

TRANSNET



freight rail

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

REQUEST FOR QUOTATION

KBY/52871

KBY_13709

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

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/52871

FOR THE REPLACEMENT OF OLD 12V FLASH LIGHT SYSTEM WITH 24V FLASH LIGHT SYSTEM AT WINDSORTON ROAD, FOR A PERIOD OF EIGHT (8) MONTHS.

FOR DELIVERY TO : TRANSNET FREIGHT RAIL, INFRA KIMBERLEY NORTH.

ISSUE DATE : 08 APRIL 2014

CLOSING DATE : 13 MAY 2014

CLOSING TIME : 10:00

"PREVIEW COPY ONLY"

Section 1

1

Respondent's Signature

Date & Company Stamp

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 or courier]
CLOSING VENUE: [Tender box at physical address for hand delivery and courier:
 Transnet Freight Rail, Property Management Building, Supply Chain
 Services, 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. Transnet will accordingly allow a "preference" to companies who provide a valid B-BBEE Verification Certificate. All procurement transactions will be evaluated accordingly.

2.1 B-BBEE Scorecard and Rating

As prescribed in terms of the Preferential Procurement Policy Framework Act (PPPFA), Act 5 of 2000 and its Regulations, Respondents are to note that the following preference point system is applicable to all bids:

- The 80/20 system for requirements with a Rand value of up to R1 000 000.00 (all applicable taxes included).
- Bidders are to note that if the 80/20 preference point system is stipulated in this RFQ and all Bids received exceed R1 000 000.00, the RFQ must be cancelled.

The value of this bid is estimated to be below R1000 000.00 (all applicable taxes included) and therefore the **80/20** system shall be applicable.

When Transnet invites prospective suppliers to submit Proposals for its various expenditure programmes, it requires Respondents to have their B-BBEE status verified in compliance with the Codes of Good Practice issued in terms of the Broad Based Black Economic Empowerment Act No. 53 of 2003.

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 one year transitional period starting 11 October 2013. During the transitional period, companies may elect to be measured in terms of the Revised Codes or the 2007 version of the Codes. After the first year of the implementation of the Revised Codes, B-BBEE compliance will be measured in

terms of the Revised Codes without any discretion. Companies which are governed by Sector-specific Codes will be measured in terms of those Sector Codes.

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 10 October 2014. Thereafter, Transnet will only accept B-BBEE certificates issued based on the Revised Codes.

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.

[Refer clause 19 below for Returnable Documents required]

2.2 B-BBEE Improvement Plan

Transnet encourages its Suppliers/Service Providers to constantly strive to improve their B-BBEE rating. Whereas Respondents will be allocated points in terms of a preference point system based on its B-BBEE scorecard to be assessed as detailed in paragraph 2.1 above, in addition to such scoring, Transnet also requests that Respondents submit a B-BBEE improvement plan. Respondents are therefore requested to indicate the extent to which they will maintain or improve their B-BBEE status over the contract period.

Respondents are requested to submit their B-BBEE Improvement Plan as an additional document with their Proposals by completion of **Annexure A** appended hereto. *[Refer to Annexure A for further instructions]*

Guidance Notes

- *Note that for low value transactions, opportunities for B-BBEE Improvement are limited. Focus should be placed on longer term contracts.*

3 Communication

- a) 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.
- b) A Respondent may, however, before the closing date and time, direct any written enquiries relating to the RFQ to the following Transnet employee:
Name: Refilwe Ramothwala Email: Refilwe.Ramothwala@transnet.net
- c) Respondents may also, at any time after the closing date of the RFQ, communicate with Maggie Pain on any matter relating to its RFQ response:
Telephone 053 838 3341 Email Maggie.Pain@transnet.net

The Respondent's original and valid Tax Clearance Certificate must accompany the Quotation. Note that no business shall be awarded to any Respondent whose tax matters have not been declared by SARS to be in order.

4 VAT Registration

The valid VAT registration number must be stated here: _____ [if applicable].

5 Legal Compliance

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

6 Changes to Quotations

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

7 Pricing

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

8 Prices Subject to Confirmation

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

9 Negotiations

Transnet reserves the right to undertake post-tender negotiations with selected Respondents or any number of short-listed Respondents.

10 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.

11 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;
- 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; or
- make no award at all.

12 Transnet's supplier integrity pact

Transnet's Integrity Pact requires a commitment from suppliers and Transnet that they will not engage in any corrupt and fraudulent practices, anti-competitive practices; and act in bad faith towards each other.

The Integrity Pact also serves to communicate Transnet’s Gift Policy as well as the remedies available to Transnet where a Respondent contravenes any provision of the Integrity Pact.

Respondents are required to familiarise themselves with the contents of the Integrity Pact which is available on the Transnet Internet site [www.transnet.net/Tenders/Pages/default.aspx] or on request. Furthermore, Respondents are required to certify that they have acquainted themselves with all the documentation comprising the Transnet Integrity Pact and that they fully comply with all the terms and conditions stipulated in the Transnet Supplier Integrity Pact as follows:

YES	NO
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Should a Respondent need to declare previous transgressions or a serious breach of law in the preceding 5 years as required by Annexure A to the Integrity Pact, such declaration must accompany the Respondent’s bid submission.

13 Respondent’s Samples

Respondents are required to submit samples of the Goods tendered for by it **only in cases where Transnet has specifically requested samples**. The sample(s) must be endorsed with the RFQ number and description and forwarded on or before the deadline date to the following addressee:

N/A

14 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 system as indicated in paragraph 2.1	<ul style="list-style-type: none"> • Pricing and price basis [firm] - whilst not the sole factor for consideration, competitive pricing and overall level of unconditional discounts¹ will be critical • 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.

15 Validity Period

Transnet desires a validity period of 30 [thirty] days from the closing date of this RFQ.

¹ Only unconditional discounts will be taken into account during evaluation. A discount which has been offered conditionally will, despite not being taken into account for evaluation purposes, be implemented when payment is effected.

This RFQ is valid until _____.

16 Banking Details

BANK: _____

BRANCH NAME / CODE: _____

ACCOUNT HOLDER: _____

ACCOUNT NUMBER: _____

17 Company Registration

Registration number of company / C.C. _____

Registered name of company / C.C. _____

18 Disclosure of Prices Quoted

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

YES NO

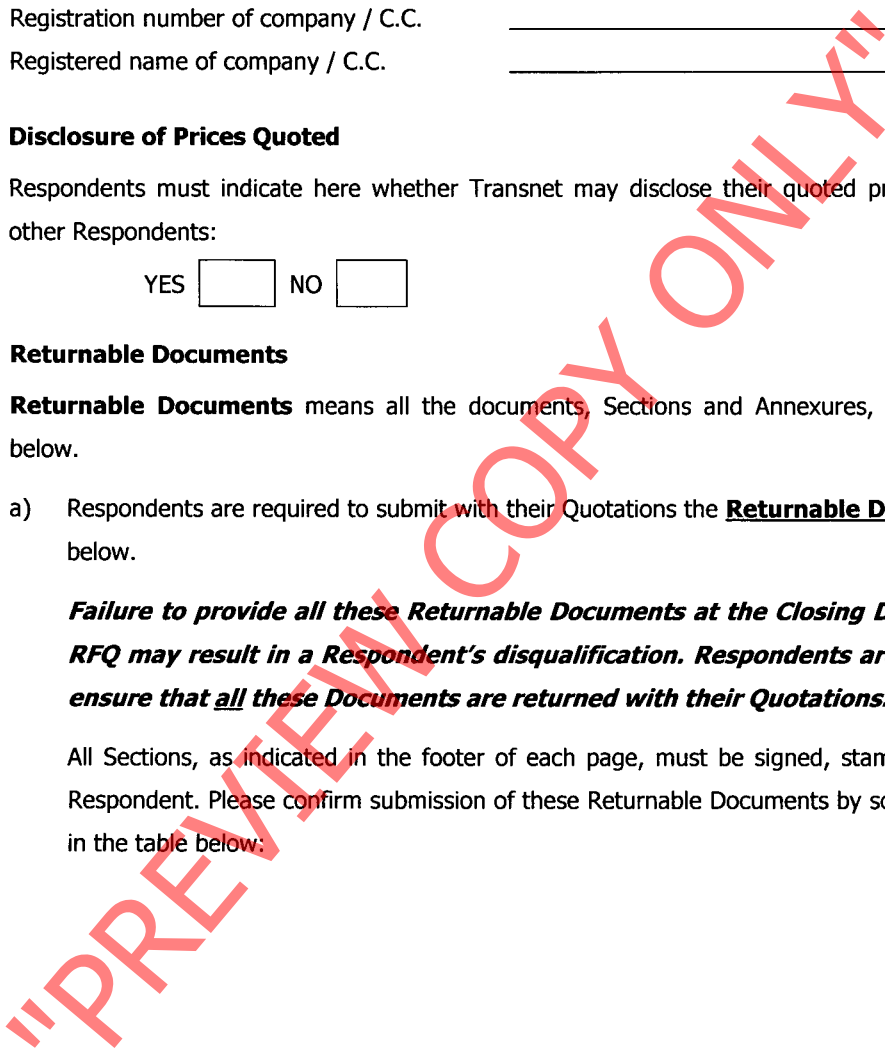
19 Returnable Documents

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

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

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

All Sections, as indicated in the footer of each page, must be signed, stamped and dated by the Respondent. Please confirm submission of these Returnable Documents by so indicating [Yes or No] in the table below:



Returnable Documents	Submitted [Yes or No]
-----------------------------	--------------------------------------

6

Respondent's Signature

Date & Company Stamp

Returnable Documents	Submitted [Yes or No]
SECTION 1 : Notice to Bidders	
<ul style="list-style-type: none"> - Valid and original B-BBEE Verification Certificate or certified copy thereof [Large Enterprises and QSEs] Note: failure to provide a valid B-BBEE Verification Certificate at the closing date and time of the RFQ will result in an automatic score of zero for preference 	
<ul style="list-style-type: none"> - Valid and original B-BBEE certificate/sworn affidavit or certified copy thereof from auditor, accounting officer or SANAS accredited Verification Agency [EMEs] Note: failure to provide a valid B-BBEE Verification Certificate at the closing date and time of the RFQ will result in an automatic score of zero being allocated for preference 	
<ul style="list-style-type: none"> - In the case of Joint Ventures, a copy of the Joint Venture Agreement or written confirmation of the intention to enter into a Joint Venture Agreement 	
<ul style="list-style-type: none"> - Original valid Tax Clearance Certificate [Consortia / Joint Ventures must submit a separate Tax Clearance Certificate for each party] 	
SECTION 2 : Quotation Form	
SECTION 3: Vendor Application Form	
<ul style="list-style-type: none"> • Original cancelled cheque or bank verification of banking details 	
<ul style="list-style-type: none"> • Certified copies of IDs of shareholder/directors/members [as applicable] 	
<ul style="list-style-type: none"> • Certified copies of the relevant company registration documents from Companies and Intellectual Property Commission (CIPC) 	
<ul style="list-style-type: none"> • Certified copies of the company's shareholding/director's portfolio 	
<ul style="list-style-type: none"> • Entity's letterhead 	
<ul style="list-style-type: none"> • Certified copy of VAT Registration Certificate [RSA entities only] 	
<ul style="list-style-type: none"> • Certified copy of valid Company Registration Certificate [if applicable] 	
Financial Statements signed by your Accounting Officer or Audited Financial Statements for previous 3 years	
ANNEXURE A – B-BBEE Preference Points Claim Form	

- b) In addition to the requirements of paragraph a) above, Respondents are further requested to submit with their Proposals the following **additional documents** as detailed below.

Please confirm submission of these additional documents by so indicating [Yes or No] in the table below:

Additional Documents	SUBMITTED [Yes or No]
ANNEXURE B: B-BBEE Improvement Plan	

Section 2
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 Terms and Conditions for the Supply of Goods or Services to Transnet [available on request]; 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 follows for the goods required, on a "delivered nominated destination" basis, excluding VAT:

Item No	Description of Goods /Services	Total Price (ZAR)
1.	Material for repair of interlocking	
2.	Cable laying, trenching and general labour	
3.	Pre-test and commissioning	
4.	Plant and equipment(small)	
5.	Plant and equipment(heavy duty)	
6.	Planning and design	
7.	Installation	
8.	Site establishment and security	
9.	Quality control, ISO 9001	
10.	Preliminary and General(Accommodation, Transport and Labour)	
	SUB TOTAL	
	VAT@14%	
	TOTAL	

Delivery Lead-Time from date of purchase order: _____ one (1) _____ [week]

Notes to Pricing:

- a) All Prices must be quoted in South African Rand, exclusive of VAT
- b) To facilitate like-for-like comparison bidders must submit pricing strictly in accordance with this price schedule and not utilise a different format. Deviation from this pricing schedule could result in a bid being disqualified.
- c) Please note that should you have offered a discounted price(s), Transnet will only consider such price discount(s) in the final evaluation stage if offered on an unconditional basis.

Section 3

VENDOR APPLICATION FORM

Respondents are to furnish the following documentation and complete the Vendor Application Form below:

1. **Original** cancelled cheque **OR** letter from the Respondent's bank verifying banking details **[with bank stamp]**
2. **Certified** copy of Identity Document(s) of Shareholders/Directors/Members [where applicable]
3. **Certified copies** of the relevant company registration documents from Companies and Intellectual Property Commission (CIPC)
4. **Certified copies** of the company's shareholding/director's portfolio
5. A letter on the company's letterhead confirm physical and postal addresses
6. **Original** valid SARS Tax Clearance Certificate
7. **Certified copy** of VAT Registration Certificate
8. **A valid and original** B-BBEE Verification Certificate / sworn affidavit **or certified copy** thereof meeting the requirements for B-BBEE compliance as per the B-BBEE Codes of Good Practice
9. **Certified copy** of valid C
10. **Company** Registration Certificate [if applicable]

SOUTH AFRICAN REPUBLIC OF SOUTH AFRICA REPUBLIC OF SOUTH AFRICA									
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.							

FOR THE REPLACEMENT OF OLD 12V FLASH LIGHT SYSTEM WITH 24V FLASH LIGHT SYSTEM AT WINDSORTON FOR A PERIOD OF EIGHT (8) MONTHS.

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/maximum 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 be 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.

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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 In terms of the Revised Codes of Good Practice issued on 11 October 2013 in terms of Government Gazette No. 36928, Bidders who qualify as QSEs 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.
- 4.6 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.
- 4.7 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.

- 4.8 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.
- 4.9 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.
- 4.10 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.
- 4.11 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 _____ 1 = _____ [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.....

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:.....



ANNEXURE B: B-BBEE IMPROVEMENT PLAN

Transnet encourages its Suppliers/Service Providers to constantly strive to improve their B-BBEE rating. Whereas Respondents will be allocated points in terms of a preference point system based on its B-BBEE scorecard, in addition to such scoring, Transnet also requests that Respondents submit a B-BBEE improvement plan. Respondents are therefore requested to indicate the extent to which their ownership, management control, Supplier Development, Preferential Procurement and Enterprise Development will be maintained or improved over the contract period.

Respondents are requested to submit their B-BBEE Improvement Plan as an additional document with their Proposals.

Respondents are to insert their current status (%) and future targets (%) for the B-BBEE Improvement Plan [i.e. not the % change but the end-state quantum expressed as a percentage] in the table below. This will indicate how you intend to sustain or improve your B-BBEE rating over the contract period. On agreement, this will represent a binding commitment to the successful Respondent.

Transnet reserves the right to request supporting evidence to substantiate the commitments made in the B-BBEE Improvement Plan.

OWNERSHIP INDICATOR	Required Responses	Current Status (%)	Future Target (%)
1. The percentage of the business owned by Black ¹ persons.	<i>Provide a commitment based on the extent to which ownership in the hands of Black persons as a percentage of total ownership of the organisation would be sustained or increased over the contract period.</i>		
2. The percentage of your business owned by Black women.	<i>Provide a commitment based on the extent to which ownership in the hands of Black women as a percentage of total ownership of the organisation would be sustained or increased over the contract period.</i>		
3. The percentage of the business owned by Black youth ²	<i>Provide a commitment based on the extent to which ownership in the hands of Black youth as a percentage of total ownership of the organisation would be sustained or increased over the contract period.</i>		
4. The percentage of the business owned by Black persons living with disabilities	<i>Provide a commitment based on the extent to which ownership in the hands of Black disabled persons as a percentage of total ownership of the organisation would be sustained or increased over the contract period.</i>		
5. New Entrants ³ (Early stage business)	<i>Provide a commitment based on the extent to which new entrants will be supported over the contract period.</i>		

1 "**Black**" means South African Blacks, Coloureds and Indians, as defined in the B-BBEE Act, 53 of 2003

2 "**Black youth**" means Black persons from the age of 16 to 35

3 "**New Entrants**" means an early stage business which is similar to a start-up. However, an early stage business is typically 3 years old or less.

MANAGEMENT CONTROL INDICATOR	Required Responses	Current Status (%)	Future Targets (%)
6. The percentage of Black Board members in relation to the total number of Board members	<i>Provide a commitment based on the extent to which the number of Black Board members, as a percentage of the total Board, would be sustained or increased over the contract period.</i>		
7. The percentage of Black female Board members in relation to the total number of Board members	<i>Provide a commitment based on the extent to which the number of Black female Board members, as a percentage of the total Board, would be sustained or increased over the contract period.</i>		
8. Black Executives directors as a percentage of all executive directors	<i>Provide a commitment based on the extent to which the number of Black executive Directors as a percentage of all Executive Directors would be sustained or increased over the contract period.</i>		
9. Black female Executives directors as a percentage of all executive directors	<i>Provide a commitment based on the extent to which the number of Black female executive Directors as a percentage of all Executive Directors would be sustained or increased over the contract period.</i>		
Other Executive Management	Required Response	Current Status (%)	Future Targets (%)
10. Black Executive Management as a percentage of all executive directors	<i>Provide a commitment based on the extent to which the number of Black executive Managers as a percentage of all Executive Directors would be sustained or increased over the contract period.</i>		
11. Black Female Executive Management as a percentage of all executive directors	<i>Provide a commitment based on the extent to which the number of Black female executive Managers as a percentage of all Executive Directors would be sustained or increased over the contract period.</i>		
Senior Management	Required Response	Current Status (%)	Future Targets (%)
12. Black employees in Senior Management as a percentage of all senior management	<i>Provide the percentage of Blacks that would be appointed or retained by the Board and would be operationally involved in the day to day senior management of the business, with individual responsibility for overall and/or financial management of the business and actively involved in the development and implementation of overall strategy, over the contract period.</i>		
13. Black female employees in Senior Management as a percentage of all senior management	<i>Provide the percentage of Black females that would be appointed or retained by the Board and would be operationally involved in the day to day senior management of the business, with individual responsibility for overall and/or financial management of the business and actively involved in the development and implementation of overall strategy, over the contract period.</i>		
Middle Management	Required Response	Current	Future

		Status (%)	Targets (%)
14. Black employees in Middle Management as a percentage of all middle management	<i>Provide the percentage of Blacks that would be retained or appointed by the organisation in the middle management cadre and would be operationally involved in the day to day management of the business, with individual responsibility for a particular area within the business and actively involved in the day to day management of the organisation, over the contract period.</i>		
15. Black female employees in Middle Management as a percentage of all middle management	<i>Provide the percentage of Blacks females that would be retained or appointed by the organisation in the middle management cadre and would be operationally involved in the day to day management of the business, with individual responsibility for a particular area within the business and actively involved in the day to day management of the organisation, over the contract period.</i>		
Junior Management	Required Response	Current Status (%)	Future Targets (%)
16. Black employees in Junior management as a percentage of all junior management	<i>Provide a commitment based on the extent to which the number of Black Junior Managers as a percentage of the total junior Managers, would be sustained or increased over the contract period.</i>		
17. Black female employees in Junior management as a percentage of all junior management	<i>Provide a commitment based on the extent to which the number of Black female Junior Managers as a percentage of the total junior Managers, would be sustained or increased over the contract period.</i>		
Employees with disabilities	Required Response	Current Status (%)	Future Targets (%)
18. Black employees with disabilities as a percentage of all employees	<i>Provide a commitment based on the extent to which the percentage of Black disabled employees, in relation to the total of all employees in the organisation, would be sustained or increased over the contract period.</i>		
PREFERENTIAL PROCUREMENT INDICATOR	Required Responses	Current Status (%)	Future Targets (%)
19. B-BBEE procurement spend from all Empowering Suppliers ⁴ based on the B-BBEE procurement	<i>Provide a commitment based on the extent to which B-BBEE spend from all Empowering Suppliers would be sustained or increased over the contract period.</i>		

⁴ "Empowering Suppliers" means a B-BBEE compliant entity, which should meet at least three of the following criteria if it is a Large Enterprise or one if it is a QSE:

(a) At least 25% of cost of sales excluding labour cost and depreciation must be procured from local producers or local supplier in SA, for service industry labour cost are included but capped to 15%.

(b) Job creation - 50% of jobs created are for Black people provided that the number of Black employees since the immediate prior verified B-BBEE Measurement is maintained.

(c) At least 25% transformation of raw material/beneficiation which include local manufacturing, production and/or assembly, and/or packaging.

(d) Skills transfer - at least spend 12 days per annum of productivity deployed in assisting Black EMEs and QSEs beneficiaries to increase their operation or financial capacity.

recognition level as a percentage of total measured procurement spend			
20. 20 B-BBEE procurement spend from all Empowering Suppliers QSEs based on the applicable B-BBEE Procurement Recognition Levels as a percentage of Total Measured Procurement Spend	<i>Provide a commitment based on the extent to which B-BBEE spend from Empowering Supplier QSEs would be sustained or increased over the contract period</i>		
21. B-BBEE procurement spend from Exempted Micro-Enterprise based on the applicable B-BBEE procurement recognition Levels as a percentage of Total Measured Procurement Spend	<i>Provide a commitment based on the extent to which B-BBEE spend from EMEs would be sustained or increased over the contract period</i>		
22. B-BBEE procurement spend from Empowering Suppliers that are at least 51% black owned based on the applicable B-BBEE Procurement Recognition Levels as a percentage of Total Measured Procurement Spend	<i>Provide a commitment based on the extent to which spend from Empowering Suppliers who are more than 51% Black-owned would be maintained or increased over the contract period.</i>		
23. B-BBEE procurement spend from Empowering Suppliers that are at least 30% black women owned based on the applicable B-BBEE Procurement Recognition Levels as a percentage of Total Measured Procurement Spend	<i>Provide a commitment based on the extent to which spend from Empowering Suppliers who are more than 30% Black women-owned would be maintained or increased over the contract period.</i>		
24. B-BBEE Procurement Spent from Designated Group ⁵ Suppliers that are at least 51% Black owned	<i>Provide a commitment based on the extent to which spend from suppliers from Designated Group Suppliers that are at least 51% Black owned would be maintained or increased over the contract period.</i>		

⁵ **"Designated Groups"** means:

- a) unemployed black people not attending and required by law to attend an educational institution and not awaiting admission to an educational institution;
- b) black people who are youth as defined in the National Youth Commission Act of 1996;
- c) black people who are persons with disabilities as defined in the Codes of Good Practice on employment of people with disabilities issued under the Employment Equity Act;
- d) black people living in rural and under developed areas; and
- e) black military veterans who qualifies to be called a military veteran in terms of the Military Veterans Act 18 of 2011.

SUPPLIER DEVELOPMENT INDICATOR	Required Response	Current Status (%)	Future Target (%)
25. Annual value of all Supplier Development ⁶ Contributions made by the Measured entity as a percentage of the target	<i>Provide a commitment based on the percentage in your organisation's annual spend on Supplier Development initiatives, will be maintained or improved over the contract period.</i>		
ENTERPRISE DEVELOPMENT INDICATOR	Required Response	Current Status (%)	Future Target (%)
26. The organisation's annual spend on Enterprise Development ⁷ as a percentage of Net Profit after Tax [NPAT]	<i>Provide a commitment based on the retention or increase in your organisation's annual spend on Enterprise Development initiatives, as a percentage of its Net Profit after Tax, over the contract period.</i>		

"PREVIEW COPY ONLY"

⁶ **"Supplier Development"** means monetary or non-monetary contributions carried out for the benefit of value-adding suppliers to the Measured Entity, with the objective of contributing to the development, sustainability and financial and operational independence of those beneficiaries:

(a) Supplier Development Contributions to suppliers that are Exempted Micro-Enterprises or Qualifying Small Enterprises which are at least 51% black owned or at least 51% black women owned.

Supplier Development within the contest of the B-BBEE scorecard must be differentiated from Transnet's Supplier Development Initiatives. Whereas the former relates to the definition above, the latter relates to improving the socio-economic environment through initiatives that are committed to as part of a contract award that contribute to the development of a competitive supplier base in relation to a particular industry.

⁷ **"Enterprise Development"** means monetary and non-monetary contributions carried out for the following beneficiaries, with the objective of contributing to the development, sustainability and financial and operational independence of those beneficiaries:

(a) Enterprise Development Contributions to Exempted Micro-Enterprises or Qualifying Small Enterprises which are at least 51% Black owned or at least 51% Black women owned;

21

Respondent's Signature

Date & Company Stamp

Peob 13709

Windsorton Replace 12v flash light system with 24v flash light system

Scope of work

Replace flash lights that is a 12v system with a 24v flash light system
Plans for the flash lights to be included.

Specifications

Flash lights to be done according to BBB3202 ver 3 for level crossings.

1. Flash light circuits for double lines (Uni-directional) BBC0003
2. Solid state flash light wiring for double lines (Uni-directional) BBB3209
3. Power supply BBB3206
4. Mounting of flash lights CSE(ST)-1-1

Apparatus cases.

