RAILTEL CORPORATION OF INDIA LIMITED
(A Govt. of India Undertaking)

NORTHERN REGION

TENDER DOCUMENT

FOR

"SUPPLY & LAYING OF OFC, HDPE DUCT, POWER CABLE, ETC. FOR PROVIDING WIFI SERVICES AT ALLAHABAD & GORAKHPUR RAILWAY STATIONS OF NORTHERN REGION."

Tender No. RailTel/Tender/LT/RO/WiFi works/ALD & GKP/2015-16/20

Cost of the Tender Document : Rs 5250/- & By post Rs 5775/-

RailTel Corporation of India Limited
(A Govt of India Enterprise)
Regional Office: 6th floor, Block-III, Delhi IT Park
Shastri Park, Delhi-110 053

LIMITED TENDER NOTICE

No. RailTel/Tender/LT/RO/WiFi work/ALD & GKP/2015-16/20 **Dated: 12.02.2016**

Regional General Manager/RailTel Corporation of India Limited, Northern Region , Delhi, invites the sealed **Limited Tenders** in "single packet" system from established contractors with proven experience for awarding **"Supply & Laying of OFC, HDPE Duct, Power Cable, etc. for providing WiFi services at Allahabad & Gorakhpur Railway Stations of Northern Region"** as per following details:

Sale of Tender Document	**From 12.02.2016 to 21.02.2016 (From 11.00 Hrs to 17.00 Hrs)**
Last date & time of submission of tender:	**Up to 15:00 hrs. on 22.02.2016**
Date & time of opening of tender:	**15:30 hrs. on 22.02.2016 (If the date of opening happens to be a holiday the tender will be opened on next working day at same time.)**
Estimated Cost of Work :	**Rs. 2951906/-**
EMD :	**Rs. 60,000/-**
Currency of Contract :	**One Year from the date of issue of LOA.**
Validity of offer:	**90 days from the date of opening of tender.**
Cost of Tender Document:	**Rs. 5,250/- (Five Thousand Two Hundred Fifty only) – including VAT and Rs. 5,775/-(Five Thousand Seven Hundred Seventy Five only) – including VAT if required by post**
Note : Tender Document may be obtained between 11:00 hrs to 17:00 hrs from 12.02.2016 to 21.02.2016 from the office of Regional General Manager , Northern Region, Delhi by paying the cost of tender document through Bank Draft in favour of "RailTel Corporation of India Limited" payable at Delhi. RailTel shall not be responsible for late receipt of tender documents for any postal delay, if required by post.	

Tender Notice and Tender Document are available on RailTel's website and can be downloaded from www.railtelindia.com. The cost of Tender document shall, however, have to be deposited along with tender bid in the form of Demand Draft as detailed above.

GM/Project
For Regional General Manager / Northern Region

Check List: (for validity of Tender)

S.NO	Items to be checked	Tick
1	Submit Offer letter complete (Form No 1) duly signed.	Yes/No
2	Submit **Earnest Money in prescribed form**	Yes/No
3	Submit Clause-wise compliance to tender conditions & Statement of Deviations (Form No 5)	Yes/No
4	Submit complete Tender Document each page duly signed & stamped	Yes/No
5	Read all Clauses of **Preamble** Carefully	Yes/No
6	Fill up a single **percentage (%)** (both in figures and in words) in **Tenderer's Offer** given at the end of schedule of Requirement **(SOR).**	Yes/No
7	Cost of Tender Document i.e Rs 5250/- submitted in the form of DD along with the offer.	Yes/No

SIGNATURE OF TENDERER WITH RUBBER STAMP

INDEX SHEET

PREAMBLE

1. **Name of the Work :**

   Supply & Laying of OFC, HDPE Duct, Power Cable, etc. for providing WiFi services at Allahabad & Gorakhpur Railway Stations of Northern Region.

2. **Scope of work:**

   The broad responsibility of the contractor under the scope of work for this tender shall be as under:

   i) Excavation of trenches and laying of HDPE Duct in all types of soils, Road/Rail crossing, in building, clamping etc. & protective works as per technical specifications.

   ii) Back filling and dressing of the excavated trenches according to technical specifications.

   iii) Blowing/pulling of Optical Fiber Cable (24F/6F) with proper tools and accessories as per Technical specifications.

   iv) Installation of Jointing Chambers & Route/Joint Indicators as per technical specification.

   v) Splicing of fibres in Joint closures/FMS and installation of new joint enclosures/FMS.

   vi) Laying of power cables, Ethernet cables in DUCT, PVC conduit.

   vii) Installation of 6/9U rack & UPS at suitable height on platforms with all sorts of angle, nuts etc.

   viii) End to end testing & submission of test results, route diagrams.

2.1 In order to Provide Optical Fibre connectivity for WiFi service at locations of Allahabad & Gorakhpur Railway Stations as and when required. The approximate quantities of different items of OFC related works which are expected to be executed during currency of the contract is given in SOR.

3. The quantities given in the Schedule of Requirement (SORs) are only indicative one to give an idea to the tenderer of the total volume of work, which is expected to be executed in one year of the contract at locations of Allahabad & Gorakhpur Railway Stations. The quantities of SOR will be executed at the rates finalized through this tender from time to time depending on the actual requirements of works in various locations of Allahabad & Gorakhpur Railway Stations through separate Work orders will be issued. Total quantities during the year may vary.

4. Broad responsibility of Tenderer under the scope of work of this tender will be as under :

a) Supply : Supply of all items confirming to industry standards as per Schedule of Requirements and the technical specifications except 24 F OFC & HDPE Duct.

b) Services: Trenching, laying, splicing, termination, testing and commissioning of Optical Fiber Cable for providing Last Mile Connectivity from RailTel POP to different customers of RailTel as per specifications given in Tender document.

5. Tender Bid : The tender bid shall be submitted in a **Sealed Cover** super scribing it with the "Name of Tender" and "Due date of Opening" shall be addressed to :

Regional General Manager/Northern Region
RailTel Corporation of India Limited,
6th floor, Block-III, Delhi IT Park,
Shastri Park, Delhi-110 053

6. <u>Qualifying Criteria:</u> DELETED

7. **Schedule of Requirements (SORs):**

There is **only one SOR** for various locations of Allahabad & Gorakhpur Railway Stations as given in Annexure-I. These are **Schedule items** for which tenderer shall quote a single percentage (both in figures and in words) in the **Tenderer's Offer** given at the end of SOR.

8. Tenderers are required to read the following instructions carefully.

a) Wherever a work arises in various locations of Allahabad & Gorakhpur Railway Stations, the Work order will be issued directly to the contractor during currency of the contract.

b) Validity of the Zonal Contract shall be 1 (one) year from the date of issue of LOA but can be extended for further period of three months on the same terms & conditions. This extended period will be used to complete the balance item of work or for work order given in the $11/12^{th}$ month of the contract.

c) The work awarded to the Zonal Contractor shall be executed as per technical specification of the tender document.

d) The rates of SOR should be quoted in percentage (above, below/at par).

e) After issue of LOA, contractor has to deposit an amount equivalent to 10 % of the cost LOA as Security Deposit/ Performance Bank Guarantee strictly within the period of Fifteen days from the date of issue of the LOA. The Bank Guarantee shall be valid for 4 months beyond the issue of Last FAC.

f) The contractor will advise the issuing bank to send bank guarantee directly to the office of Regional General Manager/RailTel, Northern Region. Similar advise for each BG extensions as and when required by the Bank to be sent by Registered Post directly to RailTel.

g) In case the contractor fails to execute the work in specified time the penalties will be imposed as per the tender conditions. Railtel reserves the right to terminate the work order after issue of 7 days notice. The security deposit submitted by the contractor will be forfeited if the work order is terminated on contractors account. Railtel may also delete the name of such contractor from the approved list of contractor.

h) The time of completion of each work order shall be 30 days or as specified in the relevant work order.

i) Timely completion of the work is the essence of the contract and paramount importance to RailTel and any extension would be considered only in exceptional circumstances.
j) All the tender conditions, mentioned as above, shall supersede any conditions of the main tender document.
k) Liquidated damages shall be imposed at the rate of 0.5 % per week or part thereof (rounded off to the nearest whole number) of the total value of the work order, subject to a maximum of 10% of the value of the work order.

9. Last Date of submission of Tender:

The tender shall be received up to **15:00 hrs on 22.02.2016** in the office of the Regional General Manager / Northern Region, 6th floor, Block-III, Delhi IT Park, Shastri Park, Delhi-110 053.

10. Date of Opening of Tender:

The tenders shall be opened at **15:30 hrs** on **22.02.2016** at the same address as mentioned in para 9 above.

11. Completion Time:

The completion Period of each work order shall be 30 days or as specified in the relevant work order.

12. **Address for Communication:**

All Correspondences and clarifications must be addressed to the:
Regional General Manager/Northern Region
RailTel Corporation of India Limited,
6th floor, Block-III, Delhi IT Park
Shastri Park, Delhi-110 053

13. **Earnest Money:**

Tenderer shall deposit Earnest Money (EMD) as specified below in the form of **Bank draft** in favour of **RailTel Corporation of India Limited**, payable at **Delhi**. The earnest money deposit by the successful tenderer will be kept in safe custody and will be release after the completion of the contract.

SN	Name of Locations	EMD (Rs)
1	Allahabad & Gorakhpur Railway Stations	60,000/-

****

SECTION - I
CHAPTER - 1

PRECAUTIONS TO BE TAKEN IN 25 KV A.C. TRACTION AREA:

1.1 GENERAL

Any Telecommunication circuits in the vicinity of AC Traction running parallel to 25 KV lines are liable to be affected by AC induced voltage. Therefore precautions should be taken to eliminate the possibility of induced voltage affecting equipment and humans.

Crossing of track, if any, should be negotiated by underground cables running at right angles to the track as far as practicable.

Special protective measures (viz. provision of G.D tubes, fuses and earthing etc) are required to be taken for telecommunication lines entering 25 KV sub station /switching posts.

For the human safety considerations the safe working voltages should be 60 V under normal conditions and 150 V with special precautions and 430 V under fault conditions.

Instructions for protection of railway staff/working personals on signaling and telecommunications installations on 25 kV AC traction shall be strictly adhered to. Precautions are required to be taken on account of following,

i) Proximity of live conductor.
ii) Pressure of return current in Rails.
iii) Induction in all metallic bodies situated closed to over head equipment.

****

SECTION - I

CHAPTER - 2

PREPARATION OF AS-BUILT ROUTE PLANS

2.0 SCOPE:

The scope of this is to prepare a final set of As-Built drawings of route plans, based on the actual cable route (which in turn shall be based on a preliminary & approved drawings of route plans, already supplied to the contractor).

2.1 Points to be taken care of for laying the OFC cable:

2.1.1 Avoid underground structures, signaling cable, power cables and pipe lines etc.

2.1.2 Avoid rodent/termite infested or infected side of the alignment.

2.1.3 Offset of the cable trench from the central line of the track such as having burrows.

2.1.4. Avoid proximity to chemical, paper and such other industries which discharge chemically active affluent.

2.1.5 Avoiding areas prone to water logging.

2.1.6 Avoiding large rock cutting/thick jungles and areas difficult to approach etc. The orientation of the route (left or right side of the track in the sections) to be decided on following:-

That side of main line, which is away from coastal side, other cables such as signaling and power.

That side which is likely to involve least track crossings and likely to be more convenient for crossing the track, bridges culverts etc.

Avoid built up areas including those area where buildings etc. are likely to come up in future.

For the straight runs as far as possible a separation of 10 Meter should be kept from the nearest track. This is as per CCITT recommendation K.8.

As a rule a minimum distance of 5.75 M should be maintained between the OHE masts and the cable. In Yards etc. where observance of this rule may be difficult, a minimum distance of 3 Meter should be maintained. In exceptional cases where the cable trench depth is less than 0.5 M the lateral distance may be reduced to 1 M.
Make the route of OFC cable within 1 meter of Railway boundary normally.

2.2 As-Built Cable Route plan.

Based on above actual route, the as-built cable route plan should be prepared:

2.2.1 The name of the location should be put in the 'LOC' column and the change in the 'CH' column. At every 10 cm. the Km. post number should be written and its exact equivalent

change entered in the 'CH' column. The name of station should be shown against the location of the Station Master 's Office.

2.2.2 Based on the route, the serial number and the length of culverts, bridges and level crossings should be marked on the 'Track Line' of the cable route plan.

2.2.3 The actual measurement of the separation distance from the central line of the track (the adjacent main line) is to be shown. This is to be compiled on the 1 Km charts.
The termination plan & locations of joint enclosures of OFC to be shown.

2.3 Preparation of Drawings

All the plans and drawings shall be neatly prepared using Computer Aided Design System & plotter etc. The drawings shall be in A3 size & suitably filed for ease of handling.
Further, a soft copy of Auto-CAD drawings in CD shall be submitted.

2.4 Information in Cable route plan:-

The cable route plan shall contain following information:-

2.4.1 Whether the cable route is on the **up** or **down** side of the Railway Tracks.

Exact locations and lengths where the cable is laid in RCC/DWC/G.I. pipes/ troughs and under the bed on culverts.

Location of track crossing and the number of tracks being crossed.
Location of road crossing and the no. of RCC/DWC/GI pipes provided.
Locations and length for protection of cable in rocky area and platform cutting etc.
Locations of Pull Chambers/Joint Pits.

2.5 DELETED.

2.6 DELETED

2.7 Guidelines for finalization of cable route plan :

2.71 The following are the guidelines for preparation of the cable route plan:
Prepare the " 1 Km charts" as explained above and enter the relevant changes and details in the "1 Km charts" based on the latest copy of approved OHE/Overhead plan supplied to him by the engineer.

2.7.2 Actual measurement by 30 M steel tape or chain along the route is necessary only in case of important locations, to be termed as "special terrains", for example, approach to repeater station/cable hut, long bridges, big yards, sharp diversions in the cable route from its parallel course along the main railway tracks due to obstruction, cuttings etc.

2.7.3 Inspect and decide the portions of route falling in category of "special terrains" stated in para 2.7.2 above, i.e. where actual longitudinal measurement is necessary.

2.7.4 The remaining portions of the route, i.e. other than the portion decided as "special terrain" as per para 2.7.2 above are to be termed as "straight runs". Actual chaining along the route is not necessary for such "straight runs" and these can be marked on the "1 Km. charts" by taking chainages from the OHE/ Overhead alignment plan.

2.7.5 The cable route should be started from a repeater/ cable hut/ station. Actual measurement along the route should be done by means of a 30 M steel tape for a few drum lengths up to a convenient point along the main line where from the distances along the route may be reckoned from the OHE/ Overhead alignment Plan. A termination allowance of actual length (prescribed 5M) of cable inside the repeater station/cable hut building should be, in addition to a length of about 10 M (actual length), kept in a pit just outside the building.

2.7.6 It should be ensured that both "special terrains" and "straight runs" should consist of full drum lengths, so that the position of joints (other than T-Joint) is fixed without difficulty in both cases.

2.7.7 Actual measurements of the separation distance should be done from the centre line of the reference track. In case of 'Special terrains' the separation distance at some points on the route may also have to be reckoned from some other permanent structures depending upon the site conditions.

2.7.8 Once the cables are laid, the chain ages at diversions, crossings, approaches of bridges, Jointing Chambers and Joints/Extra lengths of Optical fibre cables should be clearly marked on cable route plan.

2.8 Length of Optical Fibre cables: -

The approximate cable length is worked out on following basis to arrive at the location of the straight joints: -
Extra length for track crossing including 2.5 meter loop on each side.
Extra length on Approach/crossing of the bridges and culverts as per measurement in the detailed survey.
10 meter of cable to be kept on either side of major steel bridges and 5 meters on minor bridges.
At every Joint Pit a loop of 10 meters on either side of the joint and a loop of 15 meters in the Pull Chambers without joint, should be kept. In cable hut a loop of 10 meters should be kept in the cable pit.

2.9 Protective works for Cable/ Ducts:-

2.9.1 For building, masonry platforms, culverts, crossing of tracks, level crossings and roads etc. special protection for the cables are required. Some of the methods adopted for different types of protective works are specified in the following drawings:-

For Girder bridges M.S. Troughing Drg. S&T/RE/78/2/76 Page 1 & 2 and RE/42/172. (P-103 & 104).
For cable entries to Cabins, ASM's Offices etc. through HDPE pipe Drg.No. RE/S&T/ALD/SK/161/81 (P-118).
For unconsolidated embankments Shoring for the cable trench as per Drg.No. RDSO/TC/35003. (P-112).
For laying cables over the culverts in DWC pipes Drg. No. RE/S&T/ALD/SK/160/81. (P-108).
For laying cables over arch bridges brick channeling Drg. No.RE/S&T/ALD/SK/162/81. (P-117).
For route over rocky area through chase Drg.No. RE/S&T/SK/303/85 withAlteration 'A'. (P-111).
For routes under bed of culverts in DWC pipes Drg.No. RE/S&T/ALD/SK/184/81.(P-109).

For cable laying under railway track Drg. RE/S&T/ALD/SK/159/81 (P-113).
For cable laying under road drg. No. RE/S&T/ALD/SK/497/2000 (P-101)
For Stone/RCC cable route marker drg no. RCIL/NR/01 (P-116).

Note1: In non-RE area, wherever distances are reckoned with reference to overhead alignment, the distances from the nearest KM-post provided along the track, may also be mentioned.

Note 2: If any of the above-mentioned drawings are illegible or not clear, the clarifications may be sought from the office of Regional General Manager, RailTel/Northern Region.

****

SECTION I
CHAPTER - 3

TECHNICAL SPECIFICATION AND INSTRUCTIONS FOR TRENCHING AND LAYING OF OPTICAL FIBRE CABLE AND TELECOM CABLE:

3.1 SCOPE:

This chapter deals with the specifications under which the various work for trenching & laying of optical fibre cable coming under the purview of the contract are to be executed by the contractor.

3.2.1 SUPPLY OF ROUTE PLAN:

Approved Cable Route plan and jointing schedule for mid section splicing of cable will be prepared and supplied by the RailTel This shall give a preliminary idea of the number & locations and the quantities and type of various equipment to be fixed, wired and commissioned.

3.3 INSTRUCTIONS FOR EXCAVATION & BACK FILLING OF TRENCHES

3.3.1 The Representative of Engineer In-charge of the work will mark the route of the cable in white chalk or lime as per the taping and route plan and the instructions given to him by the Engineer, notwithstanding the cable route shown in the tapping and route plan to meet the requirement of local conditions at site, if any and as required shall be taken by the contractor to be final. The contractor shall be present at the time of marking and he shall furnish to the Engineer's representative required quantities of lime, rope, labour etc. for carrying out this work. The marking will be given on the track side of the trench at a distance approximately one meter away from the centre line of the trench. In the difficult terrains such as water-logged areas, the position of the cable route will be specified by off sets from the centre line of the nearest track.

3.3.2 Trenches for Telecom cable shall be dug to a depth of 1.0 meters. The width of the trench shall be adequate at the bottom to accommodate cables and their protection. Normally width of approx. 250-300mm at the bottom is sufficient. In places where underground pipes, electric main etc. come in the way, trenches deeper than one meter shall be dug as necessary and RCC/GI/DWC pipes shall be placed to protect the optical fibre cables.

3.3.3 Metalled, macadamized, concrete and stone paved roads shall also be cut to a depth of 1.0 meter. The cable shall be laid through RCC/GI /DWCpipe as per drg. at Annexure 3.2. **The road surface shall be restored to original.**

3.3.4 Wherever it is not possible to dig trench up to 1.0 meter depth due to site conditions, specific approval of site engineer / engineer's representative should be taken before digging trenches of lesser depth. Similarly where digging of trench for more than 1 meter depth is required due to site conditions, specific approval of site engineer / engineer's representative should be taken before commencing the work. In both cases prorate payments for the items of schedule shall be made.

3.3.5 The bottom of the trench where the cable is to be laid shall be free from any stones. The bottom of the trench shall be horizontal and shall in no case be undulating. When the cable bed changes from solid to soft surface or from the bridge to soft soil, tamped fill at the

transition point shall be provided so that cable is not pressed against the edge of a hard surface.

3.3.6 The brick protection shall be provided, wherever required and instructed by the engineer-in-charge .The contractor shall arrange supply and distribution of second class bricks of standard size at site along the excavated trenches and after uniformly covering the cable laid in the trenches by stone-free sieved soil up to 50 mm height above the cable, he shall arrange to place the bricks flat and position them breadth wise so that on an average 8/9 (eight/nine) bricks shall be laid in a meter length.

NOTE: In order to be certain that the full requirement of bricks has been arranged by the contractor for placing on the top of the cable to be laid on any day, he shall spread the bricks side by side on the top of the trenches before the depth of the trenches are inspected by the authorized representative.

3.3.7 The backfilling of trenches shall be done by tamping and consolidating the excavated soil in layers of 15-20 cm at a time. All the soil that is excavated shall be put back to the trench and care shall be taken in consolidation to ensure that the back filling does not suffer any sinkage in monsoon.

3.3.8 If under unavoidable circumstances, the excavation is to be done between the tracks or between OHE foundation and track, it shall be done to the full depth just before laying the cables and in the presence of the Engineer's representative so as to ensure the safety of train operations.

3.3.9 Wherever the Engineer's representative considers it necessary to adopt shoring, the Contractor will be required to adopt shoring for which the Contractor shall have sufficient quantities of shoring material on hand as
per RDSO Drawing No. TC 35003 given at Annexure-2.5. The shoring shall invariably be carried out in case of loose soil or banks made of cinders and ashes.

3.3.10 Where the direction of the trench has to change, it should be done in a gentle curve of not less than one meter radius and not at sharp angles.

3.3.11 While crossing tracks and laying over bridges & culverts, the engineers representative shall be present. The date and time of such works shall be communicated to concerned telecom supervisor of the Railways and adequate precautions, as advised by them, have to be taken.

3.4 TRACK CROSSING

All cable crossings across railway tracks shall be done in G.I. pipes (100 mm), threading the cable through these pipes. The contractor shall do the trenching to the required depth wherever necessary such as approaches to track crossing and the length in between the adjacent tracks. Two nylon rope of suitable strength shall be threaded through G.I. pipes, one to pull the cable and one for future use. The arrangement of cable and G.I. Pipe runking under Track crossings has been shown in Drg. No. RE/S&T/ALD/SK/159/81 given at Annexure-3.4.

3.5 ROAD CROSSING

3.5.1 When crossing road ways, it is necessary to lay the cables in such a manner as to avoid the necessity of handling the cable sharply and minimise excavation of road surface as far as possible. Where cable is laid in surfaced trunking, the trunking alignment should be

curved down to the pipes and proper brick or concrete joint should be made between trunking and pipe.

3.5.2 The crossing of main roads often involves difficulties especially if traffic is heavy, precautions to avoid accidents to workmen, pedestrians and vehicles should be taken. On minor roads, which can be temporarily closed to traffic, it is possible to cross the entire width of the road and open up. Pipes should be installed quickly in the cutting which is then filled in there by reducing to a minimum time for which the road is closed.

3.5.3 Some roadways which are broad may be opened for half their width, allowing the other half for use of traffic. Pipes are laid trench filled in the first half and the other half opened up after the first half is opened for the traffic. Pipes laid in the second half is linked with those laid in the first half. G.I. pipes shall be used for road crossings. In all cases pipes should be laid at a depth of 1 meter, below the formation level or lower as may be required.

3.5.4 Whenever a cable is laid across an important road particularly one with a special surface it is necessary to provide for future expansion. The following methods may be adopted.

(a) Separate pipes shall be laid for separate cable/HDPE duct. Two length of G.I. wire 10 SWG shall be used as lead wire. Two such lengths of G.I. wire shall be laid through the pipe. One wire shall be used for leading in the cable & the other wire shall be kept with suitable overlay to enable cable pulled out at later stage, if required.

