minutes else the entire mix should be thrown away.
- No water shall be added to the mix again – compulsory.
- The contractor shall make use of electric / gasoline concrete mixer.
- Reinforcement bars in the concrete surround of manholes shall be according to manhole detail plans.

Constant watch shall be maintained once the concrete has been cast:

(a) The manhole shall be fenced and no vehicle shall be allowed to run on it during its curing time of 4 hours

(b) The concrete shall be protected with wet Hessian tapes (Goni) constantly all through the 4 hours curing time else cracks will be visible on the concrete and undermines the compressive strength of the concrete .

Mauritius Telecom's inspector may ask the Contractor to take test cubes from any batch of site mixed on any concrete work. The equipment necessary for the making of test cubes shall be provided by the Contractor. Testing of the cubes shall be arranged by the Contractor in the presence of MT's supervisor/ inspector.

Works will not normally be delayed while awaiting for
the test report which shall be forwarded to Mauritius Telecom Ltd. or its representative as soon as it is available. The Contractor is to bear the expenses incurred for the test.

The compressive and tensile strengths at 3 days shall be as stipulated in the relevant British Standards. The result shall satisfy the following table:

Compressive Strength		Tensile Strength	
7 days	28 days	7 days	28 days
20 N/mm2	30 N/mm2	20 N/mm2	30 N/mm2

(a) Whether test cubes have been taken or not, Mauritius Telecom's Inspector or Engineer may carry out rebound hammer tests on any concrete work 4 hours following casting.

(b) Casting of concrete should be done in the presence of MT's supervisor; the

- latter will ensure that all works are done as per MT's technical specifications attached.

- The agreement to proceed with the casting of concrete will be recorded in the site diary; such agreement will not be withheld or delayed unnecessarily.

(c) Cutting of asphalt prior to removal of existing surround is to be done by means of an asphalt cutter especially for roads falling under the authority of RDA.

9.11 Warning Signals For Road Users

The Contractor shall comply with Road Traffic Ordinance and the requirement of the Road and Traffic Authorities and should obtain from them the approval for the proposed signalization and safety measures prior to start of works on site. The approval duly received should be forwarded to Mauritius Telecom Ltd. for verification before the start of the works.

Enclosed are standard temporary sign postings detailed as per attached drawings having reference 1904/1/97 & 1904/97 and shall be provided by the Contractor at the site of works.

(a) Rods linked with fluorescent warning tapes and barriers are to be provided by the Contractor for the fencing and isolation of uncompleted works and other related obstruction from portions not affected by the works for the safety of pedestrians, motorist and other road users.

(b) Reduce speed “15 KM/H”, “TELECOMMUNICATIONS WORKS AHEAD” and “SINGLE LANE TRAFFIC”, signs with reflectorized red and white paints are to be placed by the Contractor at 50, 100 and 150 metres respectively at both ends of the works on the side of the traffic flow to give clear warning to motorists.

(c)"STOP - GO", "DIVERSION", "NO ENTRY" signs are to be provided by the Contractor for the channelling of traffic, whenever and wherever required.

(d) Beacon flashers at both ends of the works and at intermediate positions as required are to be provided by the Contractor at night and during hours of darkness to maintain visibility of the site of work.

The signs and fences of specified dimensions and designs, after approval by the competent authorities, are to be provided by the Contractor in the necessary quantity so as to be effective.

The Contractor shall ensure that the temporary sign posts mentioned above are maintained in position during both day & night and any lost or damage of beacon flashes and associated safety equipment due to act of theft or vandalism will not be accepted as an excuse and will be considered as failure on the part of the Contractor to comply with standard precautionary measures.

9.12 Safety Measures By Mauritius Telecom

Contractors are advised that safety measures shall be strictly adhered to. Failure to provide the safety measures to specifications of the Road Authority and Mauritius Telecom Ltd., during both day and night shall cause the Employer to apply any of the following measures.

(a) The immediate stopping of further manhole repair, raising and changing of frames and covers.
(b) The closure of the site of work.
(c) Termination of the contract without prior notice, and the works allocated to other Contractors.