Apparatus cases involved to be replace by Apparatus case Type 5 CSE(ST) U 947

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

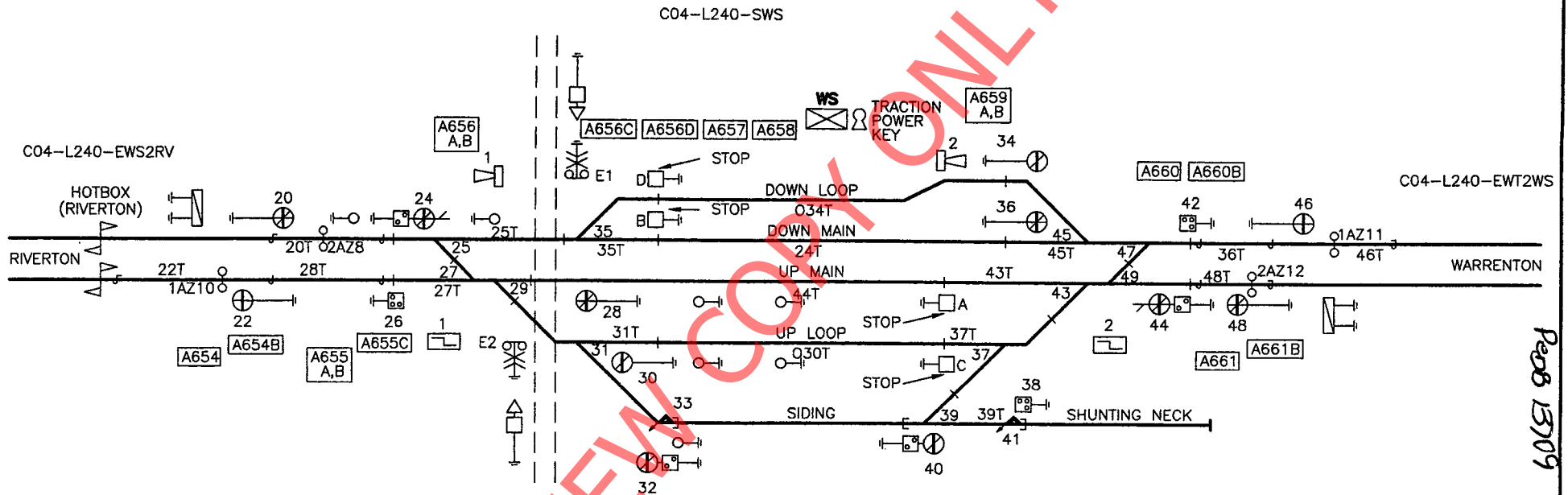
Existing App cases A656A and A656B is included.

Interlocking is done in the relay room were the working of the flash lights are initiated with a (LC)R that falls away and dropping the (LC)(2)R relay in app. Case A656A

"PREVIEW COPY ONLY"

aa
Peob 13709

CABLE PLAN CSE 2T 29
 C.T.C. CROSSING PLACE
 SPOORPLAN MK.1 INTERLOCKING
 CS90 REMOTE CONTROL FROM KIMBERLEY
 6,6KV POWER LINE
 3KV D.C. TRACTION



23
 POB 13709

POB 13709

SIGNAL	Km	POINT	SIGNAL	Km	POINT	SIGNAL	Km	POINT	POINTS	Km	POINT	POINTS	Km	POINT	MISC	Km	POINT	TR. CCT	FREQ.	TR. CCT	FREQ.	MISC.	Km	POINT
20	264,085	30	38			25	263,259	43	262,215	E1/E2	263,074	20	A	46	B	RR	262,572							
22	264,018	32	44	262,119	27	263,190				1AZ10	217,787	22	C											
24	263,318	34	262,283	42	262,124	29	263,177			H/BOX	275,304	28	D											
26	263,249	36	262,283	46	261,360	47	262,152					36	A											
28	263,062	40	48			49	262,202					48	C											

DRAWN GETEKEN	ISSUED WITH - UITGEREIK MET	SPOORNET		REGION STREEK	S/KY	2N	
		NOTICE KENNISGEWING	REFERENCE VERWYSING				DATE DATUM
CHECKED NAGESIEN				KIMBERLEY	SHT VEL		

SPOORNET

A Division of Transnet Limited

INFRASTRUCTURE (SIGNALS)

SPECIFICATION
FOR

TRENCHING AND OUTDOOR CABLE INSTALLATION

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9.0	INSTALLATION OF CABLE-MARKERS	

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.

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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 The Principal Contractor shall be responsible for the supervision of the trenching and cable laying Contractor.
- 2.2 A proposed main cable route survey plan shall be submitted by the sub-contractor and approval obtained from the Engineer before any cables are laid.
- 2.3 Any deviations from the approved route must be agreed to by the Engineer.

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

- 3.1 In general the main cable trench shall be 4mm from the fence line. Attention is draw to the fact that where there is an existing communication cable, this cable shall generally be within 2,5mm 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 Generally the depth of the trench shall be 500mm minimum unless otherwise specified. The depth of a trench crossing a service road must be at 800mm minimum.
- 3.3 Where a trench depth of 500mm 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 500mm depth and the cables must due to reattain 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 50mm on either side. The minimum dimensions of these slabs shall be 40mm thick, 300mm wide and 500mm long.

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

- 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 as set 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 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 BACKFILLING OF TRENCHES (REFER TO DRAWING CSE.516/1 ANNEXURE 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 sub-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 sub-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 sub-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 5mm riddle, to a minimum depth of 75mm from the top of the cable. This material must be supplied by the sub-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 200mm shall be compacted thereafter layers not exceeding 100mm 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 sub-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, and 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: 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 amendments 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.

6.5 Road crossings

the
pipe
pipe.

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

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 800mm.

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

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

laid

(e) Cables crossing public roads shall be piped throughout where cable 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 50mm of sand or approved soil.

7.0 INSTALLATION OF STEEL-DUCTING AND CONCRETE TROUGHING (REFER TO DRAWIN CSE.516/1 ANNEXURE 1)

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 1m 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 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 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 concrete 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 ± 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 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.

9.2 Metal (fence) type (Refer to drawing CSE.516/1 Annexures 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 upright 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 ($\pm 2\text{mm}$) to ensure rigidity. Minimum dimensions shall be 300mm x 100mm, and they shall be permanently marked in accordance with the Transport Services' Resident Engineer (Signals and Telecommunication) instruction. 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: _____

502AAF

SOUTH AFRICAN TRANSPORT SERVICES

ELECTRICAL SIGNALLING INSTALLATIONS

SPECIFICATION NO. CSE-516/1

JANUARY 1988

TRENCHING AND OUTDOOR CABLE INSTALLATION

- 1.0 SCOPE
- 2.0 GENERAL
- 3.0 TRENCHING
- 4.0 HANDLING AND LAYING OF CABLE
- 5.0 BACKFILLING OF TRENCHES
- 6.0 CROSSINGS
- 7.0 INSTALLATION OF STEEL- DUCTING AND CONCRETE TROUGHING
- 8.0 CABLE-JOINTING, JOINT-PITS AND MANHOLES
- 9.0 INSTALLATION OF CABLE-MARKERS

JANUARY 1988TRENCHING AND OUTDOOR CABLE INSTALLATION1.0 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.

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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 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.

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- 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 BACKFILLING 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.

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- 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 itself 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.

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- 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 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.
- 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.

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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 concrete 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.

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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

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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. _____

2. _____ DATE: _____

CONTRACTOR

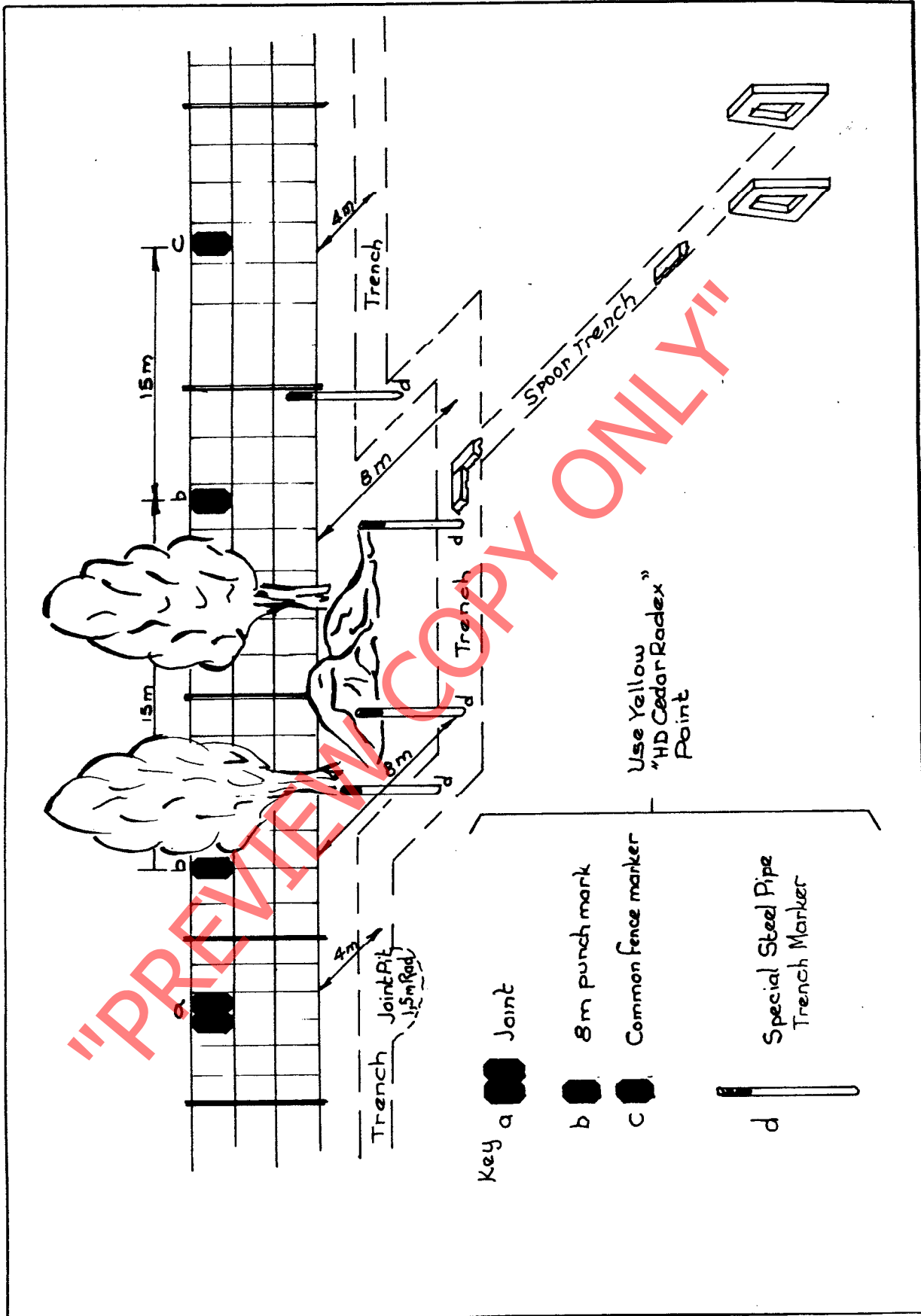
AS WITNESSES

1. _____

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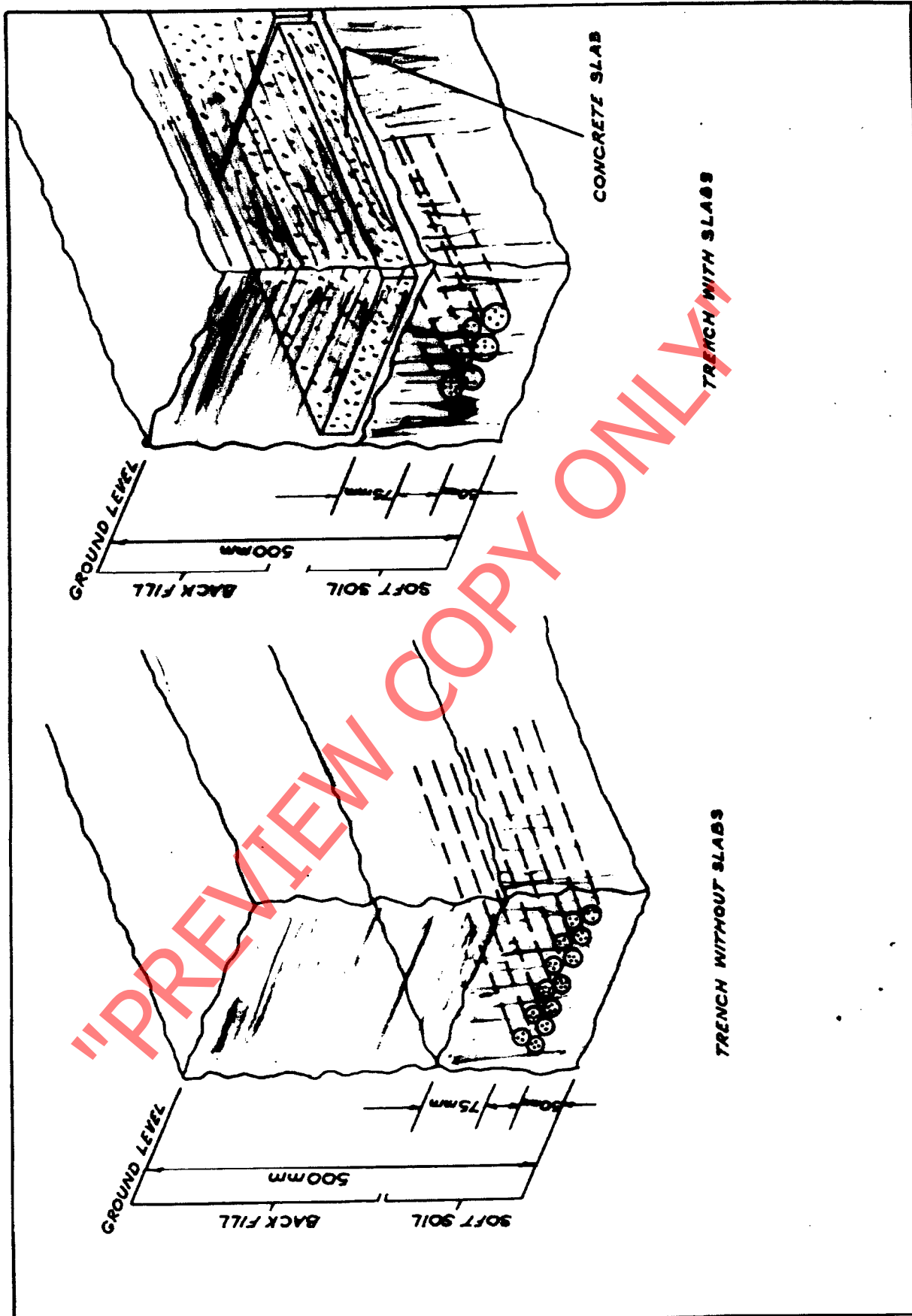
CHIEF ENGINEER
(Signals and Telecommunication)

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SATS ~ SAVD
TYPICAL CABLE TRENCH

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



CONCRETE SLAB

TRENCH WITH SLABS

TRENCH WITHOUT SLABS

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SATS ~ SAVD

TRENCH CROSS SECTION

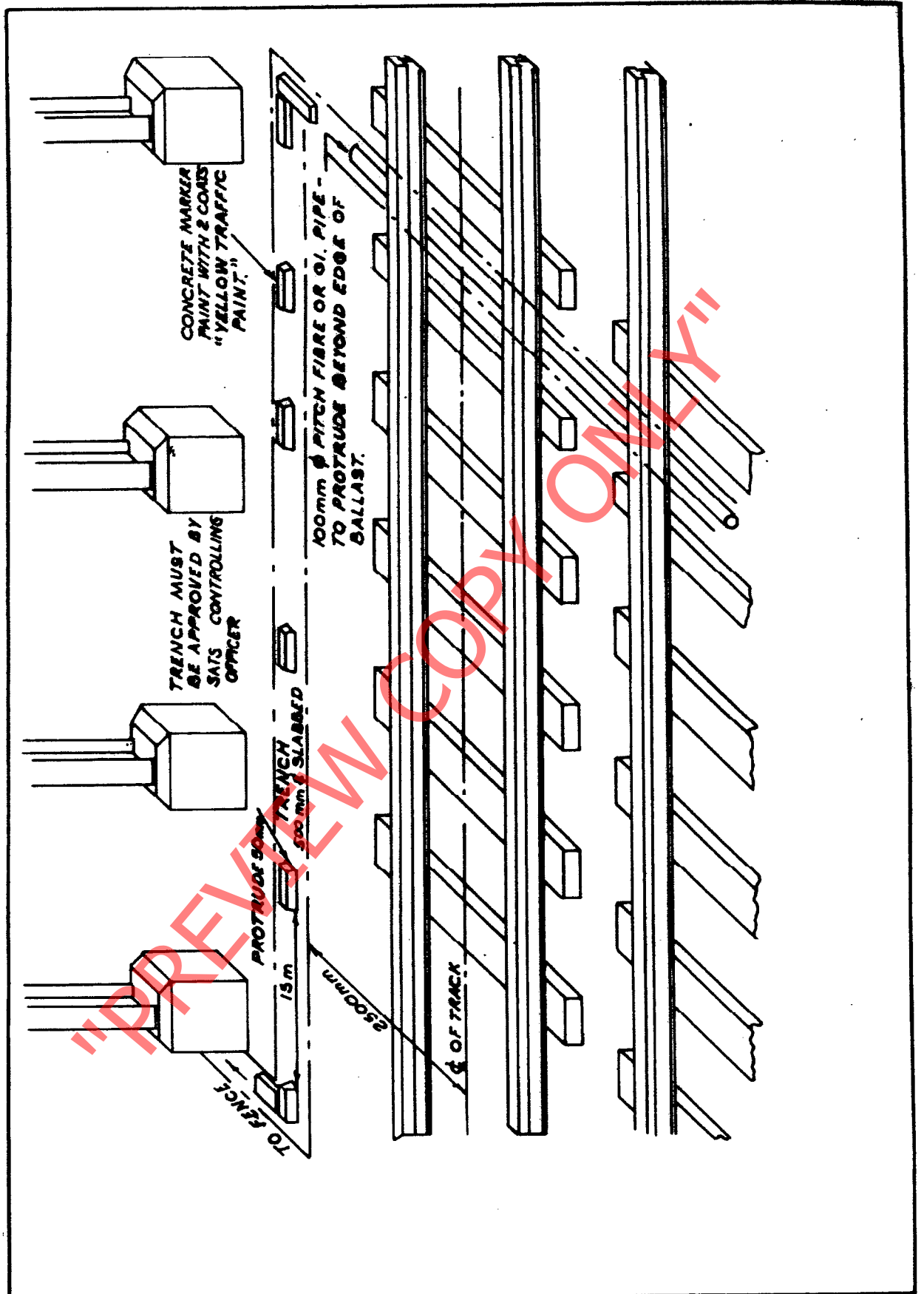
42

SPECIFICATIONS

CE(S&T)

SIG/1

ANNEXURE 2 ^{SHT 2} OF ¹¹ 4



SATS ~ SAVD

TRENCH PARALLEL TO TRACK AND TRACK CROSSING

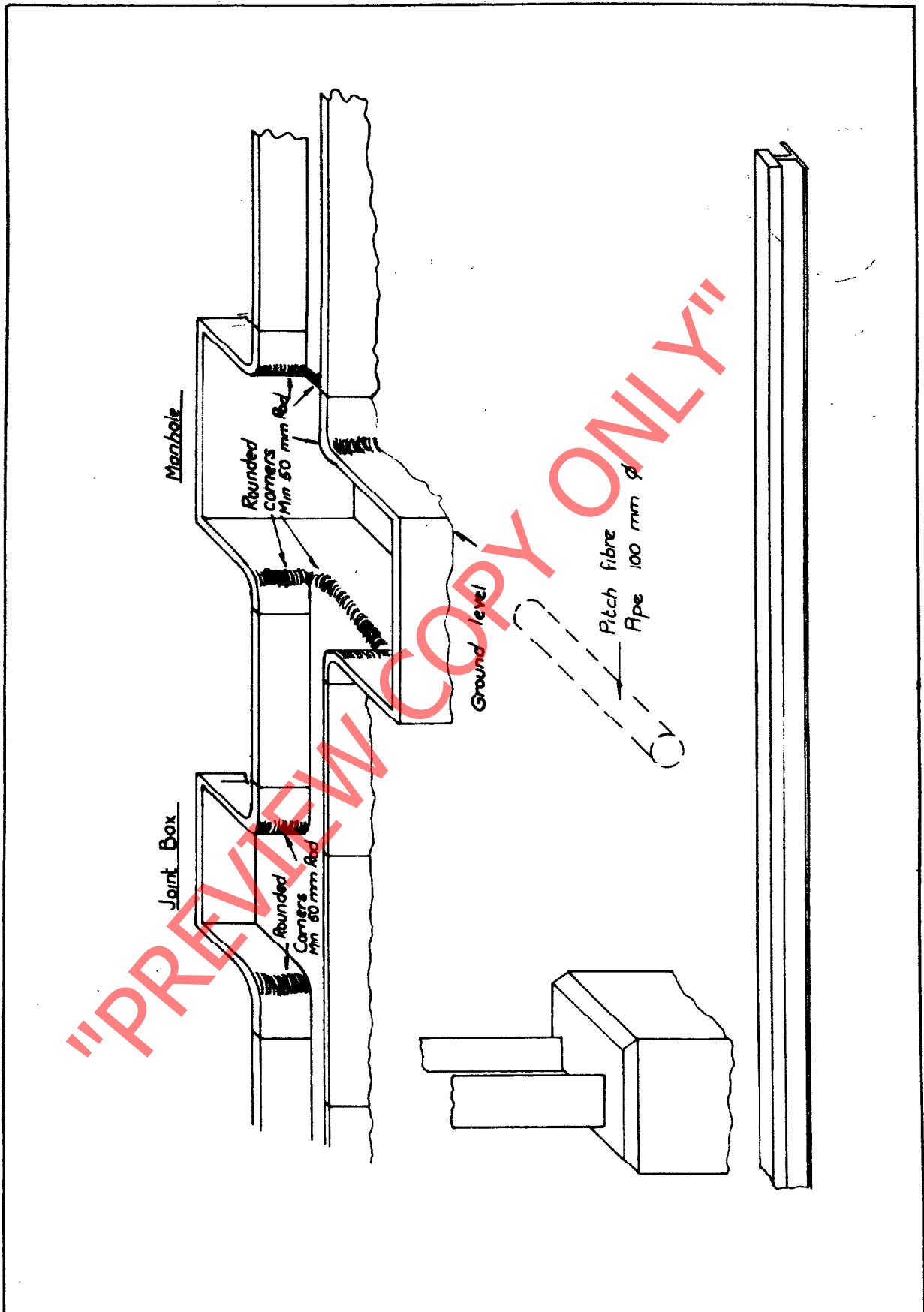
SPECIFICATION

CE (S & T)

SIG/1

ANNEXURE 2 SHE. 1 OF 2

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SATS ~ SAVD

INSTALLATION OF CONCRETE TROUGHING

44

SPECIFICATION

CE (S&T)

SIG/1

Annexure 4 OF 4

SPOORNET

A Division of Transnet Limited

INFRASTRUCTURE (SIGNALS)

SPECIFICATION
FOR

INSTALLATION OF EARTHING

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

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

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Circulation Restriction: Transnet and Relevant Third Parties

1

- 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).

3 TYPES OF EARTH

3.1 Trench Earth (Refer to Appendix 4)

- 3.1.1 Two lengths of 16 mm² 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 minimum 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 mm² 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 mm² 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 1Ω 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 1 and 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.
- 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, whichever is the shortest connection.
- 4.8 The armouring of supply cables between the EL&P distribution 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 separately 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 separately 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 Appendices 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.) 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 0.1Ω .

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 10Ω 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.

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 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.

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

1.1 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).

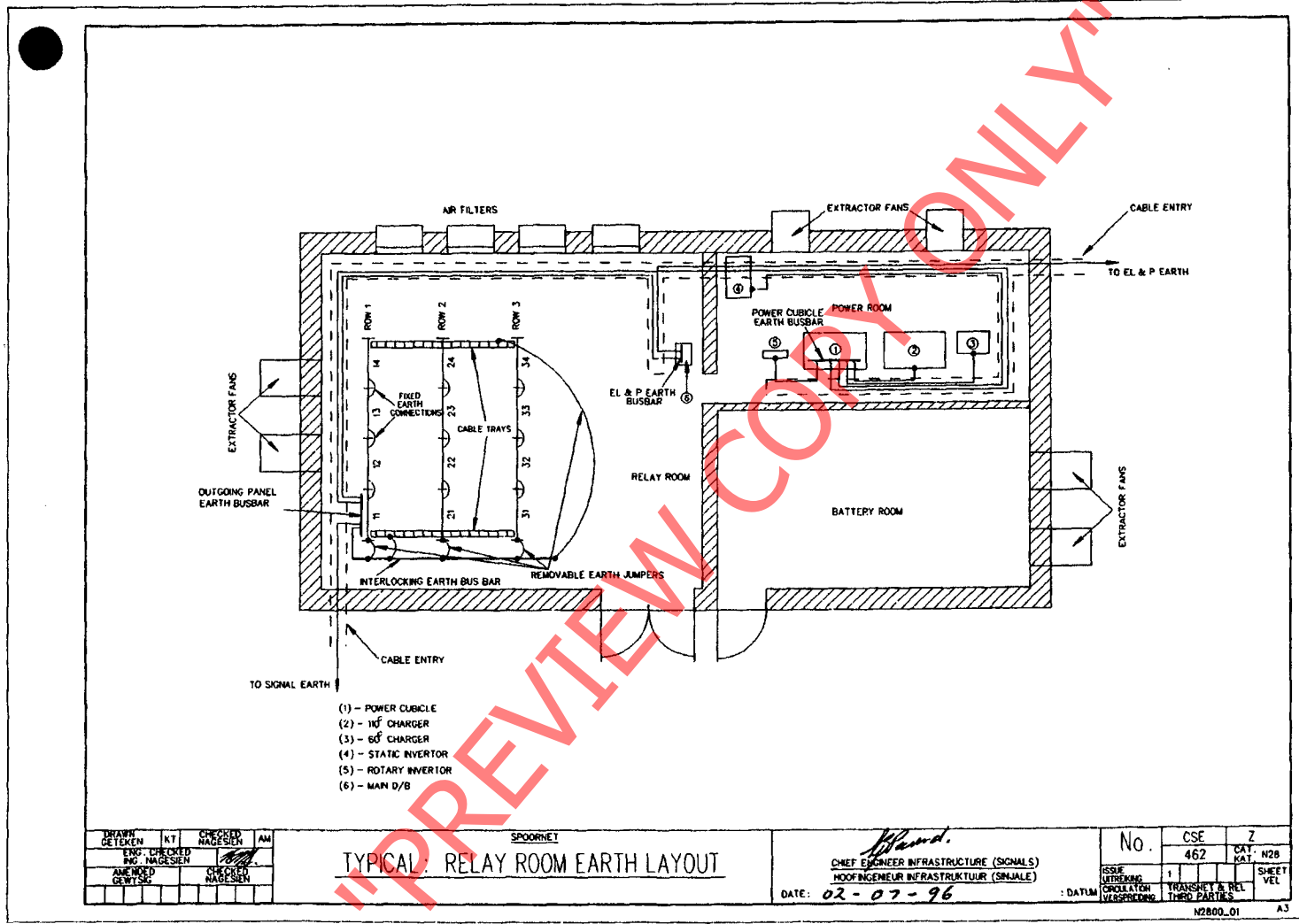
11.1.4 All gantries and metal structures spanning the track shall be bonded to the return rail. An earthing ring surrounding the base of the structure shall be provided and the gantry or metal

structure shall be bonded to the earthing ring.

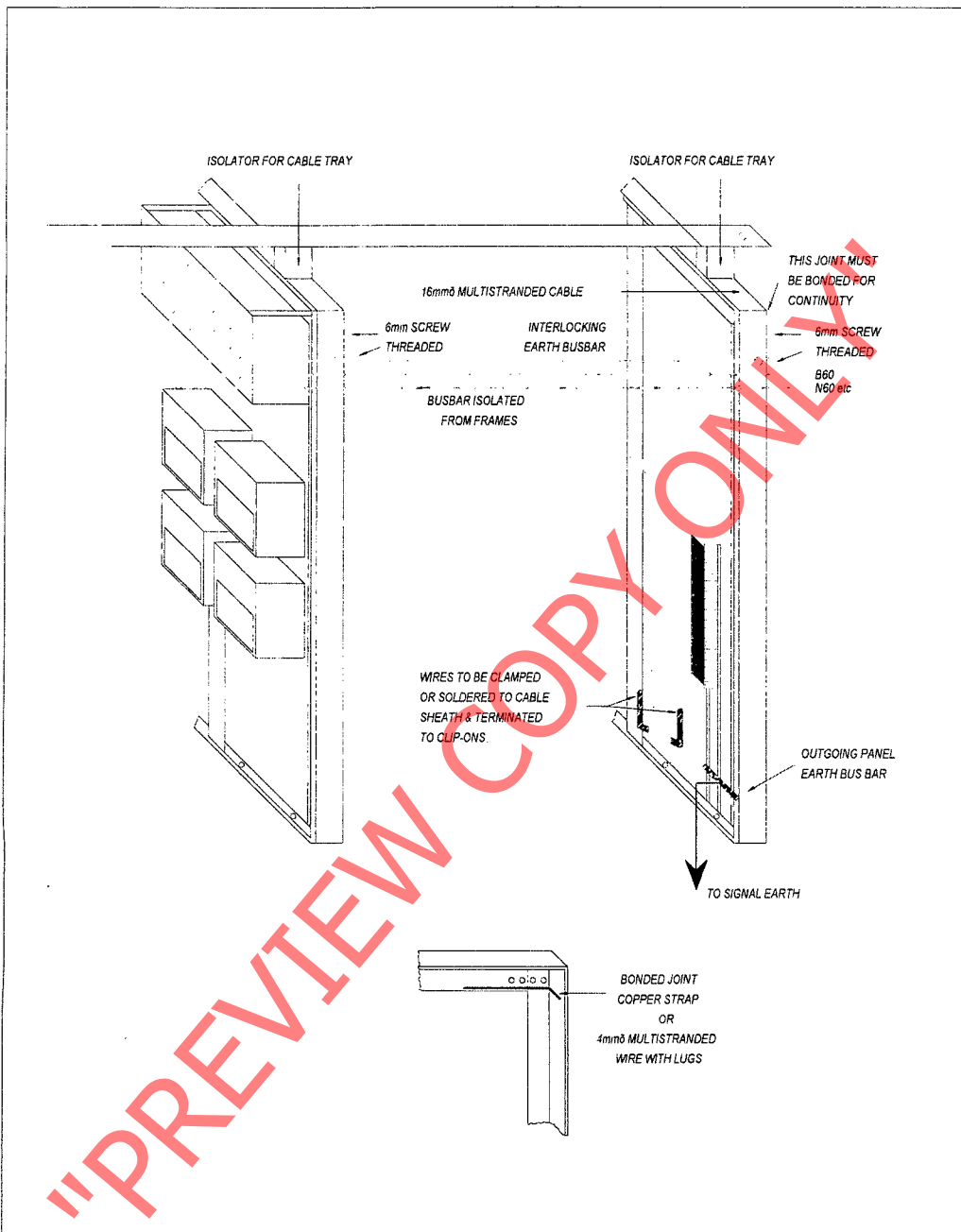
**TYPICAL RELAY ROOM EARTH LAYOUT
P.T.O.**

APPENDIX 1

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EARTHING OF FRAMEWORK IN RELAY ROOMS APPENDIX 2



96/05

SPOORNET

EARTHING OF FRAMEWORK IN RELAY ROOMS

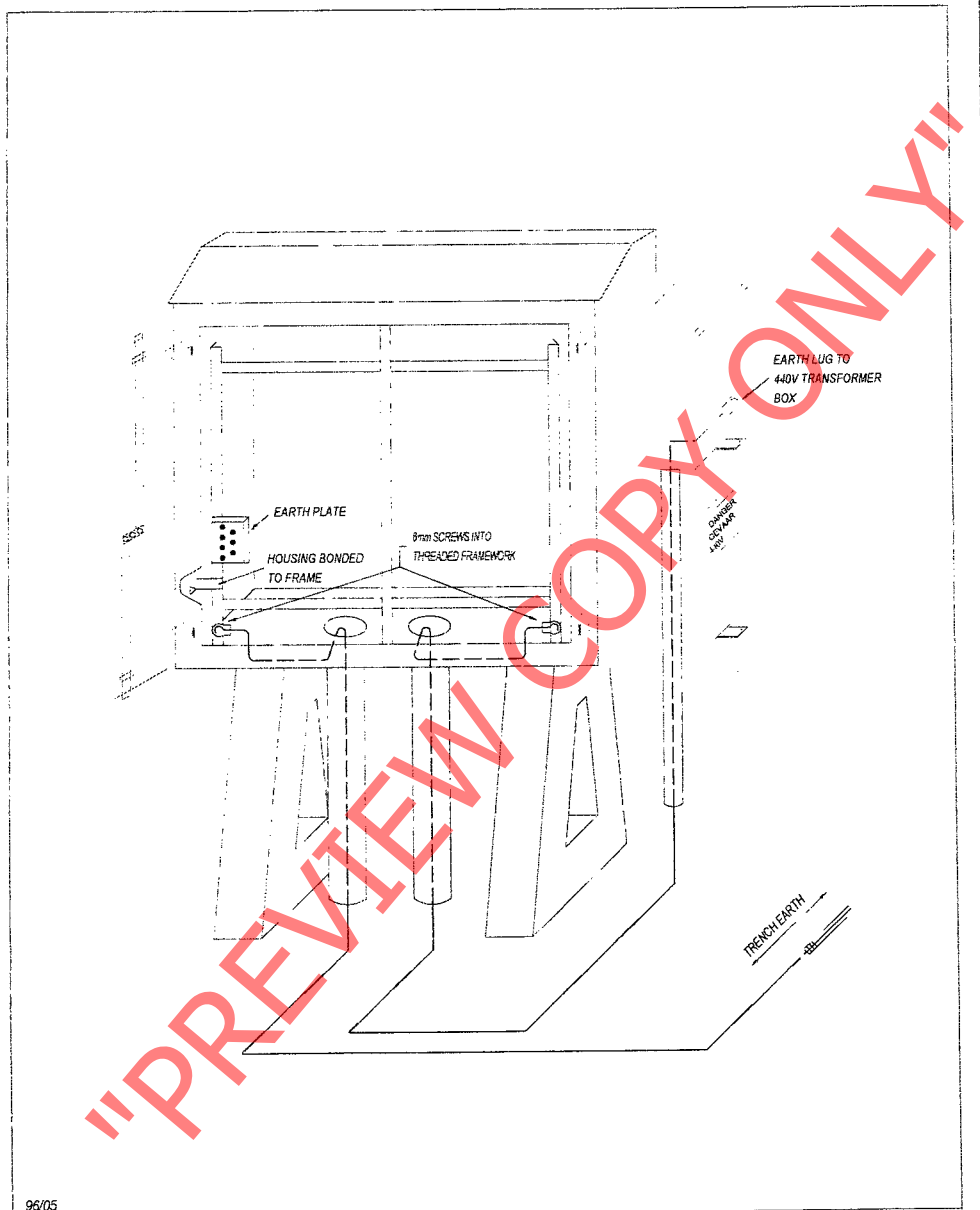
AARDING VAN RAAMWERK IN REL 1/16 KAMERS

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ENG. CHECKED ING. NAGESIEN				CHIEF ENGINEER INFRASTRUCTURE SIGNALS HOOFINGENIEUR INFRASTRUKTUUR SINJALE			515	CAT KAT N28
AMENDED GEWYSIG		CHECKED NAGESIEN		DATE	1996-07-01	ISSUE UITREIKING	1	SHEET VEL
						CIRCULATION VERSPREIDING	TRANSNET & REL THIRD PARTIES	1

1155/515W2801_01

**EARTHING OF APPARATUS CASE
P.T.O.**

APPENDIX 3



96/05

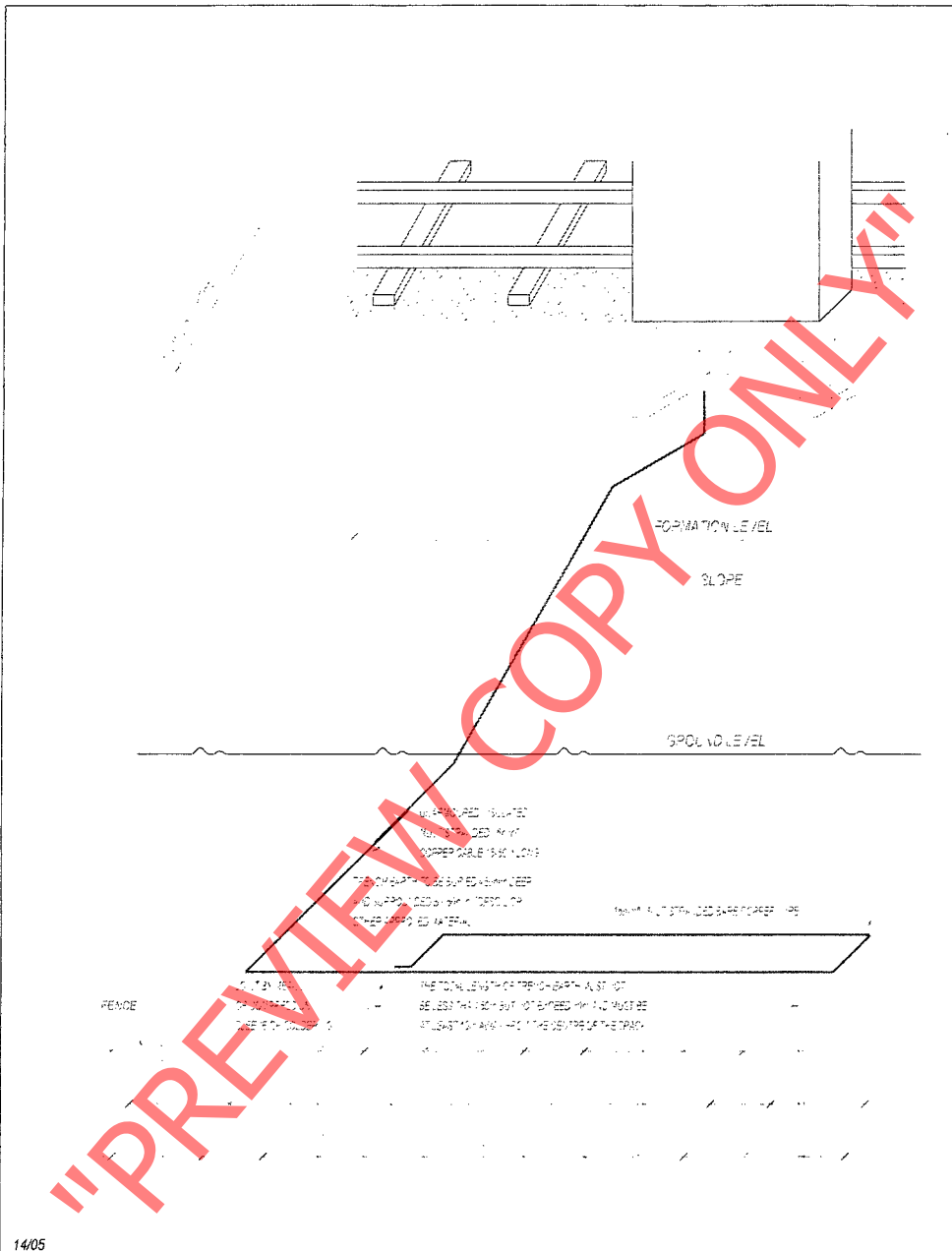
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EARTHING OF APPARATUS CASES
AARDING VAN APPARAATKASTE

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ENG CHECKED ING. NAGESIEN				CHIEF ENGINEER INFRASTRUCTURE SIGNALS HOOFINGENIEUR INFRASTRUKTUUR SINJALE			515	CAT KAT N28
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1155/515/W2802_01								

**INSTALLATION OF TRENCH EARTH
P.T.O.**

APPENDIX 4



14/05

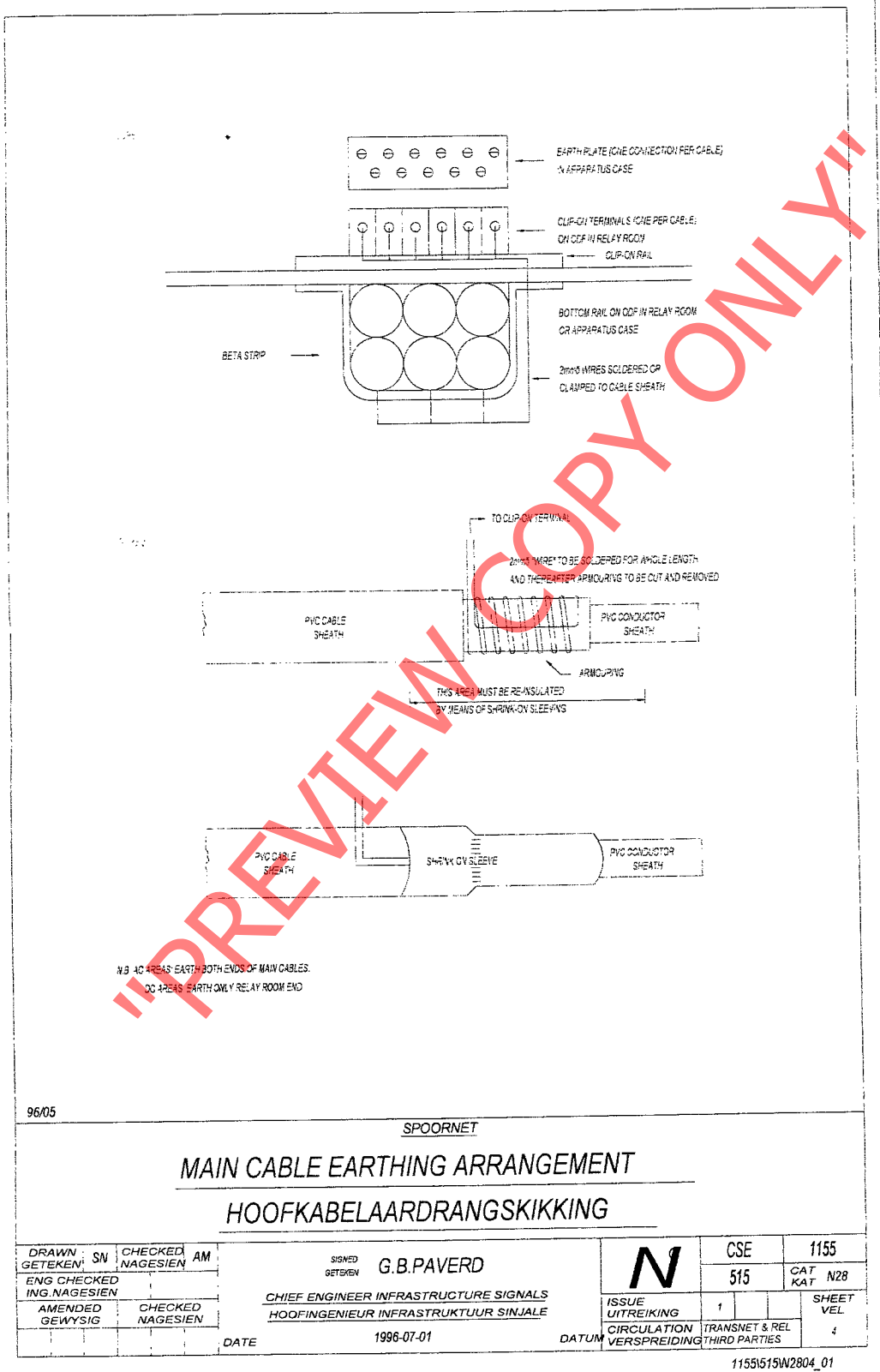
SPOORNET

**INSTALLATION OF TRENCH EARTH
INSTALLASIE VAN SLOOTAARDE**

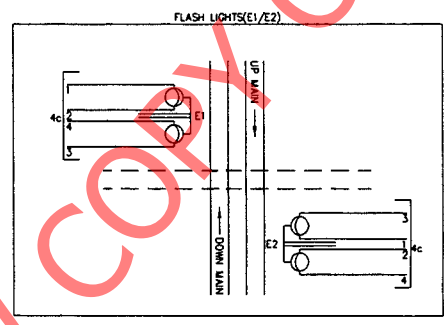
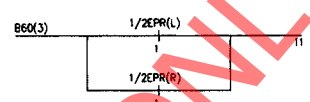
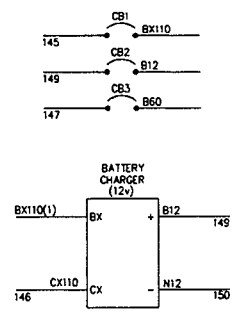
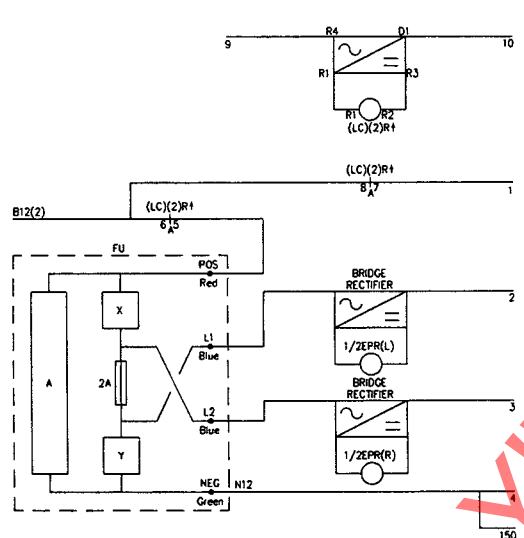
DRAWN GETEKEN	SN	CHECKED NAGESIEN	AM	SIGNED GETEKEN	G.B.PAVERD	N	CSE	1155
ENG. CHECKED ING. NAGESIEN				CHIEF ENGINEER INFRASTRUCTURE SIGNALS HOOFINGENIEUR INFRASTRUKTUUR SINJALE			515	CAT KAT N28
AMENDED GEWYSIG		CHECKED NAGESIEN		DATE	1996-07-01	DATUM	ISSUE UITREIKING	1
							CIRCULATION VERSPREIDING	TRANSNET & REL THIRD PARTIES
								SHEET VEL
								3

1155/515/N2803_01

MAIN CABLE EARTHING ARRANGEMENT **APPENDIX 5**
PT.O.



CABLE KABEL	DORRE KERN	FUNKTIE	FUNCTION FUNKTIE
4c E1	1	1	E1+
	2	2	E1±(1)
	3	3	E1±(2)
	4	4	E1-
4c E2	1	5	E2+
	2	6	E2±(1)
	3	7	E2±(2)
	4	8	E2-
6c A656C	1	9	(LC)(2)R
	2	10	NX
	3	11	EKR
	4	12	
	5	13	
	6	14	
	15		
	16		
	17		
	18		
	19		
	20		

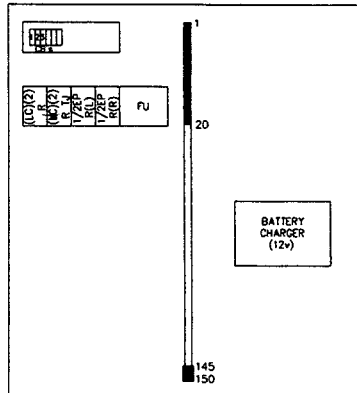


"PREVIEW ONLY"

2 ^c 16mm ² A656C	1	145	BX110
	2	146	CX110
2 ^c 16mm ² A656C	1	147	B60
	2	148	N60
2 ^c 16mm ² A656A	1	149	B12
	2	150	N12

POS	RELAY RELE WBS QM1 8F.8B	F								B								TYPE TYPE
		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	
1	(LC)(2) R	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	WBS QM1 8F.8B

POS	RELAY RELE MORGAN 2F.2B	F				B				TYPE TYPE
		1	3	2	4	1	3	2	4	
5	1/2EPR(L)	/	/	/	/	/	/	/	/	MORGAN 2F.2B
6	1/2EPR(R)	/	/	/	/	/	/	/	/	MORGAN 2F.2B



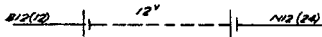
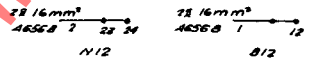
DRAHW GETEKEN	B.C.	CHECKED NAGESIEN	PK
ENG. CHECKED			
ING. NAGESIEN			
GEWYSIG		CHECKED NAGESIEN	

SPOORNET
A656B
(WINDSORTON ROAD)

57

CHIEF ENGINEER INFRASTRUCTURE (SIGNALS)
HOOF INGENIEUR INFRASTRUKTUR (SINJALE)
DATE 2007/02/23 DATUM

No	CSE	2A	SHEET VEL 1011
2	656B		



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TERMINALS - AANSLUUITING

12 BATTERY

9-2-'71	DESIGNED BY S. J. S.	CHECKED NAGELSEN	DATE
	REVISIONS	CHECKED NAGELSEN	
	AS	C	PK

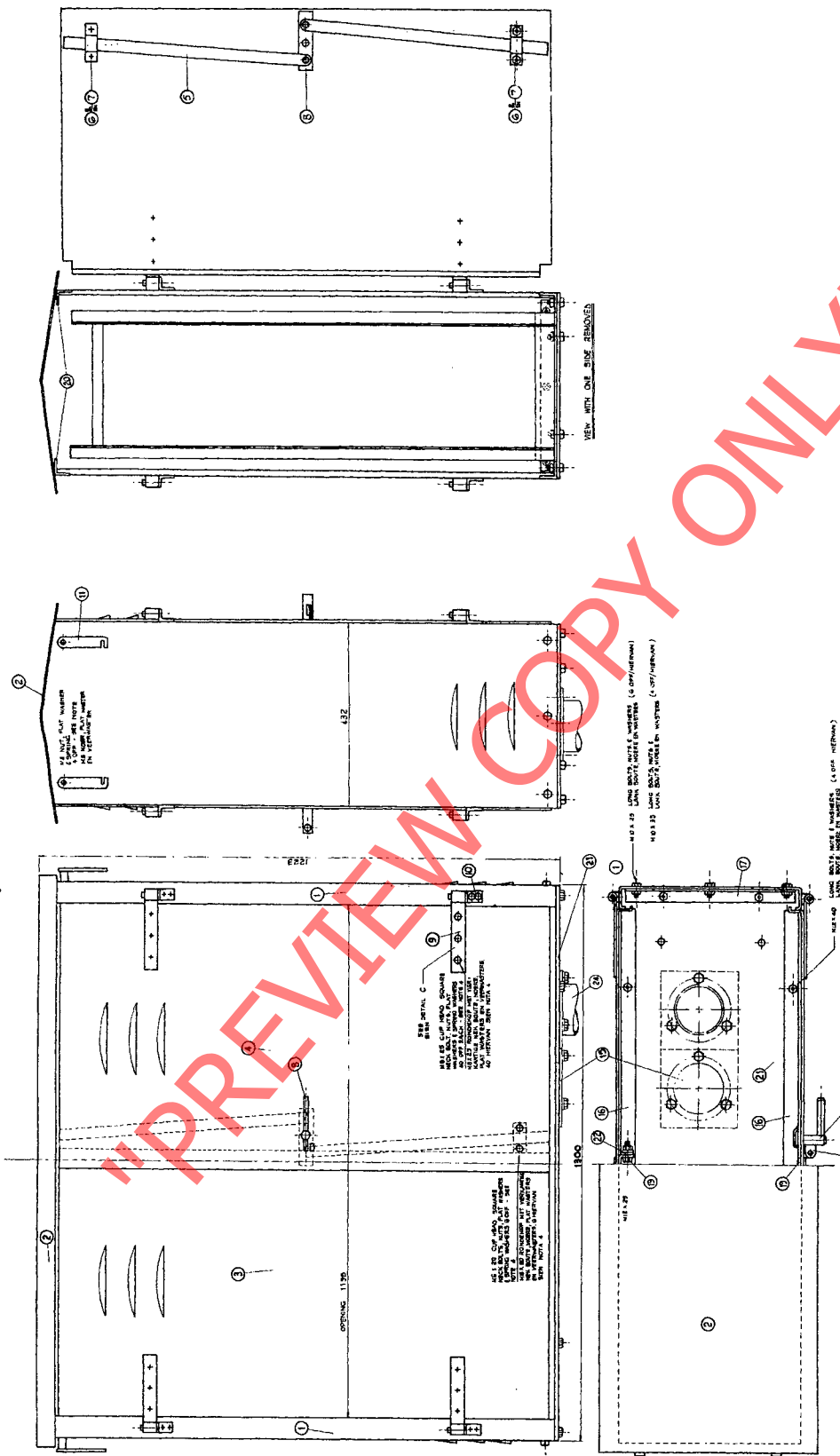
S.A.R. - S.A.S
4656A
 (WINDSOR TON ROAD)

58

SIGNALS
 SIGNALS
 JOHANNESBURG

CHIEF SIGNAL ENGINEER
 H. G. P. J. VAN DER MERWE
 DATE 2007/6/23 DATUM

Nº	CSE	2A
		656A
AMENDMENT REVISION	2	SHEET VBL



APPARATUS CASE TYPE 3 ASSEMBLY

MATERIAL	QTY	UNIT	PRICE	TOTAL	REMARKS
STEEL					
COPPER					
WELDS					
OTHER					
TOTAL					

APPARATUS CASE TYPE 3 ASSEMBLY

SCALE: 1:1

DATE: 20. 1. 1971

DR: []

ST: []

U: []

NO: []

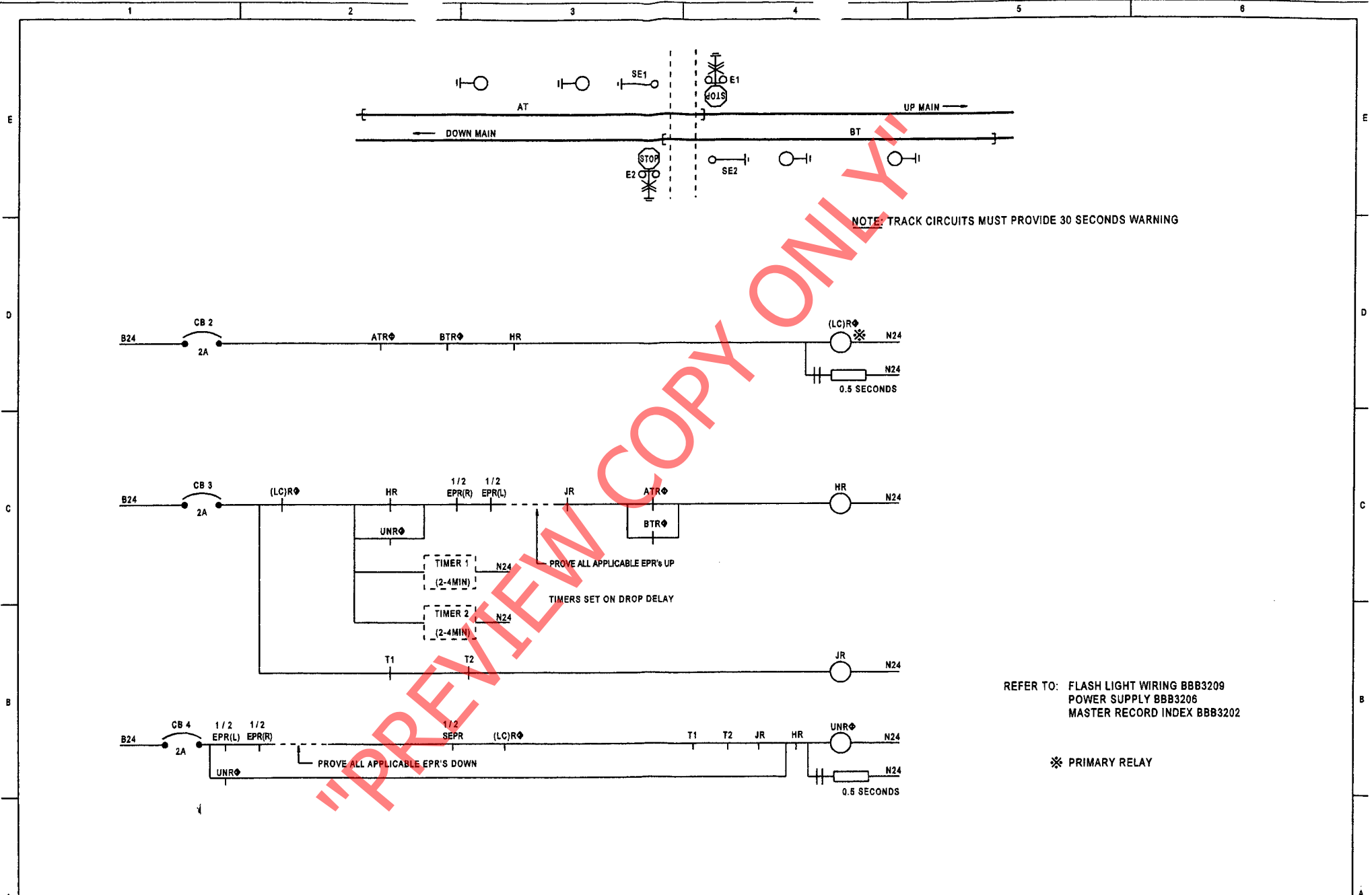
ST: []

U: []

947

APPARATUS CASE TYPE 3 ASSEMBLY

09




NOTE: TRACK CIRCUITS MUST PROVIDE 30 SECONDS WARNING

REFER TO: FLASH LIGHT WIRING BBB3209
POWER SUPPLY BBB3206
MASTER RECORD INDEX BBB3202

* PRIMARY RELAY

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RESERVED FOR CONTRACTOR'S USE	CP REF : VERSION INFO:	CDO REF : CDO/4307 DRAWN : A. STEYN DESIGNED : CHECKED : P. KAMFFER	DATE: ----- APPROVED ----- ----- AUTHORISED -----	CENTRAL DRAWING OFFICE (INFRASTRUCTURE) LEVEL CROSSING - FLASH LIGHTS DOUBLE LINE (UNI-DIRECTIONAL)	 BBC0003 VERSION 1
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CP REF : 888998

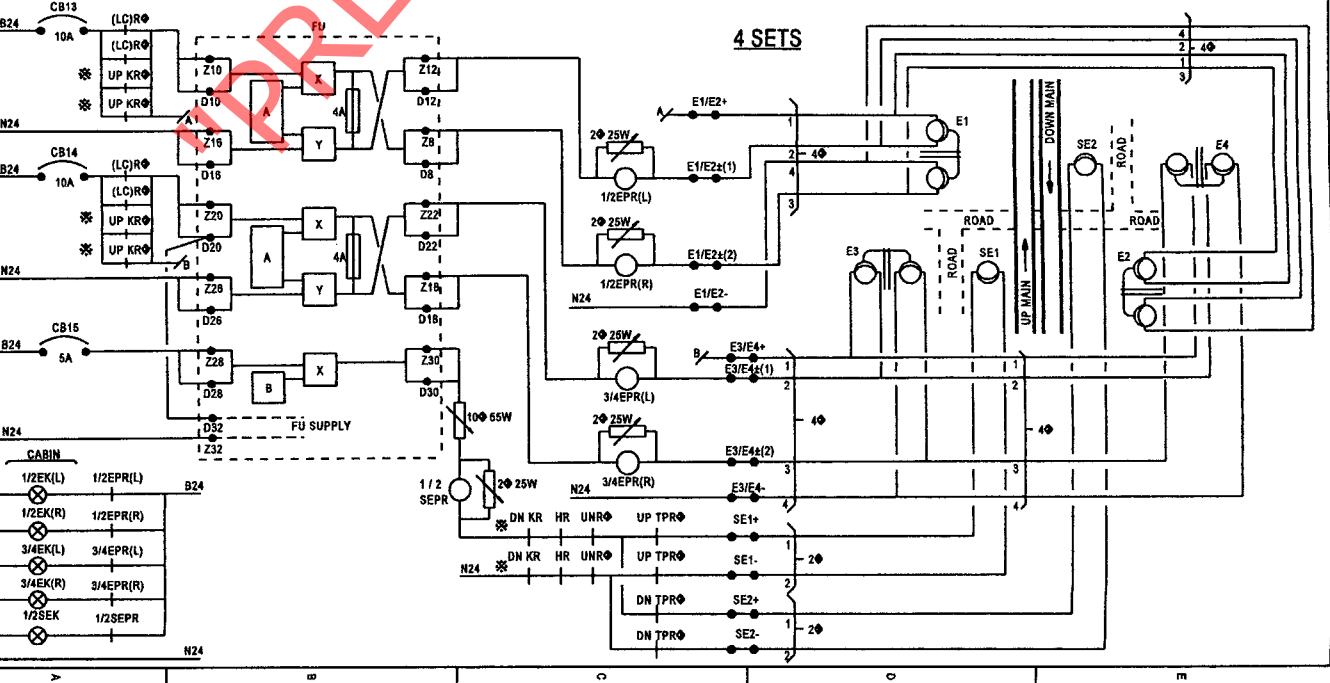
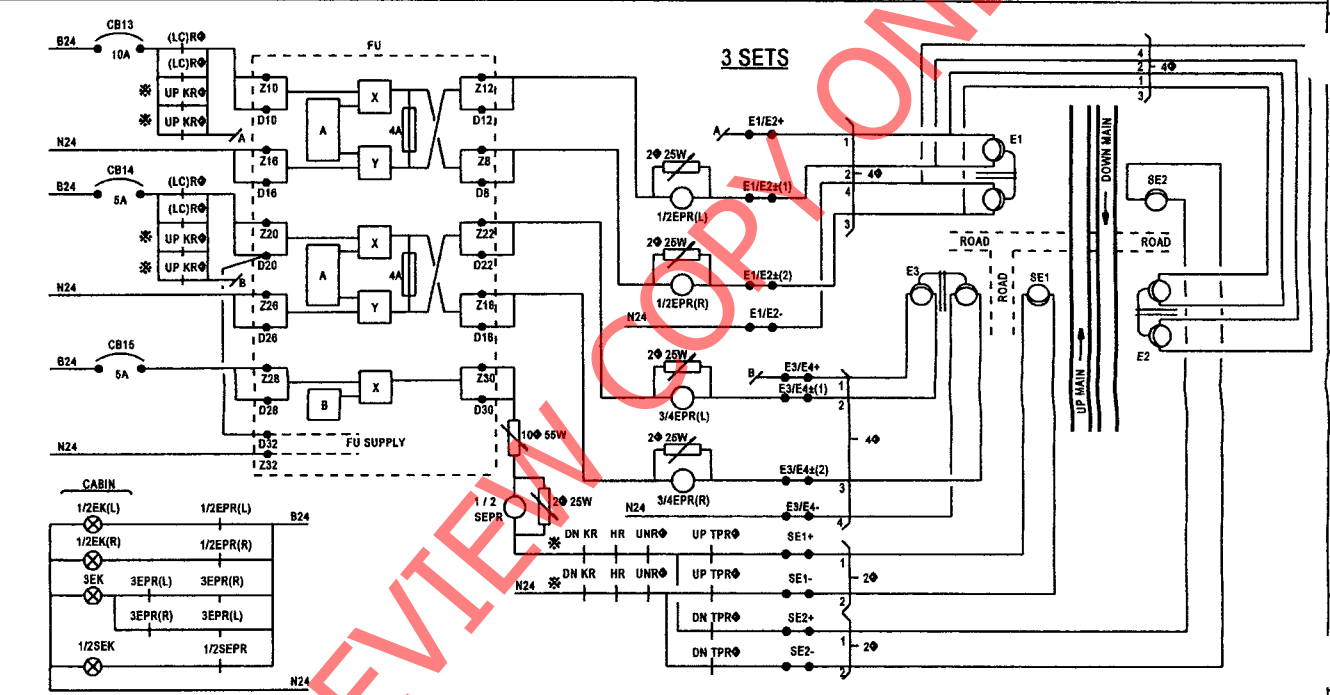
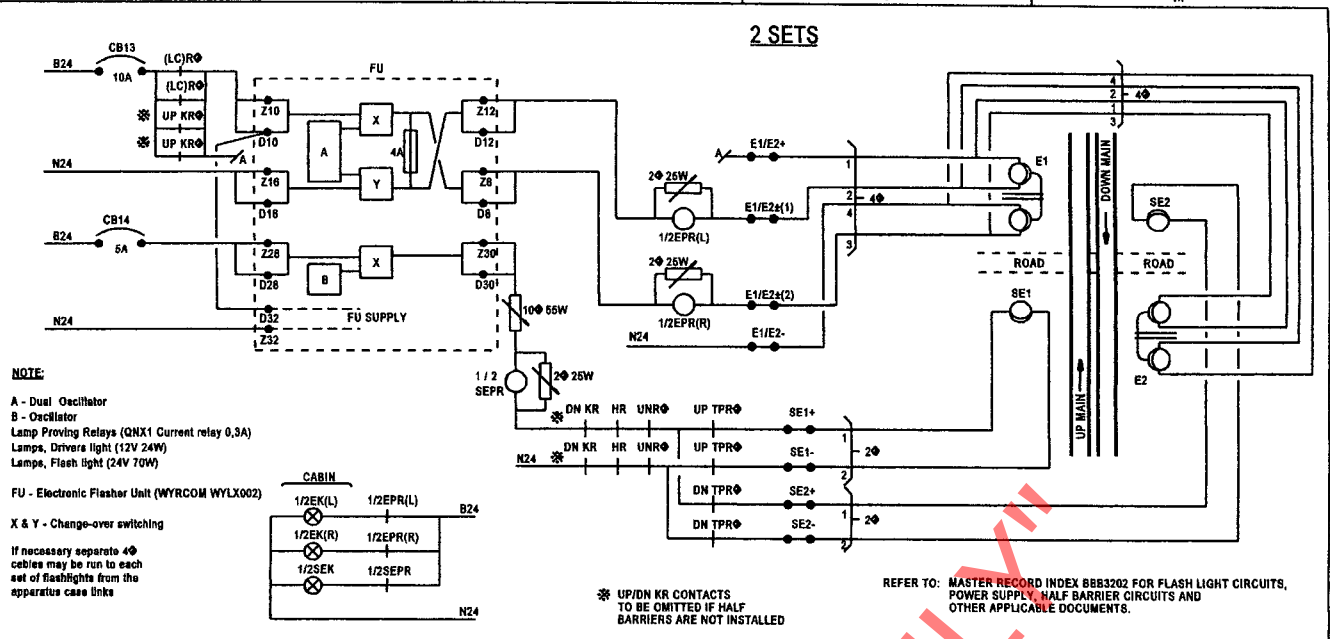
VERSION INFO: UPDN KR NOTE ADDED

CDO REF : CDO/487

DRAWN : T.O. RAJULUMI

DESIGNED : P. KAMFNER

CHECKED : P. KAMFNER



DATE: _____

APPROVED: _____

AUTHORISED: _____

CENTRAL DRAWING OFFICE (INFRASTRUCTURE)

LEVEL CROSSING - SOLID STATE FLASH LIGHT WIRING

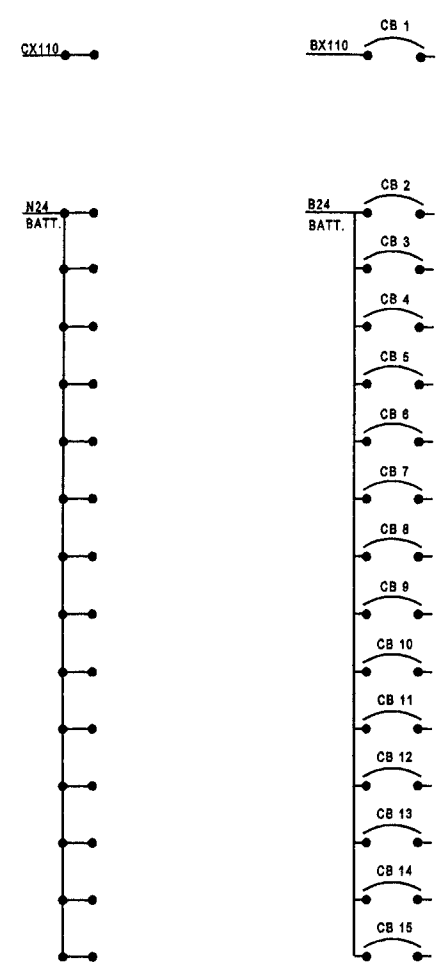
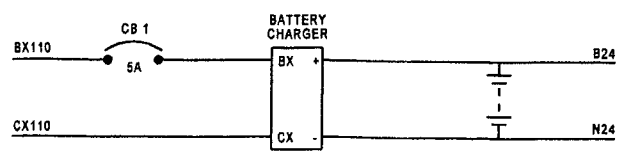
DOUBLE LINES (UNI-DIRECTIONAL)

SPOORNET

BBB3209

VERSION 3

62



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CP REF : 2003/006
VERSION INFO:

CDO REF : CDO/2331
DRAWN : A. STEYN
DESIGNED:
CHECKED : P. KAMFFER

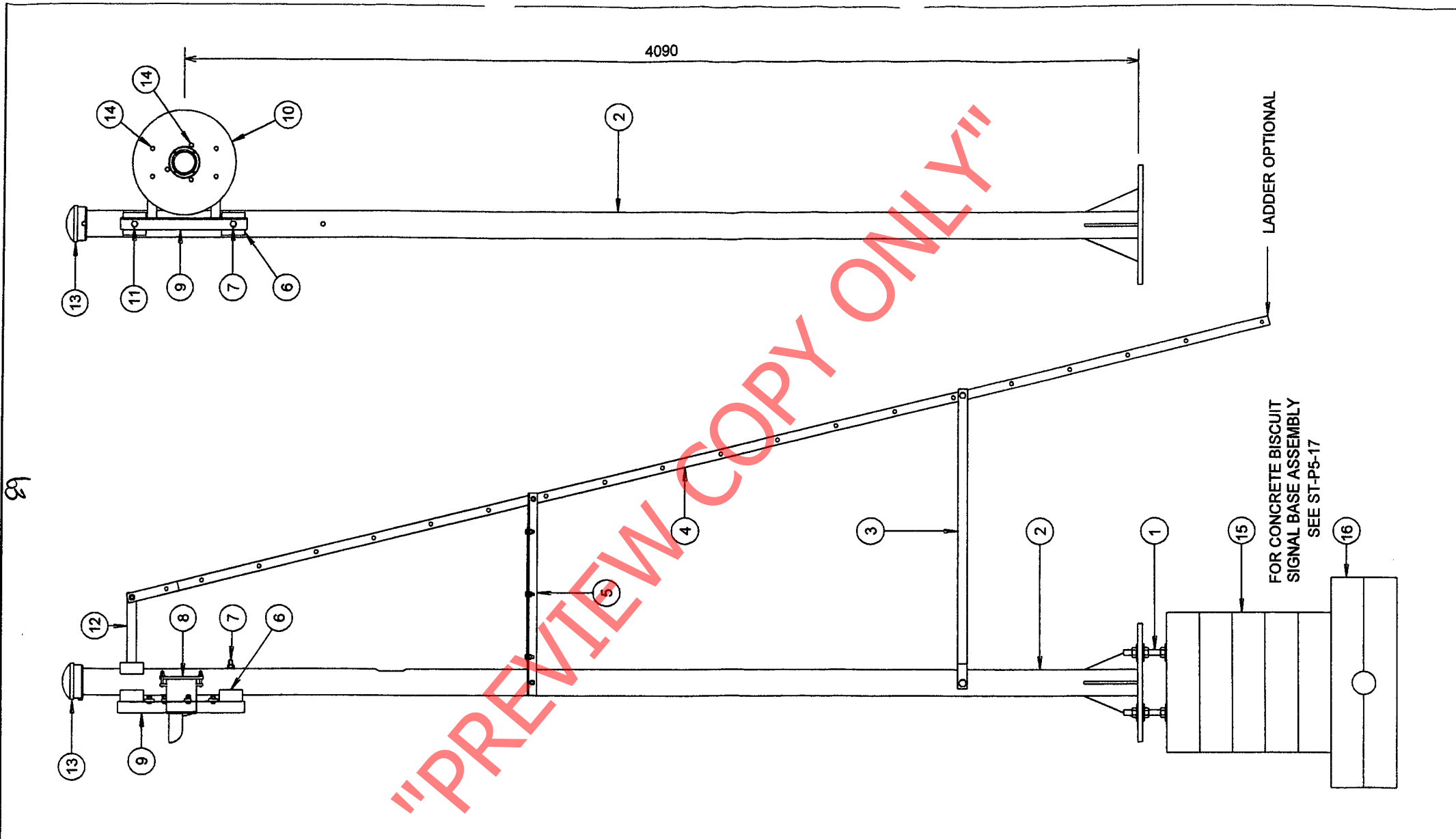
DATE:

APPROVED

AUTHORISED

CENTRAL DRAWING OFFICE (INFRASTRUCTURE)
LEVEL CROSSING - FLASH LIGHTS / HALF BARRIERS
POWER SUPPLY

 **SPOORNET**
BBB3206
VERSION 2



LADDER OPTIONAL

FOR CONCRETE BISCUIT
SIGNAL BASE ASSEMBLY
SEE ST-P5-17

NOTE: FOR MATERIAL LIST SEE: BBB3552, VER1

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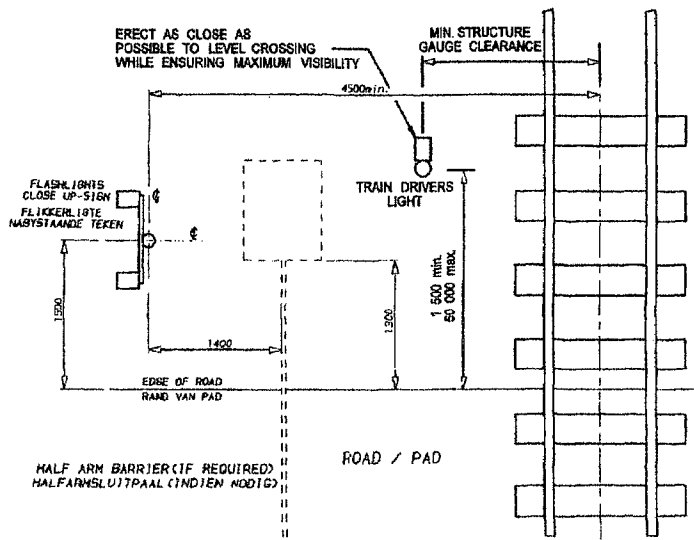
DIMENSIONS : mm	SCALE : 1 : 16	DO REF : CDO/2313	DATE:
TOLERANCE :	ITEM NO :	CP REF :	---
MATERIAL :		DRAWN : NE	APPROVED
VERSION INFO :		DESIGNED : NE	---
		CHECKED : PK	AUTHORISED

SIGNAL ASSEMBLY FOR DRIVERS LIGHT
AT LEVEL CROSSINGS



BBB3549
VERSION 1

A3



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 VASBESTEL 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.

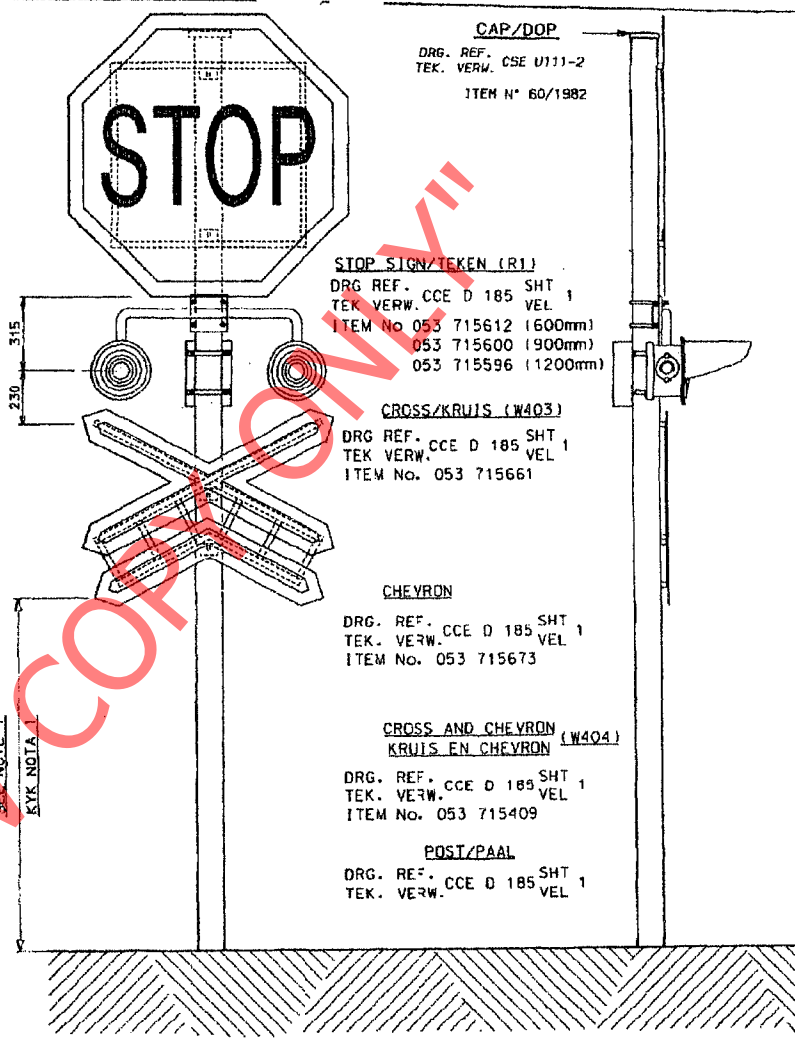
TIPES VAN MONTERING BESKIKBAAR: WANNEER GROND TOESTAND DIT TOELAAT MOET DIE PAAL TOT 1,220 DIEP BEGRANE WORD.
 WANNEER GROND ROTSAGTIG IS, MAS "BISCUITS" OF 'n BETON BASIS GEBRUIK WORD.

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 ONGERHOU DEUR HI OPS. INSTANDHOUDING INFRA (SINJALE).



CAP/DOP
 DRG. REF. CCE U111-2
 TEK. VERW. CSE U111-2
 ITEM N° 60/1982

STOP SIGN/TEKEN (R1)
 DRG REF. CCE D 185 SHT 1
 TEK. VERW. VEL
 ITEM No 053 715612 (1600mm)
 053 715600 (900mm)
 053 715596 (1200mm)

CROSS/KRUIS (W403)
 DRG REF. CCE D 185 SHT 1
 TEK. VERW. VEL
 ITEM No. 053 715661

CHEVRON
 DRG. REF. CCE D 185 SHT 1
 TEK. VERW. VEL
 ITEM No. 053 715673

CROSS AND CHEVRON (W404)
 KRUIS EN CHEVRON
 DRG. REF. CCE D 185 SHT 1
 TEK. VERW. VEL
 ITEM No. 053 715409

POST/PAAL
 DRG. REF. CCE D 185 SHT 1
 TEK. VERW. VEL

SEE NOTE 1
 KYK NOTA 1

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REFER TO : SIGNING FOR RAILWAY CROSSINGS SARTSM VOL 2 CHAPTER 7

12/2002	SEE ECP 2002080	SR	PK		3
09/02	SEE ECP 2002037	AG	PK	NS	2
06/91	SEE E.C.P. ST-Q1-1-101	CS	B		1
DATE DATUM	AMENDMENT - WYSIBING	AMENDED BEWYSIG	DO. CHECK TEL. WAGSIBING	ENG. CHECK NAME/SIG	N°
S.A.R.-S.A.S.					
FLASHLIGHTS/FLIKKERLIGTE					
MOUNTING OF LIGHTS AND CHEVRON/CROSS.					
MONTERING VAN LIGTE EN CHEVRON/KRUIS.					
DATE 07/02/10	ENG. CHECKED/IR. NAGESIEN	MATERIAL		ST	
		17RW	No		Q1-1-1
		CHIEF ENGINEER (S & T)			
		DATE 17-6-87		AMENDMENT WYSIBING	
				3	