3.5.5 At busy road crossings, trenching should be done in nights with appropriate protection and road warnings to road users.

3.5.6 The tenderer shall be responsible for compliance to applicable laws of the land and registration/approval from statutory authority, if required.

3.6 CABLE OVER STEEL / GIRDER BRIDGES:

3.6.1 Separate DWC/GI pipe shall be provided on Girder Bridges to lay OFC.

3.6.2 The Fibre optic cable on steel girder bridges shall be laid inside RCC/GI/DWC pipe to be effectively secured as per the drawing and DWC duct at both ends of bridges shall be protected.

3.6.3 When laying cable on long bridges, the question of longitudinal expansion caused by temperature differences should be taken into consideration and suitable cable loops should be provided at the pillars of the bridge. The cable should also be laid sinuously inside the trough.

3.6.4 The laying of the cable on the bridges is to be done with much care and planning. It is necessary that the cable drum to be laid on the bridge is inspected and tested thoroughly so that damaged cable is not installed.

3.7 Cable over CULVERTS :

3.7.1 Wherever possible the cable shall be laid under the bed of the culvert through DWC/G.I./RCC pipes as per sketch No. RE/S&T/ALD/SK/184/81 (Annexure-2.9). Similar arrangement shall be provided for taking the cable in water logged areas and drains.

3.7.2 In case of wet culverts or unfriendly terrains where it is not possible to lay cable under the bed of culverts, the cables may be laid over the culvert in G.I.pipes as per Drg.No.RE/S&T/ALD/SK/160/81(Annexure 3.9).

3.7.3 The protection of cable on approach to culverts shall be as per Drg. No. RE/S&T/ALD/SK /162/81(Annexure 3.9).

3.7.4 ARCH BRIDGES

The protection of cable on Arch Bridges and approach to bridges should be as per Drg.No. RE/S&T/ALD/SK/162/81 as given at Annexure-2.7.

3.8 LAYING CABLE IN SOLID AND ROCKY SOIL

3.8.1 If the terrain is rocky, it may not be possible to ensure normal dimensions of the trench. In such cases a chase is cut as shown in Drg. No.RE/S&T/ALD/SK/303/85, as given at Annexure-3.11. Sharp edges on the sides must be smoothened out and bottom of the chase should be leveled and the cable laid in sand or soft earth which should be filled and pressed down up to the step. A row of bricks should then be placed on the top and jointed with cement mortar.

3.8.2 In cases where the rock is not directly encountered, excavation to the desired depth shall be done. Payment for excavation shall be made on prorate basis on the accepted rates of item-1 of schedule of requirement.

3.8.3 In cases where excavation is possible up to 1000 mm no chase cutting shall be done. However the cable/HDPE duct shall be protected by providing second class bricks width wise on such lengths.

3.9 CABLES IN CONGESTED RESIDENTIAL AREAS AND MARSHY AREAS:

3.9.1 When laying the cable in residential sections, the cable should be specially protected on both sides up to a distance of about 300 meters beyond the building line. In such cases the cable should be protected by laying cable inside DWC/G.I./RCC pipes of 120/103 mm dia.

3.9.2 In marshy area where it is not possible to divert the cable route the cable shall be suitably laid and protected as per decision of Engineer depending on site condition, like laying cable in DWC/G.I./RCC pipes of 120/103 mm dia supported on Masonry Pillars/Iron channels etc.

3.10 LEADING OF CABLE IN MASONRY BUILDINGS

3.10.1 The cable will have to be led inside any masonry building such as Cable hut, ASM's room at a depth of 0.75 meters by cutting the masonry structure of the wall as per Drg.No. RE/S&T/ALD/SK/161/81 as given at Annexure- 3.12. After the cable has been led inside the masonry wall, the floor inside shall be duly repaired and plastered.

3.11 LAYING OF CABLE IN SPECIAL CASES:

3.11.1 Near Power Cable

When the proposed cable route comes across any other cable already laid, the contractor shall first report the fact to the Engineer. Should the cable be identified by the Engineer as

a power cable (LT or HT), the trench shall be dug as far away from the route of the power cable as practicable.

3.11.2 Crossing of Optical Fibre Cable with another cable

Crossing of the Optical Fibre cable with another cable shall be avoided wherever possible. Where, however, this is not possible, the Optical Fibre cable shall be laid in cement or asbestos cement pipes. The length of the pipe to be provided on either side of the crossing shall be at least one meter.

3.11.3 Laying other than optical fibre cables in the same Trench

No cable other than quad cable shall be laid in the trench made for the Optical Fibre cable. Even in such cases, both the cables are to be laid as per approved drawing. Where, however, exceptional circumstances exist, the optical fibre cable may be laid along with another cable in the same trench provided a specific permission of each such case is obtained in writing from Engineer. When optical fibre cable and L.T. power cable have to be laid in the same trench they shall be separated by placing a layer of second class bricks between them vertically (approx.16 bricks/meter) or laid in RCC pipe.

3.11.4 Laying of cable through RCC/GI/DWC pipes

The cable shall be laid through RCC/GI/DWC pipes at the locations marked on the route plan and as advised by the Engineer or his representative.

For laying the cable through pipes galvanized steel wires of a cross section not less than 10 SWG shall be used as a lead wire. Two such lengths of wires shall be laid through the pipes, so that after the cable is threaded through the pipe, one lead wire is permanently left in the pipe with a suitable overlay at two ends, to enable the cable to be pulled out at a later stage if required to do so.

On arch bridges and culvert bridges the cables will be threaded through DWC pipes etc. While threading the cable through these pipes the Contractor shall do the trenching to the required depth wherever necessary for which no extra charge will be paid.

3.11.5 Laying cable near feeding post:

In the vicinity of feeding posts, as far as possible the cable shall be laid on the side of the track opposite to the feeding post. Further the Optical fibre cable shall be at least one metre away from any metallic part of the O.H.E. and other equipment at the sub station which is fixed on the ground and at least one metre away from the sub - station earthing. In addition, the cable shall be laid in RCC pipes 150 mm dia (standard 2 metre length) complete or capable of being split into two half as per specn. No. ISS-458 latest for a length of 300 metres on either side of the feeding point.

3.11.6 Running of cables at foundations others than OHE Masts and from pipe outlets.

Damages to cable is likely to occur if care is not taken in laying cable where the bed changes from solid support such as a foundation pipe or bridge to soft support such as soft soil. The cable must not press against the edge of the solid support. The soft soil near the edge must be tamped and the cable raised slightly.

3.11.7 Laying near oily surface

If during the excavation of trenches for laying cables, the Contractor or his representative notices the presence of oil or oily substance or any other chemical which is likely to cause

the deterioration of the cable protective material he shall bring the matter to the notice of the Engineer or his representative and on the latter's decision he shall choose an alternative cable route or he shall protect the cable in such places in such manner as advised in writing by the Engineer or his representative. No additional charges are payable.

3.11.8 Special soil condition

Cable should not be run through abnormally high acidic or alkaline soil or through sewage. If this is unavoidable, special measures should be taken against corrosion as advised by the Engineer in Charge.

3.11.9 Provision of damage due to sharp edges

When cable are laid in trunking, care should be taken to see that no ballast or stones have been dropped inside the trunking and it should be cleared of all ballast and stones before the cover is secured. When the ends of covers are joined together with cement plaster, a piece of paper or wood should be placed under the joint to prevent the cement plaster from falling on the cables.

3.12 HANDLING OF CABLE DRUMS & PAYING OF CABLES:

3.12.1 While collecting OFC/HDPE from RailTel depot the contractor must ensure that the materials should be received in good condition. The drums shall be unloaded by the side of the Railway Track/Road from either a crane or any other suitable means very carefully so as not to cause any damage to the cable. The drums at site shall be protected until they are laid. The cable must be tested before and after laying.

3.12.2 On each drum there are two ends, A & B. The 'B' end of one cable length shall meet 'A' end of the next cable at a joint. The 'A' end shall be normally on the top unless indicated otherwise on a drum.

3.12.3 The drums shall always be kept upright, i.e. axle in parallel position to the base. The drums shall not be set by jerks but shall be handled slowly and with care. The walls of the drums should not be damaged while moving the drums if required for unrolling.

3.12.4 The drums shall normally be unrolled at the same place and the cable carried by workmen near the trench. The drums shall not be dragged in any case. But where drums of cable have to be moved, would always be rolled in the direction of the arrow, otherwise the coils tend to unwind and the cable may get battered. In case no direction arrow is marked on the drum, remove several battens and determine the direction in which the cable is coiled. The arrow should then be painted on the drum pointing in the opposite direction in which the upper cable end is coiled so that future handling of the cable drum is facilitated and then replace the battens carefully.

3.12.5 The drum should be properly mounted on jacks (or on a cable wheel) making sure that the spindle is large enough to carry the weight without bending and that it is laying horizontally in the bearings so as to prevent the drum creeping to one side or the other while it is rotating. Before attempting to pull off the cable, remove the end protection box attached to the flange of the drum and cut the security ropes so as to leave the cable free to move.

3.12.6 If a portion of the cable only is taken out from the cable drum, the battens should be immediately replaced to prevent damage to the balance of the cable. This is important.

3.12.7 The use of steel bars between the bolt heads to 'jump' or turn the drum around is dangerous to staff and likely to damage the drums. A better method is to use two steel plates with grease between them. By standing the drum on these greased plates, it can be easily elevated round to the desired position.

3.12.8 All care should be taken in handling cable drums with a view to ensure safety not only of the cables but also of the working party handling them. The man should not be allowed to brake the cable drum by standing in front but only from side.

3.12.9 Rewinding and Re-drumming of cables.

a) If for any reason it is found necessary to rewind a cable on a drum, cable drum with a proper barrel diameter not less than of the original drum should be chosen.

b) The drums should be mounted on cable jacks during rewinding operations using proper size of spindles passed through the flange holes, which will not buckle under the lead. The cable should not be bent opposite to the set it is having already.

c) In the re-drumming operations, drums should be so turned that the cable passes from the bottom of the original set with as little gap as possible.

d) Replace all the lagging on the cable drum.

3.13 CABLE LAYING:

3.13.1 It is advisable to employ the same people at the same place or job while cable is being laid.

3.13.2 Before commencement of the laying of cable/HDPE duct, inspection of the trench and inspection of protection works should be carried out so as to ensure their conformity with the specification. The trench bottom should be clean, smooth and free of small stone. When the soil contains stone or pieces of rock and therefore cannot be raddled, sieved earth about 10 cm. thick should be used both for the bedding on which the cable is laid and for covering the cables.

3.13.3 The cable drum should be brought as close to the cable trench as possible. It should be lifted with the aid of cable jacks firmly mounted on a support of stone or wood. The spindle should be minimum of 55 mm diameter and have a clearance from ground by 5 to 10 cm.

3.13.4 Where necessary the cable drum may be placed at such a point so that 2/3 of the cable is laid directly in one direction and the balance in other direction. Care should be taken in such a case to see that there are no kinks or loops in the cable.

3.13.5 The wooden battens on the drums should be carefully removed shortly prior to laying and before the drum is mounted on the jack. The nails on the lagging should be carefully removed.

3.13.6 While rolling a cable drum for laying, the drum shall be supported on an axle running through its centre, the height of the axle being such that the end frames are free to rotate and do not touch the ground at any point. The cable shall be carefully uncoiled by gently pulling the cable assisted as necessary by carefully turning the drums. The quick pulling of the cable or turning the drums shall be avoided at all costs. Each cable drum shall be

braked while laying is in progress to prevent sharp bending or buckling, particularly when the cable coils are sticking together.

3.13.7 The method of mounting the brakes is shown in Drawing No. RAILTEL/SR/OFC/2008/13 as given at page -114.

3.13.8 When drums are turned for change of direction, wooden blocks shall be carefully put under the drum bolts which stand out from the drum discs.

3.13.9 It is customary for the mate to stand in a commanding position where he can view the entire route, and shout evenly timed calls to his men to pull. If there is proper synchronization between the mate's calls and the pulling by the men, the cable will leave the drum without difficulty. It is important that the cable should be pulled with steady and even pulls and not be unnecessarily jerked or strained. On no account should a cable be allowed to twist or kink as this is likely to spring the Armour and fracture the outer serving of the cable. When pulling cable around bends, one or two men should be stationed to give the cable the correct bend when it passes.

3.13.10 While laying the cable, employ adequate number of men such that the cable can be conveniently carried by them in both hands without stretched arms. The distance between any two persons carrying the cable shall be from 2 to 10 metres depending upon weight of cable such that the maximum sag of the cable between any two persons is not more than 0.5 metres.

3.13.11 The cable shall be gently drawn by pulling the cable, which may be assisted as required, by smoothly and slowly turning the winch. The cable shall not be twisted on any account.

3.13.12 Before laying is commenced, the cable shall be uncoiled first in a straight line supported by men and then carried to the trench and laid gently & carefully ensuring that cable is not stretched while putting in the trench..

3.13.13 While laying work is in progress one man must continuously observe the cable along its length in order to determine whether any indentations, holes or other damaged parts are apparent. Such damaged parts have to be protected immediately by the cable jointer provided with the Laying party.

3.13.14 When two or three turns of cable are left on the drum, the pulling should be stopped and the inner end of the cable removed from the slot in the drum. Pulling should then be continued. If this is not done the cable end is likely to be stretched and damaged.

3.13.15 The ends of the optical fibre cable should have an overlap of 10 M at the end of each drum for jointing purpose.

3.13.16 The conditions of the cable shall be visually inspected through out its length and in case any damage or defect is noticed, the trench shall not be filled up until the Engineer's representative is notified to examine and authorize filling of the trench.

3.13.17 **MINIMUM BENDING RADIUS:**

Cables should always be bent (or straightened) slowly, they should never be bent to small radius while handling. The minimum safe bending radius for optical fibre cables

should be 30 times the diameter of the cable but wherever possible larger radius should be used.

3.13.18 Wherever cable has to be coiled/looped, the diameter of the coil/loop shall be greater than 30 times the diameter of the cable.

3.13.19 The RCC Joint Pit / Pull Chamber to be constructed should be as per the specification given in the Annexure 2.14.

3.14 CABLE RESERVE:

At the following locations, it will be necessary to provide reserve cable for future possible use.

1) Where a change to cable line is expected, the reserve to be allowed depends on circumstances.

2) In freshly banked soil to allow for slipping of the bank an allowance of 30 cm. should be provided for every 10 meters of trench (3 percent). The cable should be laid in a sinuous form.

3) Near roadways, buildings and culverts, reserve of 5 meters should be allowed at drum end.

4) On each side of major girder bridge a reserve of 10 meters should be left. For minor bridges 5 meters shall be left.

5) Where re-modeling works on culverts, bridges and track doubling work are going on, it may be necessary to keep loops of cable as an **extra reserve** pending finalization of its future route.

6) At the cable hut a loop of 10 meters in the cable pit.

7) At every Joint Pit a loop of 10 meters on either side of joint..

8) At every RCC Pull Chamber a loop of 15 meters

3.15 CABLE MARKERS

The RCC/Stone cable route markers shall normally be provided at a distance of every 100 meters on the straight portion of the cable route and also at diversions of the route of the cable culverts & LC gates. The joint indicators/markers shall be provided at all types of cable joints. The cable Markers provided shall be of standard RCC/stone type with letters "**RCIL O F C**" engraved and suitably painted with standard paint as per drawing attached. Cable Markers shall also be provided at each Joint Pit / Pull Chamber with/ without a joint respectively.

3.16 TOOLS REQUIRED FOR TRENCHING, CABLE LAYING AND FILLING.

TOOL'S NAME

Cable Jack
Cable Grip
Reopening Device
Free Hood Hook
Shackle free head hook
Grouling Hook

Pulling Bolt
Tension meter
Pulley
Anti Twist Device (swivel)
Roller
Flexible Cable
Pulling Rope
Brush
Mandrel
Chain
Measuring cord for strain gauge
Slip Winch
Wire rope
Portable VHF set
Measuring tape
Phowrah
Iron plate
Loader Backhoe for Drilling
Warning Tape
Caterpillar tractor
Fork Lifter
Vehicle Van type
Tacho- meter
Road measurer.

3.17 Execution of HDD (Trench less Horizontal Direct. Drilling - Boring)

3.17.1 Under road/platforms/railway tracks/difficult terrain etc., trench less horizontal directional drilling (HDD) method shall be adopted under the supervision of competent staff for laying of HDPE pipe (40/33 mm dia) at a depth of 1.5 meters and more (depth as per instructions of the site engineer)**.**

3.17.2 The depth of trench at any of the ends should not be less than 1.5 meter in any case. Both ends of HDPE pipes should be closed properly using accessories and the pits should be properly back filled.

3.17.3 There should be no damage to the road/platform/tracks or any such structures etc. enroot during or after the HDD operations.

3.17.4 The work includes supply of all accessories required for laying of HDPE pipes.

3.17.5 The contractor should normally adopt HDD by machine. In difficult areas like track crossing, road crossing, sharp bends etc. the contractor may adopt manual pushing method only in short lengths with the permission of the site engineer of RailTel.

3.18 Blowing /Drawing of Optical Fibre Cable:

3.18.1 **OFC** should normally be **blown** through the HDPE ducts by standard blowing machines Only in exceptional cases drawing may be adopted in short lengths with the permission of the site engineer of RailTel.

NOTE: The brick protection including supply of second class bricks of standard size at site shall not be required where OFC is being provided in HDPE/DWC ducts and quad cables are not laid. However, if quad cables are also laid along with the OFC in HDPE/DWC ducts, the brick protection shall be required as per clause 3.3.5 for protection of quad cables.

For protection of OFC and or quad cables at crossing across railway tracks, road crossings, over steel girder bridges and over culverts & arch bridges or any other special cases as decided by the site engineer during execution, DWC duct 50/39 mm dia (including supply of duct and other accessories required for protection of OFC/ quad cables) may be used in place of RCC pipes as mentioned in clause no. 3.4, 3.5, 3.6 & 3.7, as per instructions of RailTel's engineers at site.

****

SECTION - I

CHAPTER - 4

JOINTING AND TERMINATION OF FIBRE OPTIC CABLE

4.1 TECHNIQUE FOR JOINTING OF OPTICAL FIBRE CABLE

Fusion splicing shall be used for splicing fibres. This is accomplished by applying localized heating (i.e. by electric arc or flame) at the interface between two butted, pre-aligned fibre ends, causing them to soften and fuse together.

4.2 STRAIGHT JOINT FOR FIBRE OPTIC CABLE

4.2.1 There are various types of joint enclosures available in the market. The procedure for assembly of joint closure is described in the installation manual supplied with straight joint closure. This includes the following:

Material inside joint closure kit

Installation tools required

Detailed procedure for cable jointing

Procedure for re-opening the closure.

4.2.2 The Optic Fibre straight through joint closure shall be as per specn. TEC TO 910 G92 (latest) or a proven design approved by RCIL .The joint shall be protected in RCC Joint Pit as per drawing given in Annexure 2.14. (.The Optic Fibre straight through joint closure shall be of TVS, R&M, Raychem, 3M make and shall be approved in advance by RailTel. The joint shall be protected in concrete chamber as approved by engineer- in-charge.)

4.2.3 Generally, the following steps are involved for jointing of the cable:

- Preparation of cable for jointing
- Stripping/cutting the cable
- Preparation of Cable and joint closure for splicing
- Stripping and Cleaving of Fibers
- Fiber splicing
- Organizing fibers and Finishing joints
- Sealing of joint closure and
- Placing joint in the Jointing Chamber/Pit.

4.3 PREPARATION OF CABLE FOR JOINTING

During the installation, a minimum of 10 meter of cable of each end is coiled in the jointing pit to provide for jointing to be carried out at convenient location as well as spare length to be available for future use in case of failures.

The pit size must be chosen carefully to ensure that length of the wall on which joint is mounted is greater than closure length plus twice the minimum bending radius of the cable. A RCC circular Joint Pit / Pull Chamber of 1 mete outer dia as given in annexure-2.14 is sufficient for most of the cable and joint closures.

The cable is then coiled and carefully placed in the pit/chamber in the same position as required after the joint is complete. The marking is done on all the loops so that it will be easier to install it later.

The distance from the last centre to the end of the cable must be at least 1.8 meter. This is being the minimum to be stripped for preparation of joint.
Sufficient cable at each end up to the jointing vehicle/enclosure is then uncoiled from the pit for jointing.

4.4 STRIPPING/CUTTING OF THE CABLE

The cables are stripped of their outer and inner sheath with each sheath staggered approximately 10mm from the one above it.
Proper care must be taken when removing the inner sheath to ensure the fibres are not scratched or cut with the stripping knife or tool. To prevent this, it is best to only score the inner sheath twice on opposite sides of the cable, rather than cut completely through it. The two scores marking on either side of the cable are then stripped of the inner sheath by hand quite easily.

The fibers are then removed from cable one by one and each fibre is cleaned individually using Kerosene to remove the jelly.

4.5 PREPARATION OF CABLE JOINT CLOSURE FOR SPLICING

The type of preparation work performed on the cable prior to splicing differs on the type of joint closure and fiber organizer used. However, the following steps are usually common:-

The strength member of each cable are joined to each other and/or to the central frame of the joint closure.

The joint closure is assembled around the cable.

The sealing compound or heat shrink sleeve is applied to the cables and closure, or prepared for application after splicing is complete.

The fibers are protected (usually with plastic tubing) in their run from the cable core to the fiber organizer trays (particularly if cable construction is slotted core type).

Tags which identify the fiber nos. are attached at suitable location on the fibers.

Splice protectors are slipped over each fiber in readiness for placing over the bare fiber after splicing.

4.6 STRIPPING AND CLEAVING OF FIBRE

Prior to splicing each fibre must have approximately 50mm of its primary protective U.V. cured coating removed, using fibre stripper which are manufactured to fine tolerances and only score the coating without contacting the glass fibre.

The bare fibre is then wiped with a lint free tissue doused with ethyl alcohol.

Cleaving of the fibre is then performed to obtain as close as possible to a perfect 90 degree face on the fibre.

4.7 SPLICING OF THE FIBRES

The fusion splicing shall be used for fibre splicing. Some of the basic steps for fusion splicing are as given in 4.8 below.

4.8 FUSION SPLICING OF FIBRE

Some of the general steps with full automatic micro processor control splicing machine are as under:

Wash hands thoroughly prior to commencing this procedure.

Dip the clean bare fibre in the beaker of ethyl alcohol of the ultrasonic cleaver. Switch on ultrasonic cleaver for 5-10 seconds (Some of the manufacturers do not prescribe the above cleaning).

Place the bare fibre inside 'V' grove of the splicing machine by opening clamp handle such that the end of fibre is app. 1 mm. over the end of the "V" groove towards the electrodes.

Repeat the same procedure for other fibre, however, first insert heat shrink splice protector.

Press the start button on the splice controller.

The machine will pre fuse, set align both in 'X' and 'Y' direction and than finally fuse the fibre.

Inspect the splice on monitor if provided on the fusion splicing machine and assure no nicking, bulging is there and cores appear to be adequately aligned. If the splice does not visually look good repeat the above procedure.

Slide the heat shrink protector over the splice and place in tube heater. Heat is complete when soft inner layer is seen to be 'oozing' out of the ends of the outer layer of the protector.

Repeat for other fibres.

4.9 FUSION SPLICER AND OTDR

The fusion splicer and Optical Time Domain Reflecto meter (OTDR), to be used for splicing and measurements of parameters respectively, shall be of approved design and quality. The contractor shall submit

Specification of fusion splicer and OTDR

Certificate from the users, who have used the splicer and OTDR of the make, the contractor intends to use, regarding their satisfactory performance.

