TRANSNET

**Transnet SOC Limited**
**T/A Transnet Capital Projects**

TFR RME RFQ BOARD
TRANSNET FREIGHT RAIL RME
xxxxxxxx
XXXXXX

**Attention:**
sales
Telephone Number :
Fax Number :
Vendor Number :500000

# REQUEST FOR QUOTATION

**Registration Number: 1990/000900/06**
**Vat Number : 4720103177**

**REQUEST for QUOTATION**
Transnet Capital Projects
**RFQ Number / Date**
6000149885 / 18.02.2013
**Contact Person / Telephone**
Anne Mongie / 031 361 1759
**Return to VAX Number/EMAIL**
0318300001 / TCPtendersDurban@Transnet.net

**Quotation Deadline Date :** 25.02.2013
**Quotation Deadline Time :** 12H00



| Item | Material | Description | RFQ Qty | UoM | Required Del date | Confirm Del date | Unit Price Excl | Total Price Excl |
|---|---|---|---|---|---|---|---|---|
| 00010 | | 25m Scissor Mast Counte | 3 | ea | 04.03.2013 | | | |

25m Scissor Mast Counter Weighted to Transnet Spec. C/W Headgear for 8 Beka 400w HPS fitting
Delivery : 130 Eel Rd Bayhead
For more information call Gawie on 0722432569

| Item | Material | Description | RFQ Qty | UoM | Required Del date | Confirm Del date | Unit Price Excl | Total Price Excl |
|---|---|---|---|---|---|---|---|---|
| 00020 | | 15m Scissor Mast Counte | 2 | ea | 04.03.2013 | | | |

15m Scissor Mast Counter Weighted to Transnet Spec. C/W Headgear for 4 Beka 400w HPS Fitting

Transnet Limited t/a Transnet Freight Rail RME Durban, hereby invite you to supply a seperate detailed quotation to supply the above material.
All technical Queries to be addressed to : Gawie on 0722432569
Procurement related queries to be addressed by :
Ms.Anne Mongie on 031-361 1759

The closing time for the receipt of you off is 12h00 on Monday
25 February 2013. Telephonic and late quotes will not be accepted. Quotes should be submitted in our tender box at

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Queens Warehouse 237 Mahatham Gandhi rd Point DBN or faxed to
0866780040 or mailed to TCPtenderDurban@transnet.net

Procurement official : Anne Mongie
Identification details on sealed envelope : Mast Counter Weights
Quotation/Reference no: 10297436/10297437
The contractors address and identification details have to be shown on each quote received. Please supply the following documents with each quote submitted :
Valid Tax Clearance certificate
Copy of your latest BBBEE certificate
Certificate of good standing with the Workman's compensation commissioner. Failing to submit any of the above mentioned documents, could result in your quote being disqualified.

Note : Transnet may not necessarily accept the lowest or any other offer and reserves the right to select in its favor any or,a portion of any offer made. If you are unable to quote on this invitation, please submit a NO QUOTE with a short reason.
Otherwise Transnet looks forward to receive your quote by the time and date stated.

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**Delivery Address**

This RFQ is subject to the following conditions:

1. Price/s : The price/s quoted in SA currency and is excluding of V.A.T
2. Delivery : The price/s quoted should include delivery cost to the delivery address stated on the RFQ
3. Returnables : A valid tax clearance certificate and BBBEE certificate from a SANAS accredited verification agency attached to quotation for all quotes above R30 000. Please note that only the official Transnet RFQ will be accepted and all other correspondence to be attached to the original
4. Safety : To confirm to Transnet Capital Projects Health & Safety plan and specification; HAS-std-0001, copy available on request.
5. Confirmation: To confirm your participation in this tender process please sign and return this document as immediate effect prior to the quotation deadline.
6. Negotiations: The Employer may elect to negotiate the final terms of the contract/order with the preferred tenderer in accordance with Clauses F.2.17 and F.3.13 of the CIDB Standard Conditions of Tender. A copy of which is available upon request.

Signature

Date

SPOORNET
(infrastructure) (power supplies)

Specification No.

CEE.0019.90

| this issue cancels |
| --- |
| specification no.: |
| CEE.0019.85 |

# medium mast lighting of outdoor areas

This specification covers the design, supply and installation of medium mast lighting for Spoornet.

Specification No. CEE.0019.90



INDEX


| SECTION | CONTENTS | PAGE NO |
|---|---|---|
| 1.0 | SCOPE | 3 |
| 2.0 | REFERENCES | 3 |
| 3.0 | APPENDICES | 3 |
| 4.0 | METHOD OF TENDERING | 4 |
| 5.0 | SERVICE CONDITIONS | 5 |
| 6.0 | ELECTRICITY SUPPLY SYSTEM | 5 |
| 7.0 | STANDARD OF WORK, EQUIPMENT AND MATERIALS | 5 |
| 8.0 | OUTLINE OF SCHEME | 5 |
| 9.0 | MASTS | 7 |
| 10.0 | FOUNDATIONS | 9 |
| 11.0 | RAISING AND LOWERING SYSTEM | 10 |
| 12.0 | PROTECTION AGAINST CORROSION | 12 |
| 13.0 | WINCH | 13 |
| 14.0 | LUMINAIRES AND CONTROL GEAR | 15 |
| 15.0 | DISTRIBUTION BOARD AND MAST CABLING | 17 |
| 16.0 | CABLES | 19 |
| 17.0 | CABLE LAYING | 20 |
| 18.0 | EARTHING | 21 |
| 19.0 | ERECTION OF MASTS | 22 |
| 20.0 | DRAWINGS AND INSTRUCTION MANUALS | 23 |
| 21.0 | PACKING | 23 |
| 22.0 | INSPECTION | 24 |
| 23.0 | ILLUMINANCE TESTS | 24 |
| 24.0 | SPARES | 24 |
| 25.0 | GUARANTEE | 24 |

APPENDIX 1 - HORIZONTAL CLEARANCES
APPENDIX 2 - SCHEDULE OF REQUIREMENTS AND DEVIATIONS
APPENDIX 3 - PAINTING SPECIFICATION
APPENDIX 4 - CABLE TERMINATION AND EARTHING ARRANGEMENTS
APPENDIX 5 - PROVISION FOR MAST TO RAIL BONDS
APPENDIX 6 - TECHNICAL DATA SHEET
APPENDIX 7 - SCHEDULE OF RATES FOR ADDITIONS AND OMISSIONS

1
1.1 This specification covers Spoornets' requirements for the design, manufacture and supply of all equipment and materials for and the complete installation and testing on site of, medium mast lighting.

2REFERENCES
2.1 The following publications and drawing (latest edition and amendments) are referred to herein.

2.1.1 South African Bureau of Standards

SABS 0142 - Code of Practice for the Wiring of Premises.
SABS 098 Part 1 - Code of Practice for Public Lighting. The lighting of streets and highways.
SABS 763 - Hot-dip galvanised zinc coatings.
SABS 1277 - Streetlighting luminaires.
SABS 150 - PVC insulated electric cables and flexible cords.
SABS 156 - Moulded-case circuit breakers.