The Contractor shall be held responsible for any delay in the completion of the Works resulting from such measures.

9.13 Specifications For Manhole Construction & Repairs

Annex 12 Appendix to Annex 8 manhole raising

Chapter10 Format Bonds

10.1 FORM OF TENDER BOND (BANK GUARANTEE)

KNOW ALL MEN by these presents that we.....whose registered office is at.....(hereinafter called "The Surety") are held and firmly bound unto Mauritius Telecom (hereinafter called "the Employer") in the sum of Rupees
..... (Rs .....) for the payment of which sum we bind ourselves our successors and assigns jointly and severally by these presents
WHEREAS.....whose registered office is at .....

(hereinafter called "The Tenderer") has, by a Tender (hereinafter called the "Said Tender") made to the Employer offered to enter into a contract, viz.

CONTRACT for the ..... as therein mentioned and has undertaken to enter into a Performance Bond for the due performance of the contract should the said Tender be accepted by the Employer.

NOW THE CONDITION of this bond is such that if the Tenderer shall maintain the said Tender and shall enter into a Contract, including the submission of a Performance Bond for the due performance of the Contract within ten days of the date of notification of acceptance of the said Tender by the Employer, then this obligation shall be null and void but otherwise shall be and remain in full force and effect for a period of ..... days from the date set for opening the said Tender.

Dated at Port-Louis this ..... day of .....

Signature .....

Bank .....

10.2 FORM OF PERFORMANCE BOND

BY THIS BOND WE ..... whose registered office is at ..... (hereinafter called "The Contractor") and ..... whose registered office is at ....
(hereinafter called "The Surety") are held and firmly bound unto Mauritius Telecom (Hereinafter called "the Employer") in the sum of ..... being 10% of the contract value for the payment of which sum the Contractor and the Surety bind themselves their successors and assigns jointly and severally by these presents.

WHEREAS the Contractor by an Agreement made between the Employer of the one part and the Contractor of the other part has entered into contract viz **MT xxx/03/2024** (hereinafter called "the said Contract") for the performance and completion of **Multi Order Maintenance Contract**, therein mentioned in conformity with the provisions of the said contract in the regions as therein stated.

NOW THE CONDITION of the above written Bond is such that if the Contractor shall duly perform and observe all the terms, provisions, conditions and stipulations of the said contract on the Contractor's part to be performed and observed according to the true purpose, intent and meaning thereof or if on default by the Contractor the Sureties shall satisfy and discharge the damages sustained by the Employer thereby up to the amount of the above written bond then this obligation shall be null and void but otherwise shall be and remain in full force and effect but no alteration in terms of the said contract made by agreement between the Employer and the Contractor or in the extent or nature of the works to be construed, completed and maintained thereunder and no allowance of time by the

Employer under the said contract nor any forbearance of forgiveness in or in respect of any matter or thing concerning the said contract on the part of the Employer shall in any way release

the Surety/Sureties from any liability under the above written Bond. The Sureties shall only be excused when the principal for which they stand as Sureties is by law excused and in no other case.

The above bond shall become effective as from the date of issue. It will remain in force for a period of one year as from completion of the works as per the above contract.

At this date, it will be automatically cancelled and will thereafter be null and void irrespective of whether or not the present document is returned to the Contractor.

According to the present bond, the Contractor and the Surety undertake to pay, jointly and *in solido*, any amount up to a maximum of ..... on receipt of the Employer's first demand in writing stating that it has been established under the terms and conditions of the Contract that the Contractor has not fulfilled its obligations.

.....
("Good for the sum of Rupees.....".)

Signed by the said.....

In the presence of:

Name .....

Address .....

Description .....

.....

("Good for the sum of Rupees .....".)

Signed by the said.....

In the presence of:

Name .....

Address .....

Description .....

.....

It is essential that the Contractor and the Sureties should insert in their own handwriting the words "Good for the sum of

.....

rupees" in the spaces provided and date.