The RCIL reserves the right to direct the contractor to use the same or any other proven design of fusion splicer and OTDR if in the opinion of RCIL the specification of Fusion splicer and OTDR are not suitable

4.10 ORGANISING FIBRE AND FINISHING JOINTS

After each fibre is spliced, the heat shrink protection sleeve must be slipped over the bare fibre before any handling of fibre takes place, as uncoated fibres are very brittle and cannot withstand small radius bends without breaking.

The fibre is then organized into its tray by coiling the fibres on each side of the protection sleeve using the full tray side to ensure the maximum radius possible for fibre coils.

The tray are placed in the position.

OTDR reading taken for all splices in this organized state and recorded on the test sheet to confirm that all fibres attenuation are within specification. This OTDR test confirms fibres were not subjected to excessive stress during the organizing process.

After this the joint can be closed with necessary sealing etc. and ready for placement in the pit.

4.10.1 **Jointing Pit/ Pull Chamber:**: The Jointing Pit / Pull Chamber is as per drawing at Annexure-2.14. The outer dia of the circular RCC Jointing Pit / Pull Chamber shall be approx. 1000mm. The pits shall be located at every 1Km of the OFC route and spare cable of 15 meters to be looped and placed in the pit. The pit shall be refilled with dry sand after completion of the work and then closed. Stone/RCC route markers shall be provided for identification of each Jointing Pit / Pull Chamber location with/without a joint and this should be incorporated in the as-built-cable route plan.

4.11 PLACING OF COMPLETED JOINT IN PIT

Joint is to be placed on the tarpaulin provided near the pit.

The cable is laid on the ground, loop the cable such that pen mark previously place on the cable line up. Tape these loops together at the top of the coil.

The joint can now be permanently closed and sealed by heating heat shrinkable sleeve etc. However, before closing, silica gel to be kept inside for moisture protection.

Now the joint closure is placed in the jointing pit /chamber and the pit is closed after filling it with dry sand.

4.12 RE-OPENING OF THE JOINT

If required for attending to faults etc., manufacturers supply special kits for opening of the joint and the steps to be followed. However, the general steps are as under: -

Using suitable knife cut heat shrink sleeve longitudinally along its entire length.

Do not damage the smaller heat shrunk sleeve on the ends of the joint.

Apply heat to the cut sleeve until it begins to separate.

Gently remove the cut sleeve from the joint. Now the joint can be opened.

Protective sleeve/cover can be removed for attending to faults etc.

4.13 TERMINATION JOINT FOR FIBRE OPTIC CABLE.

4.13.1 This joint is provided in the cable hut for terminating the outdoor fibre optic cable of both the sides, splicing through fibres, connecting fibres to pigtails for connection to Optical Line Terminal Equipment etc.

4.13.2 The OFC Cables shall be dressed up on teak wood plank/Aluminum ladder inside cable hut. The amount of the OFC Cable shall be cut before taking the cable in the equipment rack. The cables shall be terminated on FDMS and derive required pigtails.

Two pairs of fibres shall be derived from either side cable at every OFC cable hut through pigtails with FC/PC connectors. The remaining fibres shall be looped through.

4.13.2 The procedure for installation of termination joint box depend upon the type of joint enclosure. The installation manual supplied gives the step-by-step procedure for installation. However, the general steps are as under:-

- Marking the cable
- Stripping/cutting the cable
- Gripping cable in sheath/clamp
- Treatment of tension member
- Fibre splicing
- Enclosing fibre
- Fixing strength member
- Closing the cover
- Fixing termination box
- Fixing the cable.

4.14 MARKING THE CABLE

Determine the cable length up to the proposed location of termination box. It is also to be ensured that at least 10 meters of cable is coiled in the cable pit.

Determine the cutting point and mark the cable

Determine the sheath peeling point and mark the cable

4.15 CUTTING / STRIPPING THE CABLE

Cut the cable as per the marking
Remove the sheath from cable ends. During sheath stripping care should be taken not to damage the fibres.
The length and the steps for various sheath cutting shall be as per the instruction given in the manual.

4.16 GRIPPING THE CABLE

Wind PVC tape around the cable core just beside edge of the sheath.

Insert the bushing inside sheath by cutting the cable sheath for about 25mm.

Place the sheath grip (lower half and upper half) and tighten it with the help of torque wrench.

4.17 FIXING OF TENSION MEMBER

a) Mark the tension member for the specified length and cut it.

b) Clean the tension member thoroughly by Alcohol and cotton cloth.

c) Fix tension member holder with the help of instant adhesive at the end of tension member.

4.18 FIBRE SPLICING

The procedure for splicing is same as described for straight joint closure in Clause 4.7 above.

4.19 ENCLOSING FIBRES

a) Set the fibre cassette on the base

b) Arrange excess length of fibre to make double figure of eight.

c) Enclose the spliced fibre and its excess length carefully.

d) Repeat the procedure for other fibres.

e) After this, the box can be closed. However, a packet of silica gel may be placed inside for protection from entry of moisture.

4.20 MOUNTING OF TERMINATION BOX.

Termination box can be fixed either on wall or on equipment rack. At wayside stations it shall be mounted inside the equipment rack in order
to prevent pigtails from rodent attacks.

a) Mark the fixing holes on the walls/bracket/frame
b) Place the termination box and tightened the nuts inside the base box.
c) Put the covers.

4.21 FIXING THE CABLE

Secure the cable on wall/frame at two places within one meter from termination box keeping in view straight entry of cable in termination box.

4.22 ISOLATION OF ARMOUR OF OFC CABLE

The maximum continuous length of armour of OFC Cable should not exceed 1.6 Kms. in order to keep the induced voltage within permissible limits. Where the continuous length of cable exceeds 1.6 Kms. a 50 mm cut shall be made in the armour after every 1.6 Kms. The Exposed cable at the cut shall be covered by shrinking suitable heat shrink sleeve as per TEC specifications.

4.23 ACCEPTANCE TEST FOR FIBRE OPTIC CABLE

The Procedure for Testing of Fibre Optic Cable shall be jointly finalized by Contractor with Engineer of the RCIL. The parameters in the concerned specification shall be taken as reference. The Test shall be conducted from cable hut to cable hut, after the Splicing & termination Joints are completed. The length of cable (as per marking in cable & as measured by OTDR), loss in cable, average loss per Km., No. of Splices, Splice loss, etc. shall be recorded and jointly signed as per pro-forma given in para 4.24 below.

4.24 TEST PROTOCOL FOR OPTICAL FIBRE CABLE

SYSTEM TEST PROTOCOL OPTICAL FIBRE CABLE FIELD TEST

Route: ---------- Date: ----------

Station: ---------- No. of mid-section splices: ----------

Section: ---------- Measured by: ----------

Length (by OTDR): ---------- Length as per meter marking on cable sheath----------

1) Optical measurements (On Line):

Measurement	Fibre – number 1 2 3 4 ……22 23 24	Accepted Value
1.1 Total attenuation at 1300/1550 nm with OTDR		
1.2 Total attenuation per Km at 1300/1550 nm:		<0.40 dB/Km at 1300 nm &<0.25 at 1550 nm
1.3 Splice Loss in dB with OTDR Location		Average splice loss
OHE Mast No./ Overhead alignment post no. A. B. C. D. E.		
Average Splice Loss		0.15 db, no splice should have loss >0.2 db

NOTE : ALSO ATTACH OTDR RESULTS |----|

2) Visual Inspection (On Line):

2.1 No. of Cable drum used in the section: ----------

2.2 S.No. of cable and length of each drum:

S.No. LENGTH

1. ---------- ----------M

2. ---------- ----------M

3. ---------- ----------M

4. ---------- ----------M

5. ---------- ----------M

2.3 Location of Isolation Sleeves: 1. 2. 3.

Contractor's Representative RCIL's Representative

4.25 TOOLS AND EQUIPMENTS REQUIRED FOR JOINTING AND TERMINATION OF FIBRE OPTIC CABLE.

S.No. TOOL's Name

1. Branch Joint Closure
2. Termination Box
3. Rubber end Block
4. Sheath Clamp
5. Bushing
6. Strength Member holder
7. Heat Shrinkage tube
8. Arc fusion splicer machine.

9. Power cord AC/DC
10. Walkie-Talkie 12V DC source
11. Tube heater
12. Precision cleaver
13. Cable sheath stripper
14. Fibre stripper
15. Knife for HDPE cutting
16. Hexa for strength membrane
17. Isopropyl alcohol or methanol of high specific gravity
18. Johnson Buds
19. Tweezers
20. Gun heater Blower type
21. Sleeve for splice protection
22. O.T.D.R.
23. Stickers for numbering of splicers.
24. Portable k. oil generator
25. Umbrella's 2 Nos.
26. Dust protection for splicing machine

Note:- Wherever cable has to be coiled/looped , the diameter of the coil/loop shall be greater than 30 times the diameter of the cable.

SECTION I

CHAPTER 5

List of Address for Specification

5.0 Address from where specification copy can be purchased:

The copy of IRS, RDSO, TEC and BIS specification used in the tender documents can be purchased from following sources.

5.1 IRS Specification : I) Manager Publications,
Government of India
Civil Lines, New Delhi- 110054

ii) Government of India Book Depot,
8 - S.K. Roy Road, Calcutta – 700001

5.2 RDSO Specification :

RDSO, Manak Nagar, Lucknow

5.3 DOT/TEC/ITD Specification :

Khurshid Lal Bhavan, Janpath,
New Delhi- 110001

5.4 B.I.S. Specification :

Directorate General ,
Indian Standards Institution,
9- Bahadur Shah Zafar Marg,
New Delhi -110002

F- block, Unity Building,
Narsimhraja Square,
Bangalore- 560002

534- Sardar Vallabh Bhai Patel Raod , Mumbai.

5- Choweringhee Approach, PO Princep street, Calcutta-700072

Ahinsa Building (1st floor) , SCO 82-83, Sector 27-C,
Chandigarh- 160017

5-8-56/57, L.N. Gupta Marg, Hyderabad- 208005.

117/418-B, Sarvoday Nagar, Kanpur – 208005

C.I.T. Campus, Adyar, Madras – 600020.

5.5 The specifications and drawings referred but not enclosed in the tender documents may be seen in the RCIL's office on any working day.

****

SCHEDULE

OF

REQUIREMENTS

(SOR)

Tender No. : RailTel/Tender/LT/RO/WiFi work/ALD & GKP/2015-16/20

Name of work: Supply & Laying of OFC, HDPE Duct, Power Cable, etc. for providing WiFi services at Allahabad & Gorakhpur Railway Stations of Northern Region.

SN	Description	Unit	Total Qty.	Rate/Unit (Rs.)	Amount
1	Supply of 6 core metal strenghtened outdoor unarmored OFC (should meet ITU-T/TEC specification)	Mtr.	10500	11.07	116235
2	Supply of FMS 48 fibers (SC/APC type) with accessories (preferred make TE/3M/Huber Shuner)	Nos	18	8485.872	152745.66
3	Supply of FMS 12 fibers (SC/APC type) with accessories (preferred make TE/3M/Huber Shuner)	Nos	36	4383.6	157809.6
4	Supply and provision of OFC joint closure including splicing (24 fibers) the Joint enclosure shall be TVSE/Reychem/FOSC/ Roxtec/3M make	Nos	6	4000	24000
5	Supply of joint closure for 06 fiber OFC	No.	12	44.96	539.52
6	Splicing of fiber of 24F OFC (in Joint enclosures or FMS as per the site requirement)	No.	864	101.16	87402.24
7	Splicing of fiber of 6F OFC (in Joint enclosures or FMS complete as per the site requirement)	No.	432	101.16	43701.12
8	Blowing & Drawing of OFC Cable in PVC Conduit pipe {(already installed (in electrical work)}	mtr	7200	7	50400
9	Supply & installation of Conical Manhole	Nos.	4	10208	40832
10	Supply & Installation of RCC Chambers	No.	10	3200	32000
11	Supply & Fixing of Cable Route Marker as per Drawings	No.	7	250	1750
12	Supply and installation of GI Pipe 40 / 50 / 75 mm (IS 1239 medium gauge) as per site requirements	mtr	220	490	107800
13	Trenching by HDD Machine at depth 1.65 Mtr. for Road crossing	mtr	700	262.50	183750
14	Concreting in Rocky areas for OFC protection and to keep the route marker in position	Cu.mtr	5	3082	15410
15	Breaking of pucca RCC Road & Digging of Cross Pit as per drawing	mtr	2	10999	21998
16	Laying of HDPE duct in the Trenches and in protective works already provided.	mtr	4900	4.50	22050
17	Blowing & Drawing of OFC Cable in HDPE duct.	mtr	4900	4.961	24308.9
18	Repair of Terminal OFC Joint (incl. Splicing of 24 Fibres / Dropping of Fibre / Pigtail)	No.	2	5520	11040
19	Final Testing & Commissioning	Mtr	11600	0.8121	9420.36

20	Supply of PVC insulated 3 Core **4 Sqmm** , 12 AWG , **1.1 KV** grade outdoor strengthened Copper cable for UPS supply distribution (Havells/Finolex/Anchor/Polycab make)	mtr	7200	135	972000
21	Providing telecom maintenance free earthing as per drawing attached & extension as per site engineer	Nos.	2	38500	77000
22	Supply of 25 mm PVC Conduit Pipe as per ISI Mark & Installation , Clamping of the same on wall, pole etc. with required clamps & all other installation material as required as per site requirement	mtr	13700	46.06	631022
23	Blowing & Drawing of Ethernet Cable in PVC Conduit pipe	mtr	1230	5.82	7158.60
24	Supply & Installation of 10A/DP MCB as per ISI Standard in suitable PVC/Metallic Box	Nos.	48	185	8880
25	Laying of Power Cable from UPS in PVC Conduit pipe	mtr	7200	4	28800
26	Fixing or mounting of 6U/9U size Rack at suitable height on Wall, Pole. All sorts of Angles, Nuts, Bolts, Clamps and other accesoris required for installation to be supplied by Contractor (rack will be supplied by RailTel)	Nos.	44	1000	44000
27	Fixing or mounting of UPS in 9U size Rack or outside on wall /pole . All sorts of Angles, Nuts, Bolts, Clamps and other accesories required for installation to be supplied by Contractor (UPS will be supplied by RailTel)	Nos.	12	500	6000
28	Supply of LC/PC - LC/PC Patch Cord (5 Mtr.) (3M, TE Connectivity, R&M make only)	Nos	18	166.72	3000.96
29	Supply of SC/APC - LC/PC Patch Cord (5 Mtr.) (3M, TE Connectivity, R&M make only)	Nos	18	165.65	2981.70
30	Supply of SC/APC - LC/PC Patch Cord (3 Mtr.) (3M, TE Connectivity, R&M make only)	Nos	409	156.04	63820.36
31	Supply of SC/APC - SC/APC Patch Cord (1 Mtr.), (3M, TE Connectivity, R&M make only)	Nos	30	135	4050
	Total				**2951906**

Total (in words) : Rs Twenty Nine Lacs Fifty One Thousand Nine Hundred and Six Only.

Tenderer's offer.: " I/We hereby offer to do the work at following rates

In Figure	**% Above/Below the Schedule of rates**
In Words	**% Above/Below the Schedule of rates**

Note:- Above quoted rates are including all type of applicable taxes. It is mandatory for the tenderers to give tax break up in table given below

Tax Break Up

Sr. No.	Tax Name	Rate of tax (%)

The requisite EMD for an amount of Rs. _____submitted vide DD No.

_____ dated _____ drawn on_____ bank.

Signature of Tenderer with Seal

Section II

(General Instructions to Tenderers)

1. **Submission of Tenders:**

   The tenders shall be submitted as per the format of RAILTEL enclosed herewith before or on 22**.02.2016 up to 15:00 hrs** in the Office of "The Regional General Manager/Northern Region, RailTel Corporation of India Limited, 6th floor, Block-III, Delhi IT Park, Shastri Park Delhi-110 053.

2. **The tender shall be addressed to: The Regional General Manager (NORTHERN REGION) inviting tenders as indicated in the tender notice. The cover must mention the 'name of the work & Tender' and due date of opening'**.

3. Tenders submitted by post shall be sent as "REGISTERED POST ACK DUE" and shall be posted with due allowance for any postal delay. The tenders received after the due date and time of opening is liable to be rejected. Telegraphic offers and offers received by telex/fax shall not be considered. Tenders shall be opened at the date and time as specified in the Preamble of tender document in the presence of such of those tenderers or their authorised representatives who may be present at the Office of **"The Regional General Manager (Northern Region), RAILTEL CORPORATION OF INDIA LIMITED, 6th floor, Block-III, Delhi IT Park, Shastri Park, Delhi-110 053.**

4. The tenderers shall closely peruse all the clauses, specifications and drawings indicated in the Tender Documents before quoting. Should the tenderer have any doubt about the meaning of any portion of the Tender specifications or find discrepancies / omission in the Drawings or the tender documents issued are incomplete or shall require clarification on any of the technical aspect, Scope of Work etc., he shall at once contact the authority inviting the tender for clarification before the submission of the tender.

5. Before tendering, the tenderers are advised to inspect the site of work and the environments and be acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour. No claim will be entertained later on grounds of lack of knowledge.

6. Tenderer must fill up the SOR and furnish all the required information as per the instructions given in Annexure of the specifications. Each and every page of the tender document must be SIGNED, STAMPED & SUBMITTED ALONGWITH THE OFFER by the tenderer in token of complete acceptance thereof. The information furnished shall be complete in itself.

7. All entries in the tender shall be written in ink. Erasers and over writing are not permitted and may render such tenders liable to summary rejection. All cancellations and insertions shall be duly attested by the tenderer.

8. **Deleted**

9. **Deleted**

10. **Earnest Money deposit:**

    a. The tenderer shall furnish requisite EMD in prescribed form in favour of RailTel Corporation of India Limited, payable at Delhi.

b. The tenderer shall hold the offer open till such date as specified in Clause 12 of this chapter. It being understood that the tender documents have been sold/issued to the tenderer and the tenderer has been permitted to tender in consideration of the stipulation on his part that after submitting his tender he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to Railtel. If the tenderer fails to observe or comply with the foregoing stipulation, the aforesaid amount deposited as Earnest Money shall be liable to be forfeited by Railtel.

c. The Earnest Money receipt shall be incorporated in the original copy of the tender document. The Earnest Money should be furnished in any of the following forms:

   i. Demand Drafts of the State Bank of India or any of the Nationalized Bank. No confirmatory advice from the Reserve Bank of India will be necessary.

   ii. Demand Drafts should be drawn in favour of the RailTel Corporation of India Limited, and endorsed "Account Payee".

These instruments should be valid at least for the period covering thirty days beyond the validity of the offer.

d. The bid guarantee / earnest money may be forfeited:
   i. If a tenderer withdraws its tender during the period of tenders validity specified in clause 12.
   ii. In the case of successful tenderer, if the tenderer fails to:
      1. Sign the contract in accordance with clause 13.
      2. To furnish performance guarantee in accordance with clause 14.

e. The earnest money of unsuccessful tenderer will save as herein before provided, be returned within reasonable time to the unsuccessful tenderer but the RailTel shall not be responsible for any loss or depreciation that may happen to the security for the due performance of the above stipulation to keep offer open for the period specified in the tender documents or to the Earnest Money while in their possession nor be liable to pay interest thereon.

f. If the tender is accepted, the amount of Earnest Money will be held as security deposit for due and faithful fulfillment of contract. The Earnest Money of successful tenderer will be returned after the Contract Performance Guarantee (Security Deposit) as required and formal contract duly signed is received by the purchaser.

11. Authorizations and Attestation

Tenders shall be signed by the person duly authorized / empowered to do so. Certified copies of such authority and relevant documents shall be submitted along with the tenders.

12. Validity of Offer:

The offer shall be kept open for acceptance for a minimum period of **90 days** from the date of opening of tenders. In case RAILTEL calls for negotiations, such negotiations shall not amount to cancellation or withdrawal of the Original offer which shall be binding on the tenderers.

13. Execution of the Contract:

The successful tenderers responsibility under this contract commences from the date of issue of the LOI/ LOA by RAILTEL. The successful tenderer shall be required to execute an agreement in the prescribed Performa enclosed herewith with the RAILTEL within Fifteen days after the acceptance of this tender.

14. Security Deposit:

a. On receipt of the Letter of Acceptance of Tender from the RailTel the successful Tenderer shall within a period of **15 days** deposit with the RailTel an amount equal to **10%** of the value of contract rounded off the nearest whole number in terms of thousands of rupees towards payment of performance guarantee in the form of DD/Performance Bank Guarantee for due fulfillment of the contract.

b. The Earnest Money already paid by the successful Tenderer may at the discretion of the successful Tenderer be adjusted towards payment of this Performance Guarantee and the additional amount shall be paid in any one of the following forms:
   i. Bank draft OR
   ii. Irrevocable Bank Guarantee issued by SBI or Nationalized Banks or scheduled commercial bank confirmed by SBI / Nationalized Bank acceptable to purchaser.

c. The Instruments for security deposit should be valid for four months beyond issue of last FAC. On expiry of this period the Performance Bank Guarantee will be refunded or Bank guarantee released to the contractor after adjustment of any dues payable by the contractor.

d. If the value of the work done at any time exceeds the accepted agreement value, the Security Deposit shall be correspondingly enhanced and the extra Security Deposit shall be immediately deposited by the Contractor or recovered from payments due to him.

e. Failure to deposit the Security Deposit within the stipulated time, may lead to forfeiture of Earnest Money Deposit and cancellation of the award of work.

f. RAILTEL reserves the right of forfeiture of Security Deposit in addition to other claims and penalties in the event of the Contractor's failure to fulfill any of the contractual obligations or in the event of termination of contract as per terms and conditions of the contract. RAILTEL reserves the right to set off the Security Deposit, against any claims of any other contracts with RAILTEL.

g. RETURN OF SECURITY DEPOSIT: If the Contractor fully performs and completes the work in all respects to the entire satisfaction of RAILTEL and presents an absolute "No Claim Certificate" and returns properties belonging to RAILTEL taken, borrowed or hired by him for carrying out the said works, and has completed FOUR MONTHS beyond last FAC issued as certified by the authorized representative of RAILTEL, the total amount of Security Deposit will be released to the Contractor after deducting all costs, expenses and other amounts

that are to be paid to RAILTEL under this or other contracts entered into with the Contractor.

15. No interest shall be payable by RAILTEL on Earnest Money Deposit, Security Deposit or on any moneys due to the Contractor.

16. **Rejection of tender and other conditions:**

16.1 The acceptance of Tender will rest with RAILTEL which does not bind itself to accept the lowest tender or any tender.

16.2 Conditional and un-witnessed tenders, tenders containing absurd or unworkable rates and amounts, tenders which are incomplete or otherwise considered defective and tenders not in accordance with the tender conditions, specifications etc. are liable to be rejected.

16.3 If the tenderer expires after the submission of his tender or after the acceptance of his tender, RAILTEL may at its discretion, cancel such tender. If a partner of a firm expires after the submission of the tender or after the acceptance of the tender, RAILTEL may cancel such tender at its discretion unless the firm retains its character.

16.4 RAILTEL will not be bound by any Power of Attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. RAILTEL may, however, recognize such Power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor concerned.

16.5 If the tenderer deliberately gives wrong information in his tender, RAILTEL reserves the right to reject such tender at any stage or to cancel the contract, if awarded and forfeit the Earnest Money / Security Deposit / any other moneys due.

16.6 Canvassing in any form in connection with the tender is strictly prohibited and the tenders submitted by the Contractor who resorts to canvassing are liable to be rejected.

16.7 Should a tenderer or Contractor or in the case of a firm or Company of Contractors / one or more of its Partners / Share holders / Directors have a relation or relations employed in RAILTEL, the authority inviting the tender shall be informed to the fact along with the offer, failing this RAILTEL may at its sole discretion reject the tender or cancel the contract and forfeit the Earnest Money / Security Deposit.

16.8 NO DEVIATIONS TO THE TENDER CONDITIONS SHALL BE ACCEPTED WHATSOEVER.

16.9 The proposed Work shall be planned in such a way to avoid inconvenience to the normal working of trains in the section. Proper measure shall be taken to ensure safety of the workers.

16.10 All completion drawings, as built Drawings shall be submitted by the Contractor on completion of works along with the Final Bill.

****

Section III

(General Terms and Conditions)

The following terms and expressions shall have the meaning hereby assigned to them except where the context otherwise requires:

RAILTEL shall mean Office of Regional General Manager/Northern Region of RAILTEL CORPORATION OF INDIA LIMITED, (a Company with its Registered and Regional Office at 6th Floor, Block-III, Delhi IT Park, Shastri Park, Delhi – 110 053) or its authorized Officers or other Employees authorized to deal with any matters with which these persons are concerned, on its behalf.

1.0 **'Regional General Manager'** shall mean the Officer in Administrative In-charge of the contracting unit of RAILTEL.

2.0 **'SITE'** shall means the place or places at which the plants / equipments are to be erected and services are to be performed as per the specifications of this tender.

3.0 **'CONTRACTOR'** shall mean the individual, firm or company who enters into contract with RAILTEL and shall include their executors, administrators, successors and permitted assigns.

4.0 **'CONTRACT' or 'CONTRACT DOCUMENT'** shall mean and include the agreement, the work order, the accepted appendices of rates, Schedules of Quantities, if any, General Conditions of Contract, Special Conditions of contract, instructions to Tenderers, the drawings, the technical specifications, the special specifications, if any, the tender documents and the Letter of Intent / Work Order / Acceptance letter issued by RAILTEL. Any conditions or terms stipulated by the tenderer in the tender documents or subsequent letters shall not form part of the Contract unless specifically accepted in writing by RAILTEL in the Letter of Intent / Work Order and incorporated in the Agreement.

5.0 **'GENERAL CONDITIONS OF CONTRACT'** shall mean the 'Instructions to Tenderers' and 'General Conditions of Contract' pertaining to the work detailed.

6.0 **'TENDER SPECIFICATIONS'** shall mean the Special Conditions, Technical Specifications, appendices, Site information and drawings pertaining to the work for which the tenderers are required to submit their offer.

7.0 **'TENDER DOCUMENTS'** shall mean the General Conditions of Contract and Tender Specifications.

8.0 **'LETTER OF INTENT / WORK ORDER'** shall mean the intimation by a letter / telegram / telex / fax to the tenderer that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the Contractor commences from the date of issue of this letter and all the terms and conditions of contract are applicable from this date.

9.0 **'COMPLETION TIME'** shall mean the period by date specified in the Letter of Intent / Work Order. The time allowed for completion of the work will be 30 days including Sundays & holidays from the date of issue of Letter of Intent / Work Order.

10.0 **'PLANT'** shall mean and connote the entire assembly of the plant and equipment covered by the Contract.

11.0 **'EQUIPMENT'** shall mean all equipment, machinery's, materials, structures, electrical and other components of the plant covered by the Contract.

12.0 **'TEST'** shall mean and include such test or tests to be carried out by the Contractor as are prescribed in the Contract or considered necessary by RAILTEL in order to ascertain the Quality, Workmanship, Performance and Efficiency of the contracted work or part thereof.

'APPROVED', 'DIRECTED' or 'INSTRUCTED' shall mean approved, directed or instructed by RAILTEL.

13.0 **'WORK' or 'CONTRACT WORK'** shall mean and include supply of all categories of labour, specified consumables, tools and tackles required for complete and satisfactory site transportation, handling, stacking, and storing.

14.0 **'SINGULAR' and 'PLURAL'** ETC. words carrying singular number shall also include plural and vice versa where the context so requires. Words importing masculine gender shall be taken to include the feminine gender and words importing persons shall include any Company or Association or Body of Individuals, whether incorporated or not.

15.0 **'HEADINGS'** the heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or the contract.

16.0 **'MONTH'** shall mean any consecutive period of 30 days.

17.0 **'WRITING'** shall include any manuscript, type written or printed statement under the signature or seal as the case may be.
"The authorized representative of RAILTEL" shall mean the representative duly authorized by RailTel and can be the architect, or an official appointed by RailTel.

18.0 Law governing the contract and court jurisdiction:

The contract shall be governed by the Law for the time being in force in the Republic of India. The Civil Court at Delhi / New Delhi having ordinary Original Civil Jurisdiction shall alone have exclusive jurisdiction in regard to all claims in respect of this Contract.

19.0 Issue of Notice:

The Contractor shall furnish to the RAILTEL, the Name, Designation and Address of his authorized agent and all complaints, notices, communication and references shall be deemed to have been duly given to the Contractor, if delivered to the Contractor or his authorized agent or left at or posted to the address either of the Contractor or his authorized agent and shall be deemed to have been so given in the case of posting on the day on which they would have reached such address in the ordinary course of post or at which they were so delivered or left.

20.0 Use of Land:

No land belonging to RAILTEL or its customers under temporary possession of RAILTEL shall be occupied by the Contractor without the written permission of RAILTEL. Whenever such land is occupied by the Contractor for execution of works on permission of RAILTEL, the same shall be vacated by the Contractor within 2 days of

instructions from RAILTEL and no request for extension shall be entertained by RAILTEL.

21.0 Commencement and Completion of Work:

The Contractor shall commence and executed as per para 13 of Section II.

21.1 If the successful tenderer fails to commence the work within the stipulated time, RAILTEL, at its sole discretion, will have the right to cancel the contract. His Earnest Money and / or Security Deposit will stand forfeited without any further reference to him without prejudice to any and all of RAILTEL's other rights and remedies in this regard.

21.2 All the works shall be carried out under the direction and to the satisfaction of authorized representative of RAILTEL. The transported equipment erected / constructed plant or work performed under the Contract, as the case may be, shall be taken over when it has been completed in all respects and / or satisfactorily put into operation at site.

21.3 On the completion of work, authorized representative of RAILTEL shall issue a Provisional Acceptance Certificate for successful completion of work to his satisfaction jointly with the contractor.

21.4 The period of warranty shall start from the date of issue of such Provisional Acceptance Certificate, as above, for a period of one year. After completion of **warranty period**, a Final Acceptance Certificate shall be issued by the authorized representative of RAILTEL. The final acceptance shall take effect from the date of expiry of warranty period.

22.0 Measurement of work and Mode of payment:

All payments due to the Contractor shall be made by "Account Payee" through NEFT/RTGS.

22.1 Payments for the works shall be made in accordance with approved designs & drawings and measured in relevant units except where provided or otherwise. The measurements will be made generally in accordance with standard engineering practices. The abstract of quantities arrived shall be entered in the Measurement Book and signed by the Contractor & the authorized representative of RAILTEL.

22.2 90% (Ninety percent) of the progress payment for each item of Schedule shall be made after successful completion at various locations, joint measurement and testing to the satisfaction of Engineer.

22.3 Payment of 5% (Five percent) value of the works/services completed shall be made after the issue of Provisional Acceptance Certificate and supply of Documentation as per Para 16.10 of Section II.

22.4 On the basis of Final Acceptance Certificate from the RailTel for all the works at all the locations covered in this contract and reconciliation of materials issued, the final bill for the balance 5% payment for each item of work shall be submitted by the Contractor along with a clear '**No Claim Certificate**'. The Final Acceptance Certificate shall be issued by the RAITEL only when he has accepted the work wholly after conducting the acceptance tests.

22.5 Release of Performance Bank Guarantee shall be made after four months of issue of last FAC after adjustment of any dues payable by the contractor.

22.6 All recoveries due from the Contractor shall be affected in full from corresponding running bills unless specific approval from Competent Authority is obtained to the contrary.

22.7 Measurement shall be restricted to that quantity for which it is required to ascertain the financial liability of RAILTEL under this contract.
The Contractor shall bear the expenditure involved, if any, in making the measurements and testing of materials to be used / used in the work. The Contractor shall, without extra cost to RAILTEL, provide all the assistance with appliances and other things necessary for measurement.

22.8 If, at any time due to any reason whatsoever, it becomes necessary to re-measure the work done, in full or in part, the expenses towards such re-measurement shall be born by the Contractor only.

22.9 Passing of bills covered by such measurements does not amount to acceptance of RAILTEL of the completion of the work measured. Any left out work has to be completed by the contractor, as directed.

22.10 All measurement, method of measurement, meaning an intent of specifications and interpretation of Special Conditions of Contract, given and made by the authorized representative of RailTel shall be final and binding.

22.11 Subject to any deductions or recovery which the Railtel may be entitled to make under contract, the Contractor will be entitled to be paid from time to time by way of 'on account payment' for supply of goods and 'progress payment' for works as in the opinion of the Engineer he has executed in terms of Contract.

23.0 Rights of RailTel:

23.1 To withdraw any portion of work and / or to restrict / alter quantum of work as indicated in the contract during the progress of work and get it done through the contractor of the adjacent section and / or by the departmental labour to suit RAILTEL's requirements or in case RAILTEL decides to advance the compensation due to other emergent reasons.

23.2 To terminate the contract after due notice and forfeit the Security Deposit and get the balance work done through other agencies in addition to liquidated damages in the event of:

a) Contractor's continued poor progress.
b) Withdrawal from or abandonment of the work before completion of the work.
c) Corrupt act of the Contractor
d) Insolvency of the Contractor
e) Persistent disregard of the instructions of RAILTEL.
f) Non-fulfillment of any contractual obligations.

23.3 To recover any moneys due from the Contractor from out of any moneys due to the Contractor under this or any other Contract or from the Security Deposit.

23.4 To determine the Contract or to restrict the quantum of work and pay for the portion of work done as per the satisfaction of RAILTEL.

23.5 To effect recoveries from any amounts due to the Contractor under this or any other contract or in any other form the moneys which RAILTEL is forced to pay to anybody due to Contractor's failure to fulfill any of his obligations.

23.6 To restrict or increase the quantity and nature of work to suit site requirements, since the tender specifications are based on preliminary documents and quantities furnished therein are indicative and approximate and the rates quoted shall not be subject to revision in any manner whatsoever.

23.7 While every endeavour will be made by RAILTEL to this end, RAILTEL cannot guarantee uninterrupted work due to conditions beyond its control. The Contractor will not be entitled to any compensation / extra payment on this account.

In the event of any dispute of technical nature, the decision of RAILTEL shall be final and binding to the Contractor.

24.0 Responsibilities of Contractor in respect of local taxing rules, local laws, employment for workers etc.:

The following are the responsibilities of the Contractor in respect of observance of local laws, employment of personnel, payment of taxes etc.

24.1 The tenderer must be registered is relevant states for the payment of Works Contract Tax OR tenderer must register for the same and produce the same along with the bills for payment.

24.2 As far as possible, unskilled workers shall be engaged from the local areas in which the work is being executed.

24.3 The Contractor at all times during the continuance of this contract, shall in all his dealings with the local labour for the time being employed on or in connection with the work, has due regard to all local festivals, religious and other customs.

24.4 The Contractor shall comply with all State and Central Laws, Statutory Rules, Regulations etc., such as The Payment of Wages Act, The Minimum Wages Act, The Workmen's Compensation Act, The Employer's Liability Act, The Industrial Disputes Act, The Employee's Provident Fund Act, Employee's State Insurance Scheme, The Contract Labour (Regulations and Abolitions Act, 1970) and other Acts, Rules and Regulations for labour as may be enacted by the Government during the tenure of the Contract and having force or jurisdiction at site. The Contractor shall give to the local Governing Body, Police and other concerned authorities all such notice as may be required under law.

24.5 The Contractor will obtain independent licence under the Contract Labour (Regulations and Abolition Act, 1970) from the concerned authorities based on the certificate (Form - V) issued by the principal employer / customer, if such license is required under the law.

24.6 The Contractor shall pay all taxes, fees, licence charges, deposits, duties, tolls, royalty, commissions or other charges which may be leviable on account of any of his operations connected with this contract. In case, RAILTEL is forced to make any such payment, RAILTEL shall recover the same from the Contractor either from moneys due to him or otherwise as deemed fit.

24.7 The Contractor shall be responsible for the provision of health and sanitary arrangements more particularly described in the Contract Labour (Regulations and Abolition Act, 1970) and safety precautions as may be required for safe and satisfactory execution of the contract.

24.8 The Contractor shall be responsible for proper accommodation including adequate medical facilities for the personnel employed by him.

24.9 The Contractor shall be responsible for the proper behaviour and observance of all regulations by the staff employed by him.

24.10 The Contractor shall ensure that no damage is caused to any person / property of other parties working at site. If any such damage is caused, it shall be the responsibility of the Contractor to make good the losses and compensate them.

24.11 All the properties/equipment/components of RAILTEL loaned with or without deposit, to the Contractor shall remain the properties of RAILTEL. The Contractor shall use such properties for the purpose of execution of this contract. All such properties/ equipment / component shall be taken to be in good condition unless notified to the contrary by the Contractor within 48 hours. The Contractor shall return them in good condition as and when required by RAILTEL. In case of non-return, loss, damage, repairs etc., the cost thereof, as may be fixed by the Engineer, will be recovered from the Contractor.

24.12 It shall not be obligatory on the part of RAILTEL to supply any tools and tackles or materials other than those specifically agreed to be given by RAILTEL.

24.13 The Contractor shall fully indemnify and keep indemnified RAILTEL against all claims of whatever nature arising during the course of execution of this contract.

24.14 In case the Contractor is required to undertake any work outside the scope of this contract, the amount payable shall be as may be mutually agreed upon.

24.15 Any delay in completion of works or non-achievement of periodical targets, due to reasons attributable to the Contractor, will have to be compensated by the Contractor either by increased manpower and resources or by working extra hours or more than one shift at no extra cost to RAILTEL.

24.16 The Contractor will be directly responsible for payment of wages to his workmen. A pay-roll sheet giving details of all payments made to the workmen duly signed by the Contractor's representative should be furnished to RAILTEL, if called for.

24.17 In case of any class of work for which there is no specification laid down in the contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.

24.18 No levy, payment or charges made or imposed shall be impeached by reason of any clerical error or by reason of any mistake in the amount levied, demanded or charged.

24.19 No idle labour charges will be admissible in the event of any stoppage of work resulting in the Contractor's workmen being rendered idle due to any reason at any time.

24.20 The Contractor shall take all reasonable care to protect the materials and the work till such time it has been taken over by RAILTEL.

24.21 Contractor shall not stop work or abandon the site for whatsoever reason or dispute, excepting for force majeure conditions. All problems / disputes shall be separately discussed and settled without effecting the progress of work. Stoppage or abandonment of work other than under force majeure conditions shall be treated as breach of work of contract and dealt with accordingly.

24.22 The Contractor shall keep the area of work clean and shall remove the debris etc. outside of RailTel's premises, while executing day-to-day work. Upon completion of work, the Contractor shall remove from the vicinity of work, all scrap, packing materials, rubbish, unused and other materials and deposit them in places specified by the Engineer. The Contractor will also demolish all the hutments, sheds, offices, etc., constructed and used by him and shall clean the debris. In the event of his failure to do so, the same will be arranged to be done by the RAILTEL and the expenses recovered from the Contractor.

24.23 The Contractor shall execute the work in the most substantial and workmen like manner in the stipulated time. Accuracy of work and timely execution shall be the essence of this contract. The Contractor shall be responsible to ensure that the quality, assembly and workmanship conform to the dimensions and clearance given in the drawings and/or as per the instructions of the Engineer.

24.24 The Contractor shall furnish fortnightly labour deployment report indicating the classification and number of workmen engaged, date wise and category wise. Besides, the Contractor shall also furnish progress reports on work at regular intervals as required by the Engineer.

25.0 Responsibility of contractor in respect of safety of men, equipment, material and environment:

All safety rules and codes applied by RAILTEL at site shall be observed by the Contractor and his workmen without exception. The Contractor shall be responsible for the safety of the equipment / material and work to be performed by him.

25.1 Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer, with a view to prevent pilferage, accidents, fire hazards etc. Suitable number of Clerical Staff, watch and ward, Storekeepers to take care of equipment, material, construction tools and tackles shall be posted at site by the Contractor till the completion of work under this contract. The Contractor shall arrange for such safety devices as are necessary for this type of work and carry out the requisite site tests of handling equipment, lifting tools, tackles etc. as per usual standards and practices.

25.2 The Contractor shall provide to its work force and ensure the use of the following personal protective equipment as found necessary:

Safety Helmets conforming to IS – 2925.
Safety Belts conforming to IS – 3521.
Safety Shoes conforming to IS – 1989.
Eye & Face Protection devices conforming to IS – 8520 & IS – 8940.
Hand & Body Protection devices conforming toIS – 2573, IS – 6994, IS –8807 & IS 8519.

25.3 All tools, tackles, lifting appliances, material handling equipment, scaffolds, cradles, safety nets, ladders, equipment etc. used by the Contractor shall be of safe design and construction. These shall be tested and certificate of fitness obtained before putting them to use and from time to time as instructed by authorized RAILTEL official who shall have the right to ban the use of any item.

25.4 All electrical equipment, connections and wiring for construction power, its distribution and use shall conform to the requirements of Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the Contractor to carry out all types of electrical works. All electrical appliances including portable electric tools used by Contractor shall have safe plugging system to source of Power and be appropriately earthed.

Where it becomes necessary to provide and / or store petroleum products, explosives, chemicals and liquid or gaseous fuel or any other substance that may cause fire or explosion, the Contractor shall be responsible for carrying out such provision and / or storage in accordance with the rules and regulations laid down in the relevant Government Acts, such as Petroleum Act, Explosive Act, Petroleum and Carbide of Calcium Manual of the Chief Controller of Explosives, Government of India etc. Prior approval of the authorized RAILTEL official at the site shall also be taken by the Contractor in all such matters.

25.5 The Contractor shall arrange at his cost (wherever not specified) appropriate illumination at all work spots for safe working, when natural daylight may not be adequate for clear visibility.

25.6 In case of a fatal or disabling injury/accident to any person at construction sites due to lapses by the Contractor, the victim and/or his/her dependants shall be compensated by the Contractor as per statutory requirements. However, if considered necessary, RAILTEL shall have the right to impose appropriate financial penalty on the Contractor and recover the same from payments due to the Contractor for suitably compensating the victim and/or his/her dependents. Before imposing any such penalty, appropriate enquiry shall be held by RAILTEL giving opportunity to the Contractor to present his case.

25.7 In case of any damage to property due to lapses by the Contractor, RAILTEL shall have the right to recover the cost of such damages from the payments due to the Contractor after holding an appropriate enquiry.

25.8 In case of any delay in the completion of a jobs due to mishaps attributable to lapses by the Contractor, RAILTEL shall have the right to recover cost of such delay from the payments due to the Contractor, after notifying the Contractor suitably and giving him opportunity to present his case.

25.9 If the Contractor fails to improve the standards of safety in its operation to the satisfaction of RAILTEL, after being given reasonable opportunity to do so and / or if the Contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the authorised RAILTEL official, RAILTEL shall have the right to take the corrective steps at the risk and cost of the Contractor after giving a notice of not less than seven days indicating the steps that would be taken by RAILTEL.

25.10 The Contractor shall submit report of all accidents, fires, Property damage and dangerous occurrences to the authorized RAILTEL official immediately after such occurrence, but in any case not later than 12 hours of the occurrence. Such reports shall be furnished in the manner prescribed by RAILTEL. In addition, periodic reports on safety shall also be submitted by Contractor to the authorized RAILTEL official from time to time as prescribed.

25.11 During the course of construction, alteration or repair scrap lumbers with protruding nails, sharp edges etc., and all other debris including combustible scrap shall be kept cleared from working areas, passage ways and stair in and around site.
Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck or permitted to strike each other violently. When cylinders are transported by powered vehicles, they shall be secured in a vertical position.

25.12 Deleted.

25.13 Contractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, erection site, other temporary structures, labour colony area etc. Access to such fire protection equipment shall be easy and kept open at all times. Compliance of the above requirement under fire protection shall in no way relieve the Contractor of any of his responsibility and liabilities to fire accident occurring. In the event fire safety measures are not to RAILTEL's satisfaction, RAILTEL shall have option to provide the same and recover the cost plus incidentals from Contractor's bills and / or impose penalty as deemed fit by the authorised representative of RAILTEL.

26.0 Deleted.

27.0 Insurance:

27.1 Contractor shall arrange for insuring all the materials covering the risks during transit, storage, erection and commissioning. It shall be the sole responsibility of the Contractor to insure his workmen against risks of accidents and injury while at work as required by the relevant Rules and to pay compensation, if any, to them as per Workmen's Compensation Act. The Contractor shall also insure his staff against accidents. The work will be carried out in a protected area and all the Rules and Regulations of RAILTEL/its Client in the Project Area which is in force from time to time will be followed by the Contractor.

If due to negligence and/or non-observance of safety and other precautions, any accident/injury occurs to any other persons/public, the Contractor shall pay necessary compensation and other expenses, if so decided by the appropriate authority.

27.2 The Contractor will take necessary precautions and due to protect the material, while in his custody from any damage/loss till the same is taken over by RAILTEL or customer. For lodging/processing of insurance claim the Contractor will submit necessary documents. RAILTEL will reserve the right to recover the loss from the Contractor, in case the damage/loss is due to carelessness/negligence on the part of the Contractor. In case of any theft of material under Contractor's custody, matter shall be reported to police by the Contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to RAILTEL for taking up with insurance.

28.0 Strikes and lockouts:

The Contractor will be solely responsible for all disputes and other issues connected with his workmen. In the event of Contractor's workmen resorting to strike or the Contractor resorting to lockout and if the strike or lockout so declared is not settled within a period of one month, RAILTEL shall have the right to get the work executed by employing its own men or through other agencies or both. The cost incurred by RAILTEL in this regard shall be recovered from the Contractor.
For any purpose whatsoever, the employees of the Contractor shall not be deemed to be in the employment of RAILTEL.

29.0 Force Majeure:

The following shall amount to force majeure conditions. Acts of God, Acts of any Government, War, Sabotage, Riots, Civil Commotion, Police Action, Revolution, Flood, Fire, Cyclone, Earthquake and Epidemic and other similar causes over which the Contractor has not control.

29.1 If the Contractor suffers delay in the due execution of the contract, due to delays caused by force majeure conditions, as defined above, the agreed time of completion of the work

covered by this contract shall be extended by a period of time equal to the period of delay, provided that on the occurrence of any such contingency, the Contractor immediately reports to RAILTEL in writing the cause for the delay but the Contractor shall not be eligible for any compensation on this account.

30.0 Guarantee:

Even though the work will be carried out under the supervision of the authorized representative of RAILTEL, the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of **one year from the date of completion of work** as certified by the authorized representative of RAILTEL and shall rectify free of cost to RAILTEL all defects arising out of faulty erection during the guarantee period starting from the date of completion of rectification. In the event of the Contractor failing to repair the defective works within the time specified by the authorized representative of RAILTEL may proceed to undertake the repairs of such defective works at the Contractor's risk and cost, without prejudice to any other rights and recover the same from out of any moneys payable to the Contractor or by other legal means.

31.0 Arbitration:

31.1 With Private Parties

All disputes between the parties to the contract arising out of or in relation to the contract, other than those for which the decision of the Engineer or any other person is by the contract expressed to be final and conclusive, shall after written notice by either party to the contract to the other party, be referred to sole arbitration of the Regional General Manager/Northern Region or his nominee. The arbitration shall be conducted in accordance with the provisions of the Arbitration and Reconciliation Act, 1996. The parties to the contract understand and agree that it will be no objection that the Regional General Manager /Northern Region or the person nominated as Arbitrator had earlier in his official capacity to deal directly or indirectly with the matters to which the contract relates or that in the course of his Official duties had expressed views on all or any of the matters in dispute or difference. The award of the Arbitrator shall be final and binding on the parties to this contract. In the event of the Arbitrator dying, neglecting or refusing to act or resigning or being unable to act for any reason or his award being set aside by the Court for any reason, it shall be lawful for the Regional General Manager/Northern Region or his successor, as the case may be, either to act himself as the Arbitrator or to appoint another Arbitrator in place of the outgoing Arbitrator in the manner aforesaid. The Arbitrator may, from time to time, with the consent of both the parties to the contract, enlarge the time for making the award. Work under the contract shall be continued during the arbitration proceedings. The venue of the Arbitration shall be Delhi only.

31.1.1 The Tenderers has to enter in the register all the material / tools and plants brought to the site for working in the premises available with the Security Staff / Site Incharge / Site Register.

31.1.2 The Tenderers should get all the materials inspected and approved from the authorized representative of RAILTEL before use. In case of non-approval, if authorized representative of RAILTEL wish to check the material, cost of breakages and redoing the same Work will be the sole responsibility of the Contractor own.

31.1.3 The rates should be quoted in the same units as mentioned in the tender schedule. The Bill of Quantities enclosed are very indicative and can vary as per the Site conditions,

requirements of RAILTEL or Design of authorized representative of RAILTEL and the rates quoted shall not be subject to revision.

31.1.4 The rates quoted in the tender shall include all charges of material, labour, lifts, scaffoldings, any tools & plants, freight, labour conditions, fluctuations in the rates, Sales tax, excise duty, shift working, Octroi & other taxes and shall be firm for the duration of the contract and any extended period of the contract. No escalation in the rates shall be allowed under any circumstances even in case of extension of time period.

31.1.5 The successful Tenderer is bound to carry out all the items of work necessary for the completion of the job even though the same may not have been included in the schedule of quantities.

31.2 With CPSE/ Govt. Department/ Govt. Organisation

31.2.1 In the event of any dispute or difference relating to the interpretation and application of the provisions of the contracts, such dispute or difference shall be referred by either party for Arbitration to the sole Arbitrator in the Department of Public Enterprises to be nominated by the Secretary to the Government of India in-charge of the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any party aggrieved by such award may make a further reference for setting aside or revision of the award to the Law Secretary, Department of Legal Affairs, Ministry of Law & Justice,Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary/Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the Parties finally and conclusively. The Parties to the dispute will share equally the cost of arbitration as intimated by the Arbitrator.

32. QUANTUM OF WORK AND VARIATION IN QUANTITIES

32.1 The quantities indicated in Schedule of Requirements are approximate and purport to convey the tenderer an idea of the magnitude of the work. The Contract value may vary within +/-25% of the grand total of schedule of requirements in case of variation in quantities the contractor shall be bound to carry out the work at the rates agreed in the schedule up to the limit of +/-25% variation in the value of contract and shall not be entitled to any claim or any compensation whatsoever.

32.2 The quantities quoted in the Schedule are not firm and may be varied during currency of the Contract.

32.3 RailTel reserves the rights to vary the quantity by 50% above or below the SOR. For variation in quantities beyond +25%, a rebate of 2% shall be applicable up to variation of +40%. For variation in quantities beyond +40% & up to +50%, an additional rebate of 2% shall be applicable. For variation in quantities beyond +50%, rates shall be fixed after holding negotiations with the tenderer.

32.4 All the work executed should be got approved by the authorized representative of RAILTEL and in case of any bad workmanship pointed out shall be either rectified or be taken away from the site if it is not rectifiable and shall be replaced without any extra cost by the Tenderer.

32.5 All Government taxes, levies etc. like Works Contract – Sales Tax, TDS shall be deducted from all the running bills of the Contractors.

32.6 All the works executed or under execution finished or semi-finished including all materials lying at site shall become the property of RAILTEL immediately on receipt of bills of the Contractors for the same.

32.7 The procurement of Cement, Steel, as required for completion of work shall be the responsibility of the Contractor.
All Fittings / Fixtures, Materials shall confirm to the relevant ISI specifications and approval of Authorised representative of RAILTEL.

****

Section IV
(Special Conditions of Contract)

1. The Tenderer should study all the Tender documents carefully and understand the conditions, drawing, specifications, design etc. before quoting. In case of non availability of any information or documents in the Tender Document or if there are any doubts, the Contractor shall obtain clarification either from authorized representative of RAILTEL in writing before submission of Tender and authorized representative of RAILTEL shall not be responsible for the same in any manner whatsoever.

2. The Tenderer shall take work permit from the concerned authorities, if required, before starting the Work.

3. The Tenderer has to obtain the required security permissions from the concerned authority if applicable prior to the commencement of the Work and should furnish the list of workers/staff for issue of temporary passes, if required.

4. All entries in the Tender document should be in ink/typed. Corrections, if any should be attested by full signature of the Tenderer.

5. The Tenderer or his authorized representative shall sign every page of the Tender documents. (Power of Attorney to be submitted)

6. All erasures and alterations made while filling the tender must be attested by initials of Tenderers. Over writing of figures is not permitted.

7. No page of this Tender shall be removed and the set must be submitted as it is. EACH PAGE OF THE TENDER FORM IS TO BE SIGNED ALONG WITH THE STAMP OF THE COMPANY/FIRM.

8. RAILTEL do not bind them to accept the lowest Tender and reserves the right to reject any or all the Tenders.

9. Joint Tenders shall not be accepted / considered.

10. The Tenderers shall remove all debris/wastes etc. wash and clean the floors and hand over the site quite clean on completion of the work.

11. Deleted.

12. **Penalty for delay in completion:**

12.1. If the contractor fails to execute and complete the work within the time specified in the Agreement/ Work Order or within the period of extension granted, the contractor shall accept reduction in the total amount payable to him by the purchaser at the rate of 0.5% per week or part thereof (rounded off to the nearest whole number) of the total value of the work order for the actual delay occasioned beyond the appointed time by which the work shall have been completed under the contract, for the reasons beyond his control.

12.2. The total value of penalty on account of above shall be limited to maximum of 10% (Ten percent) of the total work order value.

12.3. Such reduction shall be accepted by the purchaser in full satisfaction of the contractor's liability arising from delay only. This penalty for delay in completion will be applicable separately for each stage of completion of work when two or more stage of completion is specified in the contract. The purchaser's engineer shall at his sole discretion specify a time limit within which the unfinished portion of the work shall be completed after serving on the contractor a notice of Purchaser's intention to recover the said penalty in Form - 4.

NOTE: For purpose of this para, the value of work shall be calculated on the basis of unit prices included in schedule of requirements

13. **Adherence of time schedule**

13.1. Timely completion of the work is the essence of the contract. While delay in execution will attract penalty.

13.2. If any delay have arisen from any cause which the RAILTEL may agree as being a reasonable ground for extension of time, the authorized representative of RAILTEL may allow such additional time as he may in his absolute discretion consider to be reasonably justified by the circumstances of the case. Such extensions shall be granted, on request from contractor, **with or with out** liquidated damages.

14. The work as detailed in this Tender shall be executed and completed in all respects in accordance with the Tender document, instruction to Tenderers, Bill of Quantities, Conditions of the Contract, technical specification, schedules and Drawings to the satisfaction of authorized representative of RAILTEL.

15. **Warranty and Maintenance**

The section is to be maintained for a period of one year. The following things must be covered in this maintenance:

15.1. Any defect arising out of bad workman ship must be rectified.

15.2. Manufacturing defects as may be detected during this period must be repaired or replaced as the case may be.

15.3. Any defective material that may be noticed must be replaced.

15.4 For this maintenance, work must be completed within 24 hours from the time it is notified. In case the same is not complied with requisite penalty will be imposed and amount recovered from your security deposit.

_____

SIGNATURE OF TENDERER WITH RUBBER STAMP

Forms

Of

Tender

FORM-1

Offer Letter

1. I/We hereby declare that I/We _____ have read the various conditions to tender attached here to and hereby agree to ABIDE BY THE SAID CONDITIONS. I/We also agree to keep this tender open for acceptance for a period of 90 days from the date fixed for opening the same and in default thereof, I/We will be liable for forfeiture of my/our Earnest Money. I/We offer to do the work of "_____ _____Name of the work_____" at the rates quoted in the attached schedule and hereby bind myself/ourselves to complete the work within ------- days from the date of issue of Letter of Acceptance of the tender. I/We also hereby agree to abide by the Various Conditions of Contract and to carry out the work according to the Specifications for materials and works laid down by the RailTel for the present contract.

2. I/We understand that our tender will not be considered, if the offered rates are not written unambiguously.

3. I/We hereby confirm that only the relevant entries asked for have been made within the tender documents issued to us. I/We also confirm that in the event of any entry in this document, other than the relevant entry, shall make this tender invalid.

4. I/We hereby agree to obtain the registration number under the Contract Labour Act by registering with the Labour Commissioner and furnish the registration details to RailTel Corporation of India Limited.

5. I/We hereby also agree to get my/our firm registered with the Sales Tax Department of Government of relevant states for Works Contract Tax as per the current law, as applicable.

6. I/We hereby agree to obtain Employer's number from the Employee's State Insurance Corporation and the Provident Fund Commissioner. In the event of our not being able to provide the above said number, I/We agree to RailTel Corporation of India Limited retaining appropriate amounts at the stipulated percentage rates towards ESIC and PF covering employees and employers contribution from our interim and final bills and refunding the same to us on our providing the proof of having complied with the requirements of the relevant Acts regarding payment. We also agree that in case, I/We are unable to obtain these numbers for ESIC and PF, RailTel Corporation of India Limited may remit such amounts to the appropriate authorities.

7. I/We agree to submit to RailTel Corporation of India Limited necessary reports and returns as required for compliance of ESIC & PF regulations.

8. A sum of **Rs. 60,000/- (Rupees Sixty Thousand Only)** is herewith forwarded as "Earnest Money". The full value of Earnest Money shall stand forfeited without prejudice to any other rights or remedies if,

   I/We do not execute the contract agreement within 15 days from the date of issue of LOA issued by the RailTel or, I/We do not commence the work within ------days after receipt of orders to that effect.

9. Until a formal agreement is prepared and executed the acceptance of this tender shall constitute a binding contract between us subject to modifications, as may be mutually agreed to between us and indicated in the "Letter of Acceptance" of my/our offer for this work.

10. I have enclosed a list of document as per the list in Annexure to this declaration.

Date: _____

_____

SIGNATURE OF TENDERER WITH RUBBER STAMP

Place: _____

FORM – 2

Contract Agreement Form

An AGREEMENT made this _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ day of _ _ _ _ _ _ _ _ _ _ _ _ _ _ Two thousand and Sixteen, between RailTel Corporation of India Limited, Delhi-110053 , acting in the premises through Regional General Manager or his representative _ of RAILTEL CORPORATION OF INDIA LIMITED, (a Company with its Registered and Regional Office at 6th Floor, Block-III, Delhi IT Park, Shastri Park, Delhi – 110 053) (hereinafter referred to as 'RailTel ') of one part and M/s _ (Hereinafter referred to as 'contractor') of the other part.

Whereas in response to a call for Tender for _ , Delhi –110 053 as per Tender papers at Annexure 'A' hereto the Contractor has submitted a Tender as per Annexure 'B' hereto and whereas the said Tender of the Contractor has been accepted for as per copy of Letter of Acceptance of Tender No. _ dated _ _ _ _ _ _ _ _ _ _ complete with enclosures at the accepted rates and agreed deviations from Tender Papers _ as per Annexure-C hereto and at an estimated contract value of Rs. _ (Rupees _ only).

Now this agreement witnesses that in consideration of the premises and the payment to be made by the Purchaser to the Contractor provided for herein below the Contractor shall supply all equipment and materials and execute and perform all works for which the said Tender of the Contractor has been accepted strictly according to the various provisions in Annexure 'B' and 'C' hereto and upon such supply, execute and performance to the satisfaction of the purchaser and the purchaser shall pay to the Contractor at the rates accepted as per the said Annexure 'C' and in terms of the provisions therein.

In the witness where of the parties have hereunto set and subscribed their respective hands and/or seals day and year respectively mentioned against their respective signatures.

Signed and delivered at _ by Shri_ _for and on behalf of M/s._ _, the contractor within named in the presence of

1. Signatures
   Date
   Name in Block Capitals
   Address

2. Signatures
   Date
   Name in Block Capitals
   Address

Signed and delivered at _ for and on behalf of RailTel by Shri _ (Regional General Manager/Northern Region or his successor) in the presence of:-

1. Signatures

Date
Name in Block Capitals
Address

2. Signatures

Date
Name in Block Capitals
Address

Annexure 'A': Tender Paper _

Annexure 'B': Firm's offer . _

Annexure 'C': Letter of Acceptance . _

FORM – 3

Guarantee Bond for Security Deposit

(On Stamp Paper of requisite value)
(To be used by approved Scheduled Banks)

1. In consideration of the office of the Regional General Manager, RAILTEL CORPORATION OF INDIA LIMITED, (a Company with its Registered and Regional Office at 6th Floor, Block-III, Delhi IT Park, Shastri Park, Delhi – 110 053) (Herein after called RailTel) having agreed to exempt _ (Hereinafter called " the said Contractor(s)") from the demand, under the terms and conditions of an Agreement No. _ dated _ _ _ _ _ _ _ _ _ _ _made between _ and _ for (hereinafter called " the said Agreement") of security deposit for the due fulfillment by the said Contractor (s) of the terms and conditions contained in the said Agreement, or production of a Bank Guarantee for Rs._ _ _ _ _ _ _ _ _ (Rs _ only). We, _(indicate the name of the Bank) hereinafter referred to as " the Bank") at the request of _ Contractor(s) do hereby undertake to pay the RailTel an amount not exceeding Rs. _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ . Against any loss or damage caused to or suffered or would be caused to or suffered by the RailTel by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

2. We _ bank do hereby undertake to pay the amounts due and payable under this Guarantee without any demur, merely on demand from the RailTel stating that the amount is claimed is due by way of loss or damage caused to or would be caused to or suffered by the RailTel by reason of breach by the said Contractor(s) of any of terms or conditions contained in the said Agreement or by reason of the Contractor(s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _ only.

3. We, _ bank undertake to pay to the RailTel any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) / Supplier(s) in any suit or proceedings pending before any court or Tribunal relating thereto our liability under this present being, absolute and unequivocal. The payment so made by us under this Bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s) / Supplier(s) shall have no claim against us for making such payment.

4 We, _ bank further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the RailTel under or by virtue of the said Agreement have

been fully paid and its claims satisfied or discharged or till RailTel certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this Guarantee. Unless a demand or claim under the Guarantee is made on us in writing on or before the _, we shall be discharged from all liability under this Guarantee thereafter.
We, _ (indicate the name of Bank) Further agree with the RailTel that the RailTel shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the Agreement or to extend time of to postpone for any time or from time to time any of the powers exercisable by the RailTel against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension to the said Contractor(s) or for any forbearance, act or omission on the part of RailTel or any indulgence by the RailTel to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have affect of so relieving us.
This Guarantee will not be discharged due to the change in the Constitution of the Bank or the Contractor(s) Supplier(s).

We _ (indicate the name of Bank) lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the RailTel in writing.

Dated the __________ day of __________ 2016

for ……………………………………………..
(indicate the name of the Bank)

Witness

1. Signature
   Name

2. Signature
   Name

NOTE: The Guarantee shall be valid for a period of four months after the expiry of the warranty period of the equipment as per clause 14.c.

FORM – 4

Extension of period of completion of Work on Contractor's account

No. Date:

To,

……..

……..

Sub: (Name of Work)
1. Acceptance Letter No.
2. Agreement No.

Ref: …….(Quote specific application of the Contractor for extension to date, if received).

Dear Sir,

The stipulated date for completion of the work mentioned above is……. From the progress made so far and the present rate of progress, it is unlikely that the work will be completed by the above date (or However, the work was not completed on this date).

Expecting that you may be able to complete the work if some time is given the Regional General Manager (Northern Region) RailTel Corporation of India Limited, Delhi although not bound to do so, hereby extends the time for completion from _ __ _ _ _ _ _ _ _ _ _ _ _ to _ _ _ _ _ _ _ _ _ _ _ _ _ .

Please note that an amount equal to 0.5% of the total value of the contract per week or part thereof (rounded off to the nearest whole number) subject to a maximum of 10% of the total contract value of the works as a recovery for delay in the completion of the work after the expiry of (1) ……. will be recovered from you as mentioned in para 12 chapter II, section II of the special conditions of contract for the extended period notwithstanding the grant of this extension. You may proceed with the work accordingly. **(applicable when the extension has been granted with liquidated damages).**

The above extension of the completion date will also be subject to the further condition that no increase in rates on any account will be payable to you.

Please intimate within a week of the receipt of this letter your acceptance of the extension on the conditions stated above.

Please note that in the event of declining to accept the extension on the above said conditions or, in the event of your failure after accepting or acting up to this extension to complete the work by (2)_ (mention the extended

date here), further action will be taken in terms of relevant para of special conditions of contract.

Yours faithfully,
for & on behalf of RailTel Corporation of India Limited

Note:

1. **[Give here the stipulated date for completion without any penalty fixed earlier.]**
2. **[Here mention the extended date.]**

FORM – 5

Statement of Deviations

PROFORMA FOR STATEMENT OF DEVIATIONS

1. The following are the particulars of deviations from requirement of the Instructions to Tenderers and Conditions of Tendering , Preamble and Special conditions of Contract.

1.1 Instructions to Tenderers and Conditions of Tendering

Clause	Deviation	Remarks (Including Justification)

1.2 Preamble

Clause	Deviation	Remarks (Including Justification)

1.3 Special conditions of Contract.

Clause	Deviation	Remarks (Including Justification)

2. The following are the particulars of deviations from requirement of the technical specifications.

Annexure	Clause	Deviation	Remarks (Including Justification)

Notes:

Where there is no deviation, the statement should be returned duly signed with an endorsement indicated no deviations.

SIGNATURE AND SEAL OF THE
MANUFACTURER / TENDERER

FORM - 6

STANDING INDEMNITY BOND

(For on Account Payments and Stores supplied by RailTel)

(On Stamp paper of Requisite Value)

We, M/s _____ hereby undertake that we hold at our Stores Depot/s at _____ for and on behalf of RailTel Corporation of India Limited in the premises through Regional General Manager (Northern Region) or his successor hereinafter referred to as "the Purchaser" all materials for which 'On Account' payments have been made to us against the Contract for ---------- vide letter of Acceptance of Tender No. _____ and the materials handed over to us by the Purchaser for all purpose of execution of the said Contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of said materials against all risk till they are duly delivered as erected equipment to the purchaser or as he may direct otherwise and shall indemnify the Purchaser against any loss, damage or deterioration whatsoever in respect of the said materials while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any engineer authorized by the Regional General Manager (Northern Region), whose address will be intimated in due course.

Should any loss, damage or deterioration of materials occur or surplus materials disposed off and refund becomes due, the purchaser shall be entitled to recover from us the full cost as per prices included in the Contract (as applicable) and also compensation for such loss or damage, if any, along with the amount to be refunded without prejudice to any other remedies available to his by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

Dated this _____ day of _____ 2016

for and on behalf of
M/s _____
(Contractor)

Signature of witness

Name and witness in Block letters

Address

Form No. 7

Progress Report

Name of the section

Weeks	Trenching	Protective Works	Duct laying	Placing of Jointing Pits at sites	Splicings	Termination of OFC	Testing of OFC	Testing of HDPE Duct (Integrity Test)	Blowing of OFC	Joint/Route Markers		Final Testing & Commissioning
										RCC		
Week 1												
Week 2												
Week 3												
Week 4												
Week 5												
Week 6												
Week 7												
Week 8												
Week 9												
Total												

FORM No. 8

QUALIFICATION EXPERIENCE

Details of works executed and under execution during the last 3 years (including the current Year) should be furnished in the following format.

S.No.	Name of Project and Description of work.	Party's Address of whom the work was done	Total value of contract (in Indian Rupees)	Schedule period of Completion (Mention Period)	Actual period of Completion (Mention Period)	Reference Page for Satisfactory Performance of Work From the Authorised User	Remarks

Note: A certificate from the organization, for which the work was executed, should preferably be executed to indicate that the contract was satisfactorily performed.

Form No.9

USER's CERTIFICATE
(To be given by Authorised Person on the Organisation Letter Head)

Name of the Firm

Contract No. & date

Contract Amount (in Indian Rupees)

Completion Period as per contract

Data of Commencement
Actual date of Successful Completion

Contractor's Performance

Dated:

Name:

Designation:

Signature of the User

with Company Seal

Form No.10

SYSTEM PERFORMANCE GUARANTEE

PROFORMA FOR THE SYSTEM PERFORMANCE GUARANTEE

To

The Regional General Manager / Northern Region,

I/We……. Hereby guarantee that the design on the basis of which we have submitted our tender no ……. Has been carefully made to conform to the end objectives in the tender documents and to technical specification therein. We further guarantee that in the event of the performance of the system, when installed, not complying with the end objectives or with the specifications, contained in the tender documents, we shall provide further inputs to enable the Railtel to realize the end objectives contained in these documents without any additional payment for any additional equipment which may be required in this regard. We further guarantee that all the expenses for providing the additional inputs under the System Guarantee will be born by us. We further guarantee that these additional inputs will be provided by us to make the system workable within 1 months from the date on which this guarantee is invoked by the purchaser. The guarantee is valid for a period of one year from the date of commissioning of the system

(Signature of Firm's Authorized Officer)
Seal

Signature of witness:

1. …….

2. …….

FORM-11

Format for instruction to be provided by Vendor/Lessor/Employee for NEFT/RTGS payment to be made to them by RailTel.

Date:

To
RGM/NR,
M/s RailTel Corporation of India of India Ltd.
6th floor, Block-III, Delhi IT Park,
Shastri Park, Delhi-110 053

Dear Sir,

Sub: Bank details for payment through NEFT/RTGS for payments below/above Rs.1,00,000/- for Vendors, Employees/Lessors.

We authorize you to make payment of dues/bills to us in NEFT mode against the particulars mentioned below:

1. Name of the Agency/Employee/Lessor as given in Bank account:
2. Name of the Bank:
3. Bank Branch & address:
4. Bank account no.:
5. Bank account type(Savings/Current):
6. IFSC code:
7. Agency's/Employees/Lessor Address:
8. Agency's/Employees/Lessor telephone & mobile no:
9. Cancelled cheque

We also enclosure herewith a copy of cancelled cheque of the above mentioned bank account for verification of particulars.

We hereby declare that the above particulars given above are correct and complete.

Encl: As above.

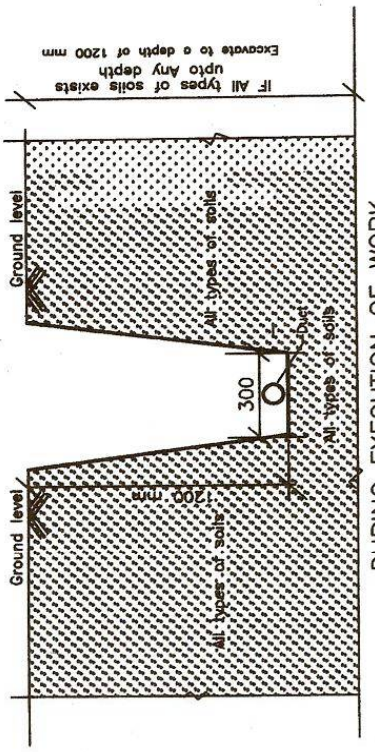
(Sign & Seal of the Vendor/Signature of Employee/Lessor)

Certified that the particulars furnished at item no.1 to 6 above are correct as per records.

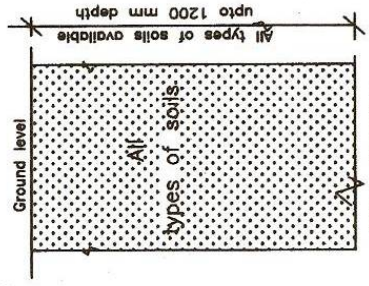
Signature of Authorised
Official from the Bank.

Section III

Drawings

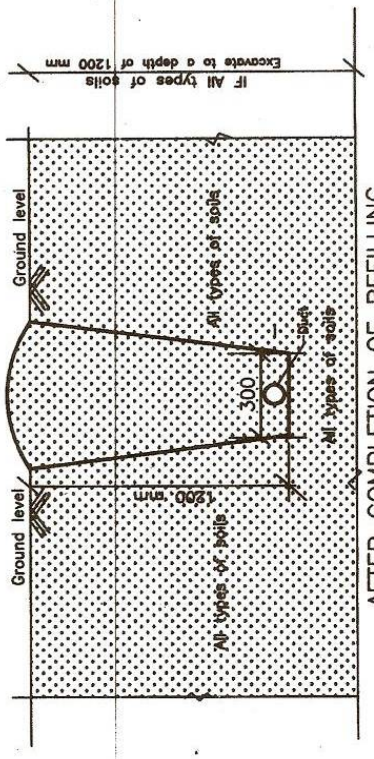


DURING EXECUTION OF WORK.
FIG.1.2



SOIL STRATA.
FIG.1.1

Note: All dimensions are in millimetres.



AFTER COMPLETION OF REFILLING.
FIG.1.3

RAILTEL CORPORATION OF INDIA Ltd..	
RGM/SR/SC.	DRG No.RAILTEL/SR/OFC/2008/1.
SKETCH SHOWING THE PROCEDURE FOR EXCAVATION OF CABLE TRENCH IN ALL TYPES OF SOILS (Normal soil/Soft soil/Sandy soil)	
NOT TO SCALE	
CONSULTANT.	(G VEERASWAMY)
MANAGER/PROJ	(M MURALI KRISHNA)
AGM/SC.	(P V MURALI KRISHNA)

SOIL STRATA.
FIG.2.1

DURING EXECUTION OF WORK.
FIG.2.2

AFTER COMPLETION OF REFILLING.
FIG.2.3

Note: All dimensions are in millimetres.

RAILTEL CORPORATION OF INDIA Ltd.	
RGM/SR/SC.	DRG No.RAILTEL/SR/OFC/2008/2.
SKETCH SHOWING THE PROCEDURE FOR EXCAVATION OF CABLE TRENCH IN Hard Morrum/Soft Rocky soil	
NOT TO SCALE	
CONSULTANT. (G VEERASWAMY)	
MANAGER/PROJ (M MURALI KRISHNA)	
AGM/SC. (P V MURALI KRISHNA)	

Ground level
If Rock EXISTS
ROCK
SOIL STRATA.
FIG.3.1
Ground level
If Rock exists
Rock
300
300
DURING EXECUTION OF WORK.
FIG.3.2
NOTE;
1.All dimensions are in millimetres.
PCC 1:2:4
Duct.
300
Ground level
If Rock exists
Rock
300
AFTER COMPLETION OF WORK.
FIG.3.3
RAILTEL CORPORATION OF INDIA Ltd..
RGM/SR/SC.
DRG No.RAILTEL/SR/OFC/2008/3.
SKETCH SHOWING THE PROCEDURE FOR EXCAVATION OF CABLE TRENCH IF ROCK EXISTS FROM SURFACE OF GROUND.
NOT TO SCALE
CONSULTANT.
(G VEERASWAMY)
MANAGER/PROJ
(M MURALI KRISHNA)
AGM/SC.
(P V MURALI KRISHNA)

Depth of Rock from surface	Cutting of ROCK.		Plain cement concrete		
	width	depth	Top level	Bottom level
300	200	200	300	500
350	200	200	350	550
450	200	200	450	650
550	200	200	550	750

SOIL STRATA.
FIG.4.1

DURING EXECUTION OF WORK.
FIG.4.2

NOTE;
1.All dimensions are in millimetres.

AFTER COMPLETION OF REFILLING.
FIG.4.3

RAILTEL CORPORATION OF INDIA Ltd.	
RGM/SR/SC.	DRG No.RAILTEL/SR/OFC/2008/4.
SKETCH SHOWING THE PROCEDURE FOR EXCAVATION OF CABLE TRENCH IF ROCK EXISTS morethan 300 to 550 mm FROM G.L.	
NOT TO SCALE	
CONSULTANT. (G VEERASWAMY)	
MANAGER/PROJ (M MURALI KRISHNA)	
AGM/SC.	

Note: All dimensions are in millimetres.

Depth of Rock from surface	Cutting of ROCK		Plain cement concrete	
	width	depth	Top level	Bottom level
600	200	150	550	750
650	200	100	550	750
750	200	Nil	550	750
850	200	Nil	650	850
950	200	Nil	750	950
1050	200	Nil	850	1050

SOIL STRATA.
FIG.5.1

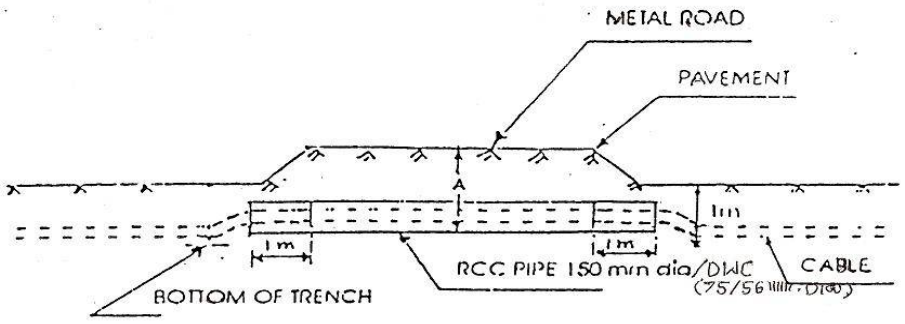
DURING EXECUTION OF WORK.
FIG.5.2

NOTE;
1.All dimensions are in millimetres.

AFTER COMPLETION OF REFILLING..
FIG.5.3

RAILTEL CORPORATION OF INDIA Ltd..	
RGM/SR/SC.	DRG No.RAILTEL/SR/OFC/2008/5.
SKETCH SHOWING THE PROCEDURE FOR EXCAVATION OF CABLE TRENCH IF ROCK EXISTS morethan 550 and lessthan 1050	
NOT TO SCALE	
CONSULTANT. (G VEERASWAMY)	
MANAGER/PROJ (M MURALI KRISHNA)	
AGM/SC. (P V MURALI KRISHNA)	

ANNEXURE - 3.2



NOTE :-

1. 'A' = DEPTH WILL BE 1 METER MIN.

OR

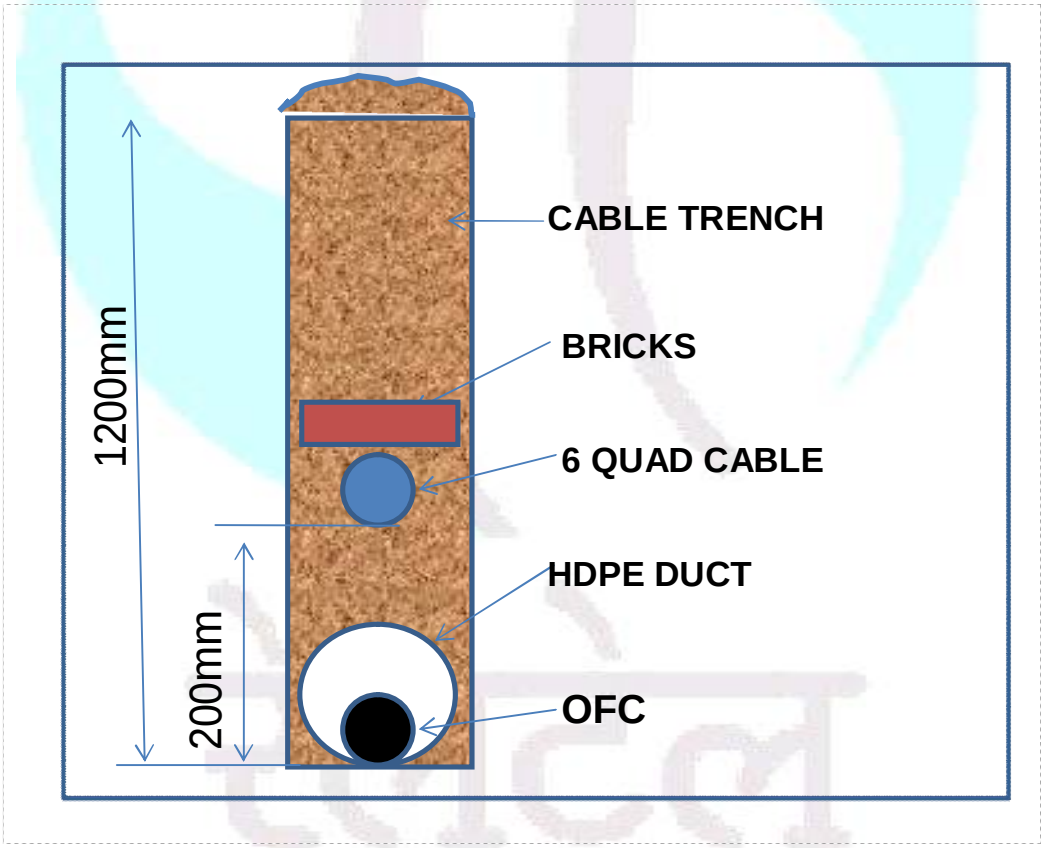
AS DECIDED BY THE ENGINEERS AS PER SITE CONDITION.

2. LENGTH OF R.C.C. PIPE SHALL BE EXTENDED BY 1 m. BEYOND ROAD EDGES.

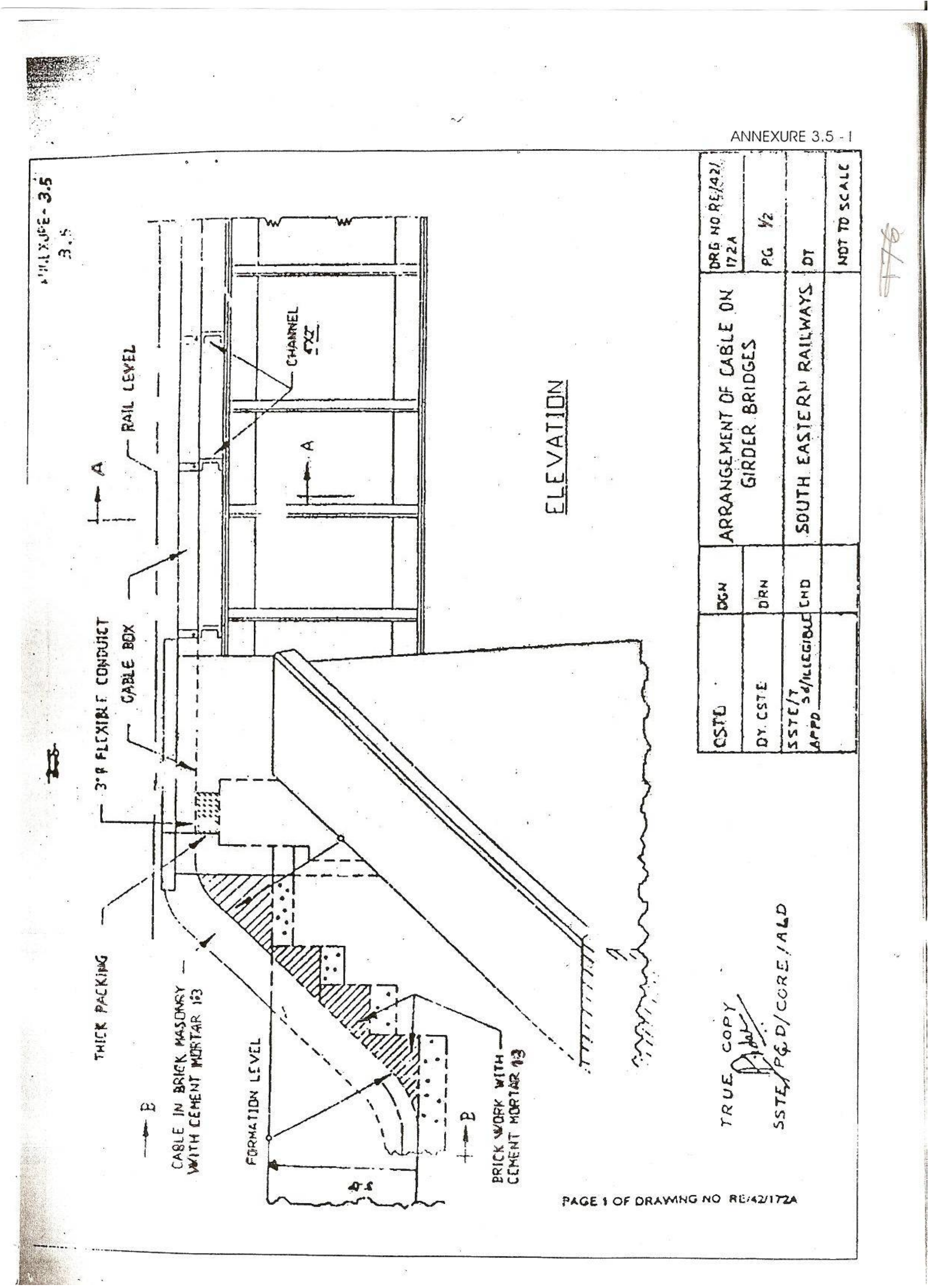
-	CSTE	DRN.	ARRANGEMENT OF RCC PIPE TRUNKING UNDER METAL ROADS	DRG NO. RE/SST/ ALD/SK/497/2000
	DY CSTE	SE/D		FG
-	SSTE/T	SE/T	RAILWAY ELECTRIFICATION	DT. 30-11-2000
-	ASTE/T		BASED ON DRG. NO. RE/SET/ALD/ SK/163/81	NOT TO SCALE

Trenching & Laying of HDPE Duct and 6 Qd Cable

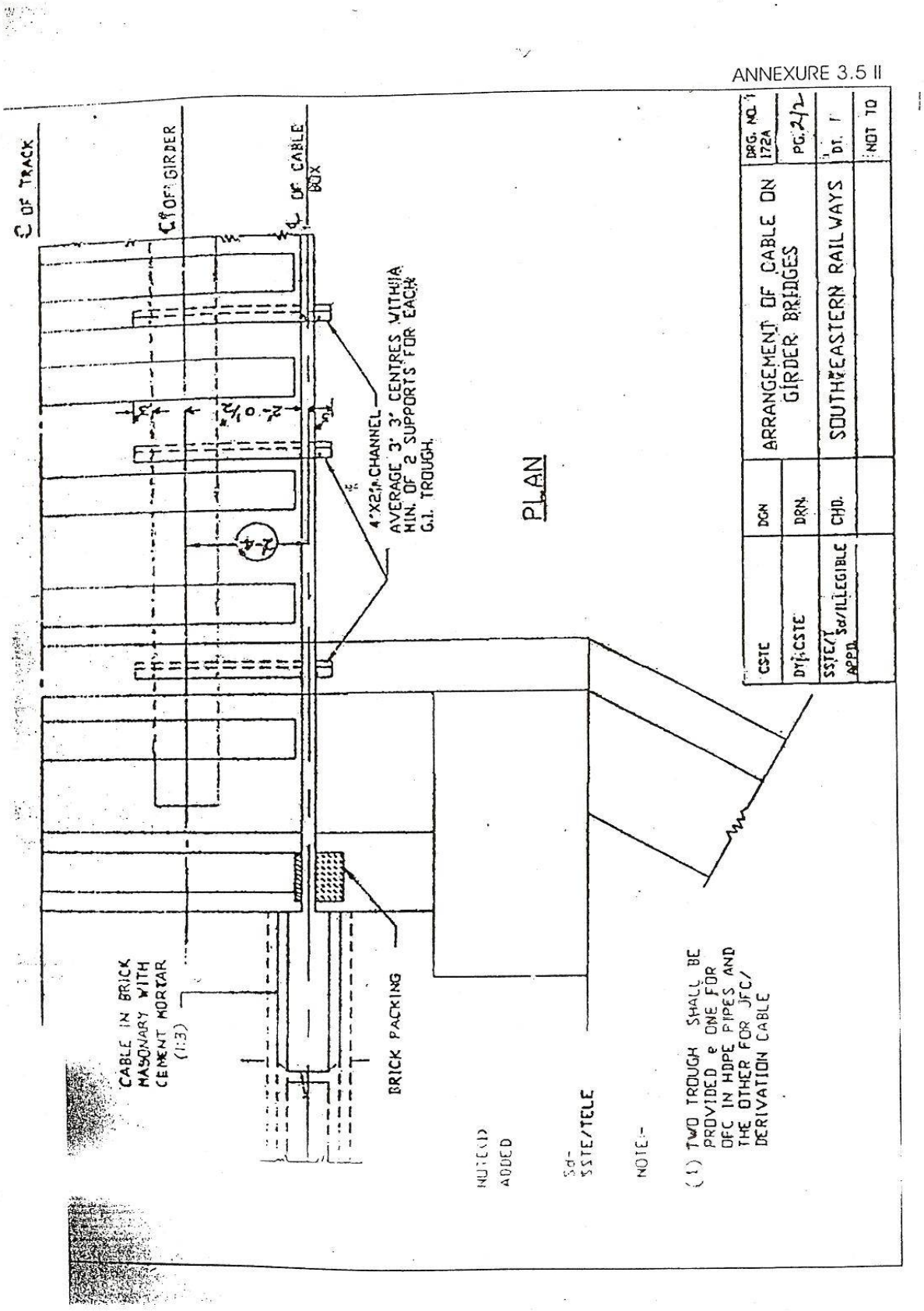
1.0 .Bascically the HDPE duct is to be laid into the ground in a depth of 1200 mm or at the bottom of the trench. 6Qd cable shall be laid after 200 mm back filling i.e. at a depth of 1000mm, followed by bricks proction as shown in the diagram below.

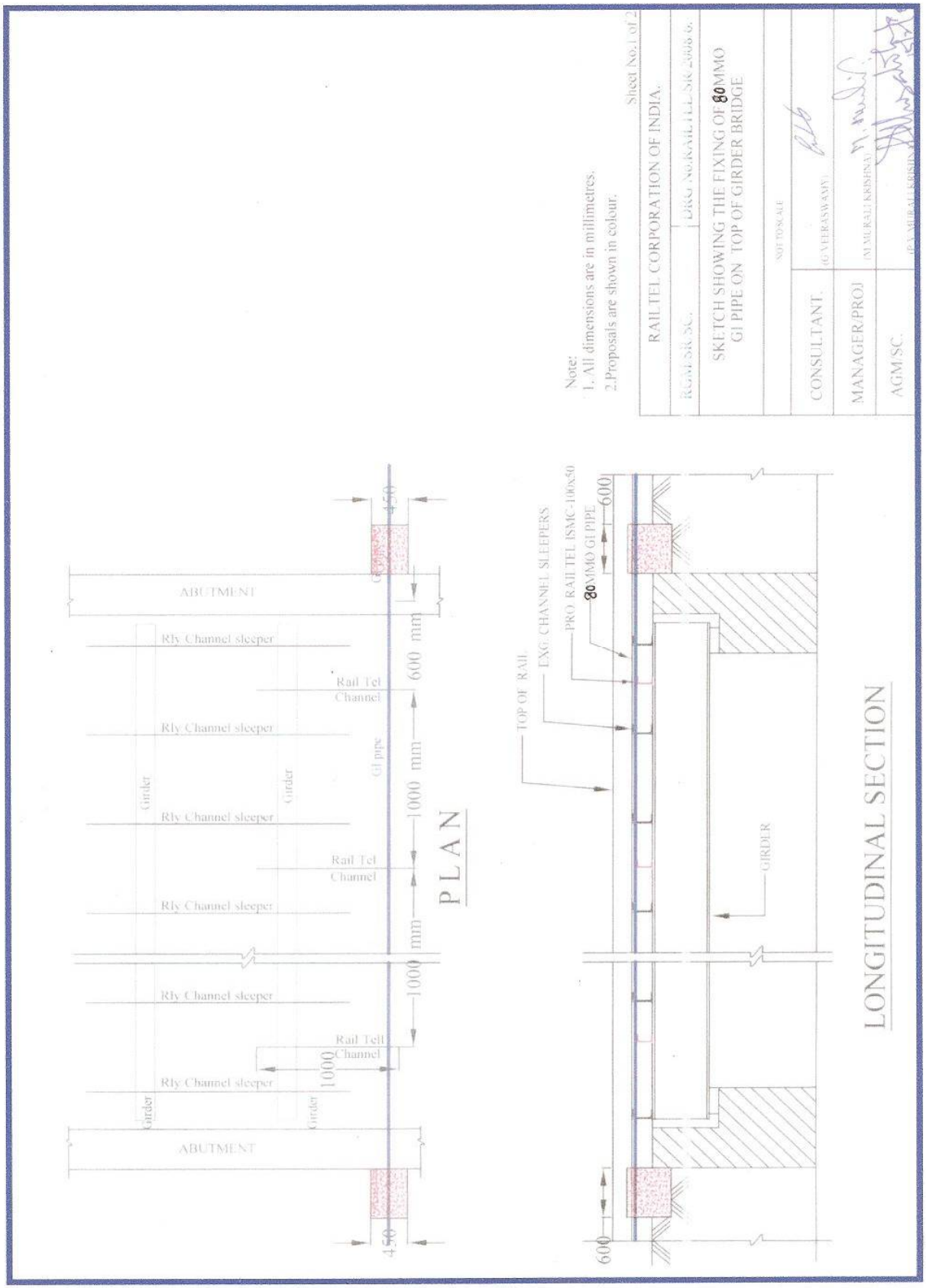


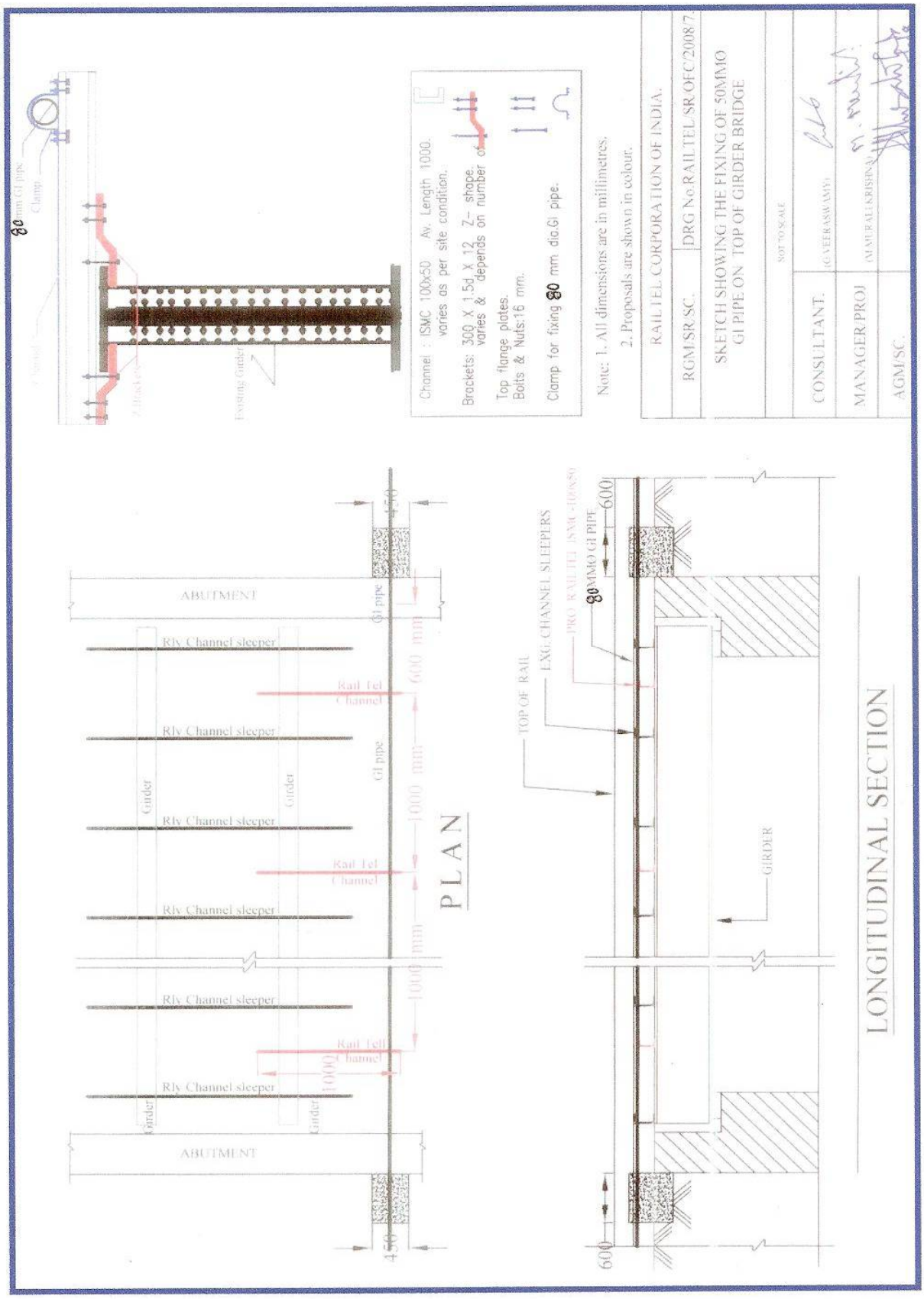
1.1 The arrangement of cable/Duct laying by crossing roads/ Railway track, Culverts, Bridges and so on will follow the rules of RDSO " Code of Practicse for installation and commissioning of Optical Fibre System" In general i

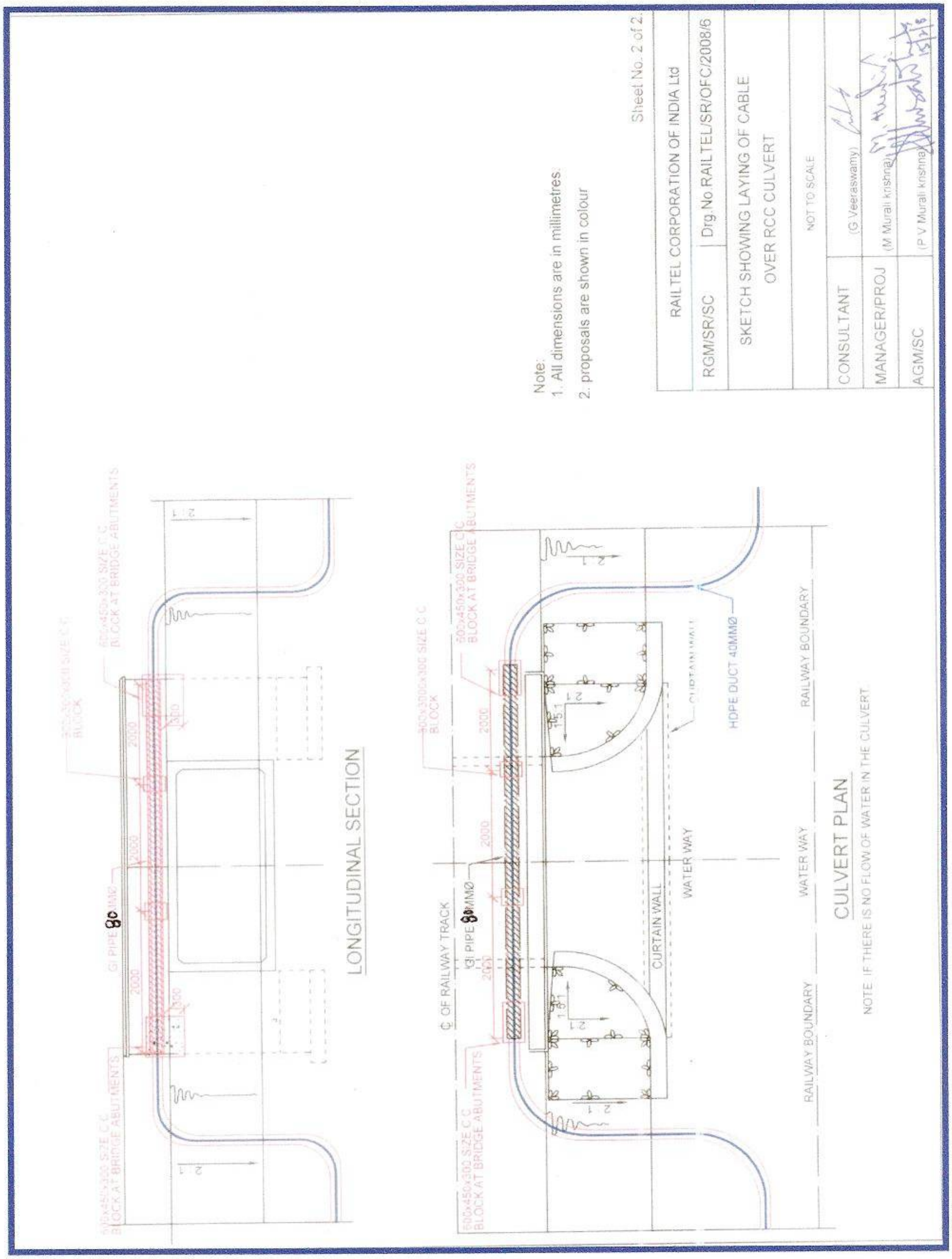

ANNEXURE 3.5 - I
RAIL LEVEL
CHANNEL
A
ELEVATION
3" Φ FLEXIBLE CONDUIT
CABLE BOX
THICK PACKING
CABLE IN BRICK MASONRY WITH CEMENT MORTAR 1:3
FORMATION LEVEL
BRICK WORK WITH CEMENT MORTAR 1:3
B
ARRANGEMENT OF CABLE ON GIRDER BRIDGES
SOUTH EASTERN RAILWAYS
DRG NO RE/42/172A
PG 1/2
DT
NOT TO SCALE
CSTE
DGN
DY. CSTE
DRN
SSTE/T
CHD
APPD
TRUE COPY
SSTE/P&D/CORE/ALD
PAGE 1 OF DRAWING NO RE/42/172A

ANNEXURE 3.5 II

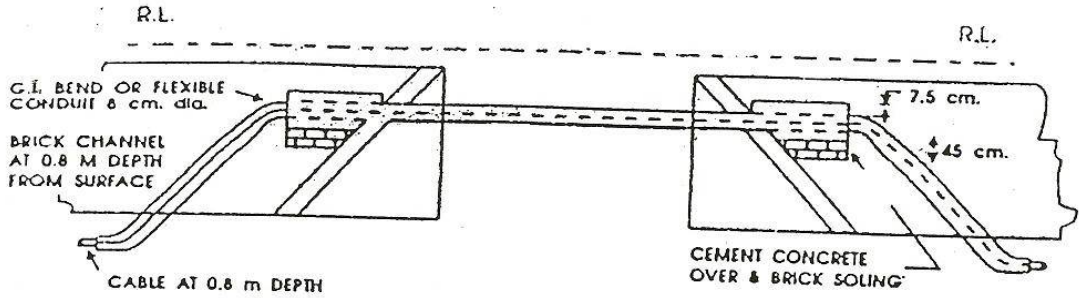


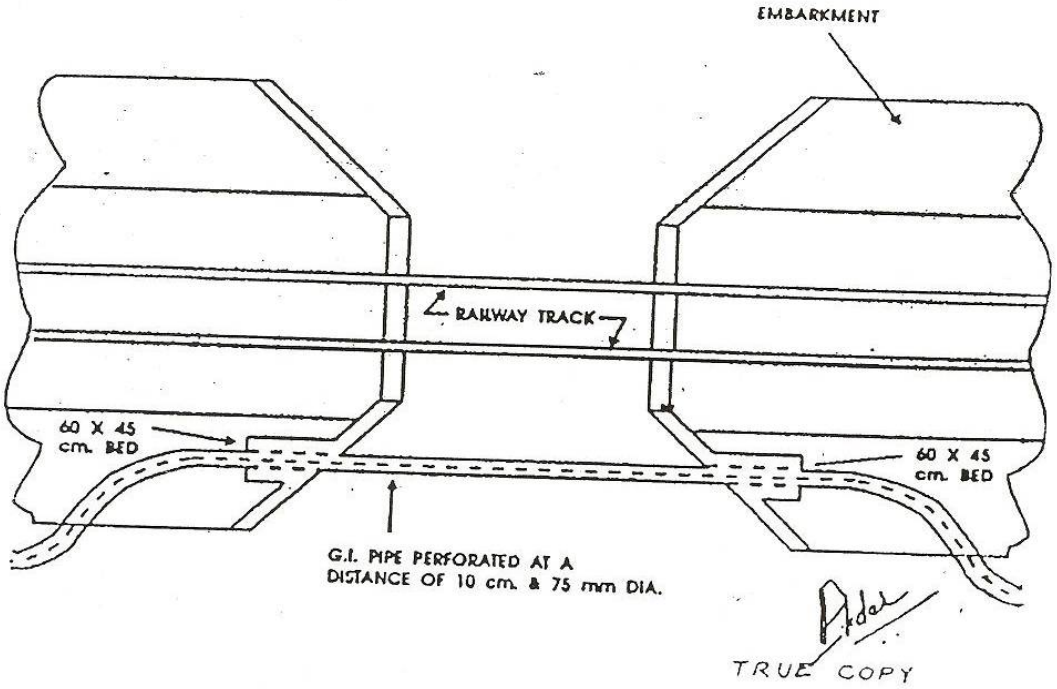

Note:
1. All dimensions are in millimetres.
2.Proposals are shown in colour.
Sheet No.1 of 2
RAILTEL CORPORATION OF INDIA.
SKETCH SHOWING THE FIXING OF 80 MM GI PIPE ON TOP OF GIRDER BRIDGE
NOT TO SCALE
CONSULTANT.
MANAGER/PROJ
AGM/SC.
PLAN
ABUTMENT
Rly Channel sleeper
Rail Tel Channel
Girder
GI pipe
600 mm
1000 mm
450
LONGITUDINAL SECTION
TOP OF RAIL
ENG: CHANNEL SLEEPERS
PRO: RAILTEL ISMC-100x50
80MM GI PIPE
GIRDER
600


80 mm GI pipe
Clamp
Existing Girder
Channel : ISMC 100x50 Av. Length 1000. varies as per site condition.
Brackets: 300 X 1.5d X 12 Z- shape. varies & depends on number of
Top flange plates.
Bolts & Nuts:16 mm.
Clamp for fixing 80 mm dia.GI pipe.
Note: 1. All dimensions are in millimetres.
2. Proposals are shown in colour.
RAILTEL CORPORATION OF INDIA.
RGM/SR/SC.
DRG No.RAILTEL/SR/OFC/2008/7
SKETCH SHOWING THE FIXING OF 50MMO GI PIPE ON TOP OF GIRDER BRIDGE
NOT TO SCALE
CONSULTANT.
(G.VEERASWAMY)
MANAGER.PROJ
(M.MURALIKRISHNA)
AGM/SC.
ABUTMENT
Rly Channel sleeper
Rail Tel Channel
GI pipe
Girder
600 mm
1000 mm
450
PLAN
TOP OF RAIL
EXG.CHANNEL SLEEPERS
PRO.RAILTEL ISMC 100X50
80MMO GI PIPE
600
GIRDER
LONGITUDINAL SECTION


LONGITUDINAL SECTION
CULVERT PLAN
NOTE: IF THERE IS NO FLOW OF WATER IN THE CULVERT
GI PIPE 80 MMØ
HDPE DUCT 40MMØ
€ OF RAILWAY TRACK
CURTAIN WALL
WATER WAY
RAILWAY BOUNDARY
Note:
1. All dimensions are in millimetres.
2. proposals are shown in colour
Sheet No. 2 of 2.
RAILTEL CORPORATION OF INDIA Ltd
RGM/SR/SC
Drg.No RAILTEL/SR/OFC/2008/6
SKETCH SHOWING LAYING OF CABLE
OVER RCC CULVERT
NOT TO SCALE
CONSULTANT
(G Veeraswamy)
MANAGER/PROJ
(M Murali krishna)
AGM/SC
(P V Murali krishna)

ANNEXURE -3.9



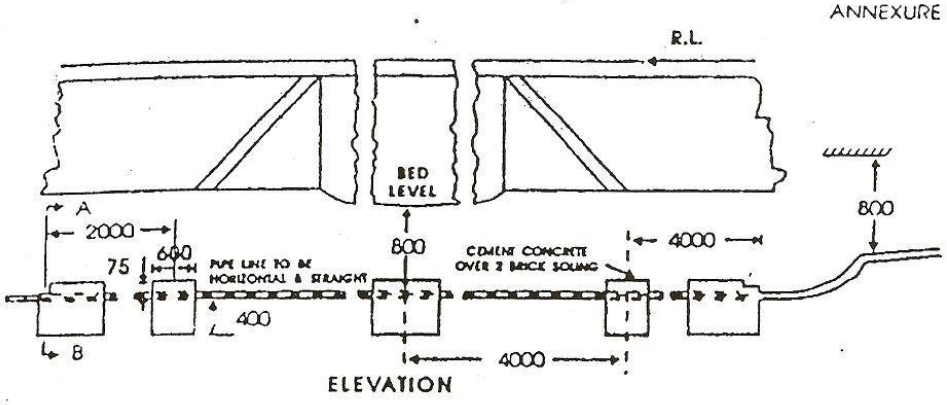


TRUE COPY

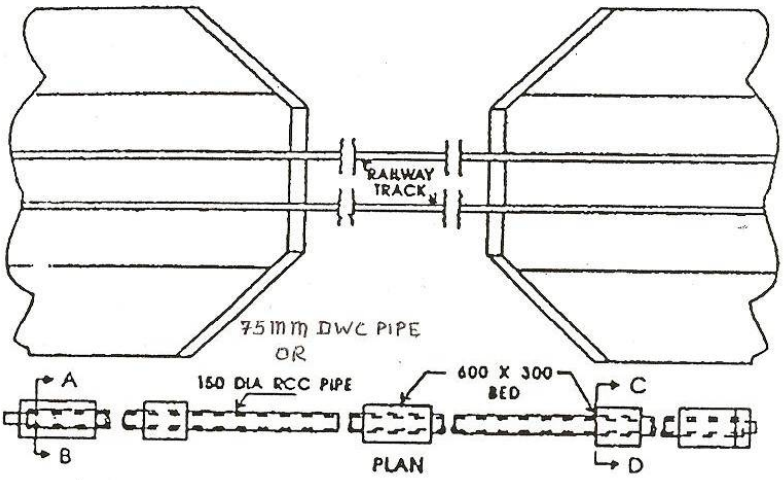
SSTE/PQD/CORE/ALD

	CSTE	DRN	G.I. PIPES ON CULVERTS.	DRG. NO. RE / SAT/ ALD / SK / 160 / 81
Sd	DY CSTE	CDM		PG.
	SSTE/T	CTI	RAILWAY ELECTRIFICATION	DT.
	ASTE/T			NOT TO SCALE

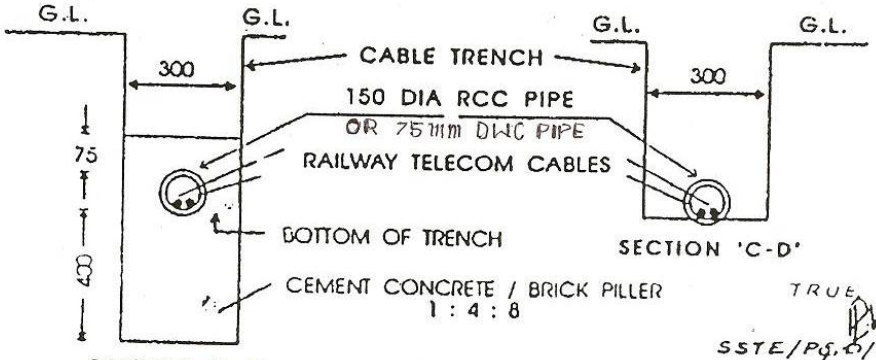
ANNEXURE 3.8



ELEVATION



PLAN



SECTION 'C-D'

SECTION 'A-B'

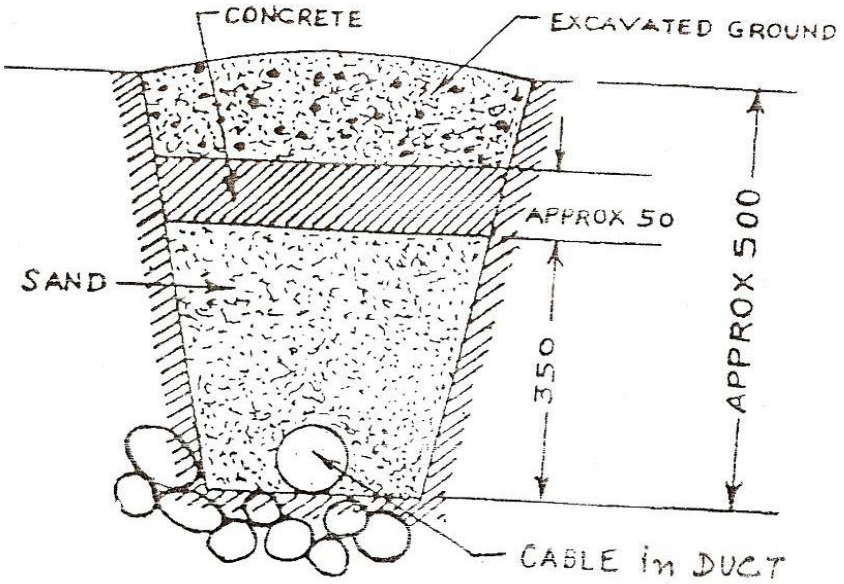
TRUE COPY

SSTE/PG.O/CORE/ALD

NOTE :- ALL DIMENTIONS IN MILIMETER

	CSTE	Sd - DRN	LAYING OF CABLE BELOW CULVERTS IN RCC PIPE OR DWC PIPE	DRG. NO RE / S&T/ ALD / SK / 164 / 81A
- Sd -	DY CSTE	TCD		PG.
- Sd -	SSTE/T	- Sd - CHD	RAILWAY ELECTRIFICATION	DT.
- Sd -	ASTE/T			NOT TO SCALE

ANNEXURE 3·11



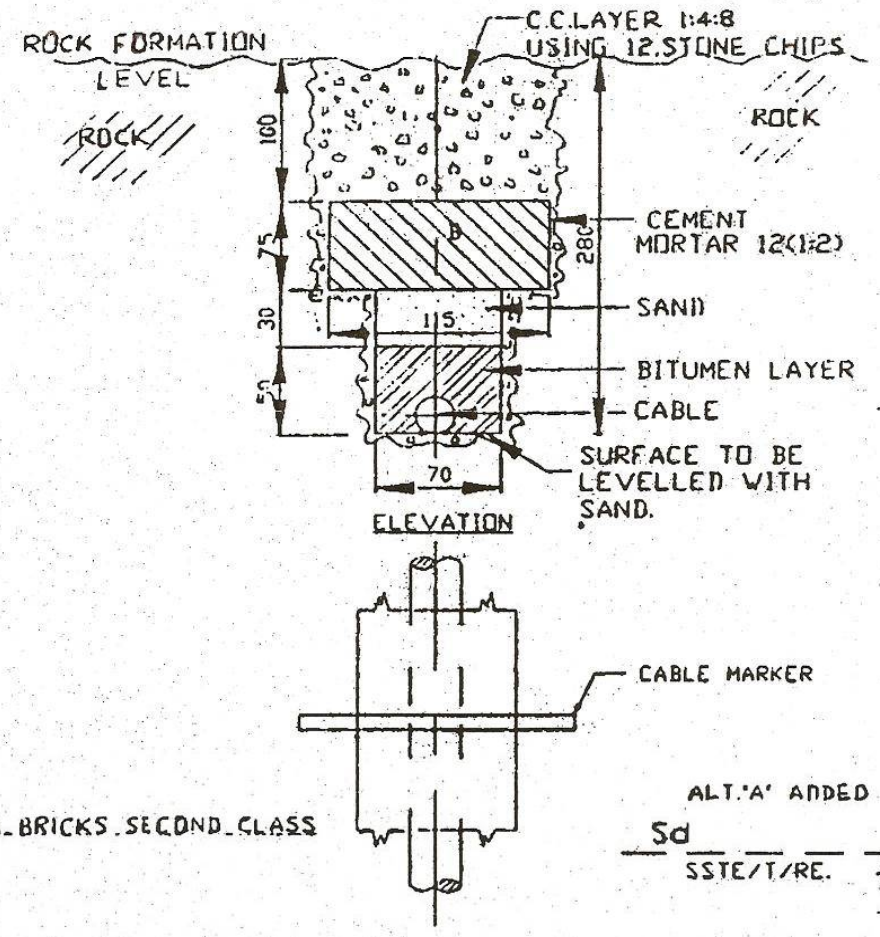
R.D.S.O.

LAYING OF FIBRE OPTIC CABLE IN ROCKY AREA

NOTES

1. ALL DIMENSIONS ARE IN mm.
2. NOT TO SCALE.

ANNEXURE 3.11



ALT.'A' ADDED

Sd
SSTE/T/RE. 22/7/87

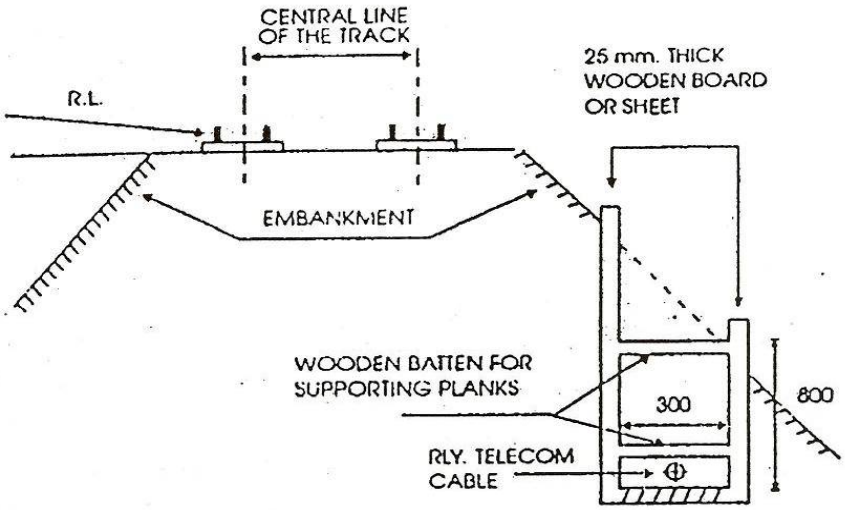
PLAN WITH TOP BRICKS REMOVED

(1) BOTTOM OF THE CHANNEL SHALL BE FILLED WITH SAND 25 TO LEVEL UNEVEN SURFACE.
(2) SLOPE SHALL BE SMOOTHLY SHAPED AND PLASTERED (1:3) INSTED OF PROVIDING SAND.
(3) ALL DIMENSIONS ARE IN MM.
(4) CABLE MARKER NOT SHOWN IN ELEVATION.
(5) CABLE MARKERS S ALL BE PROVIDED BETWEEN TWO TOP BRICKS AND THE WIDTH OF THE CHANNEL AT THE TOP SHALL BE SUITABLY EXTENDED TO ACCOMMODATE CABLE MARKER.

TRUE COPY
SSTE/P&D/CORE ALD

Sd	DY CSTE	Sd. TCD.	CHASE CUTTING IN HARD ROCKY AREA	DRG NO.	RE/S&T/ALD /SK/303/85
Sd. 25/11/85	SSTE (T)	Sd. DRN.		PG	
	ASTE (H.Q.)	Sd. CHD.	RAILWAY ELECTRIFICATION	DATE	NOT TO SCALE

ANNEXURE - 3.3



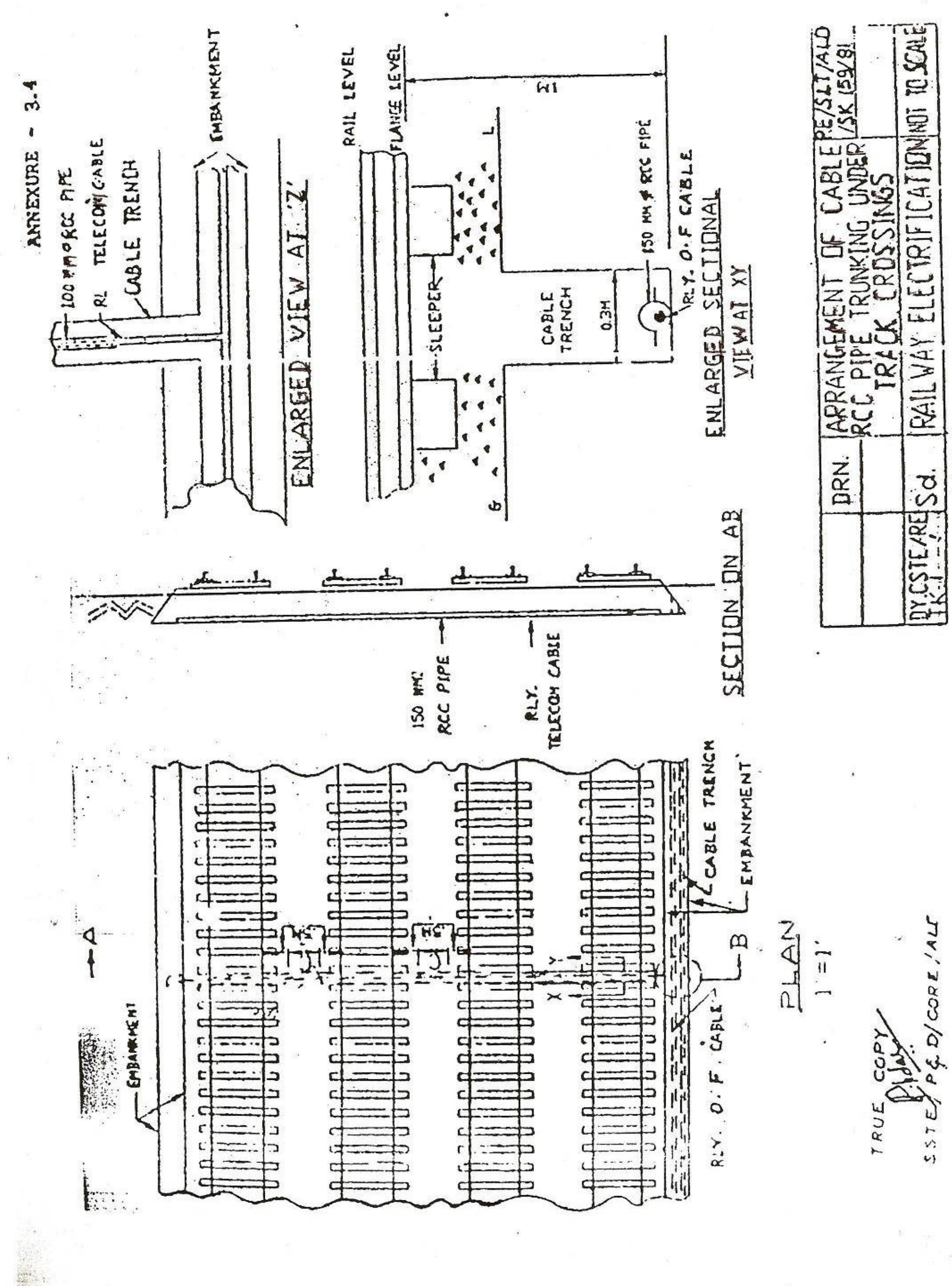
TRUE COPY

SSTE/P.S D/CORE/ALD

NOTE :-
1. DIMENTIONS ARE IN MILIMETER

	CSTE	DRN	METHOD OF SHORTING EXCAVATING TRENCH FOR CABLE	R.D.S.O/TC/35003
	DY CSTE	COM		PG
	SSTE/T	CTI	R.D.S.O.	DT.
	ASTE/T	COMP		NOT TO SCALE

ANNEXURE 3.4

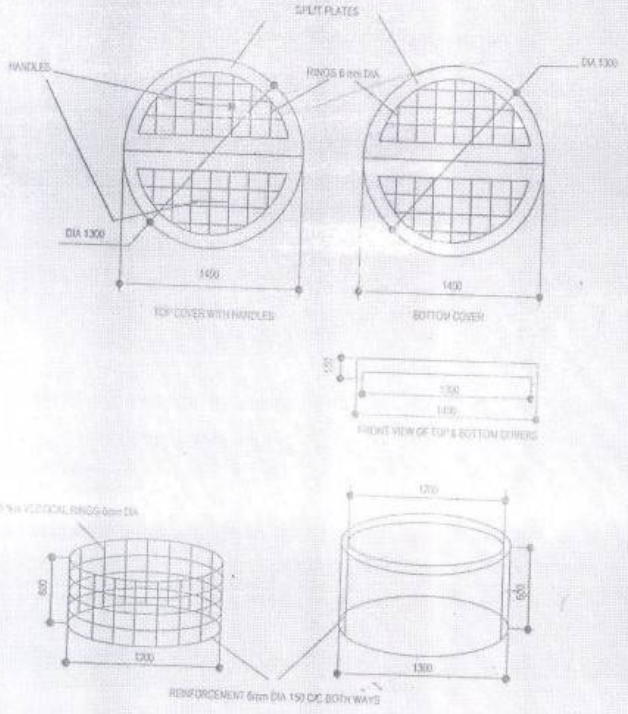

ANNEXURE - 3.4
100 mm ø RCC PIPE
RL TELECOM CABLE
CABLE TRENCH
EMBANKMENT
ENLARGED VIEW AT 'Z'
RAIL LEVEL
FLANGE LEVEL
SLEEPER
CABLE TRENCH
0.3M
1M
150 MM ø RCC PIPE
RLY. O.F CABLE
ENLARGED SECTIONAL VIEW AT XY
SECTION ON AB
150 MM RCC PIPE
RLY. TELECOM CABLE
CABLE TRENCH
EMBANKMENT
RLY. O.F. CABLE
PLAN
1" = 1'
DRN.
ARRANGEMENT OF CABLE RCC PIPE TRUNKING UNDER TRACK CROSSINGS
PE/SLT/ALD /SK 159/81
DY.CSTE/RE
Sd.
RAILWAY ELECTRIFICATION
NOT TO SCALE
TRUE COPY
SSTE/P&D/CORE/ALD

RAILTEL CORPORATION OF INDIA Ltd	
RGM/SR/SC	Drg.No.RAILTEL/SR/OFC/2008/13
METHOD OF MOUNTING THE BRAKE	
NOT TO SCALE	
CONSULTANT	(G.Veeraswamy)
MANAGER/PROJ	(M Murali krishna)
AGM/SC	(P V Murali krishna)

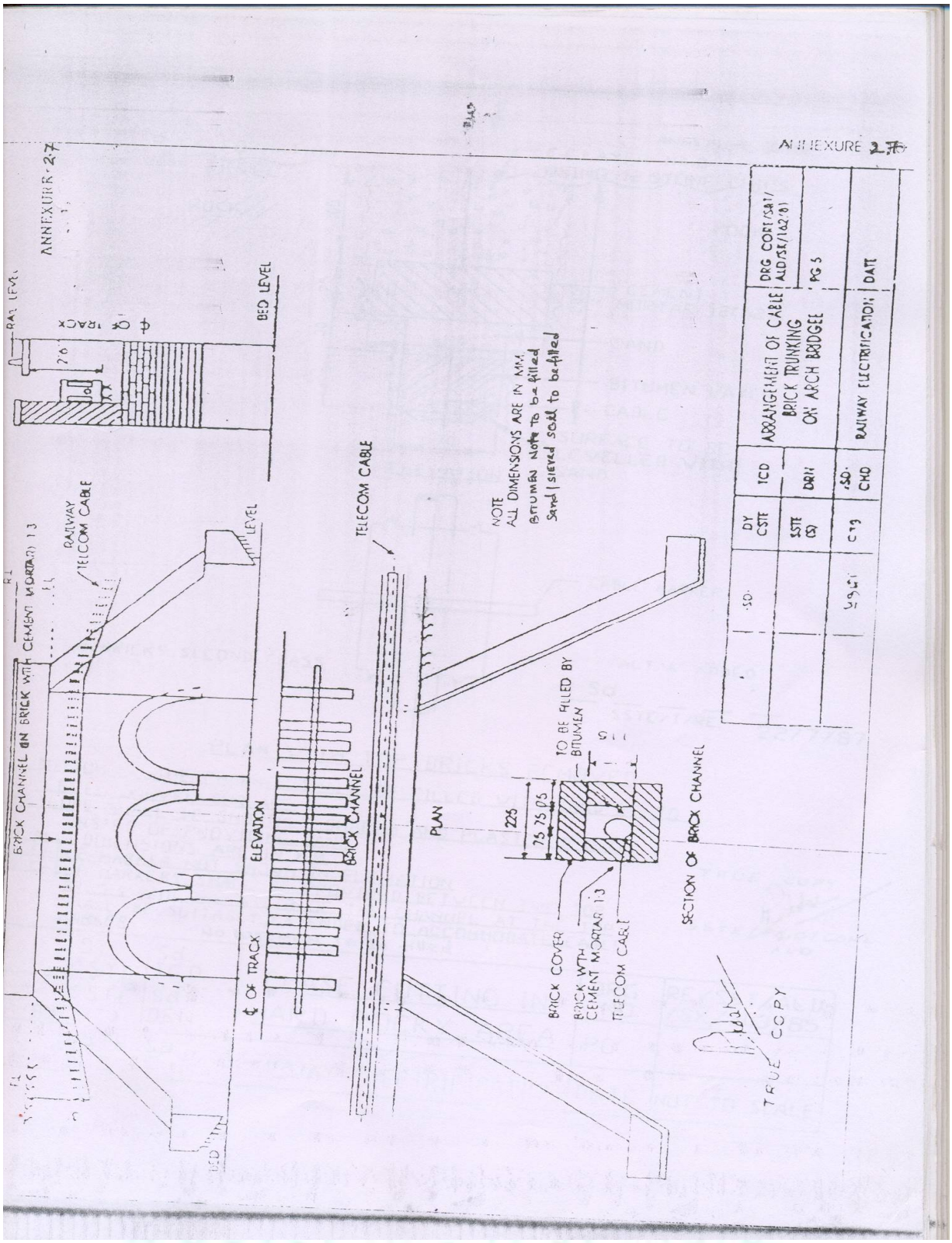
ANNEXURE 2-14

RAIL TEL CORPORATION OF INDIA LTD.

RCC CIRCULAR JOINT CHAMBER



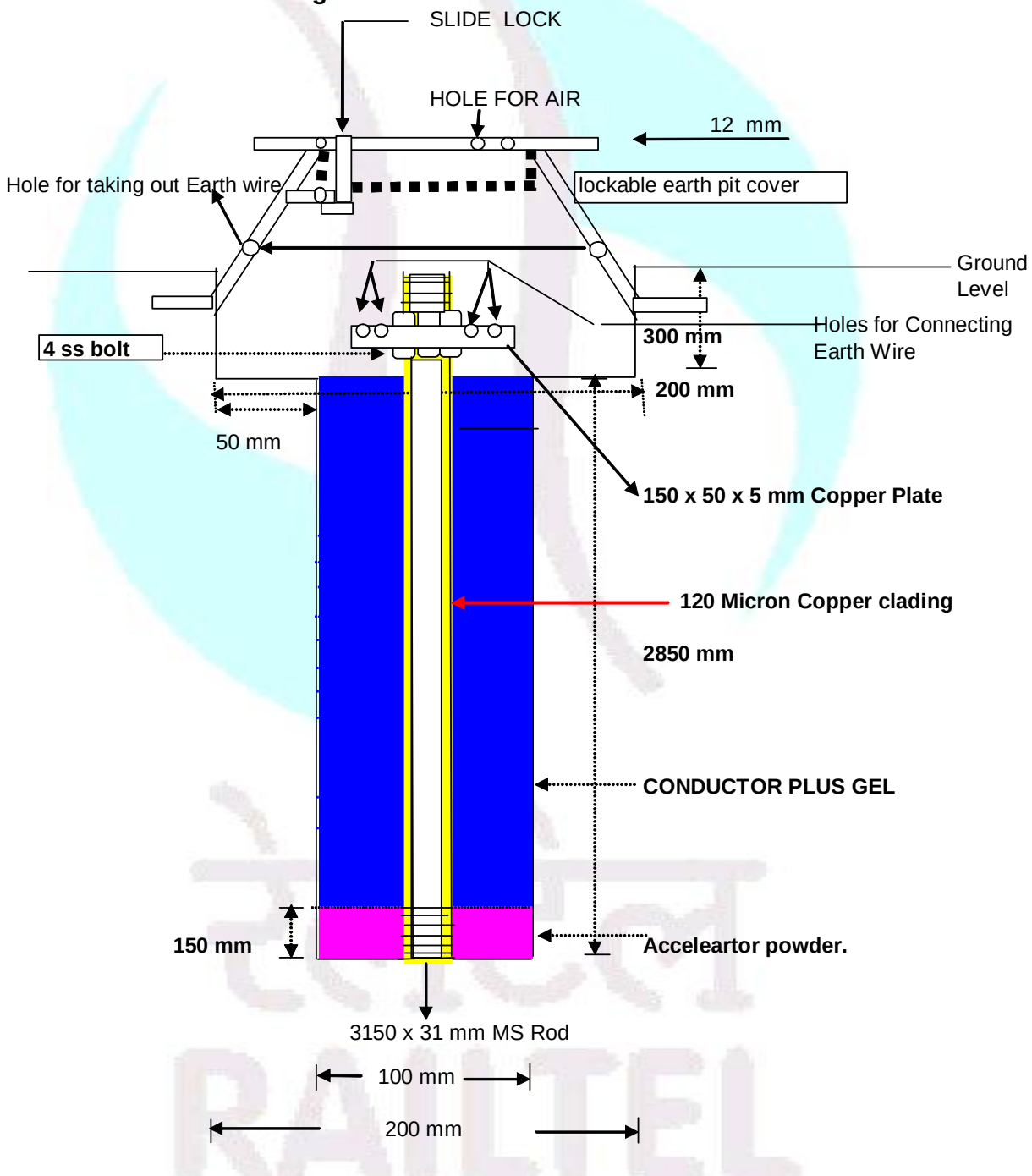
DRG.NO. RCIL/N.REGION/03/2004

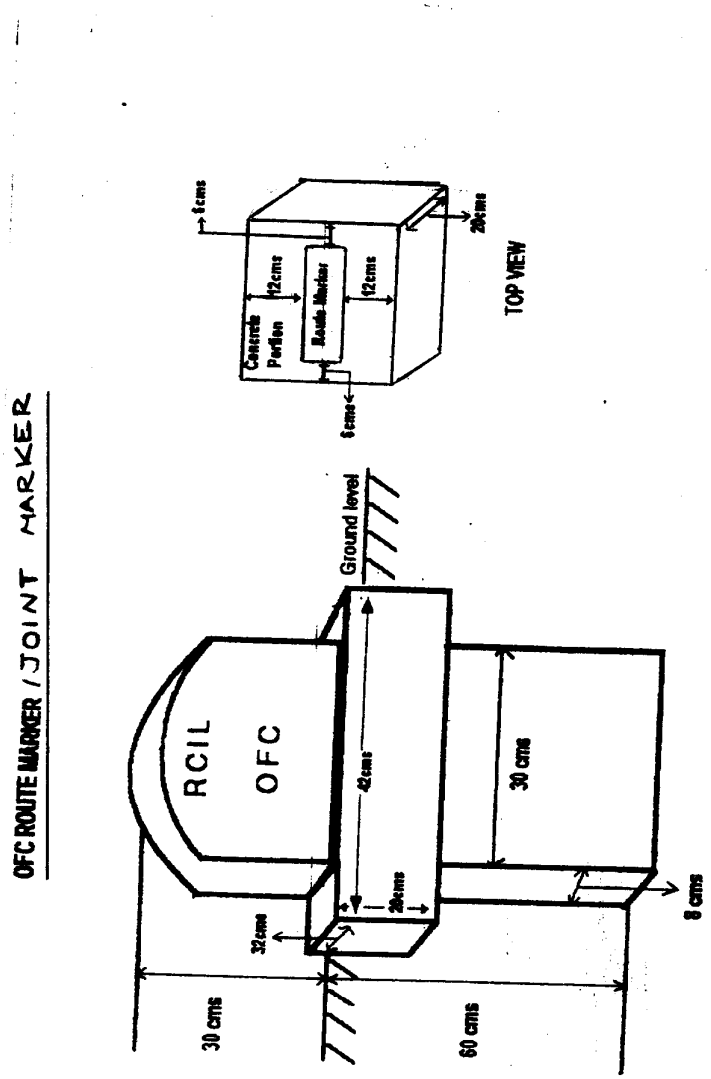

ANNEXURE 27
ANNEXURE 27
BED LEVEL
BRICK CHANNEL IN BRICK WITH CEMENT MORTAR 1:3
RAILWAY TELECOM CABLE
TELECOM CABLE
NOTE
ALL DIMENSIONS ARE IN MM.
BITUMEN Note to be filled
Sand sieved soil to be filled
ELEVATION
PLAN
SECTION OF BRICK CHANNEL
BRICK COVER
BRICK WITH CEMENT MORTAR 1:3
TELECOM CABLE
TO BE FILLED BY BITUMEN
225
75 75 75
ARRANGEMENT OF CABLE BRICK TRUNKING ON ARCH BRIDGEE
DRG CORT/SAT/ ALD/SK/102/81
PG 5
RAILWAY ELECTRIFICATION
DATE
TRUE COPY

ANNEXURE 3.12
R. D. S. O.
LEADING IN ARRANGEMENT
OF OPTIC FIBRE CABLE
FOR CABINS & OTHER BLDGS.
TITLES
FLOOR
G1 PIPE 100mm/80mm
300
50
X
X
CLAMP
CABLE
ELEVATION
M.S. CLAMP
VIEW X-X
1. DIMENSIONS ARE IN mm
OR ASM'S OFFICE AND SIMILAR BUILDING PORTION ONLY OF LEADING IN PIPE TO BE PROVIDED.
3. TO BE INSERTED OVER THE CABLE

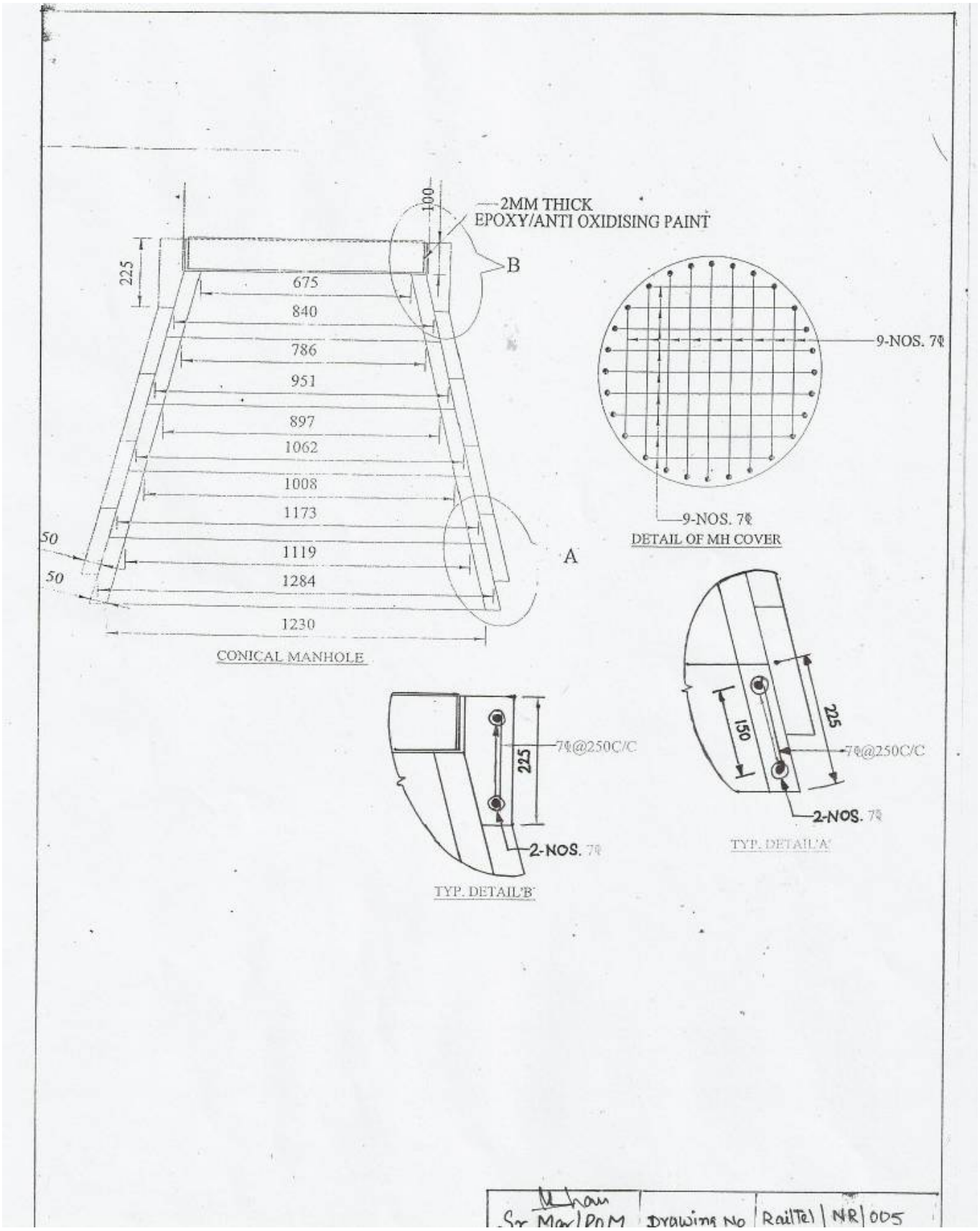
Annexure-A-IV

Maintenance Free Earthing





RAILTEL CORPORATION OF INDIA LTD. EASTERN REGION.	
PROPOSED BY -	APPROVED BY
21/03/06	21/3/06 DGM(OL)/ER.


100
2MM THICK
EPOXY/ANTI OXIDISING PAINT
B
225
675
840
786
951
897
1062
1008
1173
50
1119
50
1284
1230
A
CONICAL MANHOLE
9-NOS. 7ϕ
9-NOS. 7ϕ
DETAIL OF MH COVER
7ϕ@250C/C
225
2-NOS. 7ϕ
TYP. DETAIL'B'
225
150
7ϕ@250C/C
2-NOS. 7ϕ
TYP. DETAIL'A'
Sr Mgr/ P&M
Drawing No
RailTel/NR/005

END