2.1.2 British Standards Institution

BS 4360 - Weldable structural steels.
BS 5135 - Metal-arc welding of carbon and carbon manganese steels.

2.1.3 Spoornet

CEE-0012 - Method of tendering.
CSS 183/13.16 - Paint, rubber, chlorinated, enamel.
CSS 183/13.15 - Primer, rubber, chlorinated, high build.
CSS 183/2.30 - Xylene.
CSS 183/14.02 - Remover, paint, non-flammable, dipping type.
CSS 285/18.10 - Cleaning compound, solvent detergent, medium duty.

Drawing No. CEE-PK-14 Cable markers.

3APPENDICES
The following appendices form part of this specification :

3.1 Appendix 1 - Horizontal clearances.

3.2 Appendix 2 - Schedule of requirements and deviations.

3.3Appendix 3 - Painting specification.

3.4 Appendix 4 - Cable termination and earthing arrangement.

3.5 Appendix 5 - Provision for mast to rail bonds.

3.6 Appendix 6 - Technical Data Sheet.



3.7 Appendix 7 - Schedule of rates for additions and omissions.

4METHOD OF TENDERING

4.1 Tenderers shall submit their tender in accordance with Spoornets' method of tendering No. CEE-0012 and clauses 4.2 to 4.8 below.

4.2 Tenderers shall submit a clause by clause statement of compliance for Appendix 2 in addition to that required for the specification in terms of the aforementioned method of tendering.

4.2.1 Duplicate documents, specified in clause 2.O of CEE-0012, are not required.

4.3 Tenderers shall submit complete and detailed information concerning their offers. This information shall include descriptions and drawings of the various items of equipment offered, as well as full photometric data issued by the South African Bureau of Standards, for the luminaires they propose using.

4.4 Tenderers shall superimpose the number and orientation of luminaires per mast and isolux curves, on the drawing/s listed in Appendix 2, if not already shown.

4.5 Tenderers shall allow for the supply, delivery, off-loading, handling on site, erection, installation and testing of all items of equipment and material necessary for the complete lighting installation. This shall include the supply and laying of cables to each mast from the point/s of supply of electric power indicated on the drawing/s listed in Appendix 2 and the connecting up of the cables at each mast. Cable connections at the electrical power supply points (substation/kiosk) will be arranged by Spoornet.

4.6 Tenderers shall submit a lump sum price for the complete installation specified. This price shall allow for all cables laid and foundations excavated, in soil.

4.6.1 Soil will be taken as soil, sand and soft clay or soil with a light admixture of broken rock,

4.7 The total price tendered shall not include for a winch, which shall be quoted for separately in Appendix 7.

4.8 The "Technical Data Sheet" and "Schedule of Additions and Omissions" forming Appendices 6 and 7 to this specification, shall be completed in full and submitted by tenderers as part of their tender.

5SERVICE CONDITIONS

5.1 The lighting may be installed in areas where high humidity, high temperature, high wind, heavy rain, severe hail and a high incidence of lightning are encountered and where corrosive conditions including the presence of sulphur dioxide, prevail.

5.1.1 Equipment installed shall be suitable for efficient operation under these conditions.

6ELECTRICITY SUPPLY SYSTEM
6.1 The electricity supply system will be 3 phase, 4 wire, 50 Hz, alternating current with earthed neutral, at a nominal voltage of 380/220 V.

6.2 The voltage may vary within the range of 95 percent to 105 percent of the nominal and equipment installed shall be suitable for efficient operation at any voltage within this range.

7STANDARD OF WORK, EQUIPMENT AND MATERIALS
7.1 All work shall be carried out in a neat and orderly manner to the satisfaction of Spoornet and all equipment shall be easily accessible for maintenance purposes. Electrical work shall conform to the requirements of SABS 0142 and those laid down in this specification.

7.2 Equipment and materials used shall be of high quality design and manufacture, and shall comply with the relevant specifications and recommendations mentioned in this specification.

7.2.1 Where equipment and material does not comply with the relevant specifications, it shall be submitted to Spoornets' Engineer for approval.

7.3 Every reasonable precaution and provision shall be incorporated in the design of the equipment for the safety and security of the system and of those concerned with its operation and maintenance.

8OUTLINE OF SCHEME
8.1 The lighting scheme shall consist of a number of medium masts, each mast supporting one or more luminaires. The masts shall be hinged to enable the luminaires to be lowered for maintenance purposes.

8.2 The masts shall be located such, that the distance from the edge of the mast to the centre line of any adjacent track or tracks, shall be greater than the dimensions of the heavy solid lines representing the outline of areas from which fixed structures are restricted, shown in Appendix 1.

8.3 In complying with the requirements of clause 8.2 above, tenderers shall ensure that the distance between the centre line of the mast and the centre line of the adjacent track is not less than 2 750 mm on straight runs. The distance on curves shall be adequate to maintain the required clearances.

8.4 The masts shall be located so as not to interfere with other facilities, such as electric traction overhead equipment structures, buildings, bridges, etc. A minimum clearance of 2 800 mm shall be maintained between these aforementioned facilities and any part of the lighting installation, during lowering of luminaires to the ground.

8.5 Masts shall not be sited directly adjacent to main lines and other lines serving high speed traffic.

8.6 The top surface of all mast foundations shall be level with top surfaces of adjacent tracks, or if not cast directly adjacent to tracks, 150 mm above final surrounding ground level.

8.7 The successful tenderer's mast positions shall be approved by Spoornets' Electrical and Civil Engineers before any work is commenced, Once approval is given, Spoornets' Civil Engineer or his authorised representative, will peg the mast foundation positions and heights, on site. This action shall not relieve the successful tenderer of responsibility for compliance with clauses 8.2 to 8.6 of this specification.

8.8 The overall diameter about the centre line of the mast, of the luminaire mounting equipment, luminaires and any part thereof, shall not exceed 2 100 mm in the horizontal plane.

8.9 The minimum maintained illuminance on the horizontal plane, at ground level, shall be 3 lux at all locations in the areas indicated on the drawing/s. Isolux curves, showing the guaranteed minimum maintained illuminance of 3 lux shall be superimposed on the drawing/s listed in Appendix 2 and submitted by tenderers as part of their tender.

8.10 The design of the installation shall provide for as uniform an illuminance as possible. The max./min. horizontal illuminance uniformity ratio at ground level on a straight line between masts, shall not exceed 9:1.

8.11 Schemes using floodlighting luminaires, will not be considered. The lighting shall be provided by luminaires having a luminous intensity distribution defined in SABS 098 Part 1 as 'cut-off'. The peak intensity of the luminaires offered shall not exceed 500 cd/1 000 lm .

8.11.1 The luminous intensity distribution of any luminaire offered, that is tilted above the horizontal plane shall comply fully with the requirements for 'cut-off' luminaires in Table A1 of SABS 098 Part 1, when viewed from the usual direction of view of a driver.

8.12 Luminaires shall be mounted 15 metres above ground level unless otherwise stated in Appendix 2.

8.13 Tenderers shall use lamp lumen deterioration and luminaire maintenance factors of 0,9 and 0,8 respectively, in their design calculations.

8.14 The successful tenderer shall supply Spoornets' Site Engineer with a plan showing mast positions, number of luminaires per mast, cable routes and sizes, for approval within 30 days of the tender being awarded and before any work is commenced. This information is required to enable Spoornet to install the correctly rated protection equipment in kiosks/substations.

9MASTS
9.1 The masts shall be constructed in the form of a tapering enclosed column of polygonal cross-section.

9.2 Masts shall be hinged at a point approximately half the height of the mast, to enable luminaires to be lowered to the ground for maintenance purposes, During lowering, masts shall face a direction parallel to adjacent tracks and when in the lowered position no part of the luminaires shall make contact with the ground.

9.3 Each mast shall be fitted with a tamperproof, positive, locking device, for locking the mast in the vertical position to prevent lowering without special equipment.

9.4 The design of the mast shall be adequate to resist, when in the locked vertical position, a wind loading produced by a wind speed of 150 km/h, measured at a height of 10 metres above ground level and acting on the projected area of the mast and luminaires. The maximum permissible deflection at the top of the mast shall not exceed 2,S percent of the height of the mast under wind loading produced by a wind speed of 100 km/h . Provision shall be made in the mast design for minimising wind excited oscillation.

9.4.1 In addition to the requirements of clause 9.4, the design of the masts shall be adequate to resist, during raising and lowering, the wind forces specified in clause 9.4 from the worst direction, as well as self weight including luminaires and any inertial effects due to sudden stoppage.

9.4.2 Tenderers shall submit with their offer, a full set of design calculations, as well as dimensioned drawings of the mast structure including door opening strengthening, base plate connection and hinge details, signed by a registered professional engineer.

9.5 The masts shall be designed for mounting on a reinforced concrete foundation by means of a base flange secured to a bolt cage cast into the foundation, The base flange shall be free from laminations and the welded connection to the mast, shall fully develop the strength of the section. Means shall be provided to enable masts to be adjusted from deviations from the vertical.

9.5.1 The space between the top of the concrete foundation and the underside of the base flange shall be filled with a suitable compound after provision of a vermin proof drainage hole. The cable entry pipes shall not be obstructed.

9.6 The mast and luminaire mounting equipment shall be manufactured from steel complying with the requirements of BS 4360 grades 43A or 50. No steel section used in the construction of the mast shaft shall be less than 5 mm in thickness.

9.6.1 The mast hinge pin shall be manufactured from AISI grade 316 stainless steel.

9.7 Each mast shall be equipped with a capping unit incorporating spigots for mounting of the luminaires. The unit shall be designed to effectively seal the mast against the ingress of water.

9.8 The capping unit shall be welded or bolted to the top of the mast. If bolted, the bolt shall pass through the mast and capping unit and be secured with a nut. Bolts passing through the capping unit only and butting against the face of the mast, are not acceptable.

9.8.1 All nuts, bolts, etc, used for mounting of the capping unit shall be manufactured from stainless steel.

9.9 The luminaires shall be rigidly bolted to the mounting bracket. All nuts and bolts associated with the mounting of the luminaires shall be effectively protected against working loose, due to vibration or other causes, to ensure that the luminaires cannot change their position, or fall, after installation.

9.10 An opening shall be provided on the side of the mast to give easy access to a power distribution board and cable terminations. The opening shall be effectively sealed against the weather and protected against unauthorised entry. When the mast is installed, the opening shall face a direction parallel to adjacent tracks. Tenderers shall submit weather proofing details with their tender documents.

9.10.1 The sides of the base compartment opening under 9.10 above, shall be suitably reinforced with fully welded steel sections to restore the section modulus and prevent buckling.

9.11 Access shall be provided through the bottom of the mast and foundation for looping the supply cables into and out of the mast. Non-ferrous pipes shall be used for this purpose.

9.12 An M10 hex head stainless steel screw shall be welded to the main body of the mast in a readily accessible position, directly adjacent to, and level with the underside of the distribution board within the base compartment, for earthing purposes.

9.13 When in the fully raised position, the mast shall be effectively protected against the ingress of water.

9.14 Welding shall be in accordance with BS 5135, general requirements for the metal-arc welding of mild, or high tensile steel. It shall be carried out by qualified welders to the satisfaction of Spoornet. Site welding will not be allowed without the written approval of the Engineer.

10FOUNDATIONS
10.1 Tenderers shall include for the design and provision of, and the excavation and backfilling for, foundations complete with foundation bolts and anchor plates. The tendered price shall include for shoring of the track side of all foundation excavations within 3 400 mm of track centre lines, to guard against collapse due to rail traffic.

10.2 The foundations shall be designed for a soil bearing pressure of 150 kPa, when surcharge due to loading of adjacent track/s is ignored, Before foundations are commenced, the successful tenderer shall ascertain from Spoornets' Engineer, on site, the actual soil bearing pressure, to ensure that the design of his foundation is adequate for the location.

10.2.1 Should excavations require deepening, due to the designed foundation depth being insufficient for the location, such additional excavations will be paid for at the relevant rates in Appendix 7. This additional excavation shall be backfilled to correct foundation level using a weak mix concrete having a strength of 15 MPa at 28 days.

10.3 The mixture and strength of all concrete shall be in accordance with accepted practice but not less than 20 MPa at 28 days and shall be carefully controlled on site.

10.4 All steel reinforcing and foundation bolts shall have a minimum cover of 150 mm of concrete. The portion of the foundation bolts outside the concrete and to a depth of at least 150 mm into the concrete, as well as the nuts and washers, shall be galvanised in accordance with SABS 763.

10.5 When excavating for foundations, it is important that undermining of the track sleepers be avoided, (See clause 10.1). Where the lighting masts are located between tracks on straight runs, because of the limited space available, the length of the concrete foundation in the direction at right angles to the tracks shall not exceed 3 100 mm. Furthermore, no portion of the foundation will be permitted within a depth of 900 mm below the crown of the rails within a distance of 2 140 mm from the centre line of the track, for any track.

10.6 Full design details of the foundations, including concrete mix and strength, foundation bolt anchorage, reinforcing, etc. as well as detailed dimensioned drawings, signed by a registered professional civil engineer, shall be submitted with tenders.

10.7 After the casting of the foundation, the holes shall be backfilled and the earth properly compacted. The area around the masts shall be brought to the original level and shall be left neat and tidy.

10.8 All work in connection with the foundations shall be carefully supervised and carried out in close collaboration with Spoornets' Engineer.

11RAISING AND LOWERING SYSTEM

11.1 Masts shall be hinged at a point approximately half the height of the mast, and raised and lowered by means of a manually operated, light weight, portable winch. During operation, the winch unit shall be securely attached to the fixed section of the mast and the winch cable securely attached to the pivoting section of the mast.

11.2 The pivoting section of the mast, complete with the required number of luminaires attached thereto, shall be finely counterbalanced for ease of raising and lowering. Tenderers shall submit counter balancing details with their tender documents.

11.3 An easily detachable short length of chain shall be incorporated in the mast, between the pivoting and fixed sections, to guard against accidental lowering when the locking device specified in clause 9.3 above, is removed.

11.4 Winch ropes shall be manufactured of AISI grade 316, flexible, stranded, stainless steel and shall have a factor of safety of not less than 6.

12PROTECTION AGAINST CORROSION

12.1 Masts and all ferrous parts associated therewith, shall be hot dip galvanised in accordance with SABS 763. The mass of galvanised coating shall be determined in accordance with the non-destructive method under clause 6.3 of the aforementioned specification.

12.2 All welding, drilling, punching, stamping, cutting and bending of parts shall be completed and all burrs removed before the galvanising process is carried out.

12.3 If specified in Appendix 2, paint treatment shall be applied to all exterior galvanised surfaces in accordance with the requirements of Appendix 3.

12.4 Stringent precautions shall be taken to protect finished surfaces from injury or damage during assembly, transit, storage and erection.

13WINCH
13.1 Provision shall be made at the base of the mast for accommodation of a portable winch, which shall be used for raising and lowering of the pivoting section of the mast.

13.2 The winch shall be of light weight robust construction, suitable for site use and incorporate a carrying handle for easy transfer from one mast to another. It shall be easily coupled to, and uncoupled from, the mast. The use of more than one locking device for this purpose will not be considered.

13.3 The winch shall incorporate a spring loaded ratchet device which will ensure, in the event of the operating handle being released during the raising operation, that the pivoting section is stopped and remains in the position attained when the handle was released.

13.4 The spring loaded ratchet specified under clause 13.3 above shall be fitted with a lever of adequate length for safe operation, that must be depressed before the winch can be operated for lowering of the mast.

13.5 It shall be easily possible to fully raise or lower the pivoting section of the mast within an operating time of 5 minutes.

13.6 Tenderers shall submit a separate price for the winch offered and fully describe its method of operation.

14LUMINAIRES AND CONTROL GEAR
14.1 Luminaires shall be designed for use, and be supplied complete, with 400 watt or 250 watt high Pressure sodium discharge lamps and control gear and shall comply with the requirements of SABS 1277.

14.2 They shall be designed to withstand the movement and vibration expected at the site and at the height specified.

14.3 Luminaires shall be weatherproof and designed to inhibit the ingress of dirt and moisture. The lamp compartment shall be enclosed by a hinged, transparent, toughened glass, or vandal resistant plastic material (eg polycarbonate or ultra - high impact acrylic), cover, firmly bedded on a high grade gasket. Plastic covers shall be suitably Protected against the effects of ultra-violet radiation.

14.4 The luminaire housing shall be manufactured from die-cast LM6-M aluminium or other approved non-corrosive material and all external toggles, fixing screws, hinges, clips, etc. shall be manufactured from stainless steel, grade AISI 316 or 304.

14.5 The luminaire optical system shall consist of a high grade aluminium reflecting surface, capable of providing the light distribution required and maintaining this function under site conditions.

14.6 Lampholders shall be of the GES-(E40) type. They shall be capable of withstanding, without deterioration, the high voltages encountered during starting and the maximum temperature attained in service.

14.7 Control gear shall be integral with the luminaire and heat generated within the luminaire shall not cause deterioration of any component or affect lamp operation.

14.8 The ballast and electronic ignition device shall be designed for correct and efficient operation with the lamp offered, as well as all types of equally rated high pressure sodium lamps available on the local market.

14.9 The wattage and type of lamp to be used in the luminaire shall be stencilled on the luminaire in a position easily visible to personnel during relamping. Durable material shall be used and the lettering shall be at least 25 mm high.

14.10 The electronic ignition device shall be of the three wire type operating on the superposed pulse principle. The circuitry shall be such that at starting, or on failure of a lamp, high voltage pulses will be confined to the high voltage lead between the igniter and centre contact of the lampholder. Igniters incorporating a switching element are not acceptable.

14.10.1 A fully electronic ignition circuit shall be utilised to trigger the pulse transformer.

14.10.2 The natural frequency of the electronic ignition circuit shall be in the order of 100 kHz .

14.10.3 The lamp ignition voltage shall remain constant within a mains voltage variation of 200 to 250 volts.

14.10.4 Tenderers shall guarantee that pulsing of the igniter on a failed lamp will not have a detrimental effect on the life and efficient operation of the control gear, igniter, lampholder and circuit wiring.

14.11 Capacitors shall be fitted with safety discharge resistors incorporated within the canister of the capacitor.

15DISTRIBUTION BOARD AND MAST CABLING
15.1 A totally enclosed power distribution board of flame retardant, reinforced fibre glass construction, shall be mounted in an easily accessible position in the base compartment of the mast.

15.1.1 The board shall be provided with a front cover panel secured by captive type screws and allowing only the operating toggle of the circuit breaker to protrude.

15.2 The distribution board shall be equipped as follows :

15.2.1 One adequately rated, triple or double pole, moulded case circuit breaker, complying with the requirements of SABS 156, for control of the luminaires. It shall be rated for 250 volts and have a breaking capacity of "Class SABS 5 kA".

15.2.2 An adequate number of terminals of suitable size, allowing only one wire per terminal, for looping of the incoming and outgoing supply cables. These terminals shall be connected with bridge pieces connecting any number of adjacent terminals together to form a busbar.

15.2.2.1 Terminals shall be of the rail mounted clip-on type, with flash-barriers between terminals.

15.2.3 An insulated neutral terminal block.

15.2.4 An adequately rated earthing bar.

15.2.5 Grommeted access holes in the top and bottom of the board for cable entry.

15.3 All wiring in the distribution board shall be neatly arranged to run horizontally and vertically and shall be supported and fixed at regular intervals.

15.4 A flexible, multicore, unarmoured, heavy duty trailing cable, incorporating an additional core for earthing, shall be installed between the distribution board and the luminaires.

15.5 The cable shall be securely clamped at the top of the mast and be effectively protected against abrasion during raising and lowering of the mast.

15.6 The incoming and outgoing cable termination arrangement shall be as shown in Appendix 4.

16CABLES
16.1 All cables used, shall be 600/1 000 V rating and shall be in accordance with SABS 150.

16.2 All single core cables shall be PVC insulated and all multicore cables shall be PVC insulated, PVC sheathed, single wire armoured, PVC covered.

16.3 The armouring shall incorporate a percentage of copper wires in accordance with clause 5.8.3(c) of SABS 150.

16.4 All cables shall be adequately rated for the currents that may be carried such that the voltage drop at any luminaire does not exceed 5 percent of the nominal supply voltage, if fed from a substation and 2,5 percent of the nominal supply voltage, if fed from a kiosk.

16.5 Joints in cables will not be permitted unless authorised by Spoornets' Engineer on site.

17CABLE LAYING
17.1 Approved cable routes shall be adhered to, unless unknown buried services are encountered. Deviations will be allowed to avoid such services but all instances shall be referred to Spoornets' Engineer for approval.

17.2 Cables shall be buried in the ground in straight, neatly cut, trenches, approximately 300 mm wide, such that the top of any cable is at least 750 mm below the surrounding ground level.

17.3 During trenching, care shall be taken when placing the excavated soil so as not to cause damage or nuisance of any description and the Contractor shall take all precautions necessary to prevent damage to any other cables, water mains, drainage systems, etc. Should any of the above be damaged by the Contractor's staff, it must be reported immediately to Spoornets' Engineer who will arrange for the necessary repairs. The Contractor will be held responsible for the cost of the repairs.

17.4 Should it be necessary to remove accumulated water from a trench, this shall be undertaken by the Contractor at his expense and should be taken into account at the time of tendering. The Contractor shall provide all pumps and appliances required to carry out this operation.

17.5 Prior to laying the cables, the trenches shall be inspected thoroughly to ensure that they are free from any objects likely to damage the cables either during or after laying operations.

17.6 During laying operations, cables shall be handled with as much care as possible to avoid strain, kinks and damage to the cable and outer sheath. Once commenced, the whole of the cable laying operation shall be followed through to completion as quickly as possible so as to cause the minimum of inconvenience and obstuction.

17.7 Sleeve pipes constructed of asbestos cement, or other approved material and having a minimum internal diameter of 100 mm, shall be installed for cables crossing under existing and proposed railway tracks, tarred or concrete areas. The successful tenderer shall be responsible for restoring tarred and concrete surfaces after installation of sleeve pipes.

17.7.1 The pipes shall be installed 900 mm below crown of rail and shall extend at least 2 140 mm on either side of the centre line of the track and in the case of tarred and concrete areas, at least 900 mm beyond the edge of the tar or concrete.

17.7.2 The installation of pipes under railway tracks shall be carried out under the supervision of Spoornets' Engineer.

17.7.3 The cost of the supervision will be to Spoornets' account.

17.8 Filling in of trenches shall not be commenced until Spoornets' Engineer has inspected and approved the cables in situ. Such inspection will not be unreasonably delayed.

17.9 The first 150 mm of backfill on top of the cables shall be of fine soil, sifted if necessary, to ensure that the cables are not in contact with stones or other hard objects which may dent or damage the outer sheath of the cable when the backfill is compacted.

17.10 When backfilling, the soil shall be replaced in 150 mm layers, well rammed down and compacted, so that the final surface will match the surrounding level.

17.11 Cable markers, conforming to Drawing No. CEE-PK-14 will be supplied by Spoornet to the successful tenderer who will be responsible for installing them in the ground over the cable routes during cable laying. A cable marker shall be installed near the start where the cables leave the substation or kiosk and at intervals of 30 metres along the route. At each change in direction of the route, two cable markers shall be installed close to one another in such a way as to indicate the change in direction.

18EARTHING
18.1 The incoming and outgoing cable termination and earthing arrangement at each mast shall be as shown in Appendix 4.

18.2 The earthing core of the cable supplying the luminaires (clause 15.4) shall be connected to the earth bar in the distribution board.

18.3 The gusset arrangement shown in Appendix 5 shall be included in the tender price and provided at each mast.

19ERECTION OF MASTS
19.1 Before commencing the erection of the masts, the successful tenderer shall consult with Spoornets' Engineer, regarding the precautions necessary to avoid interference with, and danger from, train movements and accidental contact with live, traction, electrification overhead wires.

19.2 Masts and other equipment awaiting erection shall be stored on site in such a manner to ensure that all regulations are complied with and no danger to trains working, or personnel, result.

19.3 After erection of painted masts, all damage to paintwork shall be repaired according to the requirements in Appendix 3.

20DRAWINGS AND INSTRUCTION MANUALS
20.1 The successful tenderer will be required to furnish 3 prints each of detailed dimensioned drawings of the foundations, masts and raising and lowering mechanisms as well as detailed instructions for the operation and maintenance of all equipment, on completion of the installation.

20.2 The drawings and instructions shall be supplied in properly bound manuals with durable covers and the installation will not be accepted until the manuals have been handed over to Spoornets' Engineer or his authorised representative on site.

21PACKING
21.1 All equipment shall be packed in such a manner that it will be adequately protected against damage during transport and handling.

22INSPECTION
22.1 Spoornet reserves the right to inspect the equipment during or after manufacture and to be represented at any tests.

22.2 After erection of the masts and before the installation is accepted as complete, the successful tenderer shall lower and raise the pivoting section of each mast in the company of a member of Spoornets' staff to ensure the satisfactory operation thereof and for inspection purposes.

23ILLUMINANCE TESTS
23.1 On completion of the installation the successful tenderer will be required to carry out, in collaboration with Spoornets' Engineer, illuminance tests at a sufficient number of locations in the area covered by the lighting installation, to prove the values of illuminance claimed in his offer.

23.2 To comply with the requirements of clauses 8.9 and 8.13, initial (100 hr) values measured, shall not be less than 4,2 lux in all areas.

23.3 Should the values measured be below those specified, any subsequent return to site by Spoornets' staff for further measurements will be to the successful tenderer's account.

24SPARES
24.1 Tenderers shall submit a separate list of recommended spares. Individual prices shall be given for each item and tenderers shall comment on the future availability of spares from locally held stock.

25GUARANTEE
25.1 The Contractor must undertake to repair all faults due to bad workmanship and/or faulty materials and to replace all defective apparatus or materials during a period of six calendar months, calculated from the date that the completed electrical installation is accepted by Spoornet.

25.2 Any defects that may become apparent during the guarantee period must be rectified to the satisfaction of and free of cost to Spoornet.

25.3 The Contractor shall undertake work on the rectification of any defects that may arise during the guarantee period within 7 days of his being notified by Spoornet of such defects.

25.4 Should the Contractor fail to comply with the requirements stipulated above, Spoornet shall be entitled to undertake the necessary repair work or effect replacement of defective apparatus or materials, and the Contractor shall reimburse Spoornet the total cost of such repair or replacements, including the labour costs incurred in replacing defective material.



TENDERER'S SIGNATURE .....

DATE .....

CHIEF ENGINEER (Power Supplies)
(INFRASTRUCTURE)

ANNEXURE 1
SHEET 1 of 5
AMENDMENT

# HORIZONTAL CLEARANCES :
## 1 065mm TRACK GAUGE




| RADIUS (m) | WITH CANT | | NO CANT | WITH CANT | |
|---|---|---|---|---|---|
| | H (mm) | L (mm) | H & L | B (mm) | C (mm) |
| 90 | 2 730 | 3 090 | 2 780 | 1 130 | 2 100 |
| 100 | 2 700 | 3 030 | 2 750 | 1 140 | 2 050 |
| 120 | 2 650 | 2 970 | 2 700 | 1 160 | 2 010 |
| 140 | 2 620 | 2 920 | 2 660 | 1 175 | 1 990 |
| 170 | 2 590 | 2 870 | 2 630 | 1 190 | 1 970 |
| 200 | 2 570 | 2 820 | 2 600 | 1 205 | 1 950 |
| 250 | 2 550 | 2 790 | 2 580 | 1 230 | 1 920 |
| 300 | 2 540 | 2 760 | 2 560 | 1 250 | 1 900 |
| 350 | 2 530 | 2 730 | 2 540 | 1 270 | 1 890 |
| 400 | 2 520 | 2 710 | 2 530 | 1 290 | 1 875 |
| 500 | 2 510 | 2 680 | 2 520 | 1 320 | 1 850 |
| 600 | 2 500 | 2 660 | 2 510 | 1 340 | 1 830 |
| 800 | 2 490 | 2 620 | 2 500 | 1 365 | 1 790 |
| 1 000 | 2 480 | 2 600 | 2 490 | 1 380 | 1 760 |
| 1 200 | 2 480 | 2 580 | 2 490 | 1 200 | 1 730 |
| 1 500 | 2 480 | 2 550 | 2 480 | 1 415 | 1 700 |
| 2 000 | 2 480 | 2 500 | 2 480 | 1 440 | 1 660 |
| 3 000 | 2 470 | 2 470 | 2 470 | 1 500 | 1 600 |
| >5 000 | 2 460 | 2 460 | 2 460 | 1 600 | 1 600 |

**REMARKS:**

1. H AND B IS THE REQUIRED HORIZONTAL CLEARANCE ON THE OUTSIDE OF THE CURVE BASED ON MINIMUM CANT.
2. L AND C IS THE REQUIRED HORIZONTAL CLEARANCE ON THE INSIDE OF THE CURVE BASED ON MAXIMUM CANT.
3. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
4. FOR WORKSHOP AREAS AND TEMPORARY WORK, CLEARANCES H AND L MAY BE REDUCED BY 300mm.
5. ⊕ SEE ANNEXURE 1 SHEET 3 FOR PLATFORM CLEARANCES.
6. ALSO REFER TO REMARKS 4 TO 8 OF ANNEXURE 1 SHEET 2.

BE 97–01 Sht 1 of 5 DATE : JUNE 2000

# SCHEDULE OF REQUIREMENTS AND DEVIATIONS

1.0 LOCATION OF MEDIUM MAST LIGHTING INSTALLATION :

.....

.....

2.0DRAWING NUMBER/S OF RELEVANT DRAWING/S ATTACHED :

.....

.....

3.0 SPECIAL REQUIREMENTS AND DEVIATIONS FROM THE SPECIFICATION :

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CHIEF ENGINEER (Power Supplies)
(INFRASTRUCTURE)

SPOORNET
(infrastructure)(power supplies)

REFERENCE:

# PAINTING OF LIGHTING MASTS

## 1PAINTS AND PAINT THINNERS

1.1Paints and paint thinners shall be obtained from a Spoornet approved paint manufacturer.

1.2The primer coating shall be Corrocote 3 by AECI Paints, or equal approved manufacture.

1.3The two coats covering the primed surface shall be Paint, Rubber, Chlorinated, High Build, colour Dark Admiralty Grey, to Spoornet Specification CSS 183/13.15/G12 for the first coat, followed by Paint, Rubber, Chlorinated, Enamel, colour French Grey to Spoornet Specification CSS 183/13,16/H30 for the final coat.

1.4Xylene, to Spoornet Specification CSS 183/2.30, shsll be used ss a thinner for the two top coats, if necessary.

1.5All paints shall be stirred and mixed to a homogeneous condition incorporating the whole contents of the paint container. Mixed paint shall be kept mixed and in good condition throughout, stirring when neceesary to keep the pigment in suspension. Thinning shall only be undertaken in accordance with manufacturer's written recommendations and directions. Partially used containers shall be resealed to prevent evaporation of solvent.

## 2PREPARATION OF EXTERIOR SURFACES

2.1Galvanised surfaces shall be scrubbed with steel wool soaked in a clesning solution of one part by volume of Cleaning Compound, Solvent Detergent, Medium Duty to CSS 285/18,10, one part water and two parts of Remover, Paint, Non-Flammable, Dipping Type to CSS 183/14.02 to remove the protective film against formation of white rust and all other foreign matter and aleo to provide a key for adhesion of the primer. Protective clothing, gloves and masks must be used by workers during this cleaning process. Rinse the cleaned surface copiously with water.

2.2All painted surfaces, prior to application of a following coat, shall be sound, dry and free from oil, grease and other contaminants. Any unsound paint to be removed completely, the surface prepared as in clause 2.1 above and repainted coat for coat as specified below.

## 3APPLICATION OF PAINTS AT MANUFACTURER'S PREMISES

3.1 After preparation of the galvanised surfaces apply one coat of primer by spraying to give a dry film thickness of 35 - 45 micrometres, to all surfaces with the exception of the mast interior which need not be painted. Allow to dry for a minimum period of 4 hours before overcoating.

3.2The primed surfaces shall then be coated with one coat of the Paint, Rubber, Chlorinated, High Build, colour Dark Admiralty Grey, by suitable airless spray equipment to give a dry film thickness of 75 - 125 micrometers for this coat.

3.3Paints shall be applied under suitable conditions of light, temperature, humidity and ventilation. At time of overcoating, the painted surface shall be clean, dry, sound and free of misses and defective paint. Each coat of paint shall be applied as a continuous, even film of uniform thickness.

3.4Painted steel shall not be handled until the pain has dried except where necesssry in turning for painting or stacking for drying. Paint damaged in handling shall be scraped off and touched up by replacing each coat of paint scraped off. Painted steel shall not be transported or packed for trsnsport until paint is dry.

4TRANSPORTATION OF PAINTED STEEL

4.1When loading at the manufacturer's premises and when offloading at the erection site, components shall be handled with hessian covered slings in order to cause minimum damage to paintwork. During transportation, the components shall be placed on wooden dunnage and securely fastened to prevent sliding and other movement.

5SITE PAINTING

5.1Prior to the erection of masts, damaged areas of paint shall be repaired by spot cleaning in a manner that will minimise damage to sound paint. Bared areas shall be spot primed and spot painted with the materials specified, to restore all coats.

5.2In restoring specified coats as referred to in clause 5.1 special care must be taken to ensure that the prime coat is not applied over areas covered with Paint, Rubber, Chlorinated, High Build, as this could lead to premature paint failure.

5.3An overall final coat of Paint, Rubber, Chlorinated, Enamel, colour French Grey, to give a dry film thickness of 25 - 35 micrometres shall then be applied to all accessible surfaces.

5.4The total dry film thickness of the primer and two successive coats shall be between 135 - 205 m .

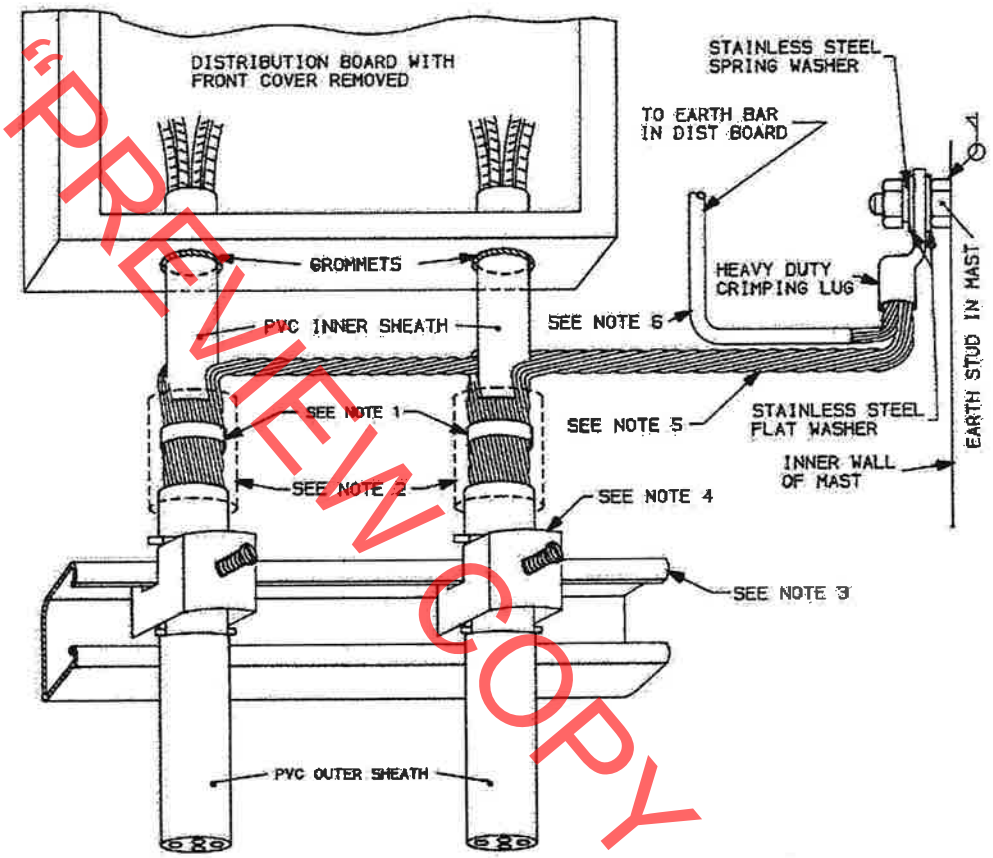
5.5During erection, masts shall be handled with hessian covered slings to minimise damage to paintwork.

5.6After erection, paintwork shall be repaired in the manner described in clauses 5.1 to 5.4 above.

CHIEF ENGINEER (ELECTRICAL)
(INFRASTRUCTURE)

REFERENCE :

# CABLE TERMINATION AND EARTHING ARRANGEMENT AT MEDIUM MASTS

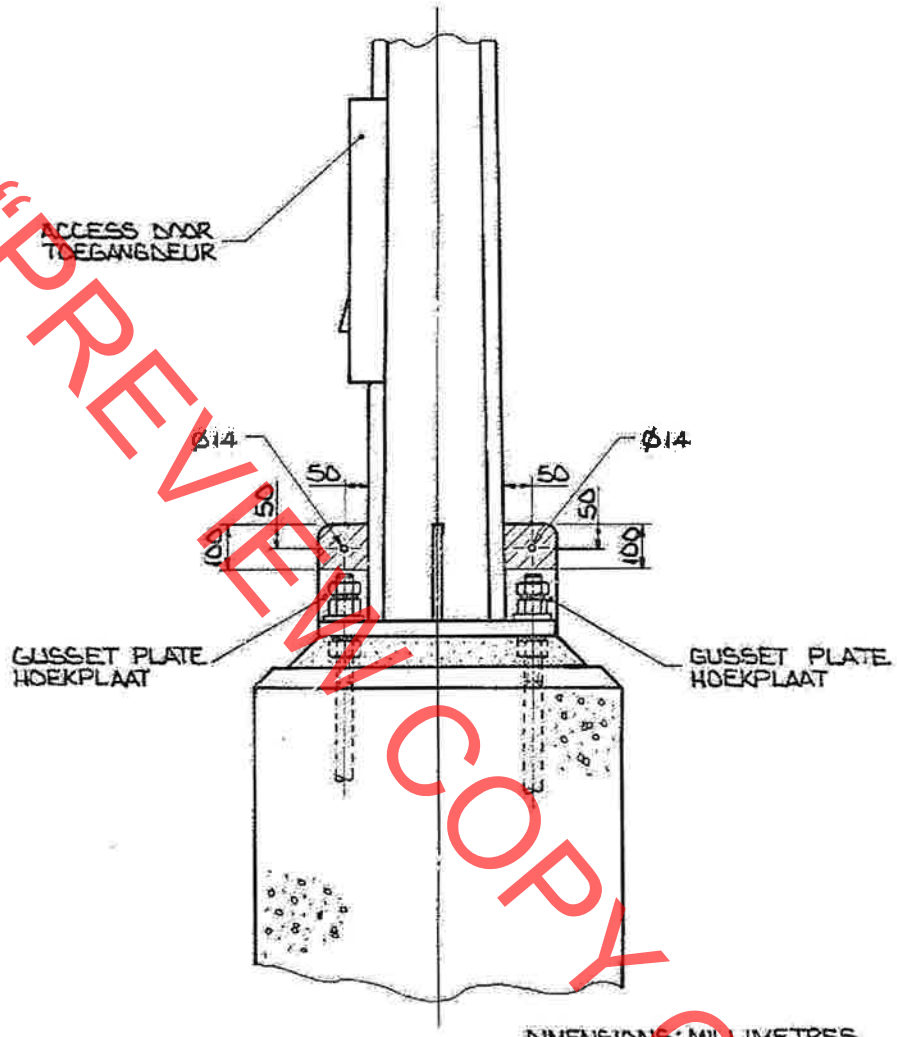





NOTES

1. GALVANISED "STRAPIT" OR EQUAL SYSTEM TO MANUFACTURERS INSTRUCTIONS.
2. THICK WALL, HEAT SHRINKABLE TUBE WITH INTERNAL SEALANT TO MANUFACTURERS INSTRUCTIONS.
3. GALVANISED "UNISTRUT", "SANKEYSTRUT" OR EQUAL CHANNEL OF ADEQUATE SIZE FOR THE PURPOSE, RIGIDLY FIXED TO A SUITABLE MOUNTING BRACKET ON THE MAST IN AN EASILY ACCESSIBLE POSITION.
4. GALVANISED "UNISTRUT", "SANKEYSTRUT" OR EQUAL CABLE CLAMPS TO SUIT CABLE DIAMETER.
5. FULL COMPLIMENT OF TINNED COPPER WIRES FROM BOTH CABLES.
6. PVC INSULATED, STRANDED COPPER CONDUCTOR OF RATED AREA AT LEAST EQUAL TO THAT OF LARGEST CONDUCTOR OF CABLE TO LUMINAIRES BUT NOT LESS THAN 2,5mm$^2$.

SPECIFICATION NO.CEE:0019
SPESIFIKASIE
APPENDIX NO. 5.
BYLAE




DIMENSIONS: MILLIMETRES
AFMETINGS: MILLIMETER



NOTES / OPMERKINGS:

1) THE TWO RECTANGULAR GUSSETS SHOWN, INCORPORATING THE Ø14 HOLE, SHALL BE PROVIDED ON EACH MAST, ONE DIRECTLY BELOW THE DOOR OPENING AND ONE DIRECTLY OPPOSITE.

   DIE TWEE REGHOEKIGE HOEKPLATE AANGETOON, INSLUITENDE DIE Ø14 GAT, SAL VOORSIEN WORD OP ELKE MAS, EEN DIREK ONDER DIE DEUR OPENING EN EEN DIREK TEENOORGESTELD.

2) THE SHADED AREA ON BOTH SIDES OF THE TWO RECTANGULAR GUSSETS SHALL BE LEFT UNPAINTED AFTER GALVANISING.

   DIE VERDONKERDE AREA OP BEIDE KANTE VAN DIE TWEE REGHOEKIGE HOEKPLATE MOET ONGEVERF BLY NA GALVANISERING.

# PROVISION FOR MAST TO RAIL BONDS.
# VOORSIENING VIR MAS NA SPOOR VERBINDINGS.

# TECHNICAL DATA SHEET

(To be completed by tenderers and submitted as part of their tender. This information is in addition to that called for in the body of the specification.)

1MASTS
1.1Manufacturer : .....

1.2Height : .....

1.3Materials and minimum thickness : .....

.....

1.4Type of construction : .....

.....

2FOUNDATIONS
2.1Details of mixture and strength : .....

.....

2.2Number of foundation bolts per foundation : .....

.....

2.3Size and material of bolts : .....

.....

2.4Total length of bolts : .....

.....

.....

3MOUNTING OF LUMINAIRES
3.1Method of mounting luminaires : .....

.....

3.2Method of mounting capping unit : .....

.....

3.3Vertical plane projected area of capping unit complete with luminaires : .....

.....

.....

3.4Overall diameter of capping unit complete with luminaires : .....

.....

3.5Mass of capping unit complete with luminaires : .....

.....

3.6Details of cable connection and type of cable used between distribution board and luminaire:

.....

.....

4RAISING AND LOWERING SYSTEM

4.1Description of system : .....

.....

.....

.....

4.2Details of winch offered : .....

.....

.....

4.3Time to lower mast : .....

4.4Time to raise mast : .....

4.5Counter balancing details : .....

5LUMINAIRES AND CONTROL GEAR

5.1Manufacturer of luminaire : .....

5.2Type and catalogue number of luminaire : .....

.....

5.3Manufacturer of lamp : .....

5.4Type and wattage of lamp : .....

5.5Lumen output (100 hr.) of lamp : .....

5.6Rated life of lamp : .....

5.7Manufacturer of ballast : .....

5.8Voltage and tappings of ballast : .....

.....

5.9Manufacturer and type of ignition device : .....

.....

5.10Pulse height (peak value) of ignition device : .....

.....

5.11Manufacturer, type and capacity of capacitor : .....

.....

5.12Working voltage of capacitor : .....

5.13Power factor of circuit : .....

5.14Length of time for lamps to reach full lumen output after switching on : .....

.....

5.15Length of time for lamps to reach full lumen output after a short interruption of the supply:

.....

5.16Types of lamps commercially available, guaranteed to operate satisfactorily at correct lamp characteristics with the ballast and ignitor combination stated above :

.....

.....

.....

5.17Period from date of commissioning of installation for which luminaires, control gear and lamps are guaranteed :

5.17.1Luminaires : .....

5.17.2Ballasts : .....

5.17.3Ignitors : .....

5.17.4Capacitors : .....

5.17.5Lamps : .....

AS WITNESSES

1.....

2.....

TENDERER'S SIGNATURE .....

DATE .....

CHIEF ENGINEER (Power Supplies)
(INFRASTRUCTURE)

REFERENCE:

# SCHEDULE OF RATES FOR ADDITIONS AND OMISSIONS

Tenderers shall complete the following schedule of rates, for use in the event of any additions and/or omissions to/from the contract, and submit them as part of their tender documents.

1MASTS, LUMINAIRES AND ANCILLARY EQUIPMENT EACH

1.1Supply, installation and testing of a 15 metre mast complete .....with capping unit, fully equipped distribution board and cable connection to luminaires, but excluding luminaires and control gear.

1.2Supply and installation of a luminaire complete with .....associated control gear, wiring and lamp.

1.3Supply and delivery of a winch complete with all components .....for attachment to mast.

2FOUNDATIONS

2.1Provision of a foundation in accordance with the requirements .....of the specification.

3EXCAVATIONS PER CUBIC METRE

3.1Rate for excavations in soil. .....

3.2Rate for excavations in soft rock. .....

3.3Rate for excavations in hard rock. .....

3.4Rate for the removal and replacement of ballast to its original .....condition.

3.5Rate for the removal and replacement of ballast and grit to its .....original condition.

3.6Provision of 15 MPa weak mix concrete in additional depth .....excavated below normal fonandation level, if required.

| | | | | | |
|---|---|---|---|---|---|
| 4 | CABLING | PER METRE LAID | | PER CABLE TERMINATION | |
| 4.1 | Supply and installation of cables excluding trenching, but incuding termination. | LABOUR | MATERIAL | LABOUR | MATERIAL |
| 4.1.1 | 4 mm square - 4 core | ..... | | ..... | |
| 4.1.2 | 6 mm square - 4 core | ..... | | ..... | |
| 4.1.3 | 10 mm square - 4 core | ..... | | ..... | |
| 4.1.4 | 16 mm square - 4 core | ..... | | ..... | |
| 4.1.5 | 25 mm square - 4 core | ..... | | ..... | |
| 4.1.6 | 35 mm square - 4 core | ..... | | ..... | |
| 4.1.7 | 50 mm square - 4 core | ..... | | ..... | |
| 4.2 | Supply and installation of PVC covered copper earthing cable. | LABOUR | MATERIAL | LABOUR | MATERIAL |
| 4.2.1 | 10 mm square - 1 core | ..... | | ..... | |
| 4.2.2 | 16 mm square - 1 core | ..... | | ..... | |
| 4.2.3 | 25 mm square - 1 core | ..... | | ..... | |
| 4.2.4 | 35 mm square - 1 core | ..... | | ..... | |

| | | |
|---|---|---|
| 5 | TRENCHING | PER CUBIC METRE |
| 5.1 | Rate for trenching 750 mm deep in soil. | ..... |
| 5.2 | Rate for trenching 600 mm deep in soft rock. | ..... |
| 5.3 | Rate for trenching 600 mm deep in hard rock. | ..... |

6 SLEEVE PIPES PER METRE LAID

6.1Rate for installation under tracks (including removal and .....replacement of ballast).

6.2Rate for installation under tarred areas (including removal and..... replacement of tar).

6.3Rate for installation under concrete areas (including removal .....and replacement of concrete).

7NOTES

7.1Soft rock will be taken as horoken or friable rock which can be removed by pick or mechanical excavator, or paving breaker. This includes hard clay.

7.2Hard rock will be taken as rock which cannot be removed by a mechanical excavator and requires drilling and blasting or splitting. This includes re-inforced or plain concrete.

7.3The attention of tenderers is drawn to the fact that the unit rates quoted for excavations, trenching, cabling and removal and replacement of ballast and grit, will be considered when adjudicating the tender.

AS WITNESSES

1.....

2.....

TENDERER'S SIGNATURE .....

DATE .....

CHIEF ENGINEER (Power Supplies)
(INFRASTRUCTURE)

REFERENCE: