TRANSNET

freight rail

Transnet Freight Rail a Division of Transnet SOC Ltd. (Reg. No. 1990/000900/30), invites all interested parties to respond to a request for quotation (RFQ) as indicated below:

All tenders should be submitted on the appropriate tender forms in a sealed envelope. The envelope must indicate the RFQ number, full description and closing date and should be deposited in the tender box before 10h00 on the closing date of the tender/s.

If delivered by hand, the Tender submissions must be addressed to Supply Chain Services, Admin Support, Tender Box, Office No. 2, Real Estate Management Building, Austen Street, Beaconsfield, Kimberley.

ISSUE OF DOCUMENTS - RFQ document will only be available from **10 July 2015** until ***17 July 2015 [15:00]*** at Transnet Freight Rail, Supply Chain Services, Office No. 2, Real Estate Management Building, Austen Street, Beaconsfield, Kimberley. **Please note that RFQ document can be e-mailed or physically collected on request / arrangement prior to cut off time from Ms. Leonie Visagie.**

Tenders can be viewed on the website (http://www.transnetfreightrail.tfr.net/Supplier/Page.aspx

***Tenderers are advised to confirm their attendance beforehand with Leonie Visagie Tel: 053 838 3119 or E-mail: Leonie.Visagie@transnet.net respectively.**

RFQ NUMBER	**KBY/53696**
SCOPE OF WORK	**For the replacement of rotating lights with A 24V flashlight system.**
REQUIRED AT	**Signalling at Middelplaats**
➔	**A COMPULSORY INFORMATION MEETING WILL BE HELD AT:**
➘	**Real Estate Management Building, Ground Floor Boardroom, Austen Street, Beaconsfield, Kimberley**
BRIEFING DATE	**DATE: 20/07/2015 at 09:00 (Companies not attending the compulsory tender briefing / site meeting will be overlooked during the award process.)**
TENDER FEE	**NO CHARGE**
COMPULSORY	**Safety boots, reflective jackets and site visit at Middelplaats**
CLOSING DATE	**Tuesday, 28 July 2015 at Kimberley**
CLOSING TIME	**10:00**
For technical queries contact:	Mr. L.J. Strauss (Bushy), Tel: 053-838 3179 / 083 284 5803
	Ref. HJC

Transnet Freight Rail urges Clients & Suppliers to report fraud/corruption at Transnet to TIPOFFS ANONYMOUS: 0800 003 056

TRANSNET

freight rail

A Division of Transnet SOC Limited Registration number 1990/00900/30

REQUEST FOR QUOTATION

KBY/53696
KBC_18319

Senior Buyer
Supply Chain Services
TRANSNET FREIGHT RAIL
Austen Street
KIMBERLEY
8301

TRANSNET

Transnet Freight Rail, a division of

TRANSNET SOC LTD

Registration Number 1990/000900/30

[hereinafter referred to as **Transnet]**

REQUEST FOR QUOTATION [RFQ] No KBY/53696

FOR THE PROVISION OF:	**FOR THE REPLACEMENT OF ROTATING LIGHTS WITH A 24V FLASHLIGHT SYSTEM (SIGNALLING) AT MIDDELPLAATS.**
FOR DELIVERY TO:	**THE INFRA MANAGER KIMBERLEY**
ISSUE DATE:	**09 JULY 2015**
CLOSING DATE:	**28 JULY 2015**
CLOSING TIME:	**10:00**
SITE MEETING:	**20 JULY 2015 AT 09:00**
VENUE:	**IN THE BOARDROOM OF THE REAL ESTATE MANAGER, AUSTEN STREET, BEACONSFIELD.**

Section 1

NOTICE TO BIDDERS

Quotations which must be completed as indicated in Section 2 of this RFQ are to be submitted as follows:

METHOD:	Tender Box
CLOSING VENUE:	Transnet Freight Rail, Real Estate Management Building, Office no. 2, Austen Street, Beaconsfield

1 Responses to RFQ

Responses to this RFQ [**Quotations**] must not include documents or reference relating to any other quotation or proposal. Any additional conditions must be embodied in an accompanying letter.

2 Broad-Based Black Economic Empowerment [B-BBEE]

Transnet fully endorses and supports the Government's Broad-Based Black Economic Empowerment Programme and it would therefore prefer to do business with local business enterprises who share these same values. As described in more detail in the attached B-BBEE Claim Form Transnet will allow a "preference" to companies who provide a valid B-BBEE Verification Certificate.

The value of this bid is estimated to be below R1 000 000 (all applicable taxes included); and therefore the **80/20** system shall be applicable.

Respondents are required to complete Annexure A [the B-BBEE Preference Point Claim Form] and submit it together with proof of their B-BBEE Status as stipulated in the Claim Form in order to obtain preference points for their B-BBEE status.

Note: Failure to submit a valid and original B-BBEE certificate or a certified copy thereof at the Closing Date of this RFQ will result in a score of zero being allocated for B-BBEE.

3 Communication

Respondents are warned that a response will be liable for disqualification should any attempt be made by a Respondent either directly or indirectly to canvass any officer(s) or employee of Transnet in respect of this RFQ between the closing date and the date of the award of the business.

A Respondent may, however, before the closing date and time, direct any written enquiries relating to the RFQ to the following Transnet employee:

Name: Herman Conradie Email: Herman.Conradie@transnet.net

Telephone: 053-8383483

Respondents may also, at any time after the closing date of the RFQ, communicate with the Chief Administrator at the Admin Support Office on any matter relating to its RFQ response:

Telephone 053-8383341 Email: Maggie.Pain@transnet.net

4 Legal Compliance

The successful Respondent shall be in full and complete compliance with any and all applicable national and local laws and regulations.

5 Changes to Quotations

Changes by the Respondent to its submission will not be considered after the closing date and time.

6 Pricing

All prices must be quoted in South African Rand on a fixed price basis, excluding VAT.

7 Prices Subject to Confirmation

Prices quoted which are subject to confirmation will not be considered.

8 Binding Offer

Any Quotation furnished pursuant to this Request shall be deemed to be an offer. Any exceptions to this statement must be clearly and specifically indicated.

9 Disclaimers

Transnet is not committed to any course of action as a result of its issuance of this RFQ and/or its receipt of a Quotation in response to it. Please note that Transnet reserves the right to:

- modify the RFQ's goods / service(s) and request Respondents to re-bid on any changes;
- reject any Quotation which does not conform to instructions and specifications which are detailed herein;
- disqualify Quotations submitted after the stated submission deadline;
- not necessarily accept the lowest priced Quotation or an alternative bid;
- reject all Quotations, if it so decides;
- place an order in connection with this Quotation at any time after the RFQ's closing date;
- award only a portion of the proposed goods / service/s which are reflected in the scope of this RFQ;
- split the award of the order/s between more than one Supplier/Service Provider should it at Transnet's discretion be more advantageous in terms of, amongst others, cost or developmental considerations ; or
- make no award at all.

Should a contract be awarded on the strength of information furnished by the Respondent, which after conclusion of the contract, is proved to have been incorrect, Transnet reserves the right to cancel the contract.

Transnet reserves the right to award business to the highest scoring bidder/s unless objective criteria justify the award to another bidder.

Transnet reserves the right to conduct Post Tender Negotiations (PTN) with selected Respondents or any number of short-listed Respondents, such PTN to include, at Transnet's discretion, any evaluation criteria listed in the RFQ document.

Should the preferred bidder fail to sign or commence with the contract within a reasonable period after being requested to do so, Transnet reserves the right to award the business to the next highest ranked bidder, provided that he/she is still prepared to provide the required goods at the quoted price.

Respondent's Signature

Date & Company Stamp

Safety Arrangements – Act 85 of 1993 and Regulations E4E

SAFETY ARRANGEMENTS AND PROCEDURAL COMPLIANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993) AND APPLICABLE REGULATIONS

1 General

1.1 The Contractor and Transnet Limited (hereinafter referred to as "Transnet") are individual employers, each in its own right, with their respective duties and obligations set out in the Occupational Health and Safety Act, Act 85 of 1993 (the Act) and applicable Regulations.

1.2 The Contractor accepts, in terms of the General Conditions of Contract and in terms of the Act, his obligations as an employer in respect of all persons in his employ, other persons on the premises or the Site or place of work or on the work to be executed by him, and under his control. He shall, before commencement with the execution of the contract work, comply with the provisions set out in the Act, and shall implement and maintain a Health and Safety Plan as described in the Construction Regulations, 2003 and as approved by Transnet, on the Site and place of work for the duration of the Contract.

1.3 The Contractor accepts his obligation to complying fully with the Act and applicable Regulations notwithstanding the omission of some of the provisions of the Act and the Regulations from this document.

1.4 Transnet accepts, in terms of the Act, its obligations as an employer of its own employees working on or associated with the site or place of work, and the Contractor and Technical Officer or his deputy shall at all times, co-operate in respect of the health and safety management of the site, and shall agree on the practical arrangements and procedures to be implemented and maintained during execution of the Works.

1.5 In the event of any discrepancies between any legislation and this specification, the applicable legislation will take precedence.

2 Definitions

2.1 In this Specification any word or expression to which a meaning has been assigned in the Construction Regulations, shall have the meaning so assigned to it, unless the context otherwise indicates: -

2.2 The work included in this Contract shall for the purposes of compliance with the Act be deemed to be "**Construction Work**", which, in terms of the Construction Regulations, 2003 means any work in connection with: -

(a) the erection, maintenance, alteration, renovation, repair, demolition or dismantling of or addition to a building or any similar structure;

(b) the installation, erection, dismantling or maintenance of fixed plant where such work includes the risk of a person falling;

(c) the construction, maintenance, demolition or dismantling of any bridge, dam, canal, road, railway, runway, sewer or water reticulation system or any similar civil engineering structure; or

(d) the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work;

2.3 **"competent person"** in relation to construction work, means any person having the knowledge, training and experience specific to the work or task being performed: Provided that where appropriate qualifications and training are registered as per the South African Qualifications Authority Act, 1995 these qualifications and training shall be deemed to be the required qualifications and training;

2.4 **"contractor"** means principal contractor and "subcontractor" means contractor as defined by the Construction Regulations, 2003.

Respondent's Signature

Date & Company Stamp

2.5 **"fall protection plan"** means a documented plan, of all risks relating to working from an elevated position, considering the nature of work undertaken, and setting out the procedures and methods applied to eliminate the risk;

2.6 **"health and safety file"** means a file, or other record in permanent form, containing the information required to be kept on site in accordance with the Act and applicable Regulations;

2.7 **"Health and Safety Plan "** means a documented plan which addresses the hazards identified and include safe work procedures to mitigate, reduce or control the hazards identified;

2.8 **"Risk Assessment"** means a programme to determine any risk associated with any hazard at a construction site, in order to identify the steps needed to be taken to remove, reduce or control such hazard;

2.9 **"the Act"** means the Occupational Health and Safety Act No. 85 of 1993.

3 Procedural Compliance

3.1 The Contractor who intends to carry out any construction work shall, before carrying out such work, notify the Provincial Director in writing if the construction work:

(a) includes the demolition of a structure exceeding a height of 3 meters; or

(b) includes the use of explosives to perform construction work; or

(c) includes the dismantling of fixed plant at a height greater than 3m,and shall also notify the Provincial Director in writing when the construction work exceeds 30 days or will involve more than 300 person days of construction work and if the construction work:-

(d) includes excavation work deeper than 1m; or

(e) Includes working at a height greater than 3 meters above ground or a landing.

The notification to the Provincial Director shall be on a form similar to Annexure A of the Construction Regulations, 2003 also shown in Annexure 1 of this Specification. The Contractor shall ensure that a copy of the completed notification form is kept on site for inspection by an inspector, Technical Officer or employee.

The Contractor shall, in accordance with the Act and applicable Regulations, make all the necessary appointments of competent persons in writing on a form similar to Annexure 2 of this Specification and deliver copies thereof to the Technical Officer. Copies should also be retained on the health and safety file.

Subcontractors shall also make the above written appointments and the Contractor shall deliver copies thereof to the Technical Officer.

In the case of a self-employed Contractor or any subcontractor who has the appropriate competencies and supervises the work himself, the appointment of a construction supervisor in terms of regulation 6.1 of the Construction Regulations, 2003 will not be necessary. The Contractor shall in such a case execute and sign a declaration, as in Annexure 3, by which he personally undertakes the duties and obligations of the "Chief Executive Officer" in terms of section 16(1) of the Act.

The Contractor shall, before commencing any work, obtain from the Technical Officer an access certificate as in Annexure 4 executed and signed by him, permitting and limiting access to the designated site or place of work by the Contractor and any subcontractors under his control.

Procedural compliance with Act and Regulations, as above, shall also apply to any subcontractors as employers in their own right. The Contractor shall furnish the Technical Officer with full particulars of such subcontractors and shall ensure that they comply with the Act and Regulations and Protekon's safety requirements and procedures.

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4 Special Permits

Where special permits are required before work may be carried out such as for hot work, isolation permits, work permits and occupations, the Contractor shall apply to the Technical Officer or the relevant authority for such permits to be issued. The Contractor shall strictly comply with the conditions and requirements pertaining to the issue of such permits.

5 Health and Safety Programme

5.1 The Tenderer shall, with his tender, submit a Health and Safety Programme setting out the practical arrangements and procedures to be implemented by him to ensure compliance by him with the Act and Regulations and particularly in respect of: -

(i) The provision, as far as is reasonably practical, of a working environment that is safe and without risk to the health of his employees and subcontractors in terms of section 8 of the Act;

(ii) the execution of the contract work in such a manner as to ensure in terms of section 9 of the Act that persons other than those in the Contractor's employment, who may be directly affected by the contract work are not thereby exposed to hazards to their health and safety;

(iii) ensuring, as far as is reasonably practical, in terms of section 37 of the Act that no employee or subcontractor of the Contractor does or omits to do any act which would be an offence for the Contractor to do or omit to do.

5.2 The Contractor's Health and Safety Programme shall be based on a risk assessment in respect of the hazards to health and safety of his employees and other persons under his control that are associated with or directly affected by the Contractor's activities in performing the contract work and shall establish precautionary measures as are reasonable and practical in protecting the safety and health of such employees and persons.

5.3 The Contractor shall cause a risk assessment contemplated in clause 5.2 above to be performed by a competent person, appointed in writing, before commencement of any Construction Work and reviewed during construction. The Risk Assessments shall form part of the Health and Safety programme to be applied on the site and shall include at least the following:

(a) The identification of the risks and hazards that persons may be exposed to;

(b) the analysis and evaluation of the hazards identified;

(c) a documented Health and Safety Plan, including safe work procedures to mitigate, reduce or control the risks identified;

(d) a monitoring and review plan.

5.4 The Health and Safety Plan shall include full particulars in respect of: -

(a) The safety management structure to be instituted on site or place of work and the names of the Contractor's health and safety representatives and members of safety committees where applicable;

(b) the safe working methods and procedures to be implemented to ensure the work is performed in compliance with the Act and Regulations;

(c) the safety equipment, devices and clothing to be made available by the Contractor to his employees;

(d) the site access control measures pertaining to health and safety to be implemented;

(e) the arrangements in respect of communication of health and safety related matters and incidents between the Contractor, his employees, subcontractors and the Technical Officer with particular reference to the reporting of incidents in compliance with Section 24 and General Administrative Regulation 8 of the Act and with the pertinent clause of the General Conditions of Contract forming part of the Contract and

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(f) the introduction of control measures for ensuring that the Safety Plan is maintained and monitored for the duration of the Contract.

5.5 The Health and Safety programme shall be subject to the Technical Officer's approval and he may, in consultation with the Contractor, order that additional and/or supplementary practical arrangements and procedures be implemented and maintained by the Contractor or that different working methods or safety equipment be used or safety clothes be issued which, in the Technical Officer's opinion, are necessary to ensure full compliance by the Contractor with his obligations as an employer in terms of the Act and Regulations. The Technical Officer or his deputy shall be allowed to attend meetings of the Contractor's safety committee as an observer.

5.6 The Contractor shall take reasonable steps to ensure that each subcontractor's Health and Safety Plan is implemented and maintained on the construction site: Provided that the steps taken shall include periodic audits at intervals mutually agreed to between them, but at least once every month.

5.7 The Contractor shall stop any subcontractor from executing any construction work, which is not in accordance with the Contractor's, and/or subcontractor's Health and Safety Plan for the site or which poses a threat to the health and safety of persons.

5.8 The Contractor shall ensure that a copy of the Health and Safety Plan is available on site for inspection by an inspector, Technical Officer, agent, subcontractor, employee, registered employee organization, health and safety representative or any member of the health and safety committee.

5.9 The Contractor shall consult with the health and safety committee or, if no health and safety committee exists, with a representative group of employees, on the development, monitoring and review of the Risk Assessment.

5.10 The Contractor shall ensure that all employees under his control are informed, instructed and trained by a competent person regarding any hazard and the related work procedures before any work commences, and thereafter at such times as may be determined in the Risk Assessment.

5.11 The Contractor shall ensure that all subcontractors are informed regarding any hazard as stipulated in the Risk Assessment before any work commences, and thereafter at such times as may be determined in the Risk Assessment.

5.12 The Contractor shall ensure that all visitors to a construction site undergoes health and safety induction pertaining to the hazards prevalent on the site and shall be provided with the necessary personal protective equipment.

6 Fall Protection Plan

6.1 In the event of the risk and hazard identification, as required in terms of clause 5.3 of this Specification, revealing risks relating to working from an elevated position the contractor shall cause the designation of a competent person, responsible for the preparation of a fall protection plan;

6.2 The Contractor shall implement, maintain and monitor the fall protection plan for the duration of Contract. The Contractor shall also take such steps to ensure the continued adherence to the fall protection plan.

6.3 The fall protection plan shall include:-

(a) A Risk Assessment of all work carried out from an elevated position;

(b) the procedures and methods to address all the identified risks per location;

(c) the evaluation of the employees physical and psychological fitness necessary to work at elevated positions;

(d) the training of employees working from elevated positions; and

(e) the procedure addressing the inspection, testing and maintenance of all fall protection equipment.

7 Hazards and Potential Hazardous Situations

The Contractor and the Technical Officer shall immediately notify one another of any hazardous or potentially hazardous situations which may arise during performance of the Contract by the Contractor or any subcontractor and, in particular, of such hazards as may be caused by the design, execution and/or location and any other aspect pertaining to the contract work.

8 Health and Safety File

8.1 The Contractor shall ensure that a health and safety file is opened and kept on site and shall include all documentation required as per the Act and applicable regulations, and shall be available to an inspector, the Technical Officer, or subcontractor upon request.

8.2 The Contractor shall ensure that a copy of the both his Health and Safety Plan as well as any subcontractor's Health and Safety Plan is available on request to an employee, inspector, contractor or the Technical Officer.

8.3 The Contractor shall hand over a consolidated health and safety file to the Technical Officer upon completion of the Construction Work and shall in addition to documentation mentioned in the Act and applicable Regulations include a record of all drawings, designs, materials used and other similar information concerning the completed structure.

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Railway Lines and High Voltage Equipment E7/1

E7/1 (July 1998)

SPECIFICATION FOR WORKS ON, OVER, UNDER OR ADJACENT TO RAILWAY LINES AND NEAR HIGH VOLTAGE EQUIPMENT

(This Specification shall be used in Transnet Contracts)

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Respondent's Signature

Date & Company Stamp

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1 DEFINITIONS

The following definitions shall apply :

Authorised Person. A person whether an employee of Transnet or not, who has been specially authorised to undertake specific duties in terms of Transnet's publication SAFETY INSTRUCTIONS: HIGH-VOLTAGE ELECTRICAL EQUIPMENT, and who holds a certificate or letter of authority to that effect.

Barrier. Any device designed to restrict access to "live" high-voltage electrical equipment.

Bond. A short conductor installed to provide electrical continuity.

Contractor. Any person or organisation appointed by Transnet to carry out work on its behalf.

Dead. Isolated and earthed.

Electrical Officer (Contracts). The person appointed in writing by the responsible Electrical Engineer in Transnet as the person who shall be consulted by the Contractor in all electrical matters to ensure that adequate safety precautions are taken by the Contractor.

Executive Officer. The person appointed by Transnet from time to time as the Executive Officer to act according to the rights and powers held by and obligations placed upon him in terms of the Contract.

High-Voltage. A voltage normally exceeding 1 000 volts.

Live. A conductor is said to be "live" when it is at a potential different from that of the earth or any other conductor of the system of which it forms a part.

Near. To be in such a position that a person's body or the tools he is using or any equipment he is handling may come within 3 metres of live exposed high-voltage electrical equipment.

Occupation. An authorisation granted by Transnet for work to be carried out under specified conditions on, over under or adjacent to railway lines.

Occupation Between Trains. An occupation during an interval between successive trains.

Project Manager. The person or juristic person appointed by Transnet from time to time as the Project Manager, to administer the Contract according to the powers and rights held by and obligations placed upon him in terms of the Contract.

Responsible Representative. The responsible person in charge, appointed by a contractor, who has undergone specific training (and holds a certificate) to supervise staff under his control to work on, over, under or adjacent to railway lines and in the vicinity of high-voltage electrical equipment.

Technical Officer. The person or juristic person appointed by Transnet from time to time as the Technical Officer, to administer the Contractor's performance and execution of the Works according to the powers and rights held by and obligations placed upon the Technical Officer in terms of the Contract.

Total Occupation. An occupation for a period when trains are not to traverse the section of line covered by the occupation.

Work on. Work undertaken on or so close to the equipment that the specified working clearances to the live equipment cannot be maintained.

Work Permit. A combined written application and authority to proceed with work on or near dead electrical equipment.

PART A - GENERAL SPECIFICATION

2. **AUTHORITY OF OFFICERS OF TRANSNET**

2.1 The Contractor shall co-operate with the officers of Transnet and shall comply with all instructions issued and restrictions imposed with respect to the Works which bear on the existence and operation of Transnet's railway lines and high-voltage equipment.

2.2 Without limiting the generality of the provisions of 2.1, any duly authorised representative of Transnet, having identified himself, may stop the work if, in his opinion, the safe passage of trains or the safety of Transnet assets or any person is affected. **CONSIDERATIONS OF SAFETY SHALL TAKE PRECEDENCE OVER ALL OTHER CONSIDERATIONS.**

3. **CONTRACTOR'S REPRESENTATIVES**

3.1 The Contractor shall nominate Responsible Representatives of whom at least one shall be available at any hour for call-out in cases of emergency. The Contractor shall provide the Technical Officer with the names, addresses and telephone numbers of the representatives.

3.2 The Contractor guarantees that he has satisfied himself that the Responsible Representative is fully conversant with this specification and that he shall comply with all his obligations in respect thereof.

4. **OCCUPATIONS AND WORK PERMITS**

4.1 Work to be done during total occupation or during an occupation between trains or under a work permit shall be done in a manner decided by the Technical Officer and at times to suit Transnet requirements.

4.2 The Contractor shall organise the Works in a manner, which will minimise the number and duration of occupations and work permits required.

4.3 Transnet will not be liable for any financial or other loss suffered by the Contractor arising from his failure to complete any work scheduled during the period of an occupation or work permit.

4.4 The Contractor shall submit to the Technical Officer, in writing, requests for occupations or work permits together with details of the work to be undertaken, at least 14 days before they are required. Transnet does not undertake to grant an occupation or work permit for any particular date, time or duration.

4.5 Transnet reserves the right to cancel any occupation or work permit at any time before or during the period of occupation or work permit. If, due to cancellation or change in date or time, the Contractor is not permitted to start work under conditions of total occupation or work permit at the time arranged, all costs caused by the cancellation shall be born by the Contractor except as provided for in clauses 4.6 to 4.8.

4.6 When the Contractor is notified less than 2 hours before the scheduled starting time that the occupation or work permit is cancelled, he may claim reimbursement of his direct financial losses caused by the loss of working time up to the time his labour and plant are employed on other work, but not exceeding the period of the cancelled occupation or work permit.

4.7 When the Contractor is notified less than 2 hours before the schedule starting time, or during an occupation or work permit, that the duration of the occupation or work permit is reduced, he may claim reimbursement of his direct financial losses caused by the loss of working time due to the reduced duration of the occupation or work permit.

4.8 Reimbursement the Contractor for any loss of working time in terms of 4.6 and 4.7, shall be subject to his claims being submitted within 14 days of the event with full details of labour and plant involved, and provided that the Technical Officer certifies that no other work on which the labour and plant could be employed was immediately available.

4.9 Before starting any work for which an occupation has been arranged, the Contractor shall obtain from the Technical Officer written confirmation of the date, time and duration of the occupation.

4.10 Before starting any work for which a work permit has been arranged, the Responsible Representative shall read and sign portion C of form No. T.1276 signifying that he is aware of the limits within which work may be undertaken. After the work for which the permit was granted has been completed, or when the work permit is due to be terminated, or if the permit is cancelled after the start, the same person who signed portion C shall sign portion D of the T.1276 form, thereby acknowledging that he is aware that the electrical equipment is to be made "live". The Contractor shall advise all his workmen accordingly.

5. **SPEED RESTRICTIONS AND PROTECTION**

5.1 When speed restrictions are imposed by Transnet because of the Contractor's activities, the Contractor shall organise and carry out his work so as to permit the removal of the restrictions as soon as possible.

5.2 When the Technical Officer considers protection to be necessary the Contractor shall, unless otherwise agreed, provide all protection including flagmen, other personnel and all equipment for the protection of Transnet's and the Contractor's personnel and assets, the public and including trains. Transnet will provide training free of charge of the Contractor's flagmen and other personnel performing protection duties. The Contractor shall consult with the Technical Officer, whenever he considers that protection will be necessary, taking into account the minimum permissible clearances set out in appendixes 1 to 4.

5.3 The Contractor shall appoint a Responsible Representative to receive and transmit any instruction, which may be given by Transnet personnel providing protection.

6. **ROADS ON TRANSNET PROPERTY**

The provision of clause 25 of the E.5, General Conditions of Contract, or clause 23 of the E.5 (MW), General Conditions of Contract for Maintenance Works, shall apply to the use of existing roads on Transnet's property.

7. **CLEARANCES**

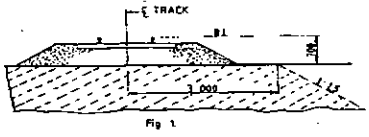
7.1 No temporary works shall encroach on the appropriate minimum clearances set out in Annexure 1 BE97-01 Sheets 1,2, 3 and 5 of 5.

8. **STACKING OF MATERIAL**

8.1 The Contractor shall not stack any material closer than 3 m from the centre line of any railway line without prior approval of the Technical Officer.

9. **EXCAVATION, SHORING, DEWATERING AND DRAINAGE**

9.1 Unless otherwise approved by the Technical Officer any excavation adjacent to a railway line shall not encroach on the hatched area shown in Figure 1.



Respondent's Signature

Date & Company Stamp

9.2 The Contractor shall provide at his own cost any shoring, dewatering or drainage of any excavation unless otherwise stipulated elsewhere in the Contract.

9.3 Where required by the Technical Officer, drawings of shoring for any excavation under or adjacent to a railway line shall be submitted and permission to proceed obtained, before the excavation is commenced.

9.4 The Contractor shall prevent ingress of water to the excavation but where water does enter, he shall dispose of it as directed by the Technical Officer.

9.5 The Contractor shall not block, obstruct or damage any existing drains either above or below ground level unless he has made adequate prior arrangements to deal with drainage.

10. **FALSEWORK FOR STRUCTURES**

10.1 Drawings of falsework for the construction of any structure over, under or adjacent to any railway line shall be submitted to the Technical Officer and his permission to proceed obtained before the falsework is erected. Each drawing shall be given a title and a distinguishing number and shall be signed by a registered professional engineer certifying that he has checked the design of the falsework and that the drawings are correct and in accordance with the design.

10.2 After the falsework has been erected and before any load is applied, the Contractor shall submit to the Technical Officer a certificate signed by a registered professional engineer certifying that he has checked the falsework and that it has been erected in accordance with the drawings. Titles and numbers of the drawings shall be stated in the certificate. Notwithstanding permission given by the Technical Officer to proceed, the Contractor shall be entirely responsible for the safety and adequacy of the falsework.

11. **PILING**

11.1 The Technical Officer will specify the conditions under which piles may be installed on Transnet property.

12. **UNDERGROUND SERVICES**

12.1 No pegs or stakes shall be driven or any excavation made before the Contractor has established that there are no underground services, which may be damaged thereby.

12.2 Any damage shall be reported immediately to the Technical Officer, or to the official in charge at the nearest station, or to the traffic controller in the case of centralised traffic control.

13. **BLASTING**

13.1 The provisions of clause 23 of the E.5, General Conditions of Contract or clause 21 of the E.5 (MW), General Conditions of Contract for Maintenance Work, shall apply to all blasting operations undertaken in terms of the Contract.

13.2 The Contractor shall provide proof that he has complied with the provisions of clauses 10.17.1 to 10.17.4 of the Explosives Regulations (Act 26 of 1956 as amended).

13.3 Blasting within 500m of a railway line will only be permitted during intervals between trains. A person appointed by the Technical Officer, assisted by flagmen with the necessary protective equipment, will be in communication with the controlling railway station.
Only this person will be authorised to give the Contractor permission to blast, and the Contractor shall obey his instructions implicitly regarding the time during which blasting may take place.

13.4 The flagmen described in 13.3, where provided by Transnet, are for the protection of trains and Transnet property only, and their presence does not relieve the Contractor in any manner of his responsibilities in terms of Explosives Act or Regulations, or any obligation in terms of this Contract.

13.5 The person described in 13.3 will record in a book provided and retained by Transnet the dates and times -

(i) when each request is made by him to the controlling station for permission to blast;

(ii) when blasting may take place;

(iii) when blasting actually takes place; and

(iv) when he advises the controlling station that the line is safe for the passage of trains.

13.6 Before each blast the Contractor shall record in the same book, the details of the blast to be carried out. The person appointed by the Technical Officer and the person who will do the blasting shall both sign the book whenever an entry described in 13.5 is made.

13.7 The terms of clause 27 hereof shall be strictly adhered to.

14. RAIL TROLLEYS

14.1 The use of rail trolleys or trestle trolleys on a railway line for working on high voltage equipment will be permitted only if approved by the Technical Officer and under the conditions stipulated by him.

14.2 All costs in connection with such trolley working requested by the Contractor shall, unless otherwise agreed, be borne by the Contractor, excluding the costs of any train protection services normally provided free of charge by Transnet.

15. SIGNAL TRACK CIRCUITS

15.1 Where signal track circuits are installed, the Contractor shall ensure that no material capable of conducting an electrical current makes contact between rails of a railway line/lines.

15.2 No signal connections on track-circuited tracks shall be severed without the Technical Officer's knowledge and consent.

16. PENALTY FOR DELAYS TO TRAINS

16.1 If any trains are delayed by the Contractor and the Technical Officer is satisfied that the delay was avoidable, a penalty will be imposed on the Contractor of R5 000 per hour or part thereof for the period of delay, irrespective of the number of trains delayed.

Respondent's Signature

Date & Company Stamp

PART B - ADDITIONAL SPECIFICATION FOR WORK NEAR HIGH-VOLTAGE ELECTRICAL EQUIPMENT

17. GENERAL

17.1 This specification is based on the contents of Transnet's publication SAFETY INSTRUCTIONS, HIGH-VOLTAGE ELECTRICAL EQUIPMENT, as amended, a copy of which will be made available on loan to the Contractor for the duration of the contract. These instructions apply to all work near live high-voltage equipment maintained and/or operated by Transnet, and the onus rests on the Contractor to ensure that he obtains a copy.

17.2 The Contractor's attention is drawn in particular to the contents of Part I, Sections 1 and 2 of the Safety Instructions : High-Voltage Electrical Equipment.

17.3 The Safety Instructions : High-Voltage Electrical Equipment cover the minimum safety precautions which must be taken to ensure safe working on or near high-voltage electrical equipment, and must be observed at all times. Should additional safety measures be considered necessary because of peculiar local conditions, these may be ordered by and at the discretion of the Electrical Officer (Contracts).

17.4 This specification must be read in conjunction with and not in lieu of the Safety Instructions : High-Voltage Electrical Equipment.

17.5 The Contractor shall obtain the approval of the Electrical Officer (Contracts) before any work is done which causes or could cause any portion of a person's body or the tools he is using or any equipment he is handling, to come within 3 metres of any live high-voltage equipment.

17.6 The Contractor shall regard all high-voltage equipment as live unless a work permit is in force.

17.7 Safety precautions taken or barriers erected shall comply with the requirements of the Electrical Officer (Contracts), and shall be approved by him before the work to be protected is undertaken by the Contractor. The Contractor shall, unless otherwise agreed, bear the cost of the provision of the barriers and other safety precautions required, including the attendance of Transnet staff where this is necessary.

17.8 No barrier shall be removed unless authorised by the Electrical Officer (Contracts).

18. WORK ON BUILDINGS OR FIXED STRUCTURES

Before any work is carried out or measurements are taken on any part of a building, fixed structure or earthworks of any kind above ground level situated within 3 metres of live high-voltage equipment, the Electrical Officer (Contracts) shall be consulted to ascertain the conditions under which the work may be carried out.

18.2 No barrier erected to comply with the requirements of the Electrical Officer (Contracts) shall be used as temporary staging or shuttering for any part of the Works.

18.3 The shuttering for bridge piers, abutments, retaining walls or parapets adjacent to or over any track may be permitted to serve as a barrier, provided that it extends at least 2,5 metres above any working level in the case of piers, abutments and retaining walls and 1,5 metres above any working level in the case of parapets.

Respondent's Signature

Date & Company Stamp

19. **WORK DONE ON OR OUTSIDE OF ROLLING STOCK, INCLUDING LOADING OR UNLOADING**

19.1 No person shall stand, climb or work whilst on any platform, surface or foothold higher than the normal unrestricted places of access, namely -

(i) the floor level of trucks;

(ii) external walkways on diesel, steam and electric locomotives, steam heat vans, etc. and

(iii) walkways between coaches and locomotives.

When in these positions, no person may raise his hands or any equipment or material he is handling above his head.

19.2 In cases where the Contractor operates his own rail mounted equipment, he shall arrange for the walkways on this plant to be inspected by the Electrical Officer (Contracts) and approved, before commencement of work.

19.3 The handling of long lengths of material such as metal pipes, reinforcing bars, etc should be avoided, but if essential they shall be handled as nearly as possible in a horizontal position below head height.

19.4 The Responsible Representative shall warn all persons under his control of the danger of being near live high-voltage equipment, and shall ensure that the warning is fully understood.

19.5 Where the conditions in 19.1 to 19.3 cannot be observed the Electrical Officer (Contracts), shall be notified. He will arrange for suitable safety measures to be taken. The Electrical Officer (Contracts), may in his discretion and in appropriate circumstances, arrange for a suitable employee of the Contractor to be specially trained by Transnet and at its costs, as an Authorised Person to work closer than 3 metres from live overhead conductors and under such conditions as may be imposed by the Senior responsible Electrical Engineer in Transnet.

20. **USE OF EQUIPMENT**

20.1 Measuring Tapes and Devices

20.1.1 Measuring tapes may be used near live high-voltage equipment provided that no part of any tape or a person's body comes within 3 metres of the live equipment.

20.1.2 In windy conditions the distance shall be increased to ensure that if the tape should fall it will not be blown nearer than 3 metres from the live high-voltage equipment.

20.1.3 Special measuring devices longer than 2 metres such as survey staves and rods may be used if these are of non-conducting material and approved by the responsible Electrical Engineer in Transnet, but these devices must not be used within 3 metres of live high-voltage equipment in rainy or wet conditions.

20.1.4 The assistance of the Electrical Officer (Contracts) shall be requested when measurements within the limits defined in 20.1.1 to 20.1.3 are required.

20.1.5 The restrictions described in 20.1.1 to 20.1.3 do not apply on a bridge deck between permanent parapets nor in other situations where a barrier effectively prevents contact with the live high-voltage equipment.

20.2 Portable Ladders

20.2.1 Any type of portable ladder longer than 2 metres may only be used near live high-voltage equipment under the direct supervision of the Responsible Representative. He shall ensure that the ladder is always used in such a manner that the distance from the base of the ladder to any live high-voltage equipment is greater than the fully extended length of the ladder plus 3 metres. Where these conditions cannot be observed, the Electrical Officer (Contracts) shall be advised, and he will arrange for suitable safety measures to be taken.

21. **CARRYING AND HANDLING MATERIAL AND EQUIPMENT**

21.1 Pipes, scaffolding, iron sheets, reinforcing bars and other material, which exceeds 2 metres in length, shall be carried completely below head height near live high-voltage equipment. For maximum safety two or more persons so as to maintain it as nearly as possible in a horizontal position should carry such material. The utmost care must be taking to ensure that no part of the material comes within 3 metres of any live high-voltage equipment.

21.2 Long lengths of wire or cable shall never be run out in conditions where a part of a wire or cable can come within 3 metres of any live high-voltage equipment unless the Electrical Officer (Contracts) has been advised and has approved appropriate safety precautions.

21.3 The presence of overhead power lines shall always be taken account of especially when communications lines or cables or aerial cables, stay wires, etc. are being erected above ground level.

22. **PRECAUTIONS TO BE TAKEN WHEN ERECTING OR REMOVING POLES, ANTENNAE, TREES ETC.**

22.1 A pole may be handled for the purpose of erection or removal near high-voltage equipment under the following conditions:

(i) If the distance between the point at which the pole is to be erected or removed and the nearest live high-voltage equipment is more than the length of the pole plus 3 metres, the work shall be supervised by the Responsible Representative.

(ii) If the distance described in (i) is less than the length of the pole plus 3 metres, the Electrical Officer (Contracts) shall be consulted to arrange for an Authorised Person to supervise the work and to ensure that the pole is earthed where possible. The pole shall be kept in contact with the point of erection, and adequate precautions shall be taken to prevent contact with live high-voltage equipment.

22.2 The cost of supervision by an Authorised Person and the provision of earthing shall, unless otherwise agreed, be borne by the Contractor.

22.3 The provisions of clauses 22.1 and 22.2 shall also apply to the erection or removal of columns, antennae, trees, posts, etc.

23. **USE OF WATER**

23.1 No water shall be used in the form of a jet if it can make contact with any live high-voltage equipment or with any person working on such equipment.

24. **USE OF CONSTRUCTION PLANT**

24.1 "Construction plant" entails all types of plant including cranes, piling frames, boring machines, excavators, draglines, dewatering equipment and road vehicles with or without lifting equipment.

24.2 When work is being undertaken in such a position that it is possible for construction plant or its load to come within 3 metres of live high-voltage equipment, the Electrical Officer (Contracts) shall be consulted. He will arrange for an Authorised Person to supervise the work and to ensure that the plant is adequately earthed. The Electrical Officer (Contracts) will decide whether further safety measures are necessary.

24.3 The cost of any supervision by an Authorised Person and the provision of earthing shall, unless otherwise agreed, be borne by the Contractor.

24.4 When loads are handled by cranes, non-metallic rope hand lines shall be used, affixed to such loads so as to prevent their swinging and coming within 3 metres of live high-voltage equipment.

24.5 Clauses 24.1 to 24.4 shall apply mutatis mutandis to the use of maintenance machines of any nature.

25. **WORK PERFORMED UNDER DEAD CONDITIONS UNDER COVER OF A WORK PERMIT**

25.1 If the Responsible Representative finds that the work cannot be done in safety with the high-voltage electrical equipment live, he shall consult the Electrical Officer (Contracts) who will decide on the action to be taken.

25.2 If a work permit is issued the Responsible Representative shall -

(i) before commencement of work ensure that the limits within which work may be carried out have been explained to him by the Authorised Person who issued the permit to him, and that he fully understands these limits;

(ii) sign portion C of the permit before commencement of work;

(iii) explain to all persons under his control the limits within which work may be carried out, and ensure that they fully understand these limits;

(iv) care for the safety of all persons under his control whilst work is in progress; and

(v) withdraw all personnel under his control from the equipment on completion of the work before he signs portion D of the work permit.

26. **TRACTION RETURN CIRCUITS IN RAILS**

26.1 DANGEROUS CONDITIONS CAN BE CREATED BY REMOVING OR SEVERING ANY BOND.

26.2 Broken rails with an air gap between the ends, and joints, at which fishplates are removed under "broken bond" conditions, are potentially lethal. The rails on either side of an air gap between rail ends on electrified lines shall not be touched simultaneously until rendered safe by Transnet personnel.

26.3 The Contractor shall not break any permanent bonds between rails or between rails and any structure. He shall give the Technical Officer at least 7 days written notice when removal of such bonds is necessary.

26.4 No work on the track which involves interference with the traction return rail circuit either by cutting or removing the rails, or by removal of bonds shall be done unless the Electrical Officer (Contracts) is consulted. He will take such precautions as may be necessary to ensure continuity of the return circuit before permitting the work to be commenced.

27. **BLASTING**

27.1 The Contractor shall obtain the permission of the Electrical Officer (Contracts) before blasting, and shall give at least 14 days notice of his intention to blast.

Respondent's Signature

Date & Company Stamp

27.2 No blasting shall be done in the vicinity of electrified lines unless a member of Transnet's electrical personnel is present.

27.3 The terms of clause 13 hereof shall be strictly adhered to.

28. **HIGH-VOLTAGE ELECTRICAL EQUIPMENT NOT MAINTAINED AND/OR OPERATED BY TRANSNET**

Where the work is undertaken on or near high-voltage electrical equipment which is not maintained and/or operated by Transnet, the Occupational Health and Safety Act No. 85 of 1993, and Regulations and Instructions, or the Mines Health and Safety Act (Act 29 of 1996), shall apply.

Such equipment includes: -

(i) Eskom and municipal equipment;

(ii) the Contractor's own power supplies; and

(iii) electrical equipment being installed but not yet taken over from the Contractor.

Respondent's Signature

Date & Company Stamp

ANNEXURE 1
SHEET 1 of 5
AMENDMENT

HORIZONTAL CLEARANCES : 1 065mm TRACK GAUGE

BE 97-01 Sht 1 of 5 DATE : JUNE 2000

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	2 480	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:

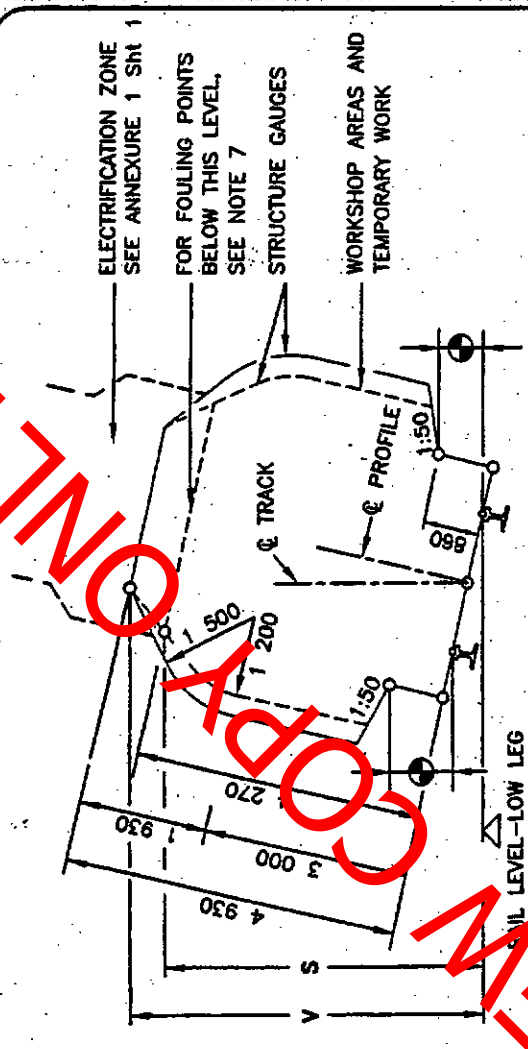
1. H AND B IS THE REQUIRED HORIZONTAL CLEARANCE ON THE OUTSIDE OF THE CURVE BASED ON MINIMUM CANT.
2. L AND C IS THE REQUIRED HORIZONTAL CLEARANCE ON THE INSIDE OF THE CURVE BASED ON MAXIMUM CANT.
3. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
4. FOR WORKSHOP AREAS AND TEMPORARY 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.

Respondent's Signature

Date & Company Stamp

ANNEXURE 1
SHEET 2 of 5
AMENDMENT

VERTICAL CLEARANCES : 1 065mm TRACK GAUGE



LOCATION		NOT ELECTRIFIED	ELECTRIFIED (PRESENT OR FUTURE)	
	RADIUS (mm)	S (mm)	3KV & 25KV V (mm)	50KV V (mm)
ALL AREAS OTHER THAN THOSE INDICATED BY * BELOW	100	4 470	5 050	5 400
	300	4 410	5 020	5 370
	600	4 370	5 000	5 350
	1 000	4 350	4 990	5 340
	1 500	4 310	4 960	5 310
	2 000	4 290	4 940	5 290
	>3 000	4 270	4 930	5 280
* OVER OR NEAR POINTS AND CROSSING IF REQUIRED BY ELECTRICAL IRRESPECTIVE OF RADIUS			5 650	6 00[illegible]

REMARKS:

1. V IS THE REQUIRED VERTICAL CLEARANCE EXCEPT WHERE REDUCED CLEARANCE S APPLIES.
2. S IS THE MINIMUM VERTICAL CLEARANCE FOR STRUCTURES AND TEMPORARY WORK OVER NON–ELECTRIFIED LINES.
3. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
4. FOR APPLICATION AT CURVES
   - 4.1 APPLY INCREASED CLEARANCES FOR CURVES TO POINTS 3m BEYOND THE ENDS OF THE CIRCULAR CURVE.
   - 4.2 REDUCE CLEARANCES AT A UNIFORM RATE OVER THE REMAINDER OF THE TRANSITION CURVE.
   - 4.3 FOR NON–TRANSITIONED CURVES REDUCE AT A UNIFORM RATE OVER A LENGTH OF 15m ALONG STRAIGHTS.
5. NEW STRUCTURES: SEE BRIDGE CODE.
6. TUNNELS: SEE DRAWING BE 82–35.
7. FOULING POINTS: SEE CLAUSE 8.1.
8. CLEARANCES ARE BASED ON 15m BOGIE CENTRES AND 21,2m VECHILE BODY LENGTH.
9. ◔ SEE ANNEXURE 1 SHEET 3 FOR PLATFORM CLEARANCES.

BE 97–01 Sht 2 of 5 DATE : JUNE 2000

Respondent's Signature

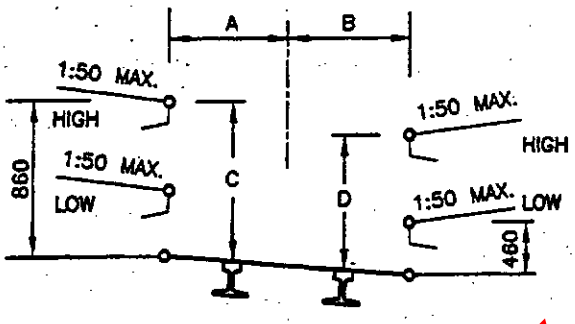
Date & Company Stamp

ANNEXURE 1
SHEET 3 of 5
AMENDMENT

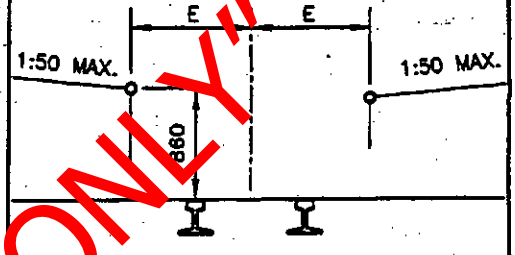
CLEARANCES : PLATFORMS

PLATFORMS : TRACK GAUGE 1 065mm

PASSENGERS



GOODS



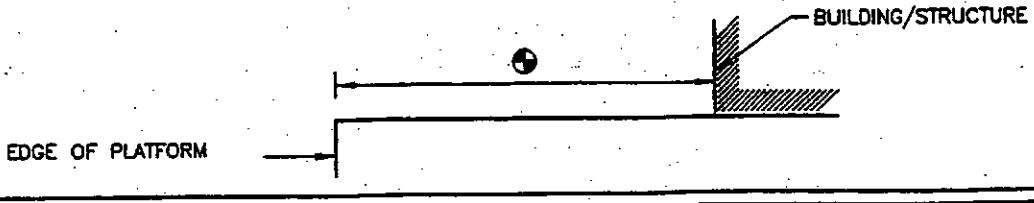
(NO CANT)

RADIUS (m)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
90	1 690	1 820	890	810	1 840
100	1 650	1 790	890	810	1 810
120	1 610	1 740	890	810	1 760
140	1 580	1 700	890	810	1 720
170	1 550	1 660	890	810	1 690
200	1 530	1 630	890	820	1 670
250	1 500	1 600	890	820	1 640
300	1 520	1 580	890	830	1 620
350	1 520	1 560	880	830	1 600
400	1 520	1 550	880	840	1 590
500	1 520	1 540	880	850	1 580
600	1 520	1 530	870	850	1 570
800	1 520	1 520	860	860	1 560
1 200	1 520	1 520	860	860	1 550
2 000	1 520	1 520	860	860	1 540
3 000	1 520	1 520	860	860	1 530
STRAIGHT	1 520	1 520	860	860	1 520

REMARKS:

1. NO CANT TO BE APPLIED EXCEPT WHEN THE GOODS PLATFORM IS ON A RUNNING LINE.
2. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
3. ⊕ 8m TO MAIN STATION BUILDINGS AND 3m TO ALL OTHER STRUCTURES.
4. TOLERANCES : SEE CLAUSE 8.0.10.

STRUCTURES ON PLATFORMS : 1 065mm AND 610mm TRACK GAUGE



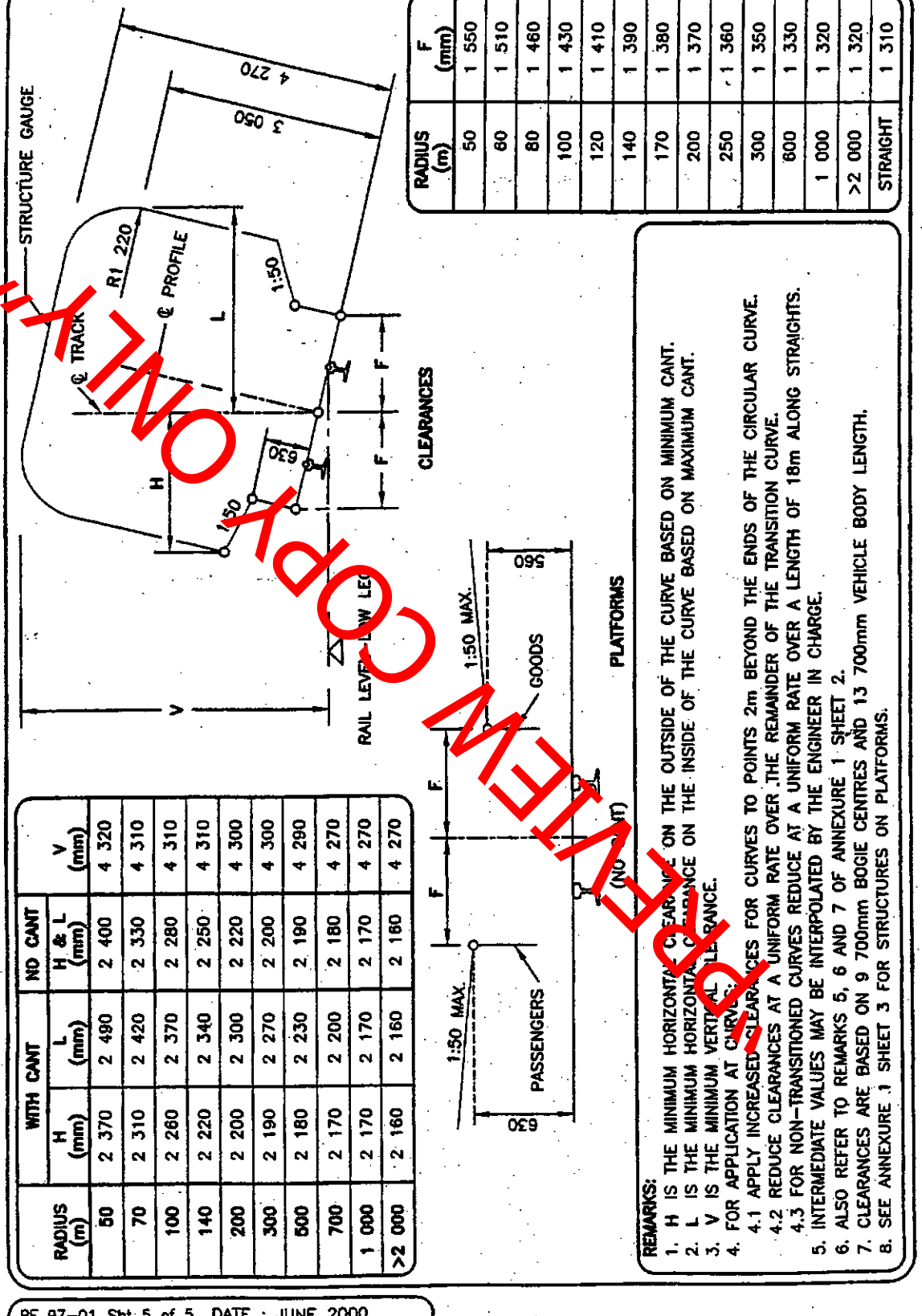
BE 97-01 Sht 3 of 5 DATE : JUNE 2000

Respondent's Signature

Date & Company Stamp

ANNEXURE 1
SHEET 5 of 5
AMENDMENT

CLEARANCES : 610mm TRACK GAUGE



RADIUS (m)	F (mm)
50	1 550
60	1 510
80	1 460
100	1 430
120	1 410
140	1 390
170	1 380
200	1 370
250	1 360
300	1 350
600	1 330
1 000	1 320
>2 000	1 320
STRAIGHT	1 310

RADIUS (m)	WITH CANT H (mm)	WITH CANT L (mm)	NO CANT H & L (mm)	V (mm)
50	2 370	2 490	2 400	4 320
70	2 310	2 420	2 330	4 310
100	2 260	2 370	2 280	4 310
140	2 220	2 340	2 250	4 310
200	2 200	2 300	2 220	4 300
300	2 190	2 270	2 200	4 300
500	2 180	2 230	2 190	4 290
700	2 170	2 200	2 180	4 270
1 000	2 170	2 170	2 170	4 270
>2 000	2 160	2 160	2 160	4 270

REMARKS:
1. H IS THE MINIMUM HORIZONTAL CLEARANCE ON THE OUTSIDE OF THE CURVE BASED ON MINIMUM CANT.
2. L IS THE MINIMUM HORIZONTAL CLEARANCE ON THE INSIDE OF THE CURVE BASED ON MAXIMUM CANT.
3. V IS THE MINIMUM VERTICAL CLEARANCE.
4. FOR APPLICATION AT CURVES:
   4.1 APPLY INCREASED CLEARANCES FOR CURVES TO POINTS 2m BEYOND THE ENDS OF THE CIRCULAR CURVE.
   4.2 REDUCE CLEARANCES AT A UNIFORM RATE OVER THE REMAINDER OF THE TRANSITION CURVE.
   4.3 FOR NON-TRANSITIONED CURVES REDUCE AT A UNIFORM RATE OVER A LENGTH OF 18m ALONG STRAIGHTS.
5. INTERMEDIATE VALUES MAY BE INTERPOLATED BY THE ENGINEER IN CHARGE.
6. ALSO REFER TO REMARKS 5, 6 AND 7 OF ANNEXURE 1 SHEET 2.
7. CLEARANCES ARE BASED ON 9 700mm BOGIE CENTRES AND 13 700mm VEHICLE BODY LENGTH.
8. SEE ANNEXURE 1 SHEET 3 FOR STRUCTURES ON PLATFORMS.

BE 97-01 Sht 5 of 5 DATE : JUNE 2000

Respondent's Signature

Date & Company Stamp

FOR THE REPLACEMENT OF ROTATING LIGHTS WITH A 24V FLASHLIGHT SYSTEM (SIGNALING) AT MIDDELPLAATS.

CLOSING VENUE: TENDER BOX

CLOSING DATE & TIME: 28 JULY 2015 AT 10:00

VALIDITY PERIOD: 90 Business Days

SECTION 2

EVALUATION CRITERA AND RETURNABLE DOCUMENTS

1 Evaluation Criteria

Transnet will utilise the following criteria [not necessarily in this order] in choosing a Supplier/Service Provider, if so required:

Criterion/Criteria	Explanation
Administrative responsiveness	Completeness of response and returnable documents
Substantive responsiveness	Prequalification criteria, if any, must be met and whether the Bid materially complies with the scope and/or specification given.
Final weighted evaluation based on 80/20 preference point	• Pricing and price basis [firm] • B-BBEE status of company - Preference points will be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table indicated in Annexure A: B-BBEE Claim Form.

2 Validity Period

Transnet desires a validity period of 90 [ninety] Business Days from the closing date of this RFQ.

This RFQ is valid until _____.

3 Disclosure of Prices Quoted

Respondents must indicate here whether Transnet may disclose their quoted prices and conditions to other Respondents:

YES ☐ NO ☐

4 Returnable Documents

Returnable Documents means all the documents, Sections and Annexures, as listed in the tables below.

All Returnable Sections, as indicated in the header and footer of the relevant pages, must be signed, stamped and dated by the Respondent.

a) Respondents are required to submit with their Quotations the **mandatory Returnable Documents**, as detailed below.

Failure to provide all these Mandatory Returnable Documents at the Closing Date and time of this RFQ will result in a Respondent's disqualification. Respondents are therefore urged to ensure that all these Documents are returned with their Quotations.

Please confirm submission of these mandatory Returnable Documents by so indicating [Yes or No] in the tables below:

Mandatory Returnable Documents	Submitted [Yes or No]
SECTION 3 : Quotation Form	

b) In addition to the requirements of section (a) above, Respondents are further required to submit with their Quotations the following **essential Returnable Documents** as detailed below.

Failure to provide all these Returnable Documents may result in a Respondent's disqualification. Respondents are therefore urged to ensure that all these documents are returned with their Quotations.

Essential Returnable Documents	Submitted [Yes or No]
SECTION 2 : Evaluation criteria and list of returnable documents	
- SECTION 4 : RFQ Declaration and Breach of Law Form	
- Valid and original, or a certified copy, of your entity's B-BBEE Verification Certification as per the requirements stipulated in Annexure A: B-BBEE Claims Form Note: failure to provide these required documents at the closing date and time of the RFQ will result in an automatic score of zero being allocated for preference	
- Original valid Tax Clearance Certificate [Consortia / Joint Ventures must submit a separate Tax Clearance Certificate for each party]	
ANNEXURE A – B-BBEE Preference Points Claim Form	
ANNEXURE B – Project Specifications (53 Pages)	
Compensation for Occupational Injuries and Diseases Act 1993/Valid Letter of Good Standing.	

CONTINUED VALIDITY OF RETURNABLE DOCUMENTS

The successful Respondent will be required to ensure the validity of all returnable documents, including but not limited to its Tax Clearance Certificate and valid B-BBEE Verification Certificate, for the duration of any contract emanating from this RFQ. Should the Respondent be awarded the contract **[the Agreement]** and fail to present Transnet with such renewals as and when they become due, Transnet shall be entitled, in addition to any other rights and remedies that it may have in terms of the eventual Agreement, to terminate such Agreement forthwith without any liability and without prejudice to any claims which Transnet may have for damages against the Respondent.

Respondent's Signature

Date & Company Stamp

SECTION 3

QUOTATION FORM

I/We_____

hereby offer to supply the goods/services at the prices quoted in the Price Schedule below, in accordance with the conditions related thereto.

I/We agree to be bound by those terms and conditions in:

- the Standard RFQ Terms and Conditions for the Supply of Goods or Services to Transnet; and
- any other standard or special conditions mentioned and/or embodied in this Request for Quotation.

I/We accept that unless Transnet should otherwise decide and so inform me/us, this Quotation [and, if any, its covering letter and any subsequent exchange of correspondence], together with Transnet's acceptance thereof shall constitute a binding contract between Transnet and me/us.

I/We further agree that if, after I/we have been notified of the acceptance of my/our Quotation, I/we fail to deliver the said goods/service/s within the delivery lead-time quoted, Transnet may, without prejudice to any other legal remedy which it may have, cancel the order and recover from me/us any expenses incurred by Transnet in calling for Quotations afresh and/or having to accept any less favourable offer.

Price Schedule

I/We quote as per Annexure B for the service required, excluding VAT: See project specifications "Annexure B"

Respondent's Signature

Date & Company Stamp

By signing this Quotation Form the Respondent is deemed to acknowledge that he/she has made himself/herself thoroughly familiar, and agrees, with all the conditions governing this RFQ, including those contained in any printed form stated to form part hereof, including but not limited to the documents stated below and Transnet SOC Ltd will recognise no claim for relief based on an allegation that the Respondent overlooked any such condition or failed properly to take it into account for the purpose of calculating tendered prices or otherwise:

1. Specifications and drawings included in this RFQ - if applicable; and
2. The following documents all of which are available on Transnet's website or upon request:
   2.1. General Bid Conditions;
   2.2. Standard RFQ Terms and Conditions for the Supply of Goods or Services to Transnet;
   2.3. Supplier Integrity Pact;
   2.4. Vendor Application Form and all supporting documents (first time vendors only)
   Alternatively, for all existing vendors, please provide vendor number(s) here:

Transnet Operating Division	Unique Vendor Number	Yes / No
Transnet Freight Rail		

In the Yes/No column above, please confirm that all the information e.g. company address and contact details, banking details etc. are still correct as at the time of allocation of the vendor number(s). Alternatively, Respondents are required to provide the updated information with their bid submission.

SIGNED at _____ on this _____ day of _____ 20___

SIGNATURE OF WITNESSES

1 _____

Name _____

2 _____

Name _____

ADDRESS OF WITNESSES

_____

_____

_____

_____

SIGNATURE OF RESPONDENT'S AUTHORISED REPRESENTATIVE: _____

NAME: _____

DESIGNATION: _____

SECTION 4

RFQ DECLARATION AND BREACH OF LAW FORM

NAME OF ENTITY: _____

We _____ do hereby certify that:

1. Transnet has supplied and we have received appropriate responses to any/all questions [as applicable] which were submitted by ourselves for RFQ Clarification purposes;
2. we have received all information we deemed necessary for the completion of this Request for Quotation [**RFQ**];
3. we have been provided with sufficient access to the existing Transnet facilities/sites and any and all relevant information relevant to the Supply of the Goods as well as Transnet information and Employees, and has had sufficient time in which to conduct and perform a thorough due diligence of Transnet's operations and business requirements and assets used by Transnet. Transnet will therefore not consider or permit any pre- or post-contract verification or any related adjustment to pricing, service levels or any other provisions/conditions based on any incorrect assumptions made by the Respondent in arriving at his Bid Price.
4. at no stage have we received additional information relating to the subject matter of this RFQ from Transnet sources, other than information formally received from the designated Transnet contact(s) as nominated in the RFQ documents;
5. we are satisfied, insofar as our entity is concerned, that the processes and procedures adopted by Transnet in issuing this RFQ and the requirements requested from Bidders in responding to this RFQ have been conducted in a fair and transparent manner; and
6. furthermore we declare that a family, business and/or social relationship **exists / does not exist** [delete as applicable] between an owner / member / director / partner / shareholder of our entity and an employee or board member of the Transnet Group including any person who may be involved in the evaluation and/or adjudication of this Bid.
7. In addition, we declare that an owner / member / director / partner / shareholder of our entity **is / is not** [delete as applicable] an employee or board member of the Transnet Group.
8. If such a relationship as indicated in paragraph 6 and/or 7 exists, the Respondent is to complete the following section:

FULL NAME OF OWNER/MEMBER/DIRECTOR/
PARTNER/SHAREHOLDER: ADDRESS:

_____

_____

Indicate nature of relationship with Transnet:

_____

[Failure to furnish complete and accurate information in this regard will lead to the disqualification of a response and may preclude a Respondent from doing future business with Transnet]

Respondent's Signature

Date & Company Stamp

9. We declare, to the extent that we are aware or become aware of any relationship between ourselves and Transnet [other than any existing and appropriate business relationship with Transnet] which could unfairly advantage our entity in the forthcoming adjudication process, we shall notify Transnet immediately in writing of such circumstances.

BREACH OF LAW

10. We further hereby certify that *I/we* ***have/have not been*** [delete as applicable] found guilty during the preceding 5 [five] years of a serious breach of law, including but not limited to a breach of the Competition Act, 89 of 1998, by a court of law, tribunal or other administrative body. The type of breach that the Respondent is required to disclose excludes relatively minor offences or misdemeanours, e.g. traffic offences. This includes the imposition of an administrative fine or penalty.
    Where found guilty of such a serious breach, please disclose:
    NATURE OF BREACH:
    _____
    _____
    _____
    DATE OF BREACH:_____
    Furthermore, I/we acknowledge that Transnet SOC Ltd reserves the right to exclude any Respondent from the bidding process, should that person or entity have been found guilty of a serious breach of law, tribunal or regulatory obligation.

SIGNED at _____ on this _____ day of _____ 20___

For and on behalf of _____ duly authorised hereto	AS WITNESS:
Name:	Name:
Position:	Position:
Signature:	Signature:
Date:	Registration No of Company/CC _____
Place:	Registration Name of Company/CC _____

Respondent's Signature

Date & Company Stamp

Supplier Declaration Form

Company Trading Name						
Company Registered Name						
Company Registration Number Or ID Number If A Sole Proprietor						
Form of entity	CC	Trust	Pty Ltd	Limited	Partnership	Sole Proprietor
VAT number (if registered)						
Company Telephone Number						
Company Fax Number						
Company E-Mail Address						
Company Website Address						
Bank Name		Bank Account Number				
Postal Address				Code		
Physical Address				Code		
Contact Person						
Designation						
Telephone						
Email						
Annual Turnover Range (Last Financial Year)	< R5 Million		R5-35 million		> R35 million	
Does Your Company Provide	Products		Services		Both	
Area Of Delivery	National		Provincial		Local	
Is Your Company A Public Or Private Entity			Public		Private	
Does Your Company Have A Tax Directive Or IRP30 Certificate			Yes		No	
Main Product Or Service Supplied (E.G.: Stationery/Consulting)						

BEE Ownership Details					
% Black Ownership		% Black women ownership		% Disabled person/s ownership	
Does your company have a BEE certificate	Yes		No		
What is your broad based BEE status (Level 1 to 9 / Unknown)					
How many personnel does the firm employ	Permanent		Part time		

Transnet Contact Person	
Contact number	
Transnet operating division	

Duly Authorised To Sign For And On Behalf Of Firm / Organisation			
Name		Designation	
Signature		Date	

Stamp And Signature Of Commissioner Of Oath			
Name		Date	
Signature		Telephone No.	

Respondent's Signature

Date & Company Stamp

FOR THE REPLACEMENT OF ROTATING LIGHTS WITH A 24V FLASHLIGHT SYSTEM (SIGNALING) AT MIDDELPLAATS.

ANNEXURE A: B-BBEE PREFERENCE POINTS CLAIM FORM

This preference form contains general information and serves as a claim for preference points for Broad-Based Black Economic Empowerment [**B-BBEE**] Status Level of Contribution.

1. INTRODUCTION

1.1 A total of 20 preference points shall be awarded for B-BBEE Status Level of Contribution.

1.2 Failure on the part of a Bidder to fill in and/or to sign this form and submit a B-BBEE Verification Certificate from a Verification Agency accredited by the South African Accreditation System [**SANAS**] or a Registered Auditor approved by the Independent Regulatory Board of Auditors [**IRBA**] or an Accounting Officer as contemplated in the Close Corporation Act [**CCA**] together with the bid will be interpreted to mean that preference points for B-BBEE Status Level of Contribution are not claimed.

1.3 Transnet reserves the right to require of a Bidder, either before a Bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by Transnet.

2. GENERAL DEFINITIONS

2.1 **"all applicable taxes"** include value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies;

2.2 **"B-BBEE"** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;

2.3 **"B-BBEE status of contributor"** means the B-BBEE status received by a measured entity based on its overall performance using the relevant scorecard contained in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;

2.4 **"Bid"** means a written offer in a prescribed or stipulated form in response to an invitation by Transnet for the provision of goods, works or services;

2.5 **"Broad-Based Black Economic Empowerment Act"** means the Broad-Based Black Economic Empowerment Act, 2003 [Act No. 53 of 2003];

2.6 **"comparative price"** means the price after the factors of a non-firm price and all unconditional discounts that can utilised have been taken into consideration;

2.7 **"consortium or joint venture"** means an association of persons for the purpose of combining their expertise, property, capital, efforts, skills and knowledge in an activity for the execution of a contract;

2.8 **"contract"** means the agreement that results from the acceptance of a bid by Transnet;

2.9 **"EME"** means any enterprise with an annual total revenue of R5 [five] million or less as per the 2007 version of the B-BBEE Codes of Good Practice and means any enterprise with an annual total revenue of R10 [ten] million or less as per the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928;

2.10 **"firm price"** means the price that is only subject to adjustments in accordance with the actual increase or decrease resulting from the change, imposition, or abolition of customs and excise duty and any other duty, levy, or tax, which, in terms of the law or regulation, is binding on the contractor and demonstrably has an influence on the price of any supplies, or the rendering costs of any service, for the execution of the contract;

2.11 **"functionality"** means the measurement according to predetermined norms, as set out in the bid documents, of a service or commodity that is designed to be practical and useful, working or operating, taking into account, among other factors, the quality, reliability, viability and durability of a service and the technical capacity and ability of a bidder;

2.12 **"non-firm prices"** means all prices other than "firm" prices;

2.13 **"person"** includes reference to a juristic person;

2.14 **"QSE"** means any enterprise with an annual total revenue between R5 [five] million and R35 [thirty five] million as per the 2007 version of the B-BBEE Codes of Good Practice and means any enterprise with an annual total revenue of between R10 [ten] million and R50 [fifty] million as per the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928

2.15 **"rand value"** means the total estimated value of a contract in South African currency, calculated at the time of bid invitations, and includes all applicable taxes and excise duties;

2.16 **"subcontract"** means the primary contractor's assigning or leasing or making out work to, or employing another person to support such primary contractor in the execution of part of a project in terms of the contract;

2.17 **"total revenue"** bears the same meaning assigned to this expression in the Codes of Good Practice on Black Economic Empowerment, issued in terms of section 9(1) of the Broad-Based Black Empowerment Act and promulgated in the Government Gazette on 9 February 2007;

2.18 **"trust"** means the arrangement through which the property of one person is made over or bequeathed to a trustee to administer such property for the benefit of another person; and

2.19 **"trustee"** means any person, including the founder of a trust, to whom property is bequeathed in order for such property to be administered for the benefit of another person.

3. ADJUDICATION USING A POINT SYSTEM

3.1 The Bidder obtaining the highest number of total points for the evaluation criteria as enumerated in Section 2 of the RFP will be awarded the contract, unless objective criteria justifies the award to another bidder.

3.2 Preference points shall be calculated after prices have been brought to a comparative basis taking into account all factors of non-firm prices and all unconditional discounts.

3.3 Points scored will be rounded off to 2 [two] decimal places.

3.4 In the event of equal points scored, the Bid will be awarded to the Bidder scoring the highest number of preference points for B-BBEE.

3.5 However, when functionality is part of the evaluation process and two or more Bids have scored equal points including equal preference points for B-BBEE, the successful Bid will be the one scoring the highest score for functionality.

3.6 Should two or more Bids be equal in all respect, the award shall be decided by the drawing of lots.

4. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTION

4.1 In terms of the Preferential Procurement Regulations, 2011, preference points shall be awarded to a Bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of Points [Maximum 20]
1	20
2	18
3	16
4	12
5	8
6	6
7	4
8	2
Non-compliant contributor	0

4.2 Bidders who qualify as EMEs in terms of the 2007 version of the Codes of Good Practice must submit a certificate issued by an Accounting Officer as contemplated in the CCA or a Verification Agency accredited by SANAS or a Registered Auditor. Registered auditors do not need to meet the prerequisite for IRBA's approval for the purpose of conducting verification and issuing EME's with B-BBEE Status Level Certificates.

4.3 Bidders who qualify as EMEs in terms of the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928 are only required to obtain a sworn affidavit on an annual basis confirming that the entity has an Annual Total Revenue of R10 million or less and the entity's Level of Black ownership.

4.4 In terms of the 2007 version of the Codes of Good Practice, Bidders other than EMEs must submit their original and valid B-BBEE status level verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS.

4.5 The Department of Trade and Industry recently revised the Codes of Good Practice on 11 October 2013 [Government Gazette No. 36928]. The Revised Codes will replace the Black Economic Empowerment Codes of Good Practice issued on 9 February 2007. The Revised Codes provide for a transitional period ending 30 April 2015. During the transitional period, companies may elect to be measured in terms of the Revised Codes or the 2007 version of the Codes. Companies which are governed by Sector-specific Codes will be measured in terms of those Sector Codes.

4.6 As such, Transnet will accept B-BBEE certificates issued based on the Revised Codes. Transnet will also continue to accept B-BBEE certificates issued in terms of the 2007 version of the Codes provided it was issued before 1 May 2015. Thereafter, Transnet will only accept B-BBEE certificates issued based on the Revised Codes.

4.7 In terms of the Revised Codes of Good Practice, Bidders who qualify as QSEs must comply with all the elements of B-BBEE for the purposes of measurement. QSEs that are at least 51% or 100% Black owned are only required to obtain a sworn affidavit on an annual basis confirming that the entity has an Annual Total Revenue of R50 million or less and the entity's Level of Black ownership. Large enterprises must submit their original and valid B-BBEE status level verification certificate or a certified copy thereof, substantiating their B-BBEE rating issued by a Registered Auditor approved by IRBA or a Verification Agency accredited by SANAS.

4.8 A trust, consortium or joint venture will qualify for points for its B-BBEE status level as a legal entity, provided that the entity submits its B-BBEE status level certificate.

4.9 A trust, consortium or joint venture will qualify for points for their B-BBEE status level as an unincorporated entity, provided that the entity submits their consolidated B-BBEE scorecard as if they were a group structure and that such a consolidated B-BBEE scorecard is prepared for every separate bid.

4.10 Tertiary institutions and public entities will be required to submit their B-BBEE status level certificates in terms of the specialised scorecard contained in the B-BBEE Codes of Good Practice.

4.11 A person will not be awarded points for B-BBEE status level if it is indicated in the Bid documents that such a Bidder intends subcontracting more than 25% [twenty-five per cent] of the value of the contract to any other enterprise that does not qualify for at least the same number of points that such a Bidder qualifies for, unless the intended subcontractor is an EME that has the capability and ability to execute the subcontract.

4.12 A person awarded a contract may not subcontract more than 25% [twenty-five per cent] of the value of the contract to any other enterprise that does not have an equal or higher B-BBEE status level than the person concerned, unless the contract is subcontracted to an EME that has the capability and ability to execute the subcontract.

4.13 Bidders are to note that in terms of paragraph 2.6 of Statement 000 of the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928, any representation made by an entity about its B-BBEE compliance must be supported by suitable evidence or documentation. As such, Transnet reserves the right to request such evidence or documentation from Bidders in order to verify any B-BBEE recognition claimed.

5. B-BBEE STATUS AND SUBCONTRACTING

5.1 **Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:**

B-BBEE Status Level of Contributor _____ = _____ [maximum of 20 points]

Note: Points claimed in respect of this paragraph 5.1 must be in accordance with the table reflected in paragraph 4.1 above and must be substantiated by means of a B-BBEE certificate issued by a Verification Agency accredited by SANAS or a Registered Auditor approved by IRBA or a sworn affidavit in the case of an EME or QSE.

5.2 **Subcontracting:**

Will any portion of the contract be subcontracted? YES/NO [delete which is not applicable]

If YES, indicate:

(i) What percentage of the contract will be subcontracted? .....%

(ii) The name of the subcontractor .....

(iii) The B-BBEE status level of the subcontractor .....

(iv) Is the subcontractor an EME? YES/NO

5.3 Declaration with regard to Company/Firm

(i) Name of Company/Firm.....

(ii) VAT registration number.....

(iii) Company registration number.....

(iv) Type of Company / Firm [TICK APPLICABLE BOX]

☐Partnership/Joint Venture/Consortium

☐One person business/sole propriety

☐Close Corporations

☐Company (Pty) Ltd

(v) Describe Principal Business Activities

.....

.....

(vi) Company Classification [TICK APPLICABLE BOX]

☐Manufacturer

☐Supplier

☐Professional Service Provider

☐Other Service Providers, e.g Transporter, etc

(vii) Total number of years the company/firm has been in business.....

Respondent's Signature

Date & Company Stamp

BID DECLARATION

I/we, the undersigned, who warrants that he/she is duly authorised to do so on behalf of the company/firm, certify that points claimed, based on the B-BBEE status level of contribution indicated in paragraph 4 above, qualifies the company/firm for the preference(s) shown and I / we acknowledge that:

(i) The information furnished is true and correct.

(ii) In the event of a contract being awarded as a result of points claimed as shown in paragraph 6 above, the contractor may be required to furnish documentary proof to the satisfaction of Transnet that the claims are correct.

(iii) If the B-BBEE status level of contribution has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, Transnet may, in addition to any other remedy it may have:

(a) disqualify the person from the bidding process;

(b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;

(c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;

(d) restrict the Bidder or contractor, its shareholders and directors, and/or associated entities, or only the shareholders and directors who acted in a fraudulent manner, from obtaining business from Transnet for a period not exceeding 10 years, after the *audi alteram partem* [hear the other side] rule has been applied; and/or

(e) forward the matter for criminal prosecution.

WITNESSES:

1. .....

2. .....

SIGNATURE OF BIDDER

DATE:.....

COMPANY NAME: .....

ADDRESS:.....

Replace Rotating lights with a 24v flashlight system at Middelplaats			
SCHEDULE OF PRICES			**ANNEXURE 1**
	CONTRACTOR :		
1	Material (Annexure 2)	R	-
2	Cable laying,Trenching and general Labour	R	-
3	Pre-test and commissioning	R	-
4	Contract Manager	R	-
5	Transport	R	-
6	Plant and Equipment(small)	R	-
7	Plant and Equipment(heavy duty)	R	-
8	Planning and design	R	-
9	Installation	R	-
10	Site supervision	R	-
11	Site Establishment and security	R	-
12	Expenses	R	-
13	Quality control ISO 9001	R	-
14	Prelimary and General	R	-
15	Accomodation	R	-
16	Sundries	R	-
17	Remove of redundant material	R	-
18			
19			
20			
	SUB-TOTAL	R	-
	VAT @ 14%	R	-
	TOTAL ESTIMATED COST	R	-

_____ **DATE :**

CONTRACT MANAGER

Replace rotating lights with a 24V flashlight system at Middelplaats				ANNEXURE 2
MATERIAL SCHEDULE			DATE:	
CONTRACTOR :				
ITEM NO.	DESCRIPTION	UNIT PRICE	TOTAL QUANTITY REQUIRED	
			QTY	PRICE
1				R -
2				R -
3				R -
4				R -
5				R -
6				R -
7				R -
8				R -
9				R -
10				R -
11				R -
12				R -
13				R -
14				R -
15				R -
16				R -
17				R -
18				R -
19				R -
20				R -
21				R -
22				R -
23				R -
24				R -
25				R -
26				R -
27				R -
28				R -
29				R -
30				R -
31				R -
32				R -
33				R -
34				R -
35				R -
36				R -
37				R -
38				R -
39				R -
40				R -
41				R -
	TOTAL			R -

DATE:

CONTRACT MANAGER

Middelplaats

Replace rotating lights with a 24v Flashlight system.(Only Flashlights)

Scope of work

Replace rotating lights with a 24v Flashlight system controlled by the interlocking.
Plans/design for the flash lights to be included.
Removal of the rotating lights and the ML track circuits. Redundent material to Kimberley North depot

Specifications

1.Flash lights to be done according to BBB3202 ver 4 for level crossings.
2.Mounting of flash lights CSE(ST)-1-1

Apparatus cases.

Standard apparatus cases (1300mm) BBD 5575 ver 3 must be used(attached is list of drawings)

Trenching

Trenching must be done according to specification no. CSE-1155-516/1

Earthing

Earthing to be done according to Specification no. CSE-1155-515

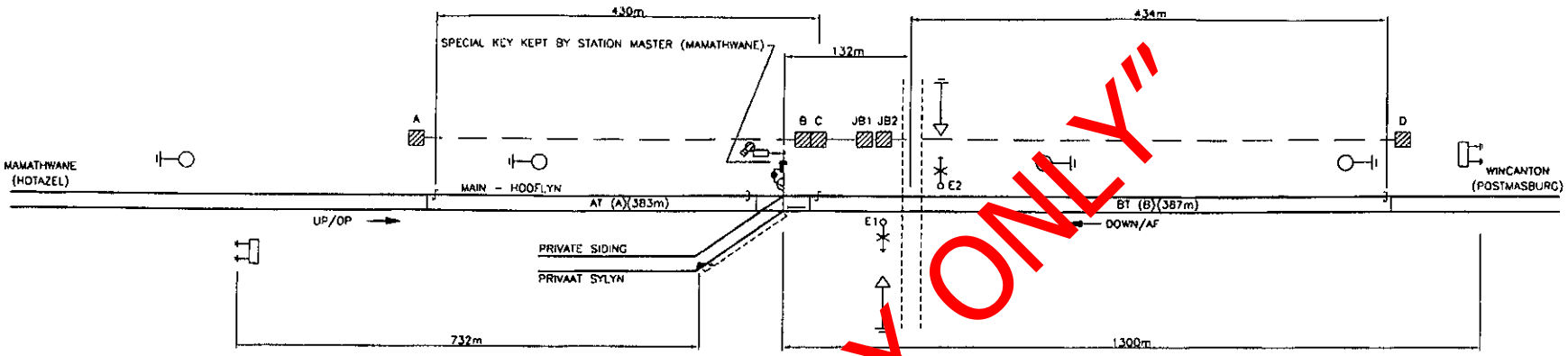
Cable Laying

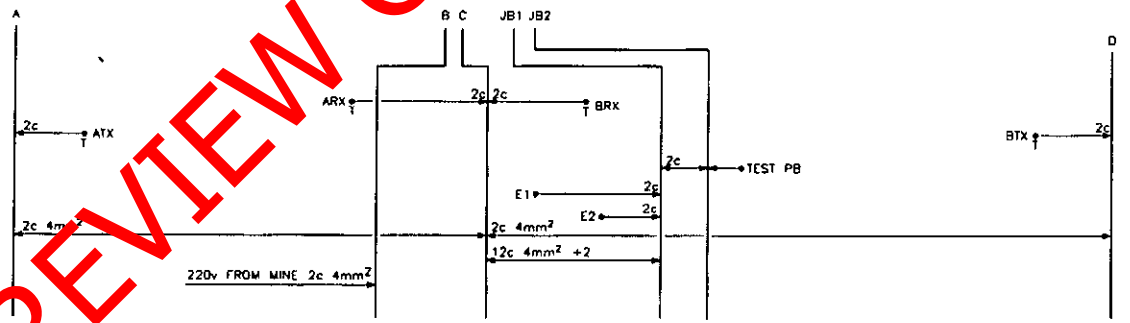
Cable must be done according to specifications BBC1504 Ver 2

Plans

Plans needed Middelplaats (level crossing 314.739KM) CSE 2CS 201-19A
Book of circuits for Middelplaats

Plans available from Piet Kamfer.





WARNING LIGHTS OPERATED BY:
WAARSKUWINGTE BEDIEN DEUR:
UP/OP -AT
DOWN/AF -BT

MINE WILL PROVIDE AN EXPLANITARY NOTICE FOR WARNING LIGHTS.

BURIED CABLE ROUTE
ONDERGRONDSE KABELROETES

CABLES 1,6mm² UNLESS SPECIFIED
KABELS TENSY GESPESIFISEER

A - 1699Hz. B - 2296Hz.

MIDDELPLAATS

(LEVEL CROSSING 314.739Km)

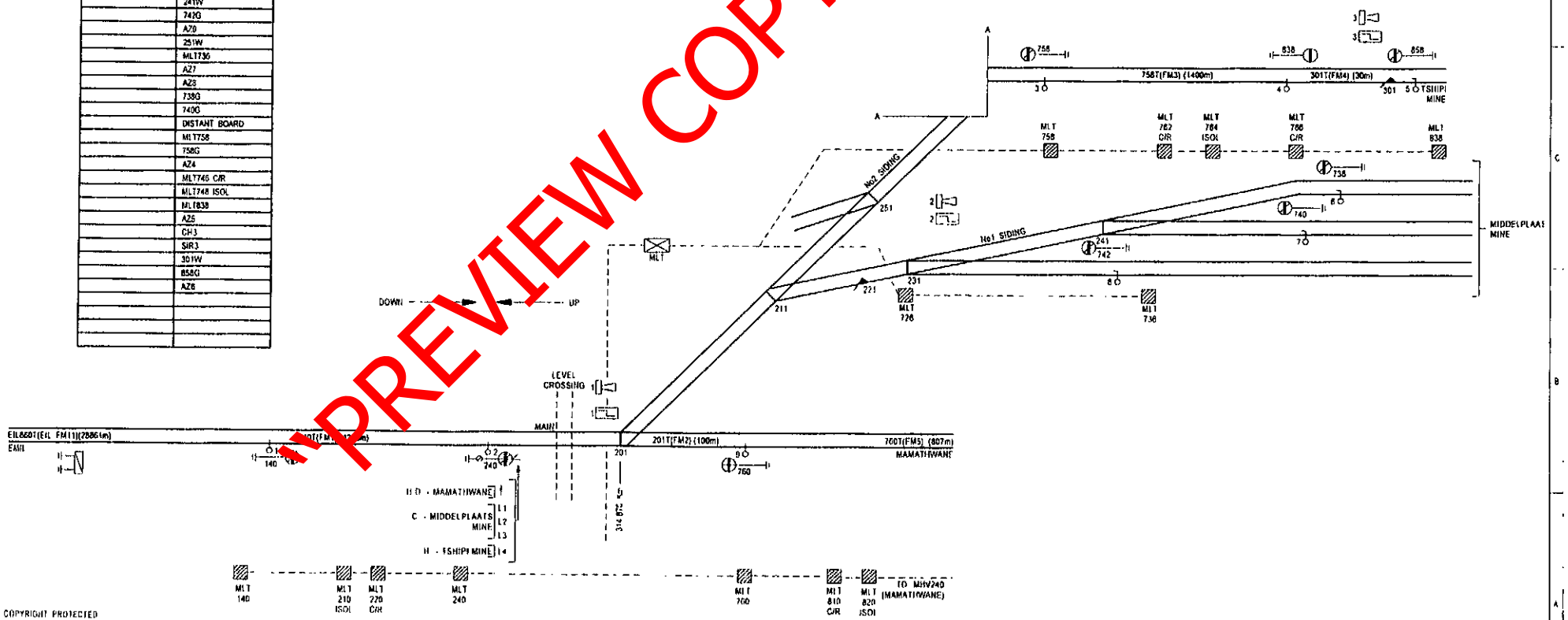
96-12

DRAWN GETEKEN	BD	CHECKED NAGESIEN	BG	CHIEF ENGINEER INFRASTRUCTURE (SIGNALS) HOOFINGENIEUR INFRASTRUKTUUR (SINJALE)	No
ENG. CHECKED ING. NAGESIEN					
AMENDED GEWYSIG		CHECKED NAGESIEN		DATE DATUM	ISSUE UITGEKIKING CIRCULATION VERSPREIDING

CSE 2CS
201-19A
SHEET VEL 1

02\C\LC\0001_-01

	DISTAND BOARD
	AZ1
	MLT140
	140G
	AZ2
	MLT 210 ISOL
	MLT220 C/R
	MLT240
	240G
	AZ3
	MLT RELAY ROOM
	201W
	CH1
	SIR1
	211W
	760G
	MLT760
	AZ10
	221W
	MLT726
	231W
	CH2
	SIR2
	MLT810
	MLT820 ISOL
	241W
	742G
	AZ9
	251W
	MLT736
	AZ7
	AZ8
	738G
	740G
	DISTANT BOARD
	MLT758
	758G
	AZ4
	MLT746 C/R
	MLT748 ISOL
	MLT838
	AZ5
	CH3
	SIR3
	301W
	858G
	AZ6



ACTOM
SIGNALLING

CHECKED		
DATE	2013/06	
DESIGNER	JVL	
CAD	MD	

CP REF BBF 9727
VERSION INFO

CDO REF
DRAWN
DESIGNED
CHECKED

DATE 30 DEC 2014
APPROVED
AUTHORISED

CONTROLLED FROM KIMBERLEY

MIDDELPLAATS (MLT) STATION LAYOUT

HRS
CR90

TRANSNET freight rail

BBF7630

VERSION 2 SHT 1

TRANSNET
freight rail
A Division of Transnet Limited

RAIL NETWORK TECHNICAL

MAINTENANCE PROCEDURE (TRAIN AUTHORISATION SYSTEMS)

Maintenance Procedure for SIGNALLING CABLES AND WIRING

Author:	Chief Engineering Technician Rail Network Technical (Train Authorisation Systems)	Franz Koch
Supported:	Senior Engineer Rail Network Technical (Train Authorisation Systems)	J van den Berg
Approved:	Principal Engineer Rail Network Technical (Train Authorisation Systems)	M Nku
Authorised:	Chief Engineer Rail Network Technical	JHP van Aardt

Date: February 2014

Circulation Restricted To:

- Transnet Freight Rail
- Transnet and Relevant Third Parties

TABLE OF CONTENTS

1 PURPOSE

This document describes the standard maintenance procedure to be followed when performing maintenance on Electrical Cables and Wiring. This procedure must be used in conjunction with the procedures described in the document: General Maintenance Procedures for Signalling Equipment **(BBB5981).**

2 SCOPE

This document describes all tasks, functional-, safety- and integrity tests as well as responsibilities of personnel in respect of routine preventive maintenance, corrective preventive maintenance, and major breakdowns on all Electrical Cables and Wiring applicable to the Signalling equipment in order to ensure the safe and reliable functioning of the Signalling Systems.

3 REFERENCE DOCUMENTS

- Apparatus case plans
- Station plans (book of circuits)
- Cable Plans
- CSE Technical Instructions
- CSE Z148F Series
- Engineering (Signals) Technical Instructions
- CSE 1133-105: The use of cables in Signalling installations
- CSE 1155-515: Specification for installation of earthing
- CSE 504/7 Ann. 1 to 4 (Jan 1985): Electrical Signalling: Outdoor signalling work
- CSE 1146-133 cat M98: Measuring and testing of cables
- CSE 1164-001 to 008: PVC insulated multi-core cables
- CSE 516/1 (Jan 1989): Trenching and outdoor cable installation
- CSE 47A/1 (Feb 1986): 500 volt insulation and continuity tester

4 DEFINITION OF ABBREVIATIONS

CPM	Corrective Preventive Maintenance
IDF	Internal Distribution Frame
MAB	Major Breakdowns
MDF	Main Distribution Frame
ODF	Outgoing Distribution Frame
OHSE	Occupational Health, Safety and Environmental
OP	Outgoing panel
PF	Potential Failure
PM order	Plant Maintenance order
PSU	Power Supply Unit
RPM	Routine Preventive Maintenance

5 APPLICABLE DOCUMENTS

- General Maintenance Procedures for Signalling Equipment. **(BBB5981)**
- General Safe Working Procedures. **(BBB5982)**
- Inspection Task List for Cables and Wiring **(BBC1505)**
- Test Sheet for Cables and Wiring **(BBC1506)**

- Core Resistance and Insulation Test Sheet for Signalling Cables **(BBC1507)**
- Cable Fault Report **(BBC1555)**
- Signalling Wiring Certificate **(BBC1599)**
- Train Working Rules, General / Local Appendices

6 RESPONSIBILITIES

For responsibilities, refer to the document: General Maintenance Procedures for Signalling Equipment. **(BBB5981)**

7 PROCEDURES:

Before performing any maintenance on electrical cables and wiring the procedures as described in documents: General Maintenance Procedures for Signaling Equipment **(BBB5981)** as well as General Safe Working Procedures **(BBB5982)** must be adhered to.

7.1 INSPECTIONS

7.1.1 When performing inspections, tasks outlined on the Inspection Task List for Cables and Wiring **(BBC1505)** must be executed.

7.1.2 The completed inspection lists must be submitted in accordance with the procedure outlined in the document General Maintenance Procedures for Signalling Equipment. **(BBB5981)**

7.2 MAINTENANCE TASKS AND TESTS:

7.2.1 Routine Preventive Maintenance (RPM) tasks:

- Do maintenance as detailed on PM order for RPM tasks.

7.2.2 PF identification:

- Do inspection tasks as per the Inspection Task List for Cables and Wiring **(BBC1505)**

7.2.3 Corrective Preventive Maintenance (CPM) and Equipment Failures (MAB)

Unless otherwise specified, the relevant tasks and tests as listed in **section 8**, should be performed after repairs, replacement of cables and wiring have been done that could affect the functioning of signalling equipment

7.3 COMMISSIONING OF NEW CABLES AND WIRING

All tests and values relevant to testing of cables and wiring shall be recorded on the Test Sheet for Cables and Wiring **(BBC1506).**

When work is done on cables, Test values related to the testing of the core resistance and insulation shall also be recorded on the Core Resistance and Insulation Test Sheet for Signalling Cables **(BBC1507)**

7.4 FUNCTIONAL TESTS

The tests outlined in the Test Sheet for Cables and Wiring **(BBC1506)** shall be performed and the results recorded. The completed test sheet must be submitted as specified in the General Maintenance Procedures for Signalling Equipment document. **(BBB5981)**

8 TEST AND REPAIR PROCEDURES

- After repairs, replacement of cables and wiring has been done, the relevant tests as listed on the Test Sheet for Cables and Wiring shall be performed. **(BBC1506)**
- Only use an approved buzzer or insulation test instrument when performing continuity or insulation tests on wiring and cables.
- Temporary repairs to wiring or cable cores shall be clearly visible, details reflected in book of circuits, recorded in the maintenance card/book and reported to supervisor.

Note:

Only competent signal maintenance officials shall be allowed to perform the following tasks regarding cables: 1. Fault finding, 2. Disconnecting/ isolating of cable(s), 3. Identifying the correct cable before cutting it, 4. Jointing of cable(s), 5. Testing of the cable(s), 6. Utilising spare cable cores, 7. Correspondence and functional testing of the cable(s) and 8. Reinstating the cable(s).

All contractors performing any sort of work on signalling cables shall be supervised by a TFR competent signal maintenance official and all applicable documentation shall be signed by the supervising person thus accepting work performed.

8.1 CABLES

Note:

- Before performing any work on cables a cable core count on the applicable terminals shall be done and the status recorded. If this differs from the approved plans, STOP the work and inform the supervisor.
- The following information shall be captured on the form: Cable Fault Report **(BBC1555)** and submitted to the supervisor:
    - Type of cable e.g. 64 core
    - Location of fault e.g. Between relay room and apparatus case
    - Core number/s faulty
    - Number of spares on the cable
    - Number of spare cores used
    - Risk category to determine priority to repair e.g.:
        - Code Red = Cable is critical and could lead to major disruption.
        - Code Orange = Cable is critical and could lead to minor disruption.
        - Code Green = Sufficient spare cores available and the cable can be repaired over a period of time.

8.1.1 **Replacement of faulty cable joint:**

8.1.1.1 Identify location of fault by using an approved cable fault-locating instrument.

8.1.1.2 Isolate cable and perform test No's 1 to 4. Refer to Paragraph 8.2.

8.1.1.3 Prepare the cable cable joint pit according to specification CSE 504/7 annexure 2

8.1.1.4 Ensure that no other cables are damaged whilst preparing the cable joint pit.

8.1.1.5 Remove the faulty cable joint.

8.1.1.6 Test the cable between the termination points on both sides by using an approved insulation test instrument (Megger),. Refer to Paragraph 8.2 for testing procedure for cables.

8.1.1.7 Joint the cable by using the correct type and specification of jointing kit.

8.1.1.8 By using an approved insulation test instrument, ensure that cable cores correspond with terminations on extreme ends (case to case, case to pot-head, case to relay room etc.).
8.1.1.9 Perform the tests as listed in Paragraph 8.2.
8.1.1.10 Perform correspondence test of the function of each and every core. A full functional test of the specific equipment is not required.
8.1.1.11 Record the location of the joint on the cable plan.
8.1.1.12 Record the results of test/s performed on the Core Resistance and Insulation Test Sheet for Signalling Cables **(BBC1507)**
8.1.1.13 Record any work done in the maintenance card/book.

8.1.2 **Repair of cable with faulty core/s**

Note: For any temporary repairs performed on cable cores/s, the Supervisor must be informed and the document "Record of temporary cable core changes" **(BBC1555)** shall be completed and submitted to the Supervisor. Full details of the work done must be recorded and endorsed on the applicable plans.

8.1.2.1 Identify location of fault by using an approved cable fault-locating instrument.
8.1.2.2 Determine the extent of the damage
8.1.2.3 For faulty cable joint, refer to Paragraph 8.1.1
8.1.2.4 For damaged cable cores/insulation, replace damaged section of cable with approved type and size of cable.
8.1.2.5 Refer to Paragraph 8.1.1 for preparation of cable joint pit.
8.1.2.6 Refer to Paragraph 8.2 for testing procedure for cables.
8.1.2.7 By using an approved insulation test instrument, ensure that cable cores correspond with terminations on extreme ends (case to case, case to pot-head, case to relay room etc.).
8.1.2.8 Perform the tests as listed in Paragraph 8.2.
8.1.2.9 Perform correspondence test of the function of each and every core. A full functional test of the specific equipment is not required.
8.1.2.10 Record position of joint on cable plan.
8.1.2.11 Record the results of test/s performed on the Core Resistance and Insulation Test Sheet for Signalling Cables **(BBC1507)**
8.1.2.12 Record any work done in the maintenance card/book.

8.1.3 **Replacement of cables or installation of new cables**

Note: Only cables complying with specification **CSE 1164-001 Cat. X47 (issue3)** shall be used for outdoor Signalling installations

8.1.3.1 Install as per **CSE 516/1** (cable trenching) and **CSE 504/7 annexure 2** (cable joint pits)
8.1.3.2 Ensure correct departure and arrival positioning of cable cores. Refer to **CSE 504/7 Annexure 1.** Refer to Figure 1 Cable Core rotation – Departure & Arrival ends on Page 10 and Figure 2 Departure & Arrival ends of Cables w.r.t. Relay Room on page 11.
8.1.3.3 Ensure correct type and specification of jointing kits where applicable.
8.1.3.4 By using an approved insulation test instrument, ensure that cable cores correspond with terminations on extreme ends (case to case, case to pot-head, case to relay room etc.).
8.1.3.5 Perform the tests as listed in Paragraph 8.2.
8.1.3.6 Record position of all joints on cable plan.

8.1.3.7 Perform correspondence test of the function of each and every core. A full functional test of the specific equipment is not required.
8.1.3.8 Test and commission according to the approved plan.
8.1.3.9 Record the results of test/s performed on the Core Resistance and Insulation Test Sheet for Signalling Cables **(BBC1507)**
8.1.3.10 Record any work done in the maintenance card/book.

8.1.4 **Termination of cables after replacement or installation of apparatus cases, pot-heads, signals, points machines and any other equipment**
8.1.4.1 Ensure that there are 3 metres of cable slack at each end of the cable.
8.1.4.2 By using an approved insulation test instrument, ensure that cable cores correspond with terminations on extreme ends. Refer to Paragraph 8.2 for testing procedure for cables.
8.1.4.3 Make off and terminate cables as per case / pothead plan.
8.1.4.4 Perform correspondence test of the function of each and every core and also a full functional test of the specific equipment. Refer to specific equipment Test Sheet.
8.1.4.5 Test and commission according to the approved plan.
8.1.4.6 Perform the tests as listed in Paragraph 8.2.
8.1.4.7 Record the results of test/s performed on the Core Resistance and Insulation Test Sheet for Signalling Cables **(BBC1507)**
8.1.4.8 Record any work done in the maintenance card/book.

8.2 Cable test procedures

8.2.1 All tests shall be performed by at least two competent Signal Maintenance Officials
8.2.2 All tests listed below shall be performed using an approved insulation test instrument. Refer to specification CSE 47A/1.

- Cable core count on applicable terminals Refer to notes in paragraph 8.1.
- Continuity test of each core
- Insulation test between all cores
- Insulation test between each core and earth/armouring.
- Loop resistance test

8.2.3 Record the results of the cable insulation tests on the Core Resistance and Insulation Test Sheet for Signalling Cables **(BBC1507)**
8.2.4 Perform a correspondence test of the function of each core.
8.2.5 Record the results of test/s performed on the Test Sheet for Cables and Wiring. **(BBC1506)**

8.3 Wiring

Note:

- Before performing any work on wiring, a wire count on the applicable terminals shall be done and the status recorded. If this differs from the approved plans, STOP the work and inform the supervisor.
- All wiring performed must be certified with a "Signalling Wiring Certificate" **(BBC1599)**

8.3.1 **Wires broken off, insulation brittle or damaged, corroded wiring, discoloured or melted insulation due to over current:**
8.3.1.1 Determine and rectify the root cause

8.3.1.2 Use the latest approved plan
8.3.1.3 Replace wire with correct type, size and colour wire. Refer to **CSE-1133-105.**
8.3.1.4 Terminate wire with correct type of connector and secure on terminals
8.3.1.5 Perform continuity test (buzz)
8.3.1.6 Perform a wire count, Refer to notes in paragraph 8.3.
8.3.1.7 Ensure that the applicable circuit is functioning correctly and the fault has been cleared.
8.3.1.8 Ensure that the wire is enclosed in ducting or tied into the wiring tree where applicable
8.3.1.9 Record the results of test/s performed on the Test Sheet for Cables and Wiring. **(BBC1506)**
8.3.1.10 Record any work done in the maintenance card/book.

8.3.2 **Installation and commissioning of new wiring or wiring changes:**
8.3.2.1 Use correct type, size and colour wires. Refer to **CSE-1133-105.**
8.3.2.2 Perform continuity test (buzz)
8.3.2.3 Install and terminate wires with correct type of connectors and secure on terminals according to approved plan
8.3.2.4 Perform wire count Refer to notes in paragraph 8.3.
8.3.2.5 Perform functional test on applicable equipment
8.3.2.6 Ensure that the wires are enclosed in ducting or tied into the wire tree where applicable
8.3.2.7 Record the results of test/s performed on the Test Sheet for Cables and Wiring. **(BBC1506)**
8.3.2.8 Record any work done in the maintenance card/book.

9 SAFE WORKING PROCEDURES

9.1 General and safety rules described in item 4.2 of the General Safe Working Procedures **(BBB5982)** shall be adhered to.
9.2 No cables or wiring shall be repaired / jointed under "live" conditions.
9.3 Refer to the General Maintenance Procedures **(BBB5981)** for the procedures to be followed for the applicable maintenance tasks (CPM, RPM, MAB or Inspection) to be performed.
9.4 Refer to **Section 8,** Test and Repair Procedures for cables and wiring, for all test procedures to be performed.
9.5 When repairs have to be done on any 220, 380 or 440 volt supply cables special care must be taken before repairs are done:
- All tests shall be performed by at least two competent Signal Maintenance Officials.
- After establishing the location of the fault in the cable, both ends of the cable shall be isolated and earthed before repairs are done.

9.6 When the condition of the cable affects the integrity of the applicable signalling functions, the Signal Maintenance Official shall:
- Sign the signalling functions, affected by the faulty cable cores, out of service and ensure that full particulars are endorsed in the train register as well as in the Maintenance Book.
- Advise the supervisor.
- Refer to Trains Working Rules Part 3, rule 104 (2) until such time as the fault has been cleared.

9.7 Ensure that all scrap PVC, Copper, Cable armouring, remains of jointing kits and cotton waste are disposed of in the prescribed manner (OHSE act).
9.8 Full functional tests are to be carried out on all the affected Signalling.
9.9 Ensure that the cable armouring earth connections is done according to specification **CSE 1155-515 cat N48.**

9.10 Ensure that all applicable links are kept open for the duration of the cable insulation test.
9.11 Ensure that reliable communication is maintained at all times amongst all personnel involved in the repair/installation/testing of cables.
9.12 All open cable trenches to be demarcated with the prescribed safety tape.
9.13 When cutting or stripping cable, use correct tools and procedure to prevent injuries
9.14 Use the correct tools and procedure when handling cable drums.

10 PROJECT TEAM MEMBERS

The following team members are the Sub-Committee of the BCC for the generation of Maintenance Procedures.

- Gerrit Koorsen - Project team leader
- Hennie de Goede
- Hennie Verster
- Willie de Beer
- Koot Nieuwoudt
- Basil Stevens

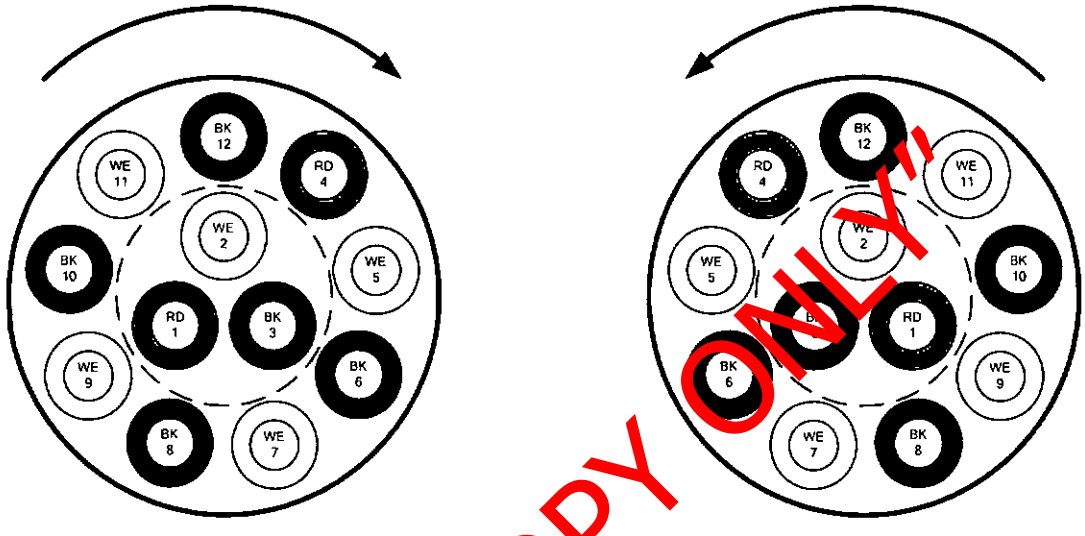


Figure 1 Cable Core Rotation – Departure & Arrival ends

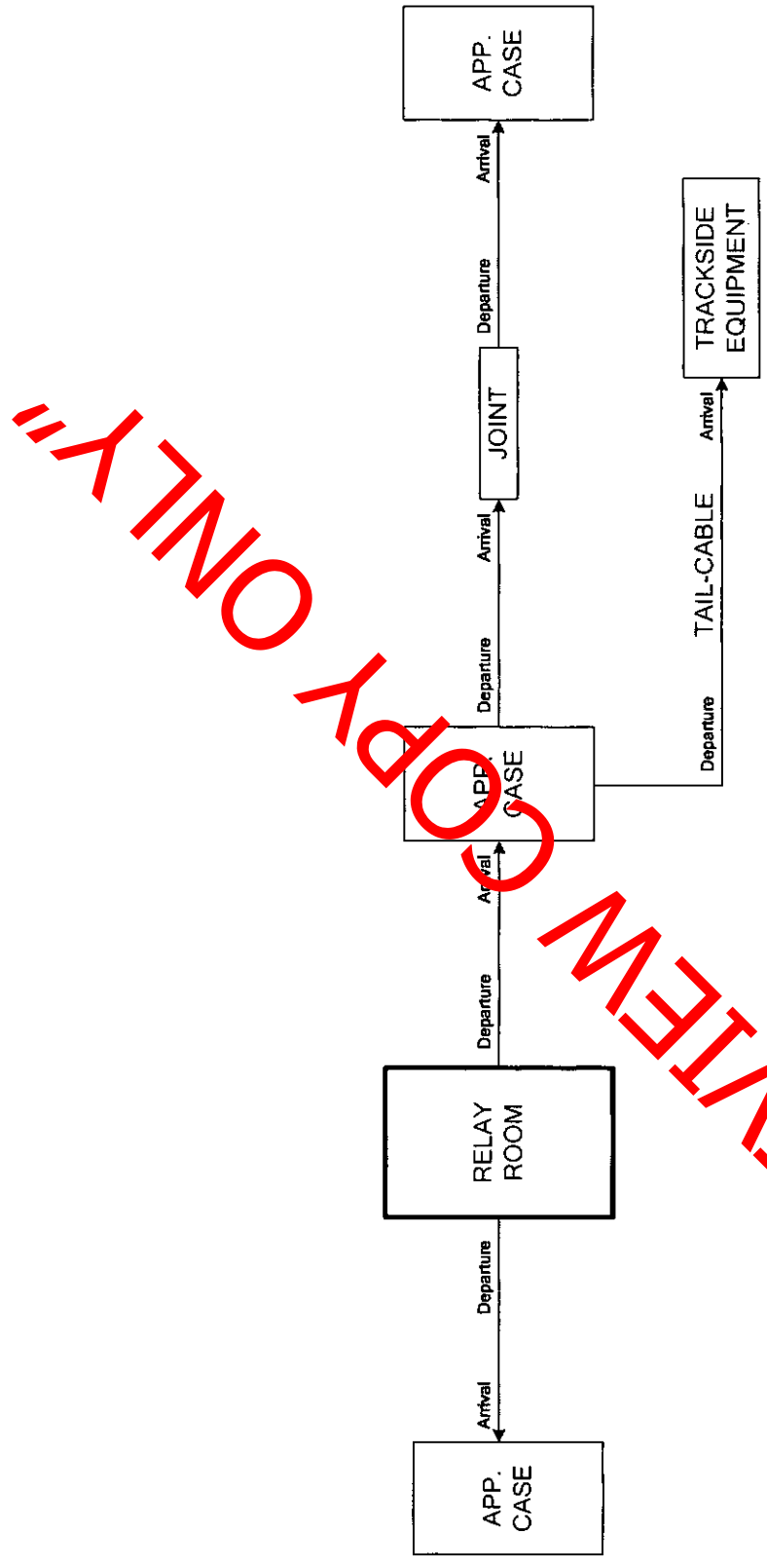


Figure 2 Departure & Arrival ends of Cables w.r.t. Relay Room

SPOORNET

A Division of Transnet Limited

INFRASTRUCTURE (SIGNALS)

SPECIFICATION
FOR

TRENCHING AND OUTDOOR CABLE INSTALLATION

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3.5 Where the trench is being excavated in uneven ground, reasonably long sections of consistent grading shall be dug rather than following every undulation of the ground.

3.6 Trenching is not permitted up and down the slopes of banks or cuttings. In such cases, galvanised steel ducting must be used and the method adopted must be discussed and approved in writing by the Transport Services' Resident Engineer (Signals and Telecommunication).

3.7 The bottom of the trench shall be compacted and smooth with a view to obviating voids forming under the cable.

3.8 All outdoor cable shall be laid on sand, to be supplied by the sub-contractor, or approved soil passed through a 5mm riddle. The bottom of the trench shall thus be covered with a 50mm layer of sand or approved soil.

3.9 The sub-contractor shall be responsible for supplying and operating his own compressor plant for trenching and where blasting is required, he must make his own arrangements.

3.10 The sub-contractor's attention is drawn to the conditions pertaining to blasting a sset out in clauses 24 and 25 of the E.5 (S and T) (1978) (Revised 1985) General Conditions of Contract.

3.11 Where trenches are excavated in rock, the sub-contractor shall dispose of the excavated material as directed by the Principal Contractor.

4.0 HANDLING AND LAYING OF CABLE

4.1 Before the commencement of any cable-laying, the trench must be inspected and approved by the Engineer or his deputy.

4.2 It must be emphasised that special care shall be taken in handling of cables and under no circumstances must the cable be dragged or the PVC sheath damaged.

4.3 No direct laying will be permitted.

4.4 Cable shall not be layed in ash, unless it is surrounded at least by 300mm of sand or approved soil, and the trench depth is increased to 1050mm.

4.5 At each relay room, apparatus case or pothead location, 3 meteres of cable slack must be provided.

4.6 If the apparatus case is not yet in position, the cable ends must be properly sealed, and then coiled and buried.

5.6 The minimum dry densities of backfilling after compaction are specified as:

(a) Within the earthworks to provide the formation, both in bank and in cut, and on the formation and floor of cuttings: 1760 kilograms per cubic metre.

(b) In all other cases: 1600 kilograms per cubic metre.

5.7 Special care must be taken to avoid contamination of the ballast with soil.

6.0 CROSSINGS

6.1 Cables crossing culverts, bridges and rock formation shall be laid in galvanised piping, G.I. ducts or concrete troughs. Where piping is attached to a structure which is an electrical conductor such as steel, then the piping must be insulated from this structure by means of wooden cleats. Allowance must be made for expansion and contraction of pipes on bridges.

6.2 Cable passing through tunnels shall be placed in G.I. pipes or approved G.I. ducting with clip-on covers, when suitable cable ducts, let into the wall of the tunnel, are not provided. The minimum height shall be 1500mm from rail level.

6.3 As it is impossible at the site meeting to determine the quantity of crossings the pipe and/or ducting requirements should be worked out by the individual sub-contractors and submitted with their tenders.

6.4 Track crossings (Refer to drawing CSE.516/1 Annexure 2 Sheet 1)

6.4.1 All track crossings are to be made using pitch fibres to specification No. SABS 921 of 1969 and subsequent amenments or G.I. piping as specified in the main specification or at the site meeting. The length of pipe is approximately 4m per track to be crossed, i.e. the pipe must protrude beyond the edge of the ballast.

6.4.2 Digging under the track, including shoring, as determined by the Engineer, is the Contractor's responsibility. This work will be supervised by the Engineer who will be responsible for strengthening the track where necessary and tamping the ballast after refilling.

6.4.3 For track crossings, a minimum of two weeks notice must be given to the Engineer in advance for preparation to be effected.

7.7 Joint boxes should be approximately double the width of the respective trough, and should be provided for all main troughing runs.

7.8 For the purpose of calculation of the quantity of joint boxes, it should be assumed that cables are supplied in drum lengths of 500m and 650m.

7.9 Concrete products damaged by the Contractor must be replaced by the Contractor.

8.0 CABLE-JOINTING, JOINT-PITS AND MANHOLES

8.1 Cable jointing shall be done by the Principal Contractor who must make every effort to complete the joints in time to allow the subcontractor to reclose jointing pits while backfilling. This however, cannot be guaranteed.

8.2 Joint-pits must be excavated from the main trench towards the track, and must be a semi-circle of 1,5m radius. (Refer to CSE.516/1 Annexure 1).

8.3 If used, manholes must be constructed of brickwork or cast concrete and waterproofed. Each shall be equipped with a conetre floor, a sump, steel rungs and suitable cover. Manholes shall not be smaller than 1m by 1m. The tenderer is to forward his proposal with his tender.

9.0 INSTALLATION OF CABLE-MARKERS (REFER TO DRAWING CSE.516/1 ANNEXURE 1 AND 2)

9.1 Concrete type

9.1.1 Within station limits the position of the main cable run shall be indicated by means of concrete cable markers. Cable markers shall be buried to a depth of approximately 250mm, so that ±50mm protrudes above the ground, and bearing the identification letters as per drawing ST.CCA.11-DF. They shall be installed at intervals of 15 metres on straight runs, and at every change of direction to cable markers at the angle of change shall be installed. Special designated cable markers bearing the marking "SI-X" (or latest amendment) shall be installed at every joint. See drawing No. ST.CCA.11-DF (latest amendment) for dimensions of cable markers.

9.1.2 Cable markers must be painted on the top and sides down to 150mm from the top, with two coats of yellow traffic paint

9.1.3 Joint markers must be painted as for cable markers.

9.1.4 All tail cable routes must be marked with concrete cable markers.

SOUTH AFRICAN TRANSPORT SERVICES

ELECTRICAL SIGNALLING INSTALLATIONS

SPECIFICATION NO. CSE-516/1

JANUARY 1988

TRENCHING AND OUTDOOR CABLE INSTALLATION

TRENCHING AND OUTDOOR CABLE INSTALLATION

1.0 SCOPE

This specification covers the trenching for, and installation of, outdoor signalling cable. It does not include the jointing or termination of cables.

2.0 GENERAL

2.1 A proposed main cable route survey plan shall be submitted by the contractor and written approval obtained from the Engineer before any cables are laid.

2.2 Any deviations from the approved route must be agreed to in writing by the Engineer.

3.0 TRENCHING (REFER TO DRAWING CSE.516/1 ANNEX. 1)

3.1 The main cable trench shall be 4 m from the fence line. Attention is drawn to the fact that where there is an existing communication cable, this cable shall be within 2,5 metres from the fence unless indicated otherwise by cable markers.

Under no circumstances shall the cable trench be as the crow flies. All main or tail cable trenches must be at a straight line and any change of angle therefrom must be at 90°.

3.2 The depth of the trench shall be 500 mm minimum, unless otherwise specified. The depth of a trench, crossing a service road must be at 800 mm minimum.

3.3 Where a trench depth of 500 mm cannot be attained, the Engineer is empowered to authorise relaxation provided the cables are protected by a layer of reinforced concrete cover slabs and confirmation thereof has to be obtained in writing by means of an eligible site instruction.

The depth of all cable trenches on formations shall be at 500 mm depth and the cables must due to re-attain specified formation compaction be protected by a layer of reinforced concrete slabs.

These concrete cover slabs must be of a sufficient width to overlap the outside cables by at least 50 mm on either side. The minimum dimensions of these slabs shall be 40 mm thick, 300 mm wide and 500 mm long.

3.4 Where due to the terrain, trenching is not possible, the use of galvanised steel ducting and/or concrete troughs is permissible.

3.5 Where the trench is being excavated in uneven ground, reasonably long sections of consistent grading shall be dug rather than following every undulation of the ground.

3.6 Trenching is not permitted up and down the slopes of banks or cuttings. In such cases, galvanised steel ducting must be used and the method adopted must be discussed and approved in writing by the Engineer.

3.7 The bottom of the trench shall be compacted and smooth with a view to obviating voids forming under the cable.

3.8 All outdoor cables shall be laid on sand, to be supplied by the contractor, or approved soil passed through a 5 mm riddle. The bottom of the trench shall thus be covered with a 50 mm layer of sand or approved soil.

3.9 The contractor shall be responsible for supplying and operating his own compressor plant for trenching and where blasting is required, he must make his own arrangements.

3.10 The contractor's attention is drawn to the conditions pertaining to blasting as set out in clauses 24 and 25 of the E.5(S & T) (1978) (Revised November 1987) General Conditions of Contract.

3.11 Where trenches are excavated in rock, the contractor shall dispose of the excavated material as directed by the Principal Contractor.

4.0 HANDLING AND LAYING OF CABLE

4.1 Before the commencement of any cable-laying, the trench must be inspected and approved by the Engineer or his deputy.

4.2 It must be emphasised that special care shall be taken in handling of cables and under no circumstances must the cable be dragged or the PVC sheath damaged.

4.3 No direct laying will be permitted.

4.4 Cable shall not be layed in ash, unless it is surrounded at least by 300 mm of sand or approved soil, and the trench depth is increased to 1 050 mm .

4.5 At each relay room, apparatus case or pothead location, 3 metres of cable slack must be provided.

4.6 If the apparatus case is not yet in position, the cable ends must be properly sealed, and then coiled and buried.

4.7 Each cable must be identified by a PVC, aluminium or lead strap which is tied around the cable at each end and which is inscribed with the cable size and number.

4.8 Where cables are to be jointed, 3 metres of overlap (1,5 metre per cable) must be provided.

5.0 DACKFILLING OF TRENCHES (REFER TO DRAWING CSE-516/1 ANNEX. 2 SHEET 2)

5.1 Before the commencement of any backfilling, and after cables have been laid, the trench must be inspected and approved by the Engineer or his deputy.

5.2 Should the contractor lay cable or backfill the trench without the inspection stipulated in clauses 4.1 and 5.1 having been conducted, the Transport Services reserves the right to request the contractor to re-open the trench and/or remove the cable, as the case may be, so that inspection may be carried out. Such re-opening of the trench and/or removal of the cable shall be for the contractor's account and he shall be liable for any damage done to the cable during the re-opening of the trench.

5.3 Backfilling must be preceded by the covering of the cables with a layer of sand or approved soil passed through a 5 mm riddle, to a minimum depth of 75 mm from the top of the cable. This material must be supplied by the contractor.

5.4 On completion of the laying of cables or pipes in trenches the latter shall be filled and compacted to the level of the ground or earthworks before trenching was commenced. When backfilling on the formation, an initial layer of 200 mm shall be compacted thereafter layers not exceeding 100 mm in loose thickness shall be compacted. Compaction shall be carried out by a mechanical rammer or other approved power tool to the minimum dry density hereinafter specified. Where necessary water shall be added to obtain the specified compacted density. Each layer shall be completed before the next layer is commenced. The contractor shall be responsible for ensuring that no damage is caused to the cable or pipes from the filling and compaction, and shall take such steps as are necessary to prevent any such damage, including the provision of concrete slabs or other approved means.

5.5 The excavated material for the trenches may only be used for backfilling if it has an acceptably low amount of rock and stones in it, therefore, large stones shall not be used for backfilling.

5.6 The minimum dry densities of backfilling after compaction are specified as :

(a) Within the earthworks to provide the formation, both in bank and in cut, and on the formation and floor of cuttings : 1 760 kilograms per cubic metre.

(b) In all other cases : 1 600 kilograms per cubic metre.

5.7 Special care must be taken to avoid contamination of the ballast with soil.

5.8 When trenches are excavated on the formation, on the slopes of embankments, or on the slopes and floors of cuttings other than in rock, backfilling on the the trench will not obstructed or divert the natural water flow in such a way as to lead to erosion.

Freedom from erosion of the trench itstelf an freedom from erosion caused by the trench must be guaranteed.

5.9 The replacement of made-up and concreted surfaces such as roads, pavements, platforms, etc., necessitated by trenching, must be arranged by the Contractor and the cost there included in his tender price.

5.9.1 In the case where the made-up surface consists of specially planted (hydroseeded) grass surfaces or/and grass soddings the hydroseeded surfaces are to be reseeded by the Contractor with seed mixtures as specified by Civil Department. Grass soddings is to be reinstated by the Contractor. The restoration of the made-up surface must be at the cost of the Contractor.

6.0 CROSSINGS

6.1 Cables crossing culverts, bridges and rock formation shall be laid in galvanised piping, G.I. ducts or concrete troughs. Where piping is attached to a structure which is an electrical conductor such as steel, then the piping must be insulated from this structure by means of wooden cleats. Allowance must be made for expansion and contraction of pipes on bridges.

6.2 Cable passing through tunnels shall be placed in G.I. pipes or approved G.I. ducting with clip-on covers, when suitable cable ducts, let into the wall of the tunnel, are not provided. The minimum height shall be 1 500 mm from rail level.

6.3 As it is impossible at the site meeting to determine the quantity of crossings the pipe and/or ducting requirements should be worked out by the contractor and submitted with this tender.

6.4 Track crossings (Refer to drawing CSE.516/1 Annex. 2 Sheet 1)

6.4.1 All track crossings are to be made using pitch fibre pipes to specification No. SABS 921 of 1982 and subsequent amendments or G.I. piping as specified in the main specification or at the site meeting. The length of pipe is approximately 4 m per track to be crossed, i.e. the pipe must protrude beyond the edge of the ballast.

6.4.2 Digging under the track, including shoring, as determined by the Engineer, is the Contractor's responsbility. This work will be supervised by the Engineer who will be responsible for strengthening the track where necessary and tamping the ballast after refilling.

6.4.3 For track crossings, a minimum of two weeks notice must be given to the Engineer in advance for preparation to be effected.

6.5 Road crossings

6.5.1 Sufficient G.I. pipes must be provided at road crossings to cater for the cables to be installed. The total cross-sectional area of cables per pipe shall not exceed 60% of the cross-sectional area of the inside of the pipe.

6.5.2 For cables crossing under road :

(a) Authority to dig must be obtained from the appropriate authorities by the Contractor.

(b) The trench must be at a depth of 800 mm .

(c) Minimum pipe size - 100 mm dia. G.I.

(d) At least one spare pipe must be provided.

(e) Cables crossing public roads shall be piped throughout where cable laid is not on Transport Services' property.

6.5.3 Temporary roads must not be piped but slabbed.

6.5.4 All pipes to be surrounded by at least 50 mm of sand or approved soil.

7.0 INSTALLATION OF STEEL-DUCTING AND CONCRETE TROUGHING (REFER TO DRAWING CSE.516/1 ANNEX. 4)

7.1 Steel ducting installed on concrete or steel surfaces (as in tunnels, on bridges or culverts) must be firmly attached by an approved means.

7.2 In the case of slopes of banks or cuttings, the ducting must be firmly secured. The means of securing the ducting is subject to the approval of the Transport Services' Engineer in charge of the project (galvanised spike, 1 m in length, concrete, etc.)

7.3 Concrete troughs (with lids) shall be in accordance with specification No. CSE-514 (latest amendment) and the relevant drawings.

7.4 Where troughing is laid alongside the track it shall be laid in such a manner so as not to prevent the placing or removal of sleepers from the track and must not obstruct civil maintenance.

7.5 Exit of cable from the main trough must be via the side of the trough and not underneath.

7.6 Reducing pieces for the transition from one size troughing to another should be designed along the lines of the troughing drawing provided.

7.7 Joint boxes should be approximately double the width of the respective trough, and should be provided for all main troughing runs.

7.8 For the purpose of calculation of the quantity of joint boxes, it should be assumed that cables are supplied in drum lengths of 500 m and 650 m .

8.0 CABLE-JOINTING, JOINT-PITS AND MANHOLES

8.1 Joint-pits must be excavated from the main trench towards the track, and must be a semi-circle of 1,5 m radius. (Refer to CSE.516/1 Annex. 1.)

8.2 If used, manholes must be constructed of brickwork or cast concrete and waterproofed. Each shall be equipped with a conetre floor, a sump, steel rungs and a suitable cover. Manholes shall not be smaller than 1 m by 1 m . The tenderer is to forward his proposal with his tender.

9.0 INSTALLATION OF CABLE-MARKERS (REFER TO DRAWING CSE.516/1 ANNEXS. 1 AND 2)

9.1 Concrete type

9.1.1 Within station limits the position of the the main cable run shall be indicated by means of concrete cable markers. Cable markers shall be buried to a depth of approximately 250 mm, so that + 50 mm protrudes above the ground, and bearing the identification letters as per drawing ST.CCA.11-DF. They shall be installed at intervals of 15 metres on straight runs, and at every change of direction to cable markers at the angle of change shall be installed. Special designating cable markers bearing the marking "SI-X" (or latest amendment) shall be installed at every joint. See drawing No. ST.CCA.11-DF (latest amendment) for dimensions of cable markers.

9.1.2 Cable markers must be painted on the top and sides down to 150 mm from the top, with two coats of yellow traffic paint.

9.1.3 Joint markers must be painted as for cable markers.

9.1.4 All tail cable routes must be marked with concrete cable markers.

9.2 Metal (fence) type (Refer to drawing CSE.516/1 Annexs. 1 and 3)

9.2.1 These are to be installed outside station limits or where it is not practicable to install concrete markers.

9.2.2 Main cable route :

Fence markers painted yellow (paint must withstand field fires; HD cedar Radex paint or similar) and affixed securely to the fence uprights every 15 metres, must be used. If for any reason the cable route is shifted from the specified distance of 4 m from the fence line this must be indicated on the fence markers by punching the actual distance of the cable route from the fence. In addition the main cable route outside the servitude must be marked by means of special markers (pipes, rails etc.) painted yellow with approved paint. The fence markers shall be made from a suitable metal, of sufficient thickness (+2 mm) to ensure

rigidity. Minimum dimensions shall be 300 mm x 100 mm, and they shall be permanently marked in accordance with the instruction of the Engineer. Proposals for fence type markers are to be submitted with the tender.

9.2.3 Cable joints :

Two fence markers will be used to indicate cable joints on the main cable route. Refer to drawing CSE.516/1 Annexure 1.

AS WITNESSES

1. _____ _____
CONTRACTOR

2. _____ DATE: _____

AS WITNESSES

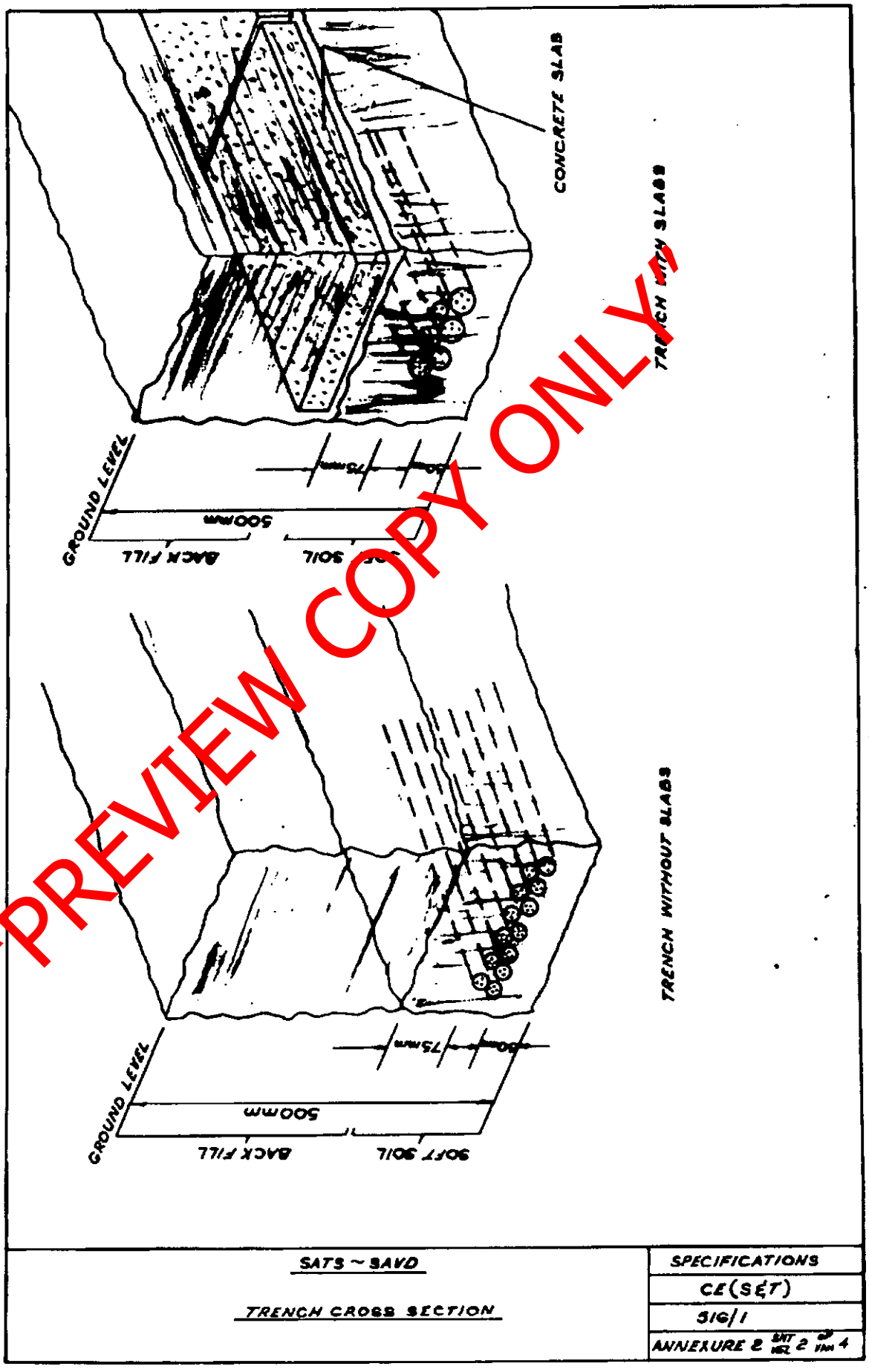
1. _____ _____
CHIEF ENGINEER
(Signals and Telecommunication)

2. _____ DATE: _____

SATS ~ SAVD

TYPICAL CABLE TRENCH

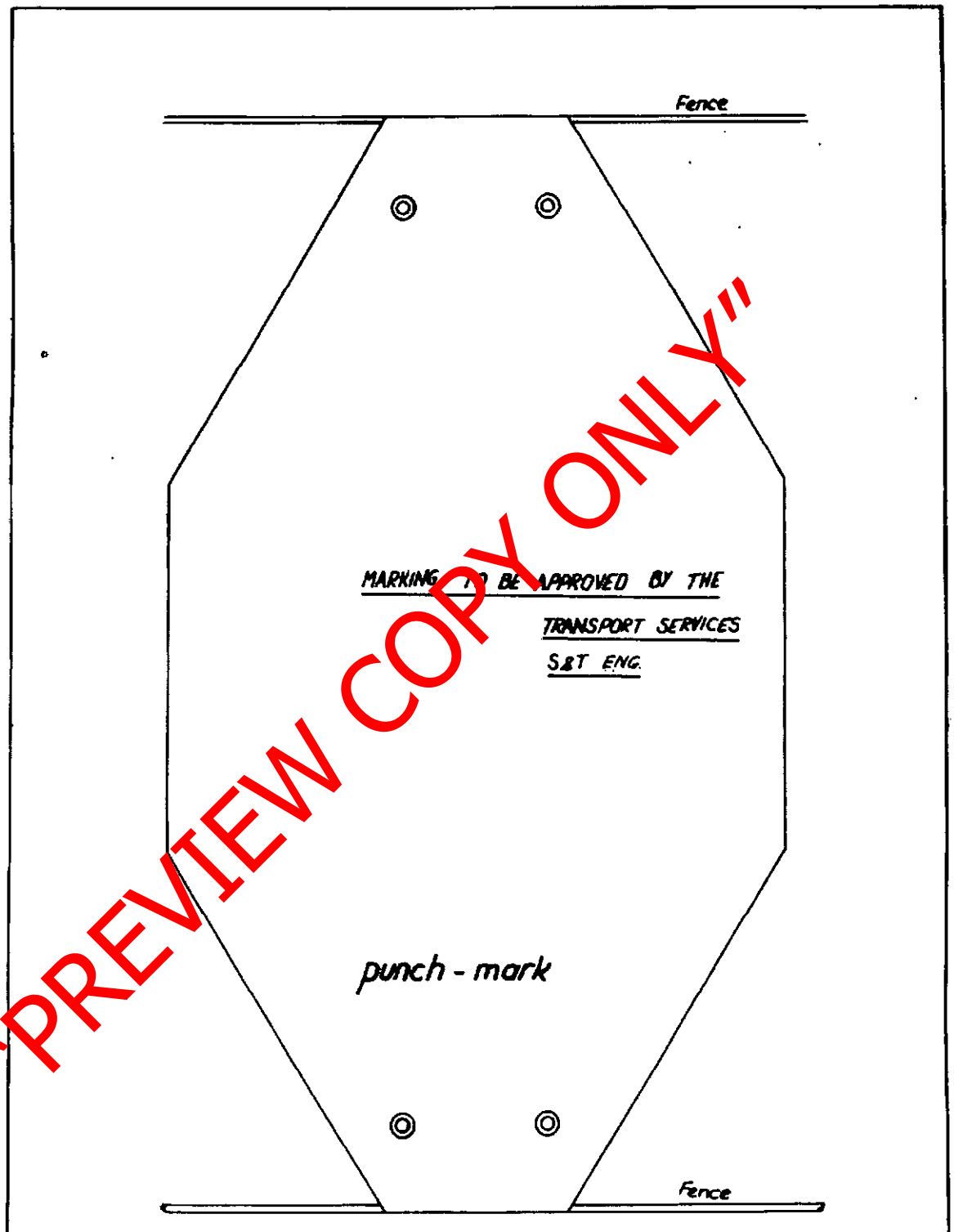
SPECIFICATIONS
CE (S&T)
516/1
Annexure 1 of 4



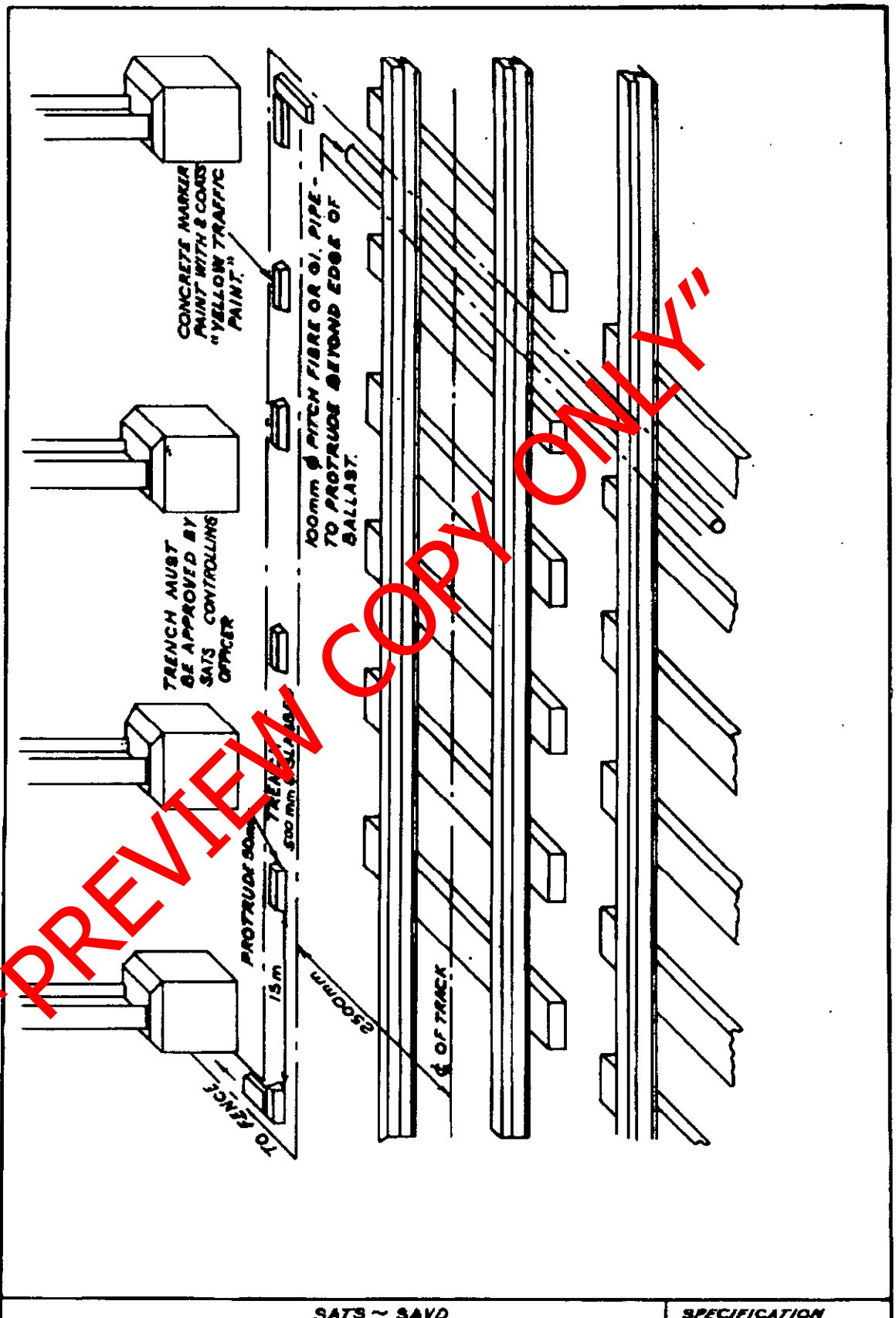
SATS ~ SAVD

TRENCH CROSS SECTION

SPECIFICATIONS
CE(SET)
SIG/1
ANNEXURE 2 SHT 2 OF 4 SHTS



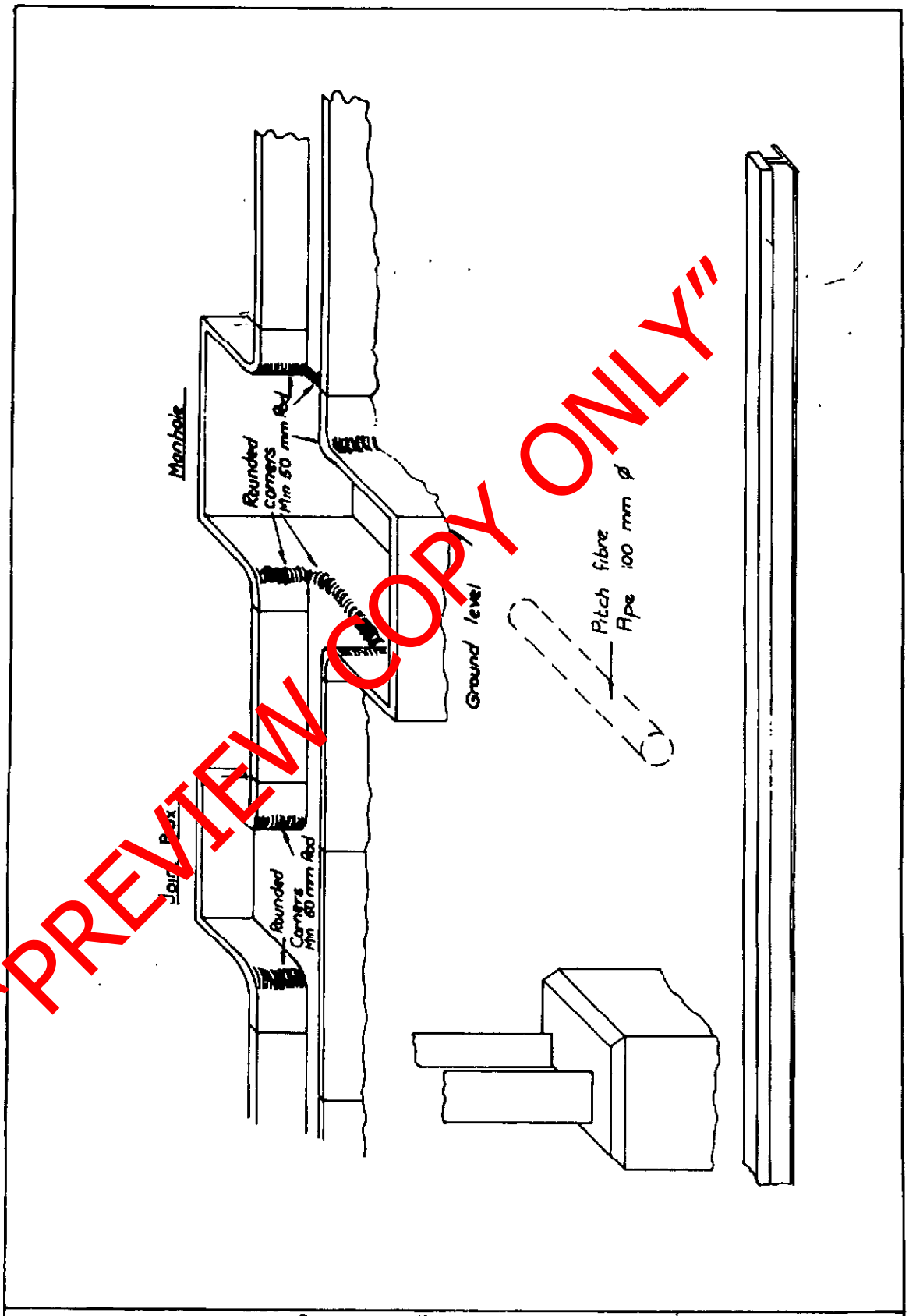
SATS ~ SAVO APPROVED METAL FENCE MARKER	SPECIFICATIONS CE (S&T) SIG/1 Annexure 3 OF PAN 4



SATS ~ SAVD

TRENCH PARALLEL TO TRACK AND TRACK CROSSING

SPECIFICATION
CE (S & T)
SIG/1
ANNEXURE E Sht. 1 of 1



SATS ~ SAVD

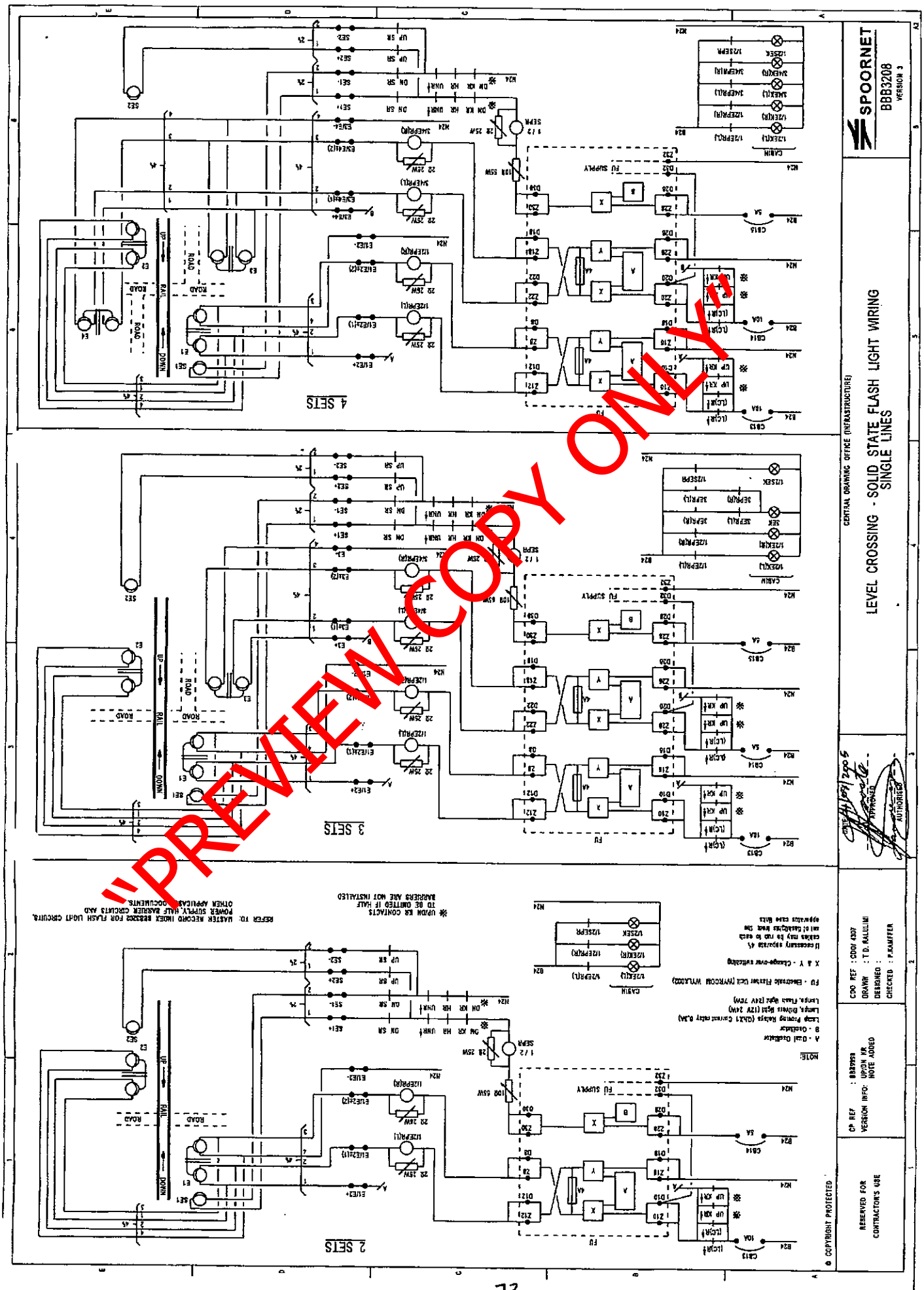
INSTALLATION OF CONCRETE TROUGHING

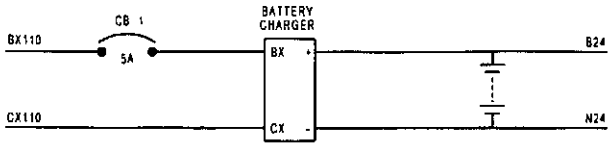
SPECIFICATION
CE (S&T)
SIG/1
Annexure 4 of Item 4

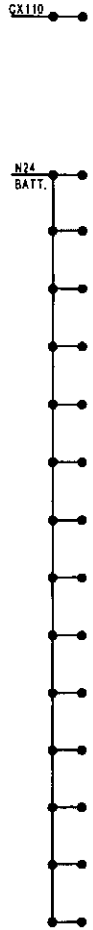
Master Record Index	SPOORNET
LEVEL CROSSINGS	BBB3202 VER 4

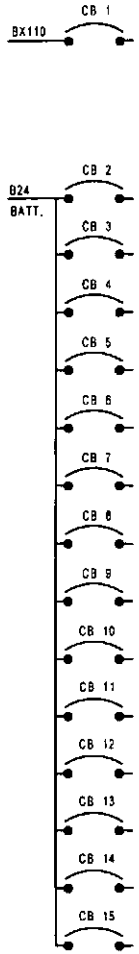
Item	Description	Document No	Version
1	Master Record Index	BBB3202	4
2	Flash Light Circuits for Single Lines with 2 Track Circuits	BBC0001	1
3	Flash Light Circuits for Single Lines with 3 Track Circuits	BBC0002	1
4	Flash Light Circuits for double lines (Uni-Directional)	BBC0003	1
5	Flash Light & Half Barrier Circuits for Single Lines with 2 Track Circuits	BBB3203	3
6	Flash Light & Half Barrier Circuits for Single Lines with 3 Track Circuits	BBB3204	3
7	Flash Light & Half Barrier Circuits for Double Lines (Uni-Directional)	BBB3205	3
8	Half Barrier Wiring	BBB3207	2
9	Solid State Flash Light Wiring for Single Lines	BBB3208	3
10	Solid State Flash Light Wiring for Double Lines (Uni-Directional)	BBB3209	3
11	Power Supply	BBB3206	2
12	Mounting of Flash Lights	ST Q1-1-1	3
13	Signing for Railway Crossings	SARTSM-VOL 2 CH 7	DEC 1995
14	Supporting Steel Framework and Fastening of Road Signs	CCE D185 SHT 1	2
15	Manual for Track Maintenance (2000)	BBB0481	2
16	Flash Light Lamp Unit (Spec., Not to be issued.)	CSE 11	FEB 1991
17	Automatic Half-Arm Barriers (Spec.)	CSE 102	OCT 1967
18	Automatic Half-Arm Barriers (Spec.)	CSE 106	SEP 1986
19	DC Lamp Proving Relay (Used with Level Crossings)	CSE 110	DEC 1971
20	Symbols for Signs and Barriers.	CSE Z148-1F Sht 17A	2
21	Signal Assembly for Driver's Light at Level Crossings.	BBB3549	1

Author:	Approved:	Authorised:	Date:

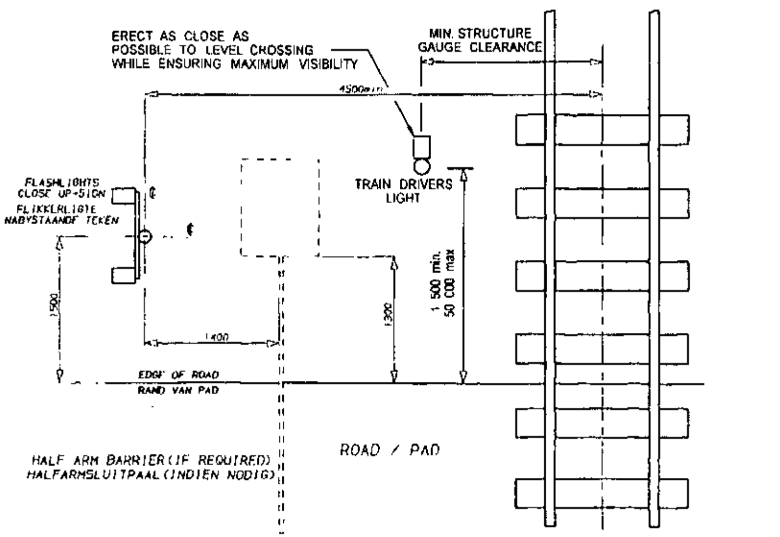




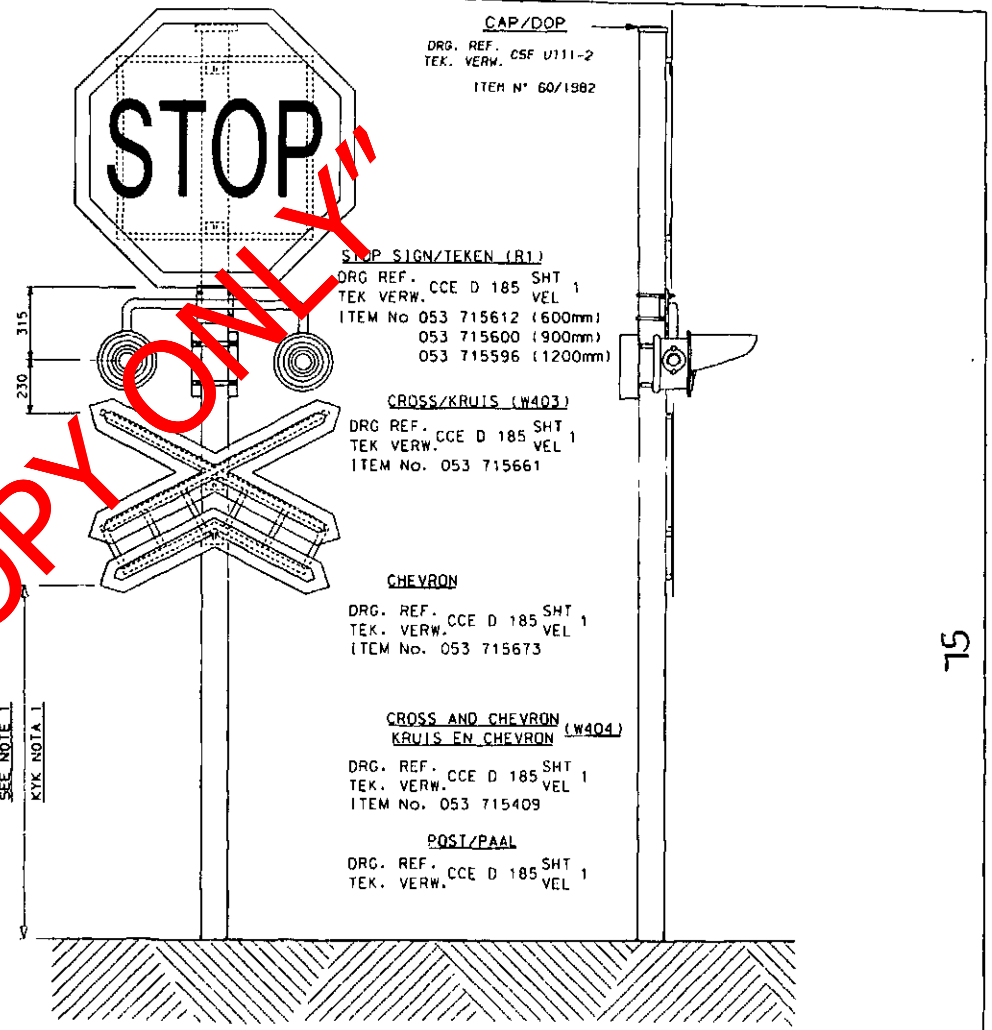




RESERVED FOR CONTRACTOR'S USE	CP REF : 2003/005 VERSION INFO:	CDO REF : CDO/ 2331 DRAWN : A. STEYN DESIGNED : CHECKED : P KAMFFER	DATE: APPROVED AUTHORISED	CENTRAL DRAWING OFFICE (INFRASTRUCTURE) LEVEL CROSSING - FLASH LIGHTS / HALF BARRIERS POWER SUPPLY	SPOORNET BBB3206 VERSION ?



PLAN VIEW SHOWING POSITION OF FLASHLIGHTS CLOSE-UP SIGN AND IF REQUIRED HALF ARM BARRIER.
PLANAANSIG TOON POSISIE VAN FLIKKERLIGTE NABYSTAANDE TEKEN EN INDIEN NODIG HALFARMSLUITPAAL



METHOD OF MOUNTING POST TO BE DETERMINED ON SITE.
METODE VAN PAALMONTERING MOET TER PLAATSE VASGESTEL WORD.

TYPES OF MOUNTING AVAILABLE: IF GROUND CONDITION PERMITS THE POST MUST BE BURIED TO 1,220.
IF GROUND IS ROCKY, "BISCUITS" OR A CONCRETE BASE MAY BE USED.

TIPES VAN MONTERING BESKIKBAAR: WANNEER GROND TOESTAND DIT TOELAAT MOET DIE PAAL TOT 1,220 DIEP BEGRAWE WORD.
WANNEER GROND ROTSAGTIG IS, MAG "BISCUITS" OF 'n BETON BASIS GEBRUIK WORD.

NOTES/NOTAS

1) 750-1500 IN SUBURBAN AREAS
IN VOORSTEDELIKE GEBIEDE
2000-2400 IN COUNTRY AREAS
IN BUITESTEDELIKE GEBIEDE

2) CROSS ALONE FOR SINGLE TRACK.
1 ADDITIONAL CHEVRON FOR MULTIPLE TRACKS
KRUIS ALLEEN VIR ENKELSPOOR.
1 ADDISIONELE CHEVRON VIR MEERVOUDIGE SPORE.

3) a) LIGHTS AND ARM SUPPLIED BY CONTRACTOR COMPLETE WITH FITTINGS.
LIGTE EN ARMS WORD VOLLEDIG MET TOEBEHORE DEUR KONTRAKTEUR VOORSIEN.
b) CROSS & STOP SIGN COMPLETE WITH FITTINGS SUPPLIED BY CE OPS. MAINTENANCE INFRA (CIVILS).
KRUIS EN STOPTEKEN WORD VOLLEDIG MET TOEBEHORE DEUR HI OPS. INSTANDHOUDING INFRA (SIVIEL) VOORSIEN.
c) FLASHLIGHTS MAINTAINED BY CE OPS. MAINTENANCE INFRA (SIGNALS).
FLIKKERLIGTE WORD ONDERHOU DEUR HI OPS. INSTANDHOUDING INFRA (SINJALE).

REFER TO : SIGNING FOR RAILWAY CROSSINGS SARTSM VOL ... TER 7

DATE / DATUM	AMENDMENT - WYSIGING	AMENDED / GEWYSIG	DO. CHECKED / TEK. NAGESIEN	ENG. CHECKED / ING. NAGESIEN	N°
12/2002	SEE ECP 2002080	SR	PK	JPJ	3
09/02	SEE ECP 2002037	Jo	PK	JPJ	2
06/97	SEE E.C.P. ST-01-1-101				1

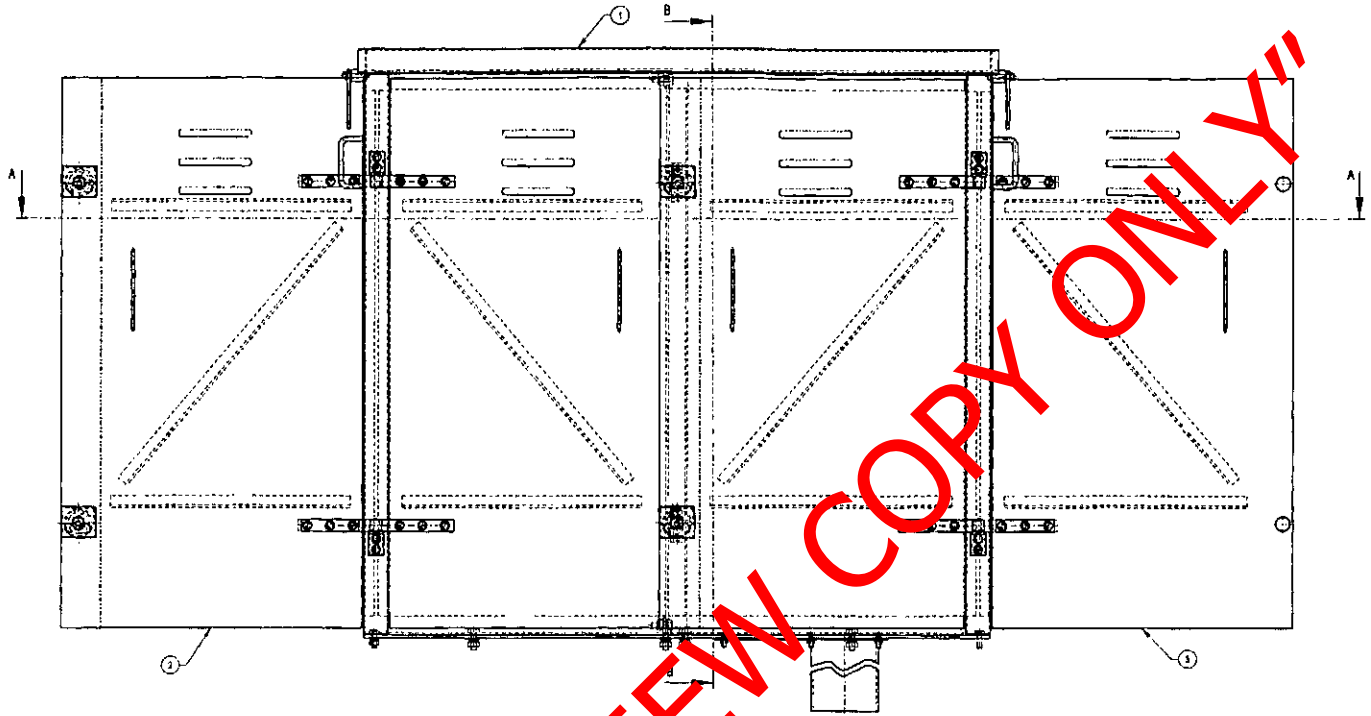
S.A.R. - S.A.S.

FLASHLIGHTS/FLIKKERLIGTE

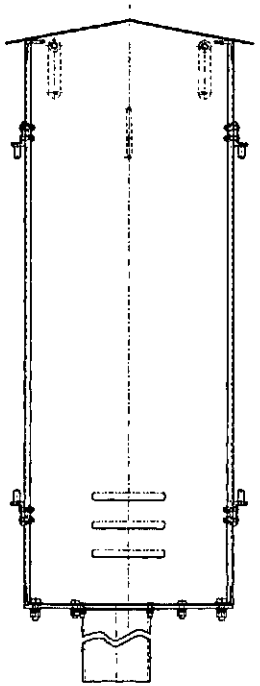
MOUNTING OF LIGHTS AND CHEVRON/CROSS.
MONTERING VAN LIGTE EN CHEVRON/KRUIS.

DATE 87/02/10
ENG. CHECKED / ING. NAGESIEN
MATERIAL / MATERIAAL
STORES CODE / MAGASYNKODE — ITEM
DRAWN / GETEKEN TH — CHECKED / NAGESIEN
CHIEF ENGINEER / HOOFINGENIEUR (S & T)
DATE 17-6-87 DATUM
No ST Q1-1-1
AMENDMENT / WYSIGING 1 2 3

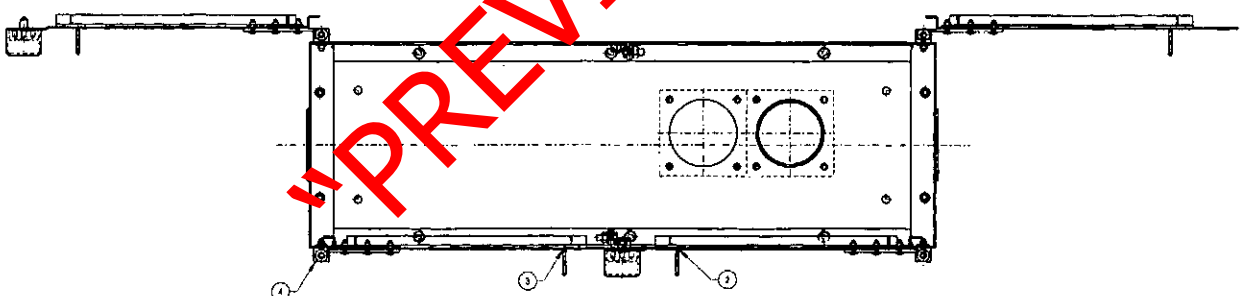
15



(FRONT DOOR CLOSED, REAR DOORS OPEN)



SECTION B-B
DOORS NOT SHOWN IN THIS VIEW



SECTION A-A

ITEM NO	DESCRIPTION	QTY	STORES ITEM NO	DRAWING NO
4	HINGE ASSEMBLY	8	-	BB05787
3	LEFT HAND DOOR	2	-	BB05788
2	RIGHT HAND DOOR	2	-	BB05789
1	MAIN STRUCTURE	-	-	BB05784

DIMENSIONS : mm SCALE : 1 : 6
TOLERANCE : LIN ± - ANG ± ITEM NO -
MATERIAL : -
VERSION INFO : DRAWING REVISED

DO REF : CDDV 8127
CP REF : BB01990
DRAWN : CJ Meiring
DESIGNED : -
CHECKED : H v Vuuren

APPROVED

AUTHORISED

STANDARD APPARATUS CASE (1 300mm)

TRANSNET freightrail

BB05575

VERSION 3

ACKNOWLEDGEMENT of RECEIPT

The following documents have been signed and supersedes all previous documents referring to the same product. All products have to be manufactured according to latest drawings. Changes may only be implemented with approval in writing from Transnet Freight Rail Technology Management.

Apparatus Case 1.3m			
BBD 5575 Ver 3	BBD 5800 Ver 3	BBD5795 Ver3	BBC 7594 Ver 2
BBD 5787 Ver 1	BBD 5802 Ver 2	BBG 1765 Ver 1	BBC 7576 Ver 2
BBD 5788 Ver 2	BBG 1793 Ver1	BBD 5796 Ver2	BBF 2477 Ver 1
BBD 5789 Ver 2	BBD 5799 Ver 3	BBF 2476 Ver 2	BBC 7596 Ver 2
BBD 5922 Ver 1	BBD 5802 Ver2	BBF 2481 Ver 1	BBF 2478 Ver 2
BBD 5790 Ver 2	BBD 5801 Ver3	BBF 2479 Ver 1	
BBD 5793 Ver 2	BBG 1792 Ver1	BBF 2480 Ver 1	
BBD 5923 Ver 1	BBD 5890 Ver3	BBF 248? Ver	
BBD 5792 Ver 2	BBD 5891 Ver3	BBD 5797 Ver 2	
BBD 5791 Ver 2	BBD 5794 Ver3	BBC 7595 Ver 2	
BBD 5798 Ver 3	BBC 7569 Ver3	BBC 7572 Ver 3	

Horse Shoe Box	
BBG 1974 Ver1	
BBG 1974 Sheet 1 to 10	

Anti Vandalism Locking Device - Bolt Side	
BBG 1872 Ver 1	
BBG 1872 Sheet 1 to 5	

Floating Nut Housing Assembly	
BBG 1873 Ver 1	
BBG 1873 Sheet 1 to 3	

Mounting Box Triple Unit	
BBB 0338 Ver3	
BBB 0338 Sheets 1 to 7	

Lid single and triple ML tuning unit box	
BBG 2344 Ver1	
BBG 2344 Sheet 1	

Points Junction Box	
BBG 1871 Ver 1	
BBG 1871 Sheets 1 to 11	
Pothead	
BBG 2317 Ver 1	
BBG 2317 Sheet 1 to 11	

SPOORNET

A Division of Transnet Limited

INFRASTRUCTURE (SIGNALS)

SPECIFICATION
FOR

INSTALLATION OF EARTHING

CONTENTS

Drawn up by: Engineering Technician (Technology Management): R. Prinsloo. . . . . .

Checked by: Sen. Eng. (Technology Management): B. Steyn . . . . . .

Authorised by: Sen. Manager. (Technology Management): G. Paverd. . . . . .

Total No.of pages 16

1 SCOPE

79

1.1 This specification sets out the requirements and procedure to be followed for the earthing of signalling equipment. It aims to protect personnel against hazardous working conditions, damaging of equipment, electric stress caused by lightning and to ensure the generation of sufficient fault currents to trigger protective devices.

2 APPLICABLE DOCUMENTS

2.1 Drawing CSE-Z-462 CAT.N28. Typical relay room earth layout.
2.2 Specification CSE-1164-066 CAT.X47. Stranded, bare copper or pvc insulated cable for earth connections.
2.3 "Safety instructions: High Voltage equipment" as issued by the Chief Engineer (Electrical).
2.4 Investigation report CSE-1123-038 CAT.E97. Investigation report on earthing of relay rooms.
2.5 Drawing CSE-1155-515 CAT.N28 sheet 1-4.
2.6 CSE Z148 (Signalling standard series).

TYPES OF EARTH

3.1 **Trench Earth** (Refer to Appendix 4)

3.1.1 Two lengths of 16 mm^2 bare copper cable (according to specification CSE-1164-066) shall be laid next to each other in a trench separated by the width of the trench.

3.1.2 The mimimum depth at which the earth conductor shall be laid is 450 mm below normal ground level.

3.1.3 The total length of the trench earth conductor shall not be less than 50 m nor exceed 80 m.

3.1.4 To minimize the effects of electrolytic corrosion on the earth conductors in DC traction areas the trench shall be at right angles to the track and at least 10 m away from the track. The bare earth conductor shall be connected to the apparatus by means of unarmoured insulated 16 mm^2 copper cable (see specification CSE-1164-066) . The length of this cable shall not be less than
15 m nor exceeding 50 m.

3.1.5 The earth wire shall be surrounded by 50 mm of approved virgin soil . Thereafter normal backfill free of large stones may be used.

3.2 Vertical Electrode Earth

3.2.1 Vertical earth electrodes shall be driven into the ground to a depth of at least 4 metres.

3.2.2 Where the required resistance is not obtained, multiple vertical electrodes shall be used. The rods shall be spaced at 3 m intervals.

3.2.3 Bimetallic copper/steel rods shall be used as earth electrodes. The rods shall be constructed by a molten welded process resulting in the formation of a microscopic crystalline steel alloy between the two metals. Electroplated rods shall not be used.

3.2.4 Where mechanical hammers are used to drive the rods, a suitable adaptor shall be used to ensure that the point of percussion is in a direct line with the central axis of the rod.

3.2.5 A phosphor bronze clamp designed to fit the rod and to incorporate the interconnecting wire shall be used for connection. All connections to electrodes shall be made 500mm under the ground surface using unarmoured insulated copper conductor to the earth electrode.

3.2.6 In the event of dissimilar metals, such as aluminium which are used for lightning protection, the connection between the dissimilar metals shall be made above ground and the joint shall be tinned, double rivetted and rendered watertight.

3.3 **Combined Horizontal and Vertical Earth Electrode Systems**

3.3.1 The trench earth system may be combined with the vertical earth electrode system by driving single vertical rods, one metre in length, connected in parallel to the horizontal earth. These vertical rods shall be spaced a minimum of one metre apart.

3.4 **Ring Earth**

3.4.1 The earthing ring shall consist of bare copper conductor of at least 16 mm^2 cross-sectional area. The ring shall have a radius of at least 1.5 metres.

3.5 **General**

3.5.1 An earthing system may be placed up to 50 metres from the apparatus to be protected.

3.5.2 Low-lying and/or damp areas must be selected in preference to high or dry localities.

3.5.3 Wherever possible, virgin soil must be used for earthing and soil such as those used for railway embankments must be avoided.

3.5.4 Areas in the vicinity of trees must be avoided as far as possible because the moisture content of such areas is greatly reduced by the water absorbed by the trees.

3.5.5 The vertical earth electrode system is preferred.

3.5.6 All earth wires and cables must be as straight as possible. Kinks, coils and sharp bends must be avoided to minimise surge impedance.

4 **RELAY ROOMS**

4.1 Every relay room shall have a separate Signal earth . This earth shall have a ground resistance of less than 1□ and shall be one of the types as described in paragraph 3 of this document.

4.2 An earth busbar shall be provided in the signalling power cubicle (power cubicle earth busbar),

on the outgoing panel (outgoing panel earth busbar) and on the interlocking (interlocking earth busbar) as shown in Appendices 1and 2 of this document.

4.3 The connection between earth busbars and/or the signal earth shall be an insulated copper cable with a cross sectional area of at least 16mm^2 and shall conform to specification CSE-1164- 066 CAT.X47. The colour of the insulation of the cable used for wiring of all the earth connections to the various equipment shall be of the green and yellow type.

4.4 All metal structures of the equipment in the relay room shall be isolated from the building.

4.5 All exposed metallic surfaces (interlocking racks, cable trays etc.) not normally carrying current shall be coupled to an earth busbar.

4.6 All the earth terminals of power equipment shall be wired individually to the power cubicle earth busbar (See drawing CSE Z 462 in Appendix 1).

4.7 The earth busbar provided by the EL&P department in the distribution box (relay room) shall be coupled to the power cubicle earth busbar or the outgoing panel earth busbar , which ever is the shortest connection.

4.8 The armouring of supply cables between the EL&P distrubution box and the power cubicle shall be earthed at both sides to the corresponding earth busbar as shown in Appendix 5.

4.9 The armouring of outgoing cables shall be connected to the earth busbar at the relay room end. Pig tail connections from the cable's armouring shall be connected seperately to enable each cable to be isolated individually when an earth fault is traced as shown in Appendix 5.

4.10 The Neutral of 440V feeds shall not be earthed.

4.11 All cable trays shall be electrically isolated from the rack structures and seperately connected to the interlocking earth busbar by a removable earth jumper.

4.12 The connection of equipment to any of the Earth busbars shall be such that any part of equipment can be isolated from the earth busbars without disturbing the earth connection of other equipment.

4.13 A removable earth jumper shall be provided between the interlocking earth busbar and the metal structure of each row of the interlocking as shown on drawings in Apppendices 1 and 2.

4.14 Assembly of racks should be such that racks in the same row are permanently in good electrical contact with each other . (Star washers, earth jumpers, pig tail connections, etc, etc.) See drawing in Appendix 2.

4.15 Any lightning protection done on incoming and/or outgoing circuits shall be coupled to the nearest earth busbar.

4.16 The sub-rack earth of any electronic/electrical equipment (PLC, Relay housings, Remote

control, Axle counters etc.) shall be individually connected to its resident rack's metal structure.

4.17 The maximum resistance between the signal earth connection and any metal structure in the relay room not normally carrying current shall be less than 0.1□.

4.18 All earth connections shall have a minimum DC current carrying capability of 10 A.

4.19 A circuit in the book of circuits of the installation showing all earth connections shall be provided (similar to CSE Z 462 in Appendix 1).

4.20 Any modifications involving the earth and/or earth connections shall be updated on the drawing in the book of circuits containing the earth connections.

5 HOUSINGS OUTSIDE RELAY ROOMS

(Refer to Appendices 4 and 5)

5.1 Cases such as apparatus cases, potheads, hot box detector housings, etc. outside relay rooms, shall be earthed at ground level, NOT formation level. Should cases be constructed of a non-conducting material, then any metal framework in or outside the case shall be earthed. Signal transformer cases housing equipment operating in excess of 150V shall be earthed. See page 75 of "Safety instructions: High Voltage Equipment 1992" as issued by the Chief Engineer (Electrical), Infrastructure, Spoornet. An earth value of less than 10 □ must be obtained.

5.2 The end of the earthing wire which is to be fixed to the apparatus shall be compression crimped or soldered into a lug big enough to take all strands of the earthing wire, the lug being fixed by a clean bolt of non-corrosive material onto a clean metallic surface and sealed against corrosion.

5.3 Ducting (outside or in tunnels), trackside disconnection boxes, signal transformers, mounting posts and cases, which are used for housing equipment operating at less than 150 V shall not be deliberately earthed nor shall they be bonded to the return rail.

6 TRACK CIRCUITS

6.1 All track circuits must be equipped with lightning arresters and earthed in accordance with the manufacturer's recommendations and the requirements of Transnet as in CSE Z148 series.

7 SIGNALS

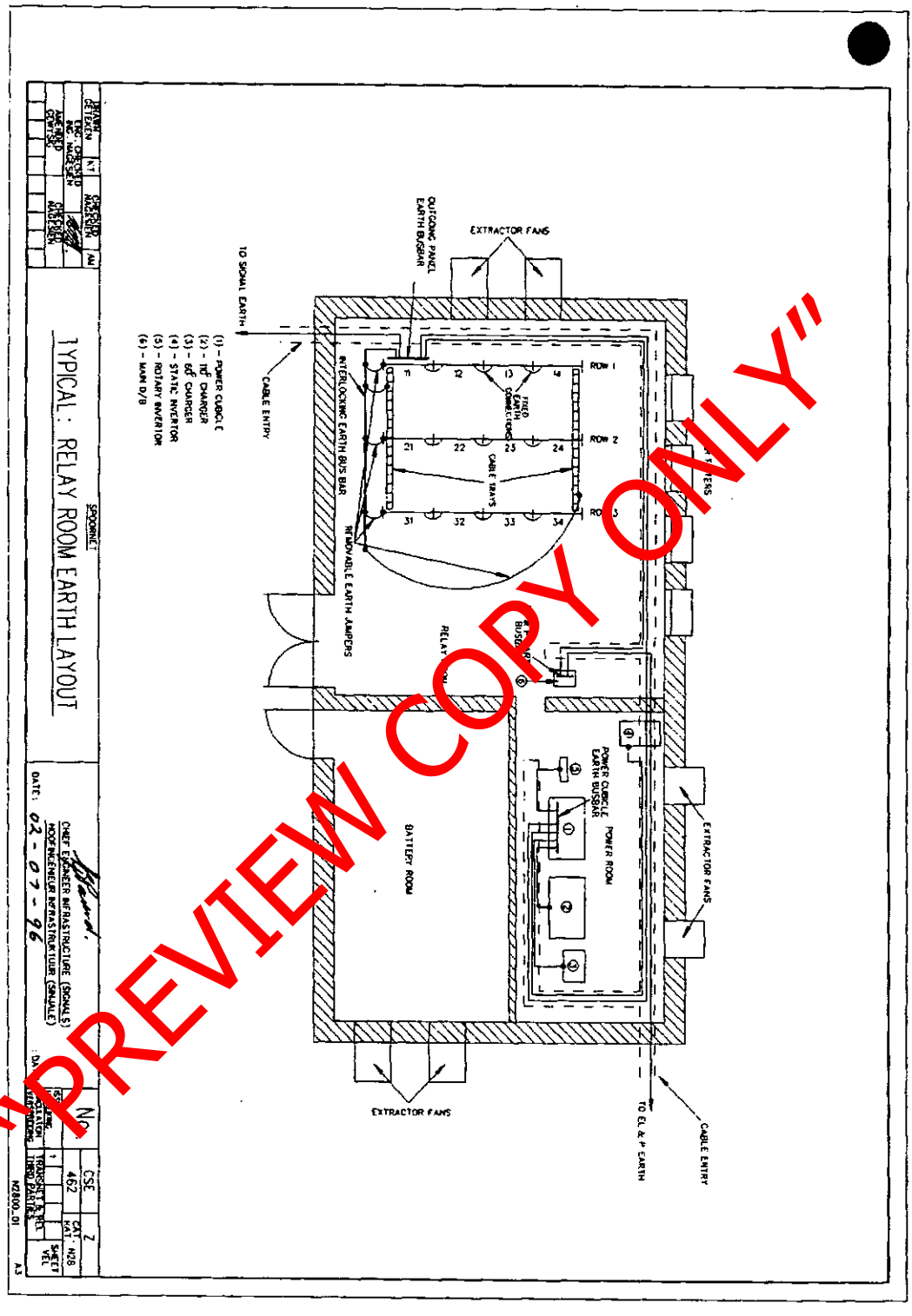
7.1 **DC and 25KV AC electrified lines.**
Signals shall not be earthed or connected to the return rail.

7.2 **50KV AC electrified lines.**
Signals on these lines shall be earthed by means of a trench earth or by a ring earth.

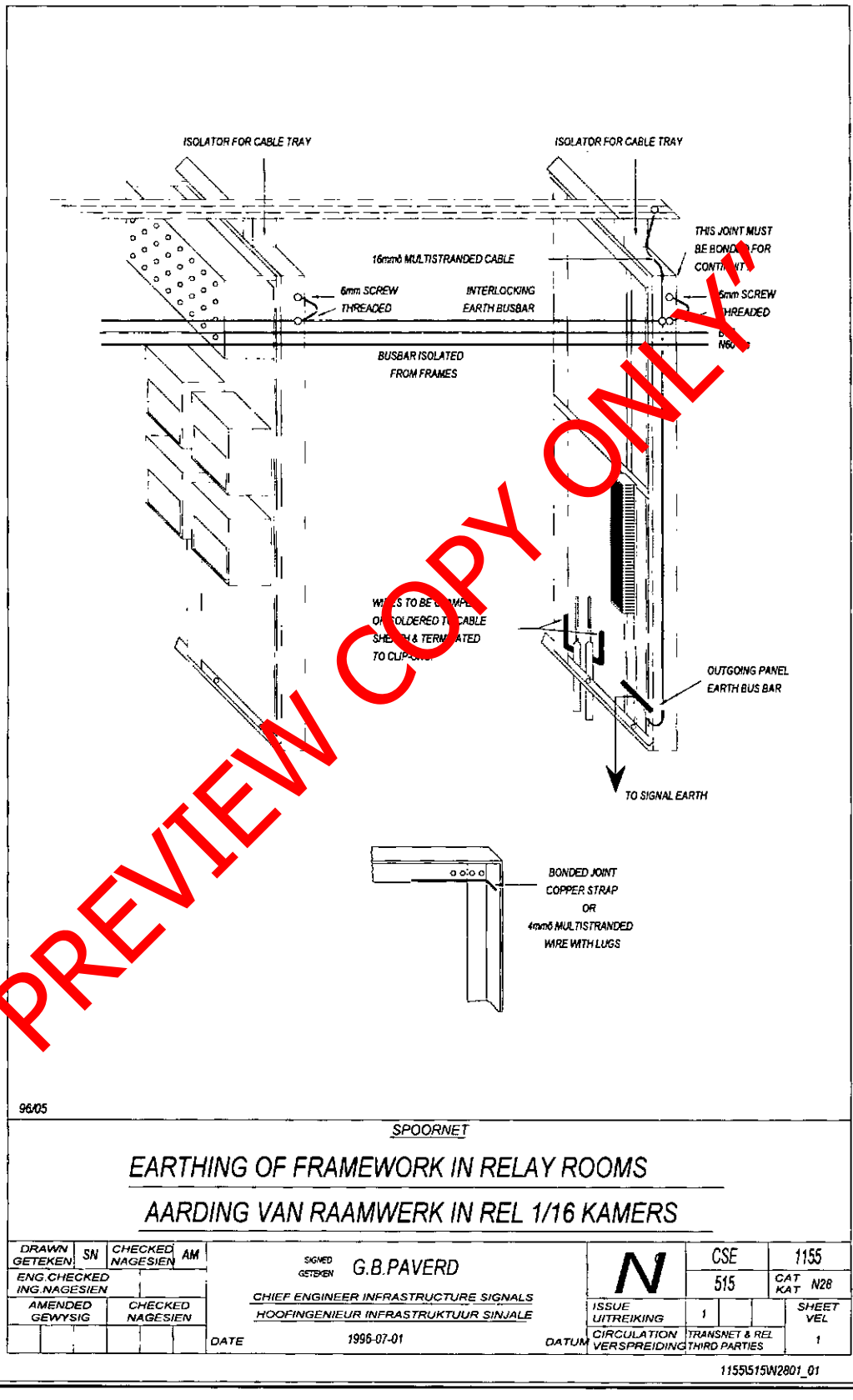
structure shall be bonded to the earthing ring.

TYPICAL RELAY ROOM EARTH LAYOUT P.T.O.

APPENDIX 1

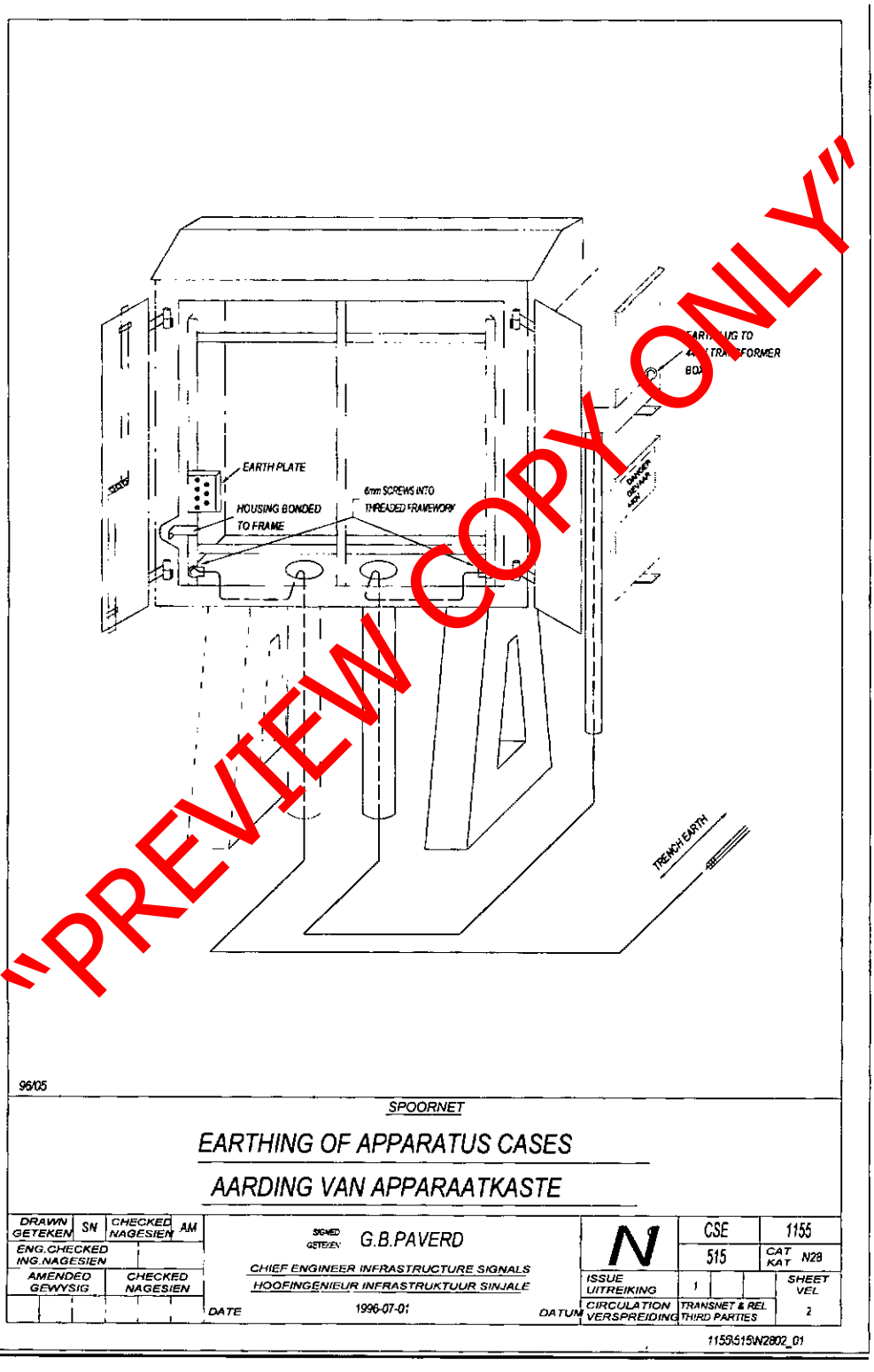


EARTHING OF FRAMEWORK IN RELAY ROOMS APPENDIX2



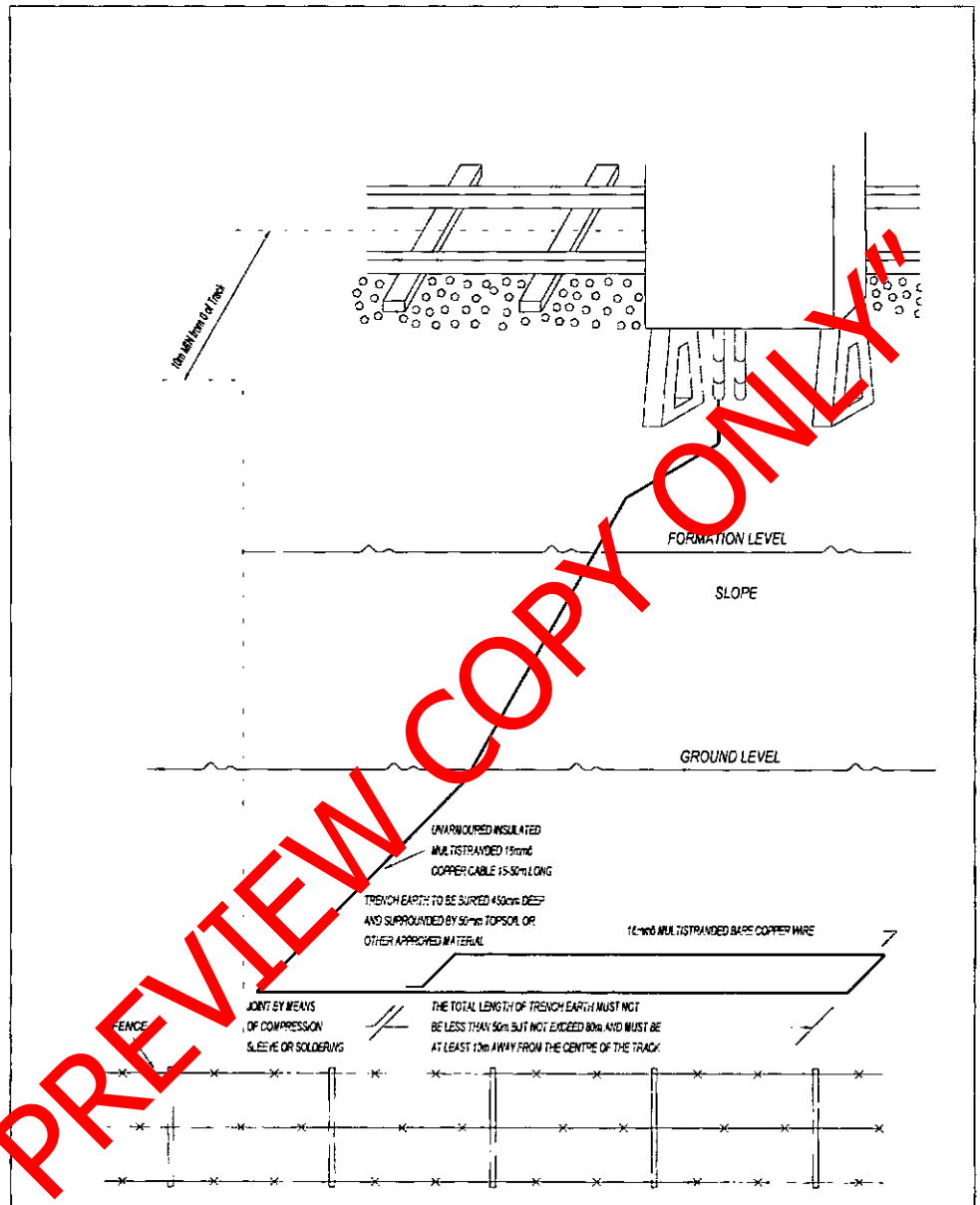
EARTHING OF APPARATUS CASE P.T.O.

APPENDIX3

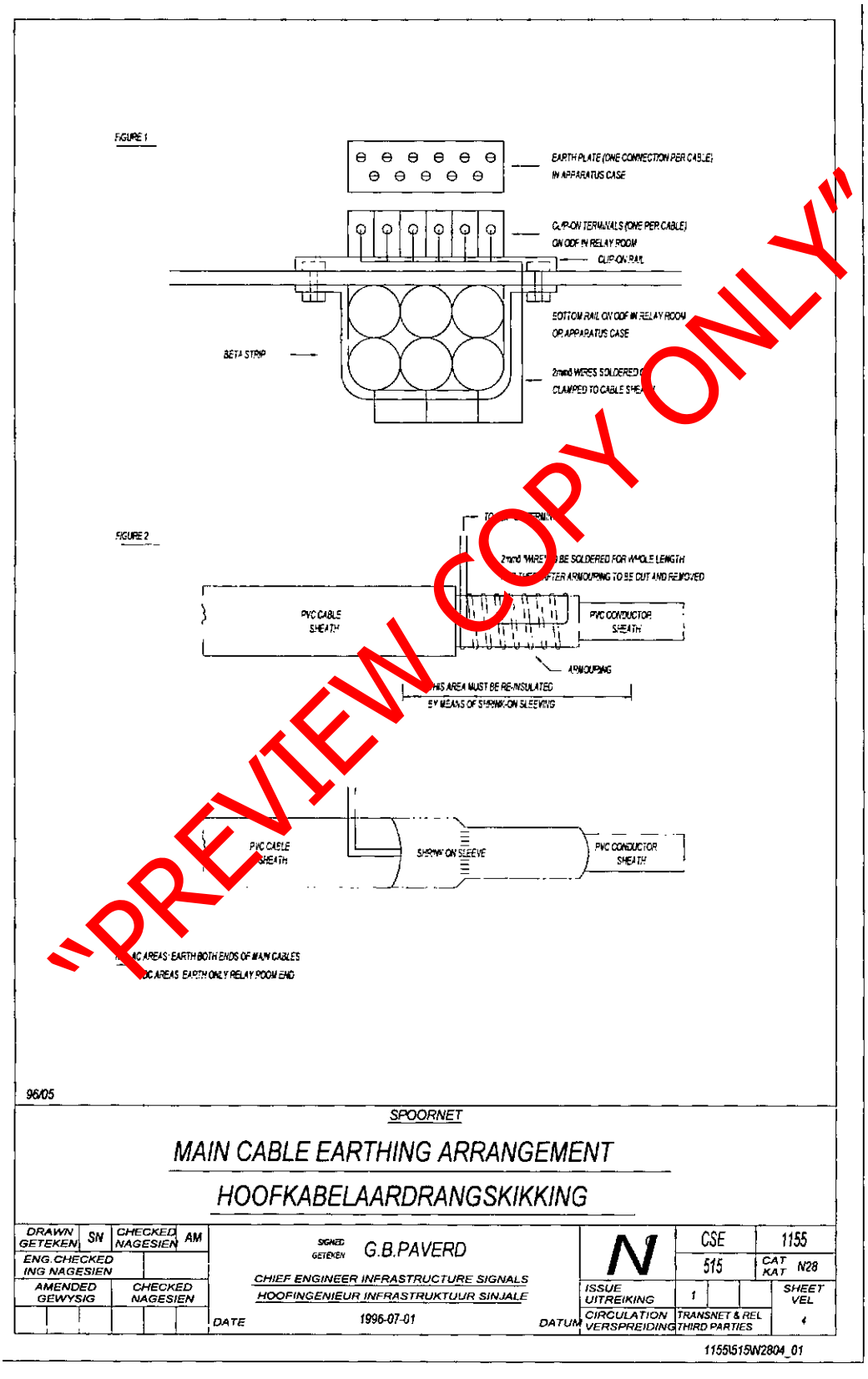


INSTALLATION OF TRENCH EARTH P.T.O.

APPENDIX4



MAIN CABLE EARTHING ARRANGEMENT APPENDIX 5 PT.O.



8 POINTS MACHINES

8.1 Points machines shall not be earthed or connected to the return rail.

9 SIGNALLING CABLES (Refer to Appendix 5)

9.1 In the relay room the armouring of main signalling cables shall be earthed. In DC traction areas the armouring of these cables at the apparatus case shall not be earthed and shall be properly insulated with shrink sleeving as shown in Appendix 5.

9.2 The armouring of 440 V power cables in DC traction areas shall be earthed at the relay room end and at the start of each subsequent termination point. In AC traction areas the armouring of 440V power cables shall be earthed at both sides.

9.3 Tail cables (i.e. apparatus case/points pothead to final function, e.g. signal, points connection box, trackside disconnection box, etc.) shall not have their armouring earthed at either end. The armouring of all tail cables must be cut back and properly insulated, e.g. with shrink sleeving.

10 CTC CABLE AND EQUIPMENT

10.1 All lightning arresters shall be mounted as close as possible to the cable entry and all connections to the arresters shall be as short and straight as possible.

Full details of protection against lightning, proposed type of arresters to be used, etc., must be submitted with any quotation for CTC cables and equipment. See CSE Z148 series.

11 EARTHING IN AC TRACTION AREAS

11.1 The earthing procedures shall be modified in AC traction areas as set out below:

11.1.1 No signal equipment or structure to which any cable armouring is connected and earthed by means of trench earth shall be closer than 2,5 m to the centre line of any electrified track. This shall be measured from the nearest possible extremity of the equipment to the centre line of the track. In the case of equipment with hinged doors, this is to be measured with the doors closed.

11.1.2 All main cables (i.e. from apparatus case/relay room to apparatus case/points pothead) shall have their armouring earthed at both ends. (Refer to Appendix 5).

11.1.3 Tail cables (i.e. apparatus case/points pothead to final function, e.g. signal, points disconnection box, trackside disconnection box, etc.) shall not have their armouring earthed at either end. The armouring of all tail cables must be cut back and properly insulated, e.g. with shrink sleeving. (Refer to Appendix 5).

11.1.4 All gantries and metal structures spanning the track shall be bonded to the return rail. An earthing ring surrounding the base of the structure shall be provided and the gantry